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USU Uniformed Services University | GRADUATE NURSING Daniel K. Inouye Graduate School of Nursing

GSN PhD Dissertation Defense Doctor of Philosophy in Nursing Science Degree

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TITLE: Factors Influencing Eating Behaviors Among Junior Enlisted Sailors in Non-Deployed Settings

**The Chair deems the written Dissertation as satisfactory to proceed to the Oral Defense*

Patricia Deuster Digitally signed by Patricia Deuster Date: 2021.07.01 12:09:21 -04'00' Date of Defense: 7/1/21

The decision of the Dissertation Committee is:

PASS

☑ **A. Both the dissertation and the oral defense are satisfactory:**

☐ **B. Minor changes are recommended by the Dissertation Committee that is to be made to the satisfaction of the Dissertation Chairperson:**

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FACTORS INFLUENCING EATING BEHAVIORS AMONG JUNIOR ENLISTED SAILORS IN NON-DEPLOYED SETTINGS

by

Melissa R. Troncoso

Dissertation submitted to the Faculty of the
Daniel K. Inouye Graduate School of Nursing Graduate Program
Uniformed Services University of the Health Sciences
In partial fulfillment of the requirements for the degree of
Doctor of Philosophy 2021

ACKNOWLEDGMENTS

No one can do it for me, but I cannot do it alone. These were the words I wrote in my *PhD Manifesto* during one of the many challenging moments of this journey. I am eternally grateful for the multitude of supporters that ensured I never walked alone. With a grateful heart, I acknowledge those whose contributions are inextricably linked to this critically important work.

Thank you to the Jonas-Geneva Veterans Healthcare Scholars, the Uniformed Services University (USU) Intramural Funding, and the Tri-Service Nursing Research Program for financially supporting this project. Their funding provided the necessary resources to receive training, collect data, and disseminate results.

I thank my incredible dissertation committee—The Dream Team. I could not have selected a more dynamic, inspiring, supportive, and brilliant team of scholars. To my chair, Dr. Patricia "Patty" Deuster, thank you for being there when I needed you most. Your humility, generosity, and mentorship are unparalleled. Thank you for opening doors and giving me the confidence to be brave and bold enough to walk through them. Col (Dr.) Candy Wilson, thank you for your selfless dedication to my professional growth. Your engagement as my methodologist was above and beyond—you are simply the best! To Dr. Jonathan Scott, thank you for listening and helping me to expand my thinking. I treasure our discussions; you made me believe I was already a scholar from day one. To Dr. Diane Seibert, thank you for your consistent encouragement; your notes and comments were always timely. Dr. Judd Allen, thank you for accepting my "cold call" and continuously requesting that I make my research actionable. To Dr. "Pat" DeLeon, smile and Aloha.

I am grateful for "my village" of cheerleaders and supporters. Thank you to the 2016, 2017, and 2018 GSN PhD cohorts for the study sessions, laughs, and motivational moments. Special thanks to Dr. Shawna Grover, CDR Tony Torres, and MAJ Tanisha Currie for walking closely with me during the dissertation phase; I appreciate our scholarly discussions and practice sessions. Dr. Shawna Grover, thank you for being the best coding and writing partner, and MAJ Currie, thank you for being my sister, my friend, and prayer warrior. Thank you to the Graduate School of Nursing and USU faculty, who gave me the knowledge and guidance I needed to complete this project. Thank you to my New Life Temple and Grace Covenant church families; this project is a testament to your prayers and faith.

To my parents, Joe and Brenda, thank you for modeling and instilling in me the character and skills I needed to succeed—perseverance, a spirit of excellence, and a love of learning. Thanks to my step-mom, Wanderval, for your positive encouragement; you bring joy to every situation. Thanks to my big sister, Mel, for reminding me how proud our ancestors would be to witness this day. I stand on the shoulders of giants.

I thank my husband, Rafael, and my children, Naomi and Marcos, for their tireless dedication and support. Team Troncoso is amazing! Thank you, Rafael, for being my rock and champion; words cannot express my gratitude. Marcos, thank you for remembering to ask, "How many pages did you write?" Knowing that you were proud of your mommy was great motivation. Finally, thank you, Naomi—my editor in training and inspirational coach—for all the encouraging notes and cards. Everyone needs a cheerleader like you.

Last but most certainly not least, I thank God for giving me the opportunity, wisdom, and grace to start and finish this project. My *PhD Manifesto* concluded with scriptures that reminded me of my purpose and encouraged me to press on. “Trust in the Lord with all your heart and do not lean on your own understanding. In all your ways acknowledge Him, and He will make straight your path” (Proverbs 3:5-6; ESV).

DEDICATION

To the Sailors and Marines I am privileged to serve.

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ABSTRACT

Factors Influencing Eating Behaviors Among Junior Enlisted Sailors in Non-Deployed Settings

Melissa R. Troncoso, PhD, 2021

Dissertation directed by: Patricia A. Deuster, PhD, MPH, FACSM, Professor and Executive Director, Consortium for Health and Military Performance, Department of Military and Emergency Medicine, F. Edward Hébert School of Medicine

Nutritional fitness is critical for human performance optimization, but most service members do not eat nutritious diets. The purpose of this study was to explore determinants of eating behaviors of junior enlisted Sailors working in non-deployed settings within the context of Navy and military culture. The specific aims were to: (a) identify the intrapersonal, social, environmental, and cultural factors that influence eating behaviors; (b) investigate the influence of cyclic physical readiness testing (PRT) on eating behaviors; and (c) identify perceived barriers and facilitators to healthy eating behaviors.

This study was a focused ethnography guided by a social ecological framework. Purposeful sampling was used to recruit active duty, junior enlisted Sailors, 18 to 25 years, stationed at Naval installations (n = 32). Systematic data collection through observations, interviews, and artifacts occurred in parallel with deductive and inductive

data analyses. Data were organized in NVivo (145) and analyzed through data condensation (e.g., coding), data display (e.g., creating matrices), and conclusion drawing and verification (e.g., identification of patterns) to identify culturally relevant categories and themes as conceptualized by participants. Quantitative data (demographics and healthy eating score) were analyzed in SPSS (v 27.0). Data were triangulated to provide detailed descriptions.

The eating behaviors of junior enlisted Sailors were influenced by several modifiable individual, social, environmental, and cultural factors. The central theme was *mission drives behaviors*. From *grabbing something quickly* to *eating quickly*, junior Sailors described a culture of *hurry up and eat*. The *slow life*—sitting down to eat *real meals*—was less often described and primarily associated with intrapersonal factors and support systems within the social and physical environments. Changes to eating behaviors during PRT evolutions highlighted a culture of *getting ready* versus *staying read*y. Healthy eating behaviors were *highly encouraged* but participants had to *go out of their way* to find or prepare nutritious foods.

Findings from this study provide new knowledge and highlight a critical need for action. A multifaceted approach balancing personal and organizational responsibility and a culture change process is needed to improve Sailors' eating behaviors, achieve nutritional fitness, and create a culture of healthy eating in the Navy.

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CHAPTER 1: Introduction

Factors influencing the eating behaviors of junior enlisted Sailors in non-deployed settings are important for understanding how military service and Navy culture impact service members' food choices and dietary habits. Identifying barriers and facilitators to eating a healthy diet is necessary for achieving nutritional fitness and creating a culture of healthy eating within the military. This chapter begins with an overview of the background that frames the approach to studying the eating behaviors of junior enlisted Sailors in non-deployed settings, followed by the problem statement, the statement of purpose, specific aims, and rationale and significance. Also included is a discussion of the research approach, assumptions, and the researcher's perspectives. It concludes with a definition of key terms, acronyms and abbreviations, and a summary.

BACKGROUND AND CONTEXT

A significant number of service members have unhealthy eating behaviors ranging from not eating enough nutrient-dense foods to overeating processed foods and disordered eating. The recently published 2020-2025 Dietary Guidelines for Americans recommend adults follow healthy eating patterns that include (a) eating a variety of nutrient-dense foods; (b) staying within calorie limits to meet nutritional needs and manage weight; and (c) limiting foods and beverages with added sugars, saturated fats, and sodium (192). Data from the Department of Defense 2011 Health Related Behaviors Survey of Active Duty Military Personnel showed that fewer than 13% of service members met national recommendations for fruit and vegetable intake, but reported that they ate unhealthy foods at least twice a day (11). In another study of 13,858 active duty,

reserve, and National Guard soldiers, only 33.7% of the sample consumed the recommended amount of fruit, and even fewer (22.2%) met national guidelines for vegetable intake (144). In addition to suboptimal nutritional intake, service members also engage in eating behaviors associated with excess weight gain, such as skipping meals, frequently eating out, and excessive snacking (85; 140). Eating disorders and compensatory behaviors such as fasting and purging (using laxatives and diuretics) for weight control are also a problem for service members (17). Over time, unhealthy eating behaviors can impair service members' health and performance (physical and mental capabilities), negatively impacting warfighter effectiveness and mission readiness.

Unhealthy dietary patterns increase the risk of developing chronic diseases, such as cardiovascular disease, diabetes mellitus, and obesity (51; 162; 192). Between 2007 and 2016, 18.1% of all service members were diagnosed with at least one cardiovascular disease risk factor (i.e., obesity, hypertension, hyperlipidemia, abnormal glucose level, and diabetes mellitus) and 0.6% were diagnosed with at least one form of cardiovascular disease (134). Of serious concern and a threat to recruitment, retention, and readiness is the dramatic increase in the prevalence of obesity (body mass index [BMI] $\geq$30 kg/m^2). Between 1995 and 2008, the prevalence of obesity among service members more than doubled, from 5% to 12% (149), and currently over 17% of military service members are obese, with the Navy leading the way at 22% (5). Interestingly, the Navy has had the dubious distinction of having the most obese service members for the past two decades (149; 154).

Obesity in the military contributes to adverse health outcomes, increased cost, and reduced force readiness. Service members with obesity are more likely to be diagnosed

with hypertension, hyperlipidemia, sleep apnea, diabetes, coronary heart disease, depression, and post-traumatic stress disorder (61; 154), resulting in higher utilization of healthcare services compared to service members with a healthy weight (BMI =18.5 kg/m^2 to 24.9 kg/m^2) (61; 168). Estimates from 2006 suggest that the DoD spent over $1.1 billion annually to treat excess weight and obesity-related conditions, and $103 million and $2.6 million were spent annually on service members who are absent from work and those who show up to work while sick, respectively (37). In 2006, early termination of contracts by first-term enlistees due to failure to meet weight standards cost the DoD $61 million (37). Service members with obesity are also more likely to fail or perform worse on periodic physical fitness tests than their colleagues with a healthy weight (24; 61). Lastly, being overweight (BMI = 25 kg/m^2 to 29.9 kg/m^2) or having obesity increases a service member's odds of disability discharge (139), which directly impacts manning for mission requirements.

Food environments with easy access to low-cost, palatable, and calorie-dense foods contribute to the obesity epidemic in the United States. (76), and service members are not immune. Many service members live and work where the food environments are unhealthy. Unhealthy food options dominate the on-base food environment with fast food restaurants, DoD non-appropriated funds dining establishments, and convenience stores, leaving some service members feeling powerless to eat healthfully (28). Changes to the military food environment have also occurred in operational settings; during World War II and Vietnam, access to junk food was limited and food insecurity was a concern (170). In more recent conflicts, the problem has reversed, and service members often have greater access to calorie-dense foods with little to no nutritional value (e.g., energy

drinks, ultra-processed pastries, and fast food) (53; 73). Because people will often eat foods that are readily available, service members living and working on military installations may default to unhealthy dietary patterns, and thus fail to meet recommended nutritional intake.

Establishing healthy eating behaviors early in a service member's career is critically important for reducing the risk of gaining excess weight. A recent study showed that a large group (46,706) of early career service members gained an average of 14.5 pounds during their first four years of service (201). Service members with overweight or obesity may rely on physical activity versus healthy eating to manage their weight (31). However, physical activity alone is less effective for weight loss and weight maintenance than the combination of dietary modification and physical activity (83). Additionally, service members may become less physically active during their military career as leadership responsibilities shift them from manual labor to sedentary activities. Weight gain increases with age among service members (149)—in terms of age and pay-grade, service members aged 36-45 years and senior enlisted personnel have the highest prevalence of obesity (109; 149). In short, left to the status quo, the military's obesity problem will not get better with time. Military decision makers and healthcare professionals understand the need to address service members' nutritional fitness to improve health outcomes and military readiness. Unfortunately, current efforts seem insufficient.

Personal Responsibility and Reactive Initiatives

Service members have a personal responsibility to maintain good health, and a mandate to maintain physical fitness and body composition standards. DoD Instruction

(DoDI) 1308.3 provides physical fitness and body fat standards for the military (41). These standards serve to promote health, physical fitness, and military appearance (59). Service members who fail to meet physical fitness or body composition standards may be ineligible for promotion or advancement, or ultimately risk early separation from active duty service (41; 205). Each Service is required to provide remediation for service members who fall below physical fitness and body composition standards. In the Navy, Sailors are required to attend the Fitness Enhancement Program (FEP), which involves mandatory physical training three times per week for six months or until they meet standards during the subsequent testing cycle (127). Sailors may also be required to enroll in a weight management program that focuses on nutrition and individual behavior change. Remediation efforts are an essential aspect of helping service members achieve and maintain military fitness and body composition standards, but service members may lack the social and environmental support to sustain healthy eating behaviors.

Health promotion and weight management initiatives in the military are often individual-focused remediation: they primarily target behavior change among service members who failed to meet body composition or physical fitness standards. Individual-level weight management initiatives focus on improving physical activity and eating behaviors through counseling, education, personalized nutrition planning, and cognitive and behavior modification (123; 166). Delivery methods can range from one-on-one sessions to group counseling and online applications. For example, the L.I.F.E (lifestyle change, individual readiness, fitness excellence, and eating healthy) Program provides service members with overweight and obesity a one-week educational and counseling session, followed by monthly follow-ups for one year (18). H.E.A.L.T.H (Healthy Eating,

Activity, and Lifestyle Training Headquarters) is an anonymous online weight management tool developed to help Army service members maintain healthy nutrition, physical fitness, and body weight year-round (176). ShipShape, the Navy's official weight management program, is an eight-session course that provides education on nutrition, physical activity, and mindset to manage weight (125). This course is highly encouraged, but not mandatory, for Sailors who fail their periodic body composition assessment. Individual-level initiatives are essential to helping service members adopt healthy eating behaviors, manage weight, and improve their overall health, but sustained behavior changes are unlikely without a supportive social and environmental culture. Additionally, there are few primary prevention environmental-level initiatives, which leads to missed opportunities to reach service members who may be at increased risk of falling out of standards over time.

Prevention-Focused Policies and Environmental-Level Initiatives

Military decision makers recognize the need for holistic and prevention-focused policies for optimal health and performance. In 2009, at the request of the Chairman of the Joint Chiefs of Staff, the Consortium for Health and Military Performance (CHAMP) developed the Total Force Fitness (TFF) Framework (See Figure 1). The TFF framework provides a holistic approach to supporting the health, fitness, and general well-being of the warfighter. The TFF framework includes eight domains of fitness: physical, financial, environment, medical and dental, spiritual, psychological, social, and nutritional. Nutritional fitness is defined as, "the provision and consumption of foodstuffs in quantities, quality, and proportions sufficient to preserve mission performance and to protect against disease and injury" (p.65) (117).

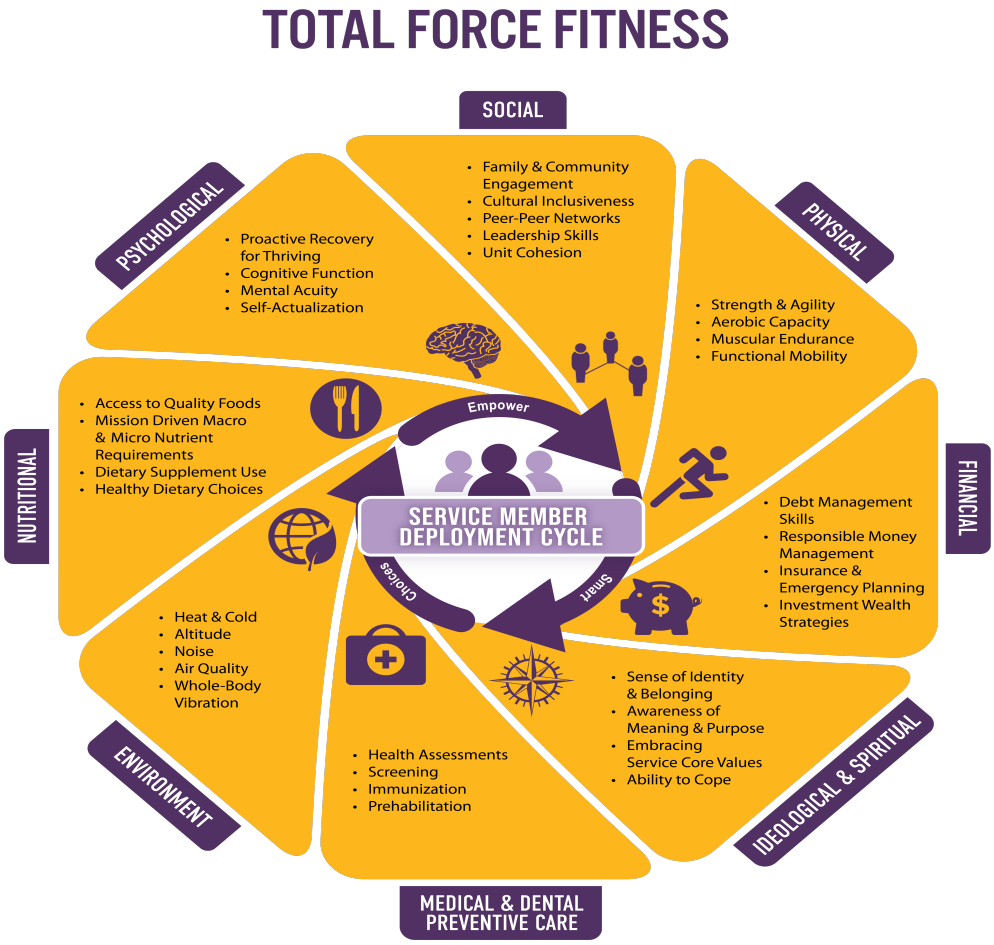


Figure 1. Total Force Fitness (TFF) framework

To achieve the goal of nutritional fitness, service members must have access to healthy eating environments that make healthy food and beverage choices easy and appealing (26; 117). Recent change recommendations to TFF requested by the Joint Requirements Oversight Council (JROC) included improving guidance related to managing the nutritional fitness of service members and recommending policy changes to the non-appropriated food environment that promote the consumption of healthier menu choices (186). Although the TFF framework is individual-centric, its prevention-focused

and holistic view necessitates multi-level and multidisciplinary strategies for effective implementation.

In 2018 the Department of Defense (DoD) updated instruction 1010.10: a policy that describes responsibility for health promotion and disease prevention within the military services (42). According to DoDI 1010.10, healthy eating is a targeted priority, and the DoD is to provide healthy environments that encourage service members to achieve optimal health and embrace values of health, fitness, and injury-reduction. Over the past decade, military leaders, in concert with multidisciplinary teams, have implemented initiatives at the local level to improve the health and wellness of military service members and their families. Programs like Operation Live Well (OLW) focuses on integrative wellness, nutrition, physical activity, and tobacco-free living, while Healthy Base Initiative (HBI) was a one-year multi-site pilot program focused on healthy eating, active living, and tobacco cessation in the military community (185). Programs like Go for Green (166) target appropriated dining facilities (DFAC) and use nutrition labeling and choice architecture to promote increased consumption of healthy foods (i.e., fruits and vegetables) and decreased consumption of high-fat and calorie-dense foods (8). Unfortunately, many initiatives, such as those mentioned above, are not adopted and implemented by all the Services or written into policies for long-term sustainability.

Current strategies do not effectively address the challenge of creating a culture where healthy eating behaviors are the norm. Findings from the HBI report suggest that there are systemic barriers to creating a healthy food environment due to the complexities of the DoD food system and a lack of coordinated efforts between the Services (185). There is a need to present scientific evidence on how best to impact the eating behaviors

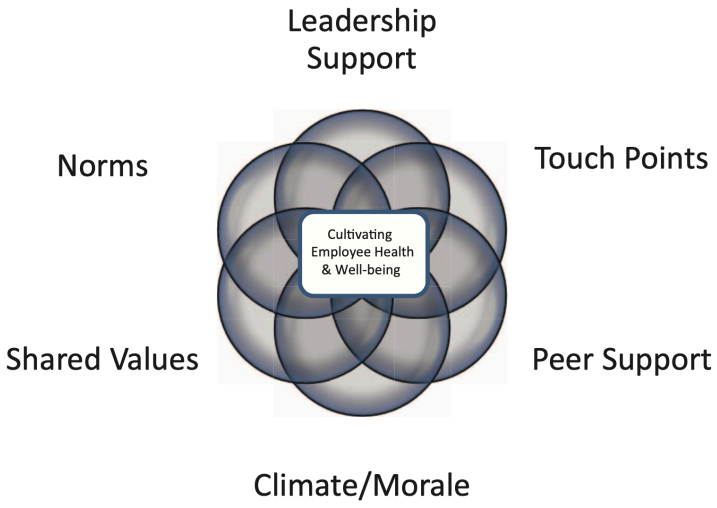
of service members to optimize human performance (14). Improving eating behaviors among service members requires a concerted effort across military decision makers, researchers, and healthcare providers with buy-in from individuals. Although these efforts can incorporate individual-level programs, build on knowledge gained from environmental-level initiatives, and leverage health promotion policies, sustained behavior changes are unlikely without a supportive social and environmental culture—a culture of health.

Moving Toward a Culture of Health

The military has an opportunity to create a culture of health that promotes and supports individual efforts to maintain healthy eating behaviors. National organizations and numerous corporate industries have recognized the need to develop a culture of health (27; 67; 158). In 2014, the Robert Wood Johnson Foundation (RWJF) launched a 20-year strategic initiative to create a national culture of health to address the numerous healthcare challenges within the United States. (27; 97). RWJF's action framework focuses on five areas: (a) making health a shared choice, (b) fostering cross-sector collaboration to improve well-being, (c) creating healthier, more equitable communities, (d) strengthening the integration of health services and systems, and (e) improved population health, well-being, and equity. Creating a culture of health within the workplace is equally important, as the work environment provides opportunities for social engagement and environmental influences.

Creating a culture of health involves shaping the collective attitudes, values, beliefs, and behaviors of a group of people toward a health focus. Doing so requires more than incentive-based health promotion and well-being initiatives that target individual

behavior change. Based on the importance of understanding culture, Safeer and Allen (2019) define culture of health as "a web of social influences that manifests itself in shared healthy beliefs and behaviors" (p. 863) (157). They identify six spheres of influences (See Figure 2): (a) leadership support, (b) shared values, (c) norms, (d) peer support, (e) social climate, and (f) touch points (ways in which the organization practices touch the employee, such as through the built environment).



(p.864) (157)

Figure 2. The spheres of cultural influence

Creating a culture of health in the military could make it easier and more desirable for service members to make healthy choices than it is now, and shift the current culture from individual responsibility for behavior change to shared responsibility between service members and the organization (190). To move toward a culture of healthy eating, we need to understand how current military culture influences service members' eating habits and food choices and the barriers and facilitators to eating healthfully.

PROBLEM STATEMENT

Despite current military policies, programs, and initiatives encouraging nutritional fitness, research indicates that a significant number of service members have unhealthy eating behaviors (11; 102). Eating behaviors are the pathway to nutritional fitness, a determinant of health and performance. Unhealthy eating behaviors contribute to poor health outcomes, which compromise the DoD's ability to "build a more lethal force."

Research on eating behavior in the military is limited. Most studies have focused on disordered eating, dietary intake by using food frequency questionnaires, or Army service members (54; 81; 82; 102; 106; 146). Few studies have examined contextual factors that influence service members' eating behaviors, particularly Navy service members who have consistently been at higher risk for obesity than their sister Services, and very little is known about what motivates early career Sailors to adopt and sustain healthy eating behaviors. In the general population, the transition between adolescence to young adulthood (18-25 years) is a high-risk period for developing unhealthy eating behaviors and gaining weight (177). The adoption and maintenance of healthy eating behaviors among service members are most likely to occur within a culture of health where the healthy choice is supported and valued (157). Research is needed to understand how factors related to military service and Navy culture promote healthy or unhealthy eating behaviors among junior enlisted Sailors to ensure a fit and ready force.

STATEMENT OF PURPOSE, SPECIFIC AIMS, AND RESEARCH QUESTIONS

The purpose of this study was to explore intrapersonal, social, and environmental factors influencing eating behaviors of junior enlisted Sailors in non-deployed settings within the context of Navy and military culture. The researcher anticipates that better understanding of this phenomenon will provide scientists, health professionals, and

military decision makers salient and culturally relevant data to address barriers and facilitators to achieving nutritional fitness among service members. Knowledge gained from this study may also inform military policies and initiatives that foster a culture of health within the Navy and DoD. To examine the problem, the researcher addresses the following specific aims and research questions:

Specific Aim 1. Identify the intrapersonal, social, environmental (physical and macro-level), and cultural factors that influence eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 1A: What are prominent eating behaviors among junior enlisted Sailors?

Research Question 1B: What intrapersonal, social, environmental (physical and macro-level), and cultural (military and Navy) factors influence eating behaviors among junior enlisted Sailors?

Specific Aim 2. Investigate the influence of cyclic physical readiness testing (PRT) on eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 2: In what ways do eating behaviors change during PRT season?

Specific Aim 3: Identify perceived barriers and facilitators to healthy eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 3A: How do junior enlisted Sailors define healthy eating behaviors?

Research Question 3B: What individual characteristics hinder or facilitate healthy eating behaviors among junior enlisted Sailors?

Research Question 3C: What aspects of the social, physical, macro-level, and cultural environment hinder or facilitate healthy eating behaviors among junior enlisted Sailors?

RATIONALE AND SIGNIFICANCE

Targeting nutritional fitness of active duty service members is a strategic imperative for a "fit and ready force." Military policies (26; 42; 43; 48) affirm the importance of service members' nutrition and dietary intake for health and combat effectiveness. Current efforts have not adequately addressed the issue of unhealthy eating behaviors, which lead to poor dietary quality, health outcomes, and performance.

Research is needed to understand contextual factors unique to the military and subcultures within the military that influence eating behaviors among junior enlisted Sailors. Beginning in basic training, recruits are transformed from civilians to Sailors, soldiers, airmen, and Marines. These recruits are taught the values, beliefs, and behavioral characteristics important to the military and service-specific cultures. They are also introduced to new eating habits that can set them on a course toward healthy or unhealthy eating behaviors during their military career (21; 102). Evidence that some service members gain a significant amount of weight during their first tour of duty following recruit training (mean weight gain of 6.6 kg in 7-year period) (201) suggests that emerging adults in the military face similar risks of developing unhealthy eating behaviors and gaining excess weight as their civilian counterparts (128; 177). Nutritional fitness is a continuous process (132) and efforts must be made to ensure service members establish healthy eating behaviors early in their career and work in a culture that supports sustainment of those healthy behaviors. This study will provide new and salient information that can be used to inform future research, DoD policies, and multidisciplinary initiatives that foster a culture of healthy eating within the Navy and DoD.

RESEARCH DESIGN OVERVIEW

A qualitative research approach using a focused ethnographic design guided by a social ecological framework was chosen for this study because the aim was to understand and identify an underexplored phenomenon within a specific sociocultural context. The philosophical assumptions undergirding this study are that there may be multiple realities of a phenomenon and knowledge is constructed with subjective evidence requiring the researcher to "get as close as possible to participants being studied" (p.21) (34). In contrast to a traditional ethnography that may include years of fieldwork and a broad exploration of a cultural group (56), focused ethnography can be used to explore a specific issue within a sub-group of people in a short timeframe by relying more heavily on interviews than participant observations (74).

The Uniformed Services University Institutional Review Board approved this study. The study was conducted at National Capital Region Navy bases in Maryland. Stratified purposeful sampling was used to target junior enlisted Sailors (E1-E4), ages 18 to 25 years old, who were rated as Hospital Corpsman (HM) or Master-At-Arms (MA). Participation was completely voluntary and all Sailors meeting inclusion criteria were eligible to take part in the study. The researcher used multiple strategies (e.g., posted flyers, sent emails, worked with gatekeepers) to recruit a diverse sample closely representative of the Navy's junior enlisted force.

The research design included collecting multiple forms of evidence to understand, describe, and interpret factors influencing Sailors' eating behaviors. Data collection methods included observations, semi-structured interviews, informal interviews, photo elicitation, and artifacts. Data collection and data analysis were iterative and recursive,

providing an opportunity for constant comparison and triangulation of data sources and methods. Following the literature review, an interview guide was developed using a social ecological model as a framework to address the specific aims. Eligible Sailors participated in semi-structured interviews lasting approximately 30 to 60 minutes. Informal interviews were conducted with professionals with knowledge of junior enlisted Sailors and factors related to service members' eating behaviors. Observations were conducted in public areas where eating-related behaviors occurred. The researcher maintained field notes of data from observations and interviews. Artifacts, such as policy documents, food-related signs and flyers, and photographs were collected. Photo elicitation—photos taken by participants and discussed during the interview process—was used to elicit deep and meaningful talk and provide visual data that may be otherwise invisible to the researcher (72). Data analysis involved condensing the data corpus by coding and categorizing the evidence, creating domains and taxonomies for cultural interpretations, creating data displays for further condensation and analysis, identifying themes, and drawing and verifying conclusions (113; 173; 174). The researcher took care to maintain rigor throughout the research process to provide robust and plausible research findings.

RESEARCHER ASSUMPTION

Based on the researcher's experience and background as a Navy nurse practitioner, coursework, and review of the literature, three primary assumptions were made regarding this study. First, the military is a culture with multiple subcultures, to include, but not limited to, Service branch, occupation, rank (i.e., enlisted vs. officer), and active status (i.e., active duty, reservist, Veteran). This assumption is based on the

researcher's experience in the Navy and interactions with civilians and service members in different specialties within the Army, Air Force, Marine Corps, Coast Guard, and Public Health Service. The researcher has worked with and cared for officers and enlisted service members in active, reserve, and post-service status and has discussed cultural differences among subgroups throughout her career. Additionally, the literature review presented in Chapter 2 supports the assumption that the military is a culture with multiple subcultures.

The second assumption was that service in the Navy influences eating behaviors in ways that may differ from civilian-life or service in other branches (e.g., Marine Corps). This assumption was guided by the researcher's experiences and the literature review. Civilians, especially those that do not work with or for the DoD, may experience more autonomy and agency in their work environment, daily schedule, and living situation that could influence their eating habits differently from service members. There are few civilian professions where body composition and physical fitness are conditions of employment, as required for service members. The researcher observed differences in Service cultures related to operational requirements, work tempo, occupational and fitness (nutritional and physical) expectations, and amenities (e.g., dining facilities) while working in Joint military environments.

The third assumption was that emerging adults in the military experience a similar stage of transition from adolescence to adulthood as civilian emerging adults, with exceptions that are most likely due to military and Navy requirements. This assumption is based on the researcher's knowledge that our military is an all-volunteer force comprised of individuals representative of the U.S. population, with the exception of those who do

not meet the standard for entry (e.g., criminal or medical disqualifiers). The researcher assumed that a majority of the findings from the literature on eating behaviors among civilian emerging adults would translate to the military population and could provide a starting point for exploration.

THE RESEARCHER

The researcher for this study brings a strong interest to create a culture of health within the military that promotes and supports individual efforts to maintain healthy eating habits. This interest is informed by her personal inclination toward health promotion and disease prevention, and her professional experiences as a clinician and Naval officer. While serving as a family nurse practitioner at the Marine Corps Recruit Depot, Parris Island, she observed eating habits of the junior Sailors and had numerous conversations with Sailors and Marines related to their nutrition and dietary intake. Concerned about diet-related diseases (e.g. pre-diabetes) and perceived suboptimal well-being among early and mid-career service members, she wanted to find out what was getting in the way of them making healthy food choices and what could be done from a clinical and policy perspective to make the healthy choice the easy choice.

The researcher acknowledges that the experiences and insights that are valuable to the development and execution of the study could be a liability and bias judgements related to the research design and interpretation of findings. In addition to identifying the assumptions and theoretical orientation (discussed in Chapter 2) at the outset of the study, the researcher engaged in ongoing self-critique by employing various strategies, such as reflective journaling and dialogue with dissertation committee members and people with knowledge of the military and Navy culture. Furthermore, to address subjectivity and

strengthen the trustworthiness of the research, various steps were taken, such as maintaining an audit trail, triangulating data sources and methods, and discussing data collection and analysis frequently with a methodology expert. These steps are discussed in detail in Chapter 5.

DEFINITION OF KEY TERMS

The following section provides definitions of key terms used in this dissertation. Some definitions include direct quotes of authors' definitions to retain contextual meaning.

Culture. Culture can be defined in different ways with a materialist (behaviors, customs, and way of life) or ideational (ideas, beliefs, and knowledge) perspective (56). In this dissertation, the term *culture* encompasses both perspectives and is defined as, "the acquired knowledge that people use to interpret experience and generate social behavior" (p.5). (173)

Culture of health. A culture of health within an organization is "a web of social influences that manifests itself in shared healthy beliefs and behaviors" (p. 863) (157).

Eating behaviors. Eating behaviors are a broad construct that refer to actions related to food consumption, to include food preferences, food motives, food selection, food intake (quality and quantity), feeding patterns, and meal timing (66; 86).

Healthy eating behaviors. Healthy eating behaviors are defined as eating patterns that include consuming a variety of nutrient-dense foods (e.g., vegetables and fruits) and limiting unhealthy foods (e.g., saturated fats, trans fats, added sugars, and sodium) within an appropriate caloric level to (a) meet nutritional needs, (b) maintain a healthy body

weight, (c) promote sustained physical and mental health, and (d) reduce the risk of chronic disease (193).

Healthy foods. "Foods that (a) are comprised of at least one of the major food groups (vegetables, fruits, grains, dairy, and protein foods) equal to at least half the portion size that the *Dietary Guidelines for Americans [2020]* uses for measuring the nutrients in that food, and (b) contain only moderate amounts of saturated fats, added sugars, and sodium" (33).

Junior enlisted Sailor. A junior enlisted Sailor is an active duty Navy enlisted service member between the rank of E1-E4. The majority of junior enlisted Sailors are between the ages of 18 to 25 years old.

Macro-level environment. Marco-level environment refers to *sectors* within the larger society that are distal to the individuals, such as military policies, health systems, the food industry, and societal norms and values (180).

Nutritional fitness. "The provision and consumption of foodstuffs in quantities, quality, and proportions sufficient to preserve mission performance and to protect against disease and/or injury" (p. 65) (117).

Physical environment. Physical environment refers to the multiple *settings* where people live, work, and play, or in terms of eating behaviors, where people eat or procure food (180). Physical environment is inclusive of other terms used in the literature, such as *food environment* or *built environment*.

Recruit training. Recruit training refers to the initial training program for all service members. Service-specific terms for recruit training include basic training, boot

camp, and initial military training. For standardization, the term recruit training is used in this dissertation.

Social environment. Social environment refers to the myriad of *networks* (e.g., family members and coworkers) and *interactions* (e.g., role modeling and social support) that connect people.

Unhealthy eating behaviors. Unhealthy eating behaviors are defined as eating patterns that undermine mental and physical health and well-being. Unhealthy eating behaviors include overconsumption of highly processed foods and underconsumption of nutrient-dense foods as defined by national guidelines (193). Disordered eating behaviors that do not meet diagnostic criteria for eating disorders are also considered unhealthy eating behavior. Examples of disordered eating include frequent dieting, food restriction, and feelings of guilt associated with eating (4).

Unhealthy/less healthy foods. "Foods that are high in saturated fat, added sugar, and/or sodium, or that contribute little to meeting dietary recommendations" (33).

ACRONYMS AND ABBREVIATIONS

ACFL	Assistant Command Fitness Leader
APF	Appropriated Fund
BAH	Basic Allowance for Housing
BAS	Basic Allowance for Subsistence
BCA	Body Composition Assessment
CFL	Command Fitness Leader
CJCS	Chairman of the Joint Chiefs of Staff
CNIC	Commander, Navy Installation Command
CO	Commanding Officer
DFAC	Dining Facility
DoD	Department of Defense
FEP	Fitness Enhancement Program
HM	Hospital Corpsman
HPO	Human Performance Optimization
MA	Master-At-Arms

MWR	Morale, Welfare, and Recreation
NAF	Non-Appropriated Fund
NAS Pax River	Naval Air Station Patuxent River
NEX	Navy Exchange
NEXCOM	Navy Exchange Service Command
NSAA	Naval Support Activity Annapolis
NSAB	Naval Support Activity Bethesda
PRT	Physical Readiness Test
PT	Physical Training
RDC	Recruit Division Commanders
TFF	Total Force Fitness
WRNMMC	Walter Reed National Military Medical Center

SUMMARY

This dissertation study used a qualitative approach with a focused ethnographic design to explore the contextual factors that influence eating behaviors among junior enlisted Sailors in non-deployed settings. The study contributes to nursing science, military health research, clinical practice, and public policy by creating new knowledge that can inform research and initiatives to achieve nutritional fitness among emerging adults across the Armed Forces. The following four chapters are organized as follows: literature review, methods, findings, and discussion.

CHAPTER 2: Literature Review

This chapter reviews the literature on individual, social, physical, and macro-level environmental influences on eating behaviors among U.S. service members and emerging adults in the general U.S. population by using a social ecological conceptual framework for categorization and analysis of salient factors. A discussion of the social ecological model and its application to the literature review and research study introduces this chapter and is followed by a review of the relevant literature. This chapter concludes with a summary of the review and a discussion of gaps that the research study aimed to address.

CONCEPTUAL FRAMEWORK

The conceptual framework guiding this study is a social ecological model of food choice and eating behaviors (180). Social ecological models are useful for studying interacting determinants of health behaviors (such as eating behaviors), developing tailored and multi-layered interventions, and evaluating health behavior outcomes within and across groups. Various social ecological models address broad and specific health behaviors (161), and many of these have roots in Bronfenbrenner's ecological systems theory of human behavior (22).

The term *ecology* has early roots in biology and refers to relationships between organisms and their environments (178). Social ecological models emphasize individuals' relationships within the contexts of social, institutional, and cultural environments (179). Social ecological models applied to health behaviors also include policy and psychological influences on behavior (161). In contrast to models or theories that

primarily address health behaviors from an individual (e.g., The Health Belief Model) or interpersonal (e.g., Social Cognitive Theory) level (150), social ecological models take a broader and multidimensional view of human behavior and posit that individuals influence and are influenced by social and environmental factors across multiple levels (105). The terms *ecological model*, *socio-ecological model*, and *social ecological model* are used interchangeably in the literature. For consistency and emphasis on social-environmental interactions, the term *social ecological model* is used throughout this dissertation.

Seminal Social Ecological Models

Bronfenbrenner's (22) ecological systems theory was one of the first to posit the interconnectedness of environmental influences on human growth and development. He identified four environmental levels: microsystems, mesosystems, exosystems, and macrosystems. Microsystems represent the most proximal environments in which individuals participate in activities, roles, and relationships across different settings. Examples include homes or schools where individuals engage in face-to face encounters. Mesosystems—systems of microsystems—are composed of interrelations among two or more microsystems in which individuals are involved. Examples of mesosystems include relationships between school and peer groups, or families and church. Exosystems are the third level and represent environments in which individuals exist, but are not active participants, such as a parent's place of employment in relation to their respective child. Although the child is not directly involved in the parent's work site, he or she may be indirectly affected by the parent's work schedule or salary. The most distant level is the macrosystem, which represents cultures and subcultures derived from consistencies

within the microsystems, mesosystems, and exosystems. The U.S. military is an example of a macrosystem, in which culturally based belief systems and lower order systems (micro, meso, and exo) co-exist. Bronfenbrenner's theory provides a holistic and contextual perspective for studying the interconnectedness of individual behaviors with concrete and abstract environments. Over time, researchers have developed different social ecological models with varying categories and hierarchies of environmental influences (161).

McLeroy and colleagues (105) developed a social ecological model for health promotion that conceptualizes the multi-level influences on health-related behaviors (e.g., healthy eating and tobacco cessation). Their model consists of five levels: intrapersonal, interpersonal, organizational, community, and public policy. Factors within the intrapersonal level are characteristics of the individual, such as knowledge, skills, and beliefs. The interpersonal level includes factors such as social networks, support systems, and relationships with family, friends, and work groups. It is within this level that social support, social identity, and group norms are presumed to shape individuals' attitudes, beliefs, and behaviors. Within the organizational level are institutional rules and regulations that govern operations and processes as well as organizational characteristics such as structures, values, and the use of incentives. At the community level are interconnected institutions and informal networks, which include sources of social identity, services, and resources, such as schools, churches, and volunteer agencies. The fifth level, public policy, includes geographical and political power structures that influence critical areas such as allocation of resources and prioritization of health issues.

In addition to identifying levels of influence on health behaviors, McLeroy and colleagues' (105) social ecological model provides a way to move beyond "individually-oriented behavior change strategies" (p. 352) to targeted interventions that account for the crucial connections between individuals and their sociocultural environment. For example, strategies to improve unhealthy eating behaviors could involve (a) addressing knowledge of nutrition recommendations and beliefs about what constitutes healthy eating (intrapersonal); (b) identifying ways to influence social norms (interpersonal); (c) creating healthier environments by changing the culture to support, promote, and value health as an organizational priority (organizational); (d) providing resources and services within the larger community that make it easier to access healthy foods (community); and (e) implementing public policies that promote improved access, availability, and affordability of quality nutrition (policy). This social ecological model assumes that isolated interventions are insufficient for sustained health behavior change and postulates that long-term multidisciplinary collaboration on concurrent multi-level interventions is necessary to achieve and maintain positive health behavior change.

The social ecological model for health promotion has strengths and limitations. The model identifies important levels of influence on individual behaviors and highlights that the task of improving health behaviors and outcomes must be shared across multiple social and environmental levels. It identifies determinants of health that may be outside an individual's control but are fundamental to long-term behavior change. A limitation of the social ecological model for health promotion is its lack of specificity of salient influences, which is why Sallis and colleagues (161) argue for behavior-specific social ecological models.

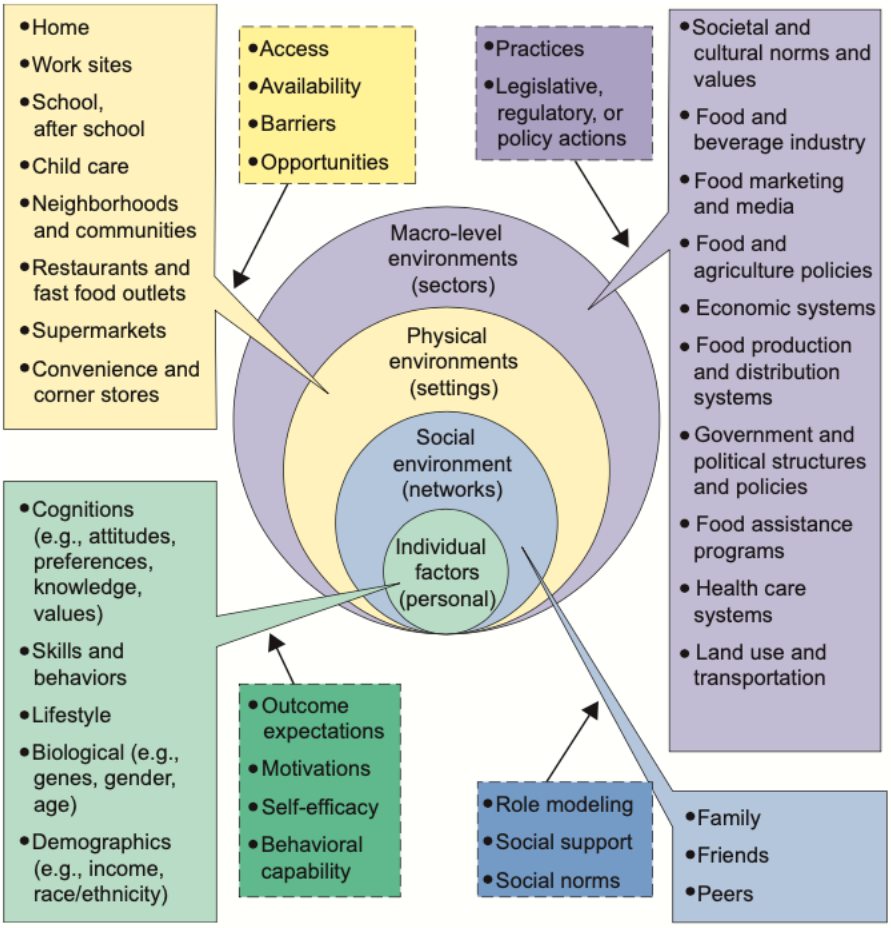
Principles of Social Ecological Models of Health Behaviors

Sallis and colleagues (161) identified four core principles of social ecological models of health behaviors. First, specific health behaviors are influenced by multiple social and environmental factors at the intrapersonal, interpersonal, organizational, community, and public policy levels. Second, factors influencing behaviors interact and work together across levels. This second principle assumes that factors within levels are not always mutually exclusive. For example, beliefs about certain health behaviors may be ascribed to the intrapersonal level, but these beliefs may be formed by networks within the social environment and reinforced by factors within the community. Third, interventions that address multiple levels of influence are most effective in changing behaviors. For example, workplace interventions designed to improve eating behaviors will work best when the food environment, organizational leadership, and social norms reinforce the principles of healthy eating taught to individuals. The final principle proposed is that social ecological models for health behaviors are most effective when they are behavior-specific as specificity provides enhanced opportunities to identify relevant factors within each level of influence to be addressed. Story and colleagues (180) provide a social ecological model that adheres to the aforementioned principles by providing specificity for eating behaviors.

A Social Ecological Model for Eating Behaviors

Eating behaviors are complex actions influenced by multiple interconnected individual, social, environmental, and cultural factors. In 2002, Story et al. (181) created a conceptual framework for understanding individual and environmental influences on eating behaviors among adolescents, using social cognitive theory and social ecological

perspectives that include four levels of influence: individual (intrapersonal), social environment (interpersonal), physical environment (community settings), and macro-level environment (societal and policy). The authors identified specific factors within each level that have been shown to impact food choice and eating behaviors. Story et al. (180) developed a similar conceptual framework with a visual model to describe the various levels of influence on eating behaviors and identified areas for intervention to promote healthy eating at the population level by focusing on policy and environmental approaches (see Figure 3). Within the latter framework, the authors suggest that certain factors within each level impact food choices or eating behaviors through certain characteristics or mechanisms unique to that level of influence. For example, within the individual level, one's knowledge and skills of nutrition or cooking may impact his or her self-efficacy for healthy eating behaviors. Because these models are nearly identical in terms of the levels of influence and respective factors within each level, the proceeding text reviews these frameworks as one social ecological model for eating behaviors by using the 2008 model (180) as the primary point of reference.



(p.C-1) (180)

Figure 3. An ecological framework for eating behaviors.

Factors within the individual level that influence eating behaviors include psychosocial, behavioral, biological, demographic, and lifestyle characteristics of the individual (180; 181). These factors include modifiable and nonmodifiable characteristics, such as food preferences and experiences, knowledge about healthy eating, culinary skills, hunger, sex, genetic predispositions, socioeconomic status, and perceived time constraints that influence eating behaviors through motivations, self-efficacy, outcome expectations, and behavioral capability. These factors may influence

an individual in different ways throughout the lifespan and are influenced by other factors within social, physical, and macro-level environments.

Within the social environment level are social networks such as family, friends, and peers (e.g., coworkers or classmates) that influence eating behaviors through role modeling, social support, and social norms (180; 181). Examples of the interconnected influences between the individual level and social environment level are the influence of parental eating behaviors on individual preferences, or social norms and trends on individual attitudes and beliefs about the healthfulness or certain foods or food groups.

The physical environment includes settings where individuals obtain food and eat, such as home, work sites, neighborhoods, food outlets, supermarkets, and convenience stores (180; 181). Factors within the physical environment influence access and availability to certain foods as well as barriers and opportunities that promote or hinder healthy eating. Individual and social environmental factors may influence the physical environment by advocating for certain food establishments based on individual and collective preferences, attitudes, and beliefs about the food environment. Conversely, the physical environment may influence the other levels by creating an environment that reinforces or encourages new social norms and lifestyle characteristics such as convenience.

Lastly, the macro-level environment includes factors within the larger society and political systems, such as societal norms and values, food and beverage industries, economic systems, food production and distribution systems, and healthcare systems. Factors within this level are influenced by practices and legislative actions pertaining to the food environment at the population level.

One of the strengths of the social ecological model for eating behaviors by Story et al. (180) is that the model is tailored to a specific health behavior—eating. Another strength is that social and environmental factors are found to be associated with eating behaviors across diverse populations (e.g., children, adolescents, and adults) (77; 164). Limitations of this model relate to the lack of validated measures to assess multi-levels of influence, and the limited evidence on causal influences of multiple factors on individual eating behaviors (180). These limitations are not unique to the social ecological model for eating behaviors but rather common to social ecological models in general.

It can be difficult to measure and evaluate the multidirectional influences of factors within each level because the social ecological model is broad and encompasses numerous layers. In a review of twenty years of health promotion literature from a single peer-reviewed journal, Golden and Earp (64) found that interventions and targets for change were primarily at the individual level and fewer than five percent of the articles described targeting all five levels (i.e., intrapersonal, interpersonal, institution, community, and policy). The authors concluded that much of the work in health behavior change was individually oriented and advances must be made to target and intervene beyond the intrapersonal and interpersonal levels to address multifaceted problems.

National organizations and researchers recognize the utility of using social ecological models to implement change at various levels of influence. According to the 2015 Dietary Guidelines for America, addressing eating behaviors from a social ecological perspective is essential to improving eating behaviors and supporting sustained behavior change at the population level (193). The Scientific Report of the 2020 Dietary Guidelines Advisory Committee stressed the need to improve Americans' dietary

patterns—the quantities, proportions, qualities, and frequency of food consumption—as a means of improving health and reducing preventable disease (50). Improving dietary patterns, or more broadly, eating behaviors, requires knowledge of the various influences that facilitate or create barriers to healthy eating. Distant environmental and policy influences can impact individuals' ability to self-regulate appetite, with actions such as increasing the availability of ultra-processed and highly palatable foods and drinks (164).

Social networks can also influence food choice and overall diet quality. Hoerster et al. (77) conducted a study of dietary quality among U.S. Veterans by using the social ecological model by Story et al. (180). They found that high levels of social support, neighborhood cohesion, and sharing healthy recipes, as well as high availability of low-fat foods, were significantly associated with better diet quality. The social ecological model for eating behavior can aid research and intervention efforts by identifying important contextual influences of eating behaviors for study development of targeted and comprehensive interventions.

According to Miles and colleagues (113), "a conceptual framework explains, graphically and/or in narrative form, the main things to be studied…[is] developed at the beginning of a study and evolve[s] as the study progresses" (p.15). The social ecological model of eating behaviors guided the following literature review by providing a framework for identifying and categorizing potentially salient factors according to various levels (i.e., individual, social environment, physical environment, macro-level environment). It also provided a reference for comparison with factors identified in the literature review, which led to the development of a preliminary conceptual framework for the research study (presented in Chapter 3).

REVIEW OF THE LITERATURE

Research on eating behaviors among service members is limited. Even less is known about the contextual factors that influence eating behaviors among young, early career service members, and how these early career influences may impact eating behaviors over the long-term. Emerging adulthood, the period between 18 to 25 years, is recognized as a critical transition from adolescence to adulthood (7). During emerging adulthood, individuals gain autonomy and independence and potentially develop life-long health habits with serious implications for health and well-being.

A review of the literature was conducted using the previously described social ecological framework to determine factors that influence eating behaviors of U.S. service members and emerging adults in the general U.S. population. This section begins with a description of the methods for the literature review, a conceptual definition of eating behaviors, and an overview of military culture. An understanding of military culture is needed to appreciate aspects of military service that may influence the eating behaviors of service members.

Methods

A systematic search and review of the literature was conducted to examine contextual factors related to eating behaviors among two populations: service members and emerging adults. Two separate electronic searches of PubMed, PsycINFO, and CINAHL were conducted with the assistance of a research librarian in September 2019 during the development of the research proposal and again in February of 2020 before recruitment and data collection. Multiple search strings were created with the following terms: military, navy, eating behaviors, diet, eating habits, dietary habits, dietary

behaviors, eating patterns, social norms, military culture, peer support, young-adult, environment (social, food, work, and built), social support, and ecological. Articles were limited to original research of human subjects, age 18 years and older, U.S. samples, and published in English.

Titles, abstracts, and full-text articles were screened according to the following inclusion and exclusion criteria. Articles had to relate to eating behaviors and mention at least one factor within the social ecological model associated with eating behavior. Articles that focused exclusively on weight change or other outcomes unrelated to eating were excluded. Articles specifically focused on problematic or pathological eating were excluded in the review of emerging adults, but articles focusing on disordered eating (defined below) among service members were included because of the reported connection between disordered eating and military weight standards (Bodell et al., 2014). Studies of emerging adults were limited to samples between the ages of 18 to 25 years or with a mean age of ≤25 years. Review articles, conference abstracts, dissertations, and non-peer-reviewed literature were excluded. Survey, epidemiological, and cross-sectional studies that only described dietary patterns or trends were reviewed for background information and are included at the beginning of each section. A total of 30 articles of service members and 22 articles of emerging adults were selected for review.

Defining Eating Behaviors

Eating behaviors is a broad construct that refers to actions related to food consumption, to include food preferences, food motives, food selection, food intake (quality and quantity), feeding patterns, and meal timing (66; 86). Eating behaviors are influenced by a complex interplay among biological, psychological, genetic, social,

cultural, and environmental factors (66; 86; 103). Different terms, such as *nutrition behaviors*, *dietary behavior*, *dietary patterns,* and *eating habits*, are also used in the literature to refer to eating behaviors.

Healthy eating behaviors are generally defined by dietary quality, nutrient density, and calorie consumption. The 2015-2020 Dietary Guidelines for Americans define healthy eating behaviors as eating patterns that meet nutritional needs, stay within an appropriate calorie limit, are achievable and maintainable for the long-term, and include a variety of nutrient-dense foods (193). In a more recent report, The Scientific Report of the 2020 Dietary Guidelines Advisory Committee discusses healthy eating behaviors in terms of "healthy dietary patterns defined by the quality of foods that are included, as well as foods that should be avoided (p. 1) (50). Healthy eating behaviors provide optimal nutrition by consuming adequate amounts of nutrient-rich sources, such as vegetables, fruits, whole grains, legumes, lean meats, and unsaturated oils, and limiting the consumption of processed foods, such as sugar-sweetened food and drinks and refined carbohydrates (50). In turn, optimal nutrition supports physical and psychological health and well-being and reduces the risk of diet-related disease. It is important to note that people ascribe different meanings to healthy eating behaviors that reflect individual, social, and cultural experience. In a review of 195 qualitative research studies, the authors found that people explained healthy eating in ways of eating (e.g., quantity and timing), food production methods, health consequences, national standards, life stages, and personal goals (16).

Similar to healthy eating behaviors, unhealthy eating behaviors most often refer to dietary quality and quantity based on dietary guidelines. Dietary intakes that include not

eating enough nutrient-dense foods and overeating calorie-dense foods high in added sugar, saturated and trans fats, sodium, and alcohol are deemed unhealthy by national dietary guidelines (193). Unhealthy eating behaviors undermine health and well-being and increase the likelihood for preventable chronic diseases and poor mental and physical performance. Another category of unhealthy eating behaviors is disordered eating—unhealthy behaviors that generally include negative psychosocial components.

Disordered eating refers to a range of problematic eating behaviors that may negatively impact mental and physical health (4). Disordered eating may include frequent dieting, preoccupation with food, rigid rituals surrounding food, and using exercise, fasting, purging, and/or food restriction to control weight or to make up for consuming "bad foods" (4). Disordered eating differs from eating disorders based on strict diagnostic criteria as defined by the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. Eating disorders are psychiatric disorders that significantly impair physical and psychological functioning; they include, but are not limited to, anorexia nervosa, bulimia nervosa, and binge eating (3).

Military Culture

The U.S. military is a culture with shared values, norms, behaviors, language, customs, and rituals that are distinct from the general U.S. civilian population (111; 148). Many characteristics of military culture are defined by law, organizational structure, and mission requirements. Because culture is "the acquired knowledge that people use to interpret, experience, and generate social behaviors" (p. 5) (173), indoctrination begins during recruit training and continues until separation or retirement from active service.

Military identity may be stronger than other common identities, such as race, political party, and gender (111).

Similar to other cultures, the military is an amalgamation of subcultures that may be characterized by military Service department (i.e., Air Force, Army, Marine Corps, Navy, and Coast Guard); occupation (e.g., infantryman or mechanic); active, reserve, or Veteran status; and combat exposure. For Navy service members, the ship and ship life shape cultural practices. The ship is a closed social system where attention to detail and respect for systems and processes dictate behavior (111). Sailors assigned to a ship may spend more than 50% of their time in service at sea. Because of the limited space on ships, Sailors are expected to be specialized and well-rounded. The loss of a Sailor at sea could result in critical gaps in manpower and capability. Thus, Sailors are expected to function in a variety of roles and hold "collateral" duties in addition to their assigned job. During periods of increased work demands, or high operational tempo, Sailors may forgo engaging in positive health behaviors and minimize health problems and personal needs to meet the mission.

Important characteristics of military culture to consider include the hierarchical structure, importance of the mission, and fitness and military appearance. The military has an authoritarian and hierarchical structure characterized by military rank and the chain of command (148). Enlisted service members in the pay grades of E1 to E4 have far less influence or control over other members in a unit (or even themselves) compared to senior enlisted service members and officers (71). For example, single enlisted service members in low pay grades may be required to live on base, a rare requirement for senior enlisted and officers. Senior service members have significant control and influence over

junior service members' work and social activities. Senior service members also serve as educators, role models, and mentors to junior service members. Thus, it is conceivable that leaders may influence the eating behaviors of subordinates by providing access to certain foods and by modeling normative and culturally acceptable, or unacceptable, behavior. Lastly, the mission of the organization or unit generally takes precedence over individual preferences and needs (71). For example, a common Navy aphorism, "ship, shipmate, and self," reflects the order of priorities. The cultural expectation of "mission first" may impact eating behaviors by prescribing what types of foods are available in various environmental settings and the amount of time allotted for eating.

Fitness and military appearance are integral to military culture (124). Military instruction dictates that service members maintain a specified level of fitness and body composition (41). In addition to mandatory standards, it is assumed by the military and general population that service members should look physically fit (59). Failure to meet fitness and body composition standards or unfavorable perceptions can result in early termination of military service, negative performance evaluations, and stigma (41; 163). Because of the high stakes of maintaining body weight standards and military appearance, a significant number of service members engage in unhealthy eating behaviors and weight loss practices (17). As discussed later in this section, the consequences of these behaviors can extend beyond active military service (104).

An understanding of military culture is important for investigating eating behaviors of service members. U.S. military cultural competence is espoused by national governmental and healthcare organizations as critical to improving mental health outcomes in service members (110; 111). It is arguable that military cultural competence

is also important for improving the military nutrition environment and eating behaviors among service members as the prevalence of diet-related conditions continues to increase among active duty service members and Veterans (15; 154).

Eating Behaviors Among Service Members

Early research on eating behaviors among service members primarily focused on nutrition and dietary intake needed to sustain life and performance in combat (117). Diet-related issues faced by service members during early and mid-20th century conflicts (e.g., WWII) included problems such as undernutrition and food insecurity (170). Although much current military nutrition research focuses on the impact of nutrition on health and human performance optimization, diet-related issues have shifted to overconsumption and increased availability of unhealthy foods.

The majority of service members do not eat a healthy diet. In 2005, fewer than 10% of service members consumed three or more servings of fruit and vegetables daily (19). Data from the 2011 DoD Health Related Behaviors Survey revealed that only fewer than 13% of service members met the Healthy People 2010 goals (11). Dietary intake was not included in the 2015 or 2018 surveys, but a 2013 study revealed that the diet of 13,858 active duty, reserve, and National Guard soldiers were marginally healthier than service members who participated in the 2011 DoD Survey (144). Thirty-eight percent, 22%, and 16.8% of participants in the study met the dietary guidelines for fruit, vegetable, and whole grain intake, respectively. The authors measured nutrition behaviors with a five-item healthy eating score modified from the US Department of Agriculture's (USDA) Healthy Eating Index (HEI). The mean healthy eating score (HES) was slightly higher for soldiers age 17 to 29 years compared to soldiers age 30 years and older.

Although the percentage of service members who met dietary guidelines for fruit, vegetable, and whole grain intake was higher than earlier military surveys, results showed that less than half of service members met the minimum recommendation for healthy food intake.

Reasons for service members' dietary inadequacies are not clear. Different social and environmental factors influence eating behaviors and may impact the dietary quality of service members. Thirty articles were selected to examine what is known about the contextual factors that influence eating behaviors among service members. Several of the studies focused on disordered eating (n = 11) and influences within the physical environment (n = 15). Two of the three qualitative studies were retrospective accounts of eating behaviors of Veterans during military services. Seven studies discussed influences with the individual, social environment, and macro-level environment. This review of eating behaviors among service members is organized by themes, beginning with disordered eating behaviors. The review continues with individual, social environmental, physical environmental, and macro-level factors. Disordered eating behaviors in the military are influenced by factors at multiple levels and are discussed separately for simplicity.

Disordered Eating and "Making Weight"

Service members must meet physical fitness and body composition standards to remain on active service, and each service conducts cycling testing (biannually or annually) to assess compliance (41). Service members who struggle to maintain weight standards are likely to engage in unhealthy eating behaviors and weight control practices during assessment periods. This phenomenon is termed "making weight." Masheb et al.

(104) define “making weight” as using “unhealthy weight control strategies to reduce weight in an effort to meet weight requirement” (p. 1064). Making weight strategies include behaviors associated with disordered eating and eating disorders, such as fasting, vomiting, and using laxatives and diuretics.

Disordered eating behaviors during and outside of assessment periods are highly prevalent across all branches of the military. One author conducted three similar correlational descriptive studies of different demographic populations in the military to investigate the prevalence and contributing factors of eating disorder behaviors among service members (106-108). Among 706 female Navy nurses stationed at military commands around the globe, 1%, 12.5%, and 36% reported symptoms of anorexia nervosa (AN), bulimia nervosa (BN), and eating disorder not otherwise specified (NOS), respectively. McNulty (108) studied 1,425 Navy men serving on ships and military treatment facilities in the continental United States and found that 2.5%, 7%, and 40.8% reported symptoms of AN, BN, and NOS, respectively. Similar results were found in a study of 1,278 active duty female Army, Navy, Air Force, and Marines stationed in Okinawa Japan in 1999, with an overall prevalence of 1% for AN, 8% for BN , and 62.8% of NOS. Age was not a significant factor in any of the studies. The most commonly reported eating and purging behaviors in all three studies included using diuretics, diet pills, laxatives, vomiting, binge eating, fasting, and exercising.

Lauder and colleagues (96) used the same Eating Disorder Inventory questionnaire to investigate disordered eating behavior among 423 female Army soldiers, and then interviewed at-risk participants. Eight percent of the participants screened and interviewed were diagnosed with an eating disorder. The highest percentage of eating

disorders was situational eating disorders (i.e., eating behaviors consistent with NOS that were practiced intermittently during military weigh-ins or physical fitness tests) compared to AN, BN, and NOS. Data from more recent studies suggest the prevalence of disordered eating behaviors has not improved (24; 80; 115; 199).

Numerous factors within each of the four levels are associated with disordered eating, to include making weight, social pressure and military-related variables (e.g., advancement/promotion), combat exposure, post-traumatic stress disorder (PTSD), trauma, depression, and stress. Among the studies reviewed, making weight was the most frequently cited reason for disordered eating (24; 96; 106-108). Making weight has been described as a continual struggle throughout military service (21). Researchers (24) conducted a cross-sectional study of 489 Navy service members stationed at a large U.S. military treatment facility using a locally developed survey to assess eating behaviors associated with periodic physical readiness testing. Thirty-nine percent of participants reported binge-type behavior; 18% reported using laxatives, diuretics, and diet pills; and 25% reported fasting to lose weight. In three similar studies on the prevalence and contributing factors of eating disorder behaviors in the military (106-108), participants reported several factors in addition to making weight that predicted disordered eating behaviors, to include harassment by supervisors about their weight, competitiveness (or being passed over) for promotion, rotating shifts, and being separated from family.

Deployment and combat exposure are associated with disordered eating behaviors. Deployment can be a time of high stress, emotional liability, and physical and mental trauma, which results in eating food for comfort versus sustenance (21). Combat exposure during deployment was associated with increased risk of women developing

disordered eating (80). In a large, longitudinal military cohort study (n = 48,378), disordered eating behavior was compared among service members who did, or did not, report combat exposure. Women were 1.78 times more likely to report a new onset of disordered eating compared to men. Reasons for the difference between genders are unknown and warrant further exploration.

Individual factors resulting from social and environmental influences are associated with disordered eating behaviors among service members. In a large military cohort of 33,937 service members, PTSD, history of trauma, depression, and anxiety were associated with binge eating, loss-of-control eating, self-induced vomiting, and use of laxatives (115). In another study, female Veterans reported using disordered eating to cope with loneliness and trauma (21). Trauma experienced before and during military service is associated with disordered eating (9; 20; 199). Pre-service history of verbal abuse was found to be associated with disordered eating among entry-level service members. (199). In a study conducted with female Veterans (n = 407) to investigate if military sexual trauma and combat exposure predicted eating disorders (i.e., AN, BN, and binge eating disorder), the researchers found that military sexual trauma, not combat exposure, was associated with eating disorders (20). These findings differ from the study by Jacobson et al. (80) that showed that combat exposure was associated with new-onset disordered eating, perhaps because the authors did not control for military sexual trauma, or because of differences in the sample (e.g., sample size, diversity, and active duty vs. Veteran).

Disordered eating during military service may influence eating behaviors for the long-term. Studies among U.S. military Veterans suggest individuals who report

disordered eating behavior to make weight or as a coping mechanism are more likely to continue engaging in disordered eating post-military service (21; 104; 170). In a study of 120 U.S. military Veterans, 33% of participants reported making weight behaviors (e.g., fasting and using laxatives) (104). Of those with a history of disordered eating, 57.9 % continued to engage in weekly binge eating and 53.8 % engaged in current compensatory behaviors such as fasting and using diuretics (104). Veterans who reported issues related to food insecurity or frequent periods of intense hunger during military service reported post-service issues of stashing and hoarding food, overeating, and dreaming of food (170).

Disordered eating behaviors are clearly a problem among service members. Disordered eating is prevalent among service members regardless of age, sex, and/or race. Because all but one of the studies relied solely on self-report questionnaires, it is not clear how many participants had actual eating disorders according to diagnostic criteria. It is likely that the prevalence of disordered eating behaviors and eating disorders has increased as the number of service members with overweight or obesity has also increased, but maintenance of body composition standards remains a condition of employment. Future studies investigating eating behaviors among service members should include inquiries of making weight behaviors among participants and assess longitudinal trends of behavioral patterns. Doing so would provide critical information on trends in disordered eating behaviors during time in service and the age or period of active duty service where shifts toward disordered eating behaviors occur. Making weight seems to be a significant factor, placing service members at increased risk for developing unhealthy behaviors throughout their career and post-active service.

Individual (Intrapersonal)

Individual factors associated with eating behaviors as identified in the social ecological model can include cognitions, skills and behaviors, lifestyle, biological, and demographics. The few factors identified in this review included body composition, body satisfaction and appearance, health orientation, and knowledge.

Weight and Body Composition

The eating behaviors of service members are influenced by, but also impact, their weight and body composition. Although the majority of studies reported other biological and demographic data such as age and sex, weight and body composition were not variables investigated as influences of eating behaviors. The relationship between BMI and characteristics of intuitive eating and motivation for eating (i.e., eating for physical [hunger], environmental/social, or emotional reasons) was explored by Cole and colleagues (31) in a sample of 295 service members. Intuitive eating refers to eating in response to hunger and satiety cues and is associated with healthy eating patterns. A higher percentage of normal weight participants (77% vs. 66% overweight, $p = 0.001$) was identified as physical eaters, whereas a higher percentage of overweight participants was identified as environmental/social eaters (29% vs. 19% normal weight, $p = 0.016$). Participants with a normal weight had higher scores related to reliance on internal hunger and satiety than overweight participants. Additionally, participants identified as trying to lose weight reported more environmental, social, and emotional eating versus eating for physical reasons. Individuals with higher BMI are also more likely to engage in disordered eating behaviors, particularly during body composition testing periods (24). In a study that described associations between healthy eating behaviors and various

demographic factors of 13,858 soldiers, participants with a healthy waist circumference and BMI were more likely to have healthy dietary patterns as assessed by a healthy eating score than those with unhealthy anthropometric measures (144).

Body Satisfaction and Physical Appearance

Body satisfaction and physical appearance influence eating behaviors among service members. Dissatisfaction with weight, a drive for thinness, and negative body image are associated with disordered eating behaviors as described in the previous section (24; 96; 106). It is not clear to what extent ideals of military appearance and body composition standards contribute to dissatisfaction with body weight and appearance as compared to civilians who are subjected to military standards. In a study of senior military officers (n = 58), physical appearance and meeting military weight and/or body fat standards were leading motivators for eating healthily (169).

Health Orientation

Having a healthy eating identity was shown to predict healthy eating behaviors. Healthy eating identity refers to how an individual perceives their eating behavior, such as identifying as a healthy eater or someone who is careful about what they eat. In one study of 575 U.S. Army Drill Sergeant Candidates, researchers investigated the impact of nutrition knowledge and healthy eating identity on eating behaviors (i.e., fruit and vegetable intake, skipping meals, and eating out) (82). Participants were asked to rate their agreement with statements such as "I am a healthy eater," and their nutrition knowledge was assessed with a 20-item survey on general sports nutrition. The authors found that having a healthy eating identity was a stronger predictor of healthy eating behaviors than nutrition knowledge (82). Healthy eating identity was positively

associated with fruit and vegetable intake and negatively associated with frequency of eating out. Both nutrition knowledge and healthy eating identity were negatively associated with skipping meals (82). Maintaining one's overall health is a motivator for eating healthily (169), and service members who view themselves as being in good or excellent health have better overall dietary quality than service members who perceive their health as fair or poor (144).

Nutrition Knowledge

Nutrition knowledge may be a factor influencing individual eating behaviors among service members. Among a sample of Army Drill Sergeant Candidates ($n = 575$), nutrition knowledge was negatively associated with skipping meals ($p < 0.01$), but there was no significant association between fruit and vegetable intake ($p = 0.07$) and eating out ($p = 0.08$) (82). It may be that availability and access to certain foods outweighs the influence of nutrition knowledge. Researchers collected qualitative information from soldiers stationed on a military installation that was part of a workplace health promotion initiative to improve health behaviors and health outcomes. They found that despite reports of positive changes in nutrition knowledge and awareness, few reported positive behavior change (28). These studies suggest that nutrition knowledge may be insufficient for promoting healthy eating behaviors.

Service members may not possess the necessary nutrition knowledge or self-confidence in their knowledge to positively influence those they lead. In a recent qualitative study exploring nutrition attitudes, beliefs, and knowledge among male and female Army Drill Sergeants, participants reported a lack of self-confidence in their nutrition knowledge (81). These sergeants reported having adequate baseline knowledge

but lacked detailed knowledge to instruct and influence the eating behaviors of their recruits. The study did not report evidence of how the participants' perceived self-confidence of nutrition knowledge influenced their own eating behaviors. According to the Military Regulation on Nutrition and Menu Standards for Human Performance and Optimization, all Services must provide "fundamental knowledge of nutrition during initial military training," and "incorporate nutrition education throughout each service member's career life" (p.7) (48). To what extent service members who receive nutrition education during their career are confident in their knowledge and use that knowledge to guide their eating behaviors has yet to be determined.

Studies on individual factors that influence eating behaviors among service members are limited. Given the plethora of health promotion and weight management initiatives in the military, more research is needed to determine factors most likely to promote healthy eating behaviors within the individual and thereby impact weight and physical performance. Similarly, practitioners and health promotion entities can be better equipped to provide tailored interventions and support for healthy eating behaviors when there is knowledge of potential barriers to healthy eating at the individual level.

Social Environment (Networks)

Social influences on eating behaviors involve social networks, to include friends, coworkers, and family members. Two studies in this review addressed the influence of leadership on Army soldiers' eating behaviors. The influence of leadership on junior soldiers toward healthy eating appeared stronger during recruit training than at later training intervals. In a mixed-methods study of 598 soldiers, researchers (79) found that 85% of soldiers in recruit training believed their leaders (drill sergeants) thought it was

important to eat healthily, whereas only 45% of soldiers in advanced individual training thought the same of their leaders (cadre members). Soldiers reported that leaders influenced their eating behavior through role modeling, pointing out consequences related to food choices, teaching them how to eat, and dictating the time allotted for eating (primarily in recruit training). Interestingly, while some leaders provided a positive influence, others were perceived as being hypocritical. For example, soldiers reported that drill sergeants scolded recruits for eating unhealthy foods but engaged in eating fast food and unhealthy snacks themselves. It may be that the hypocrisy identified by recruits in recruit training shifted their perspective on leadership's influence during advanced individual training.

Some leaders believe they have a responsibility to educate and influence soldiers' eating behaviors while others do not (79; 81). For example, in the recruit setting, some drill sergeants educated recruits on making healthier choices to improve their performance on physical fitness tests (79), and others felt that providing education or influencing food choices was not necessarily part of their job (81). Regardless of leaders' personal beliefs, military instruction states that leaders should promote healthy eating and "lead by example and encourage Warfighters to think about what goes on the plate or in the cup or bowl" (p. 6) based on national dietary guidelines (48).

Family relational health may influence eating behaviors among service members. Military couples (active duty husbands and civilian wives) who reported having positive family relational health had better psychological resources that related to having healthy eating behaviors (135). In another study, soldiers who scored high in family fitness on the Army's Soldier and Family Fitness program Global Assessment Tool were more likely to

have high healthy eating scores (OR 2.99; 95% CI, 2.99-2.59) corresponding to better nutritional intake (144). Research on the military family's influence on eating behaviors among service members is limited. However, this is an emerging area as researchers seek to address obesity, a lag measure of unhealthy eating behaviors, among military families (182).

No studies described the influence of other social networks, such as coworkers, peers, or families of origin, on eating behaviors. This is a critical gap that warrants investigation. In many instances, service members spend numerous hours with others in their units or work environments and are likely to adopt the eating habits of their peers and ascribe to cultural norms of eating in the workplace. Additionally, service members come from diverse ethnic, racial, and socioeconomic backgrounds with a wide range of food preferences, meal patterns, and cultural influences related to eating. It is unknown to what extent service members' backgrounds continue to influence their eating behaviors after recruit training. More studies are needed to identify influential networks and how these networks might influence eating behaviors.

Physical Environment (Settings)

Physical environmental factors identified include recruit training, combat or deployed environments, military dining facilities (DFACs), and the food environment of military bases.

Recruit Training

Recruit training is a formidable environment that influences eating behaviors among enlisted service members. During recruit training, service members are introduced to eating a lot of food in a short period of time while in a controlled and high stress

environment. Dining is limited to three meals a day in DFACs with specific menu rotations and food options designed to meet the physical needs of military recruits. Recruits are not allowed to purchase food or snacks during training and are only allowed to eat in DFACs at designated intervals (i.e., breakfast, lunch, and dinner). For some, recruit training promotes unhealthy eating behaviors that may persist for the long-term, while it introduces others to eating a more balanced and higher quality diet.

Unhealthy changes in eating behaviors associated with recruit training include eating fast, ignoring internal satiety cues, and consuming excess or insufficient calories (21; 52; 203). Army recruits spend less than 30 minutes in the DFAC and may have anywhere from 20 to 25 minutes to eat depending on the meal (e.g., breakfast vs. lunch) (203). In a study of 1,283 (n = 928 with pre and post data) Army, Air Force, and Marine Corps recruits, researchers found that 82% of recruits reported eating at a faster rate during recruit training compared to pre-recruit training (52). The researchers evaluated self-reported rates of eating and reliance on internal satiety cues pre- and post-recruit training. Not only did the majority of recruits report eating faster, but 55% reported a reduced reliance on internal satiety cues during recruit training compared to pre-recruit training. No longitudinal studies have investigated whether changes in eating rates and reliance on internal cues persist after recruit training. However, qualitative study results of male and female U.S. Veterans suggest changes in eating behaviors adopted during recruit training persist post-service (21; 170). In these studies, Veterans reported that recruit training is where they learned to eat extremely large portions in a short amount of time due, in part, to the abundance of available food and time constraints and that they continued these behaviors after separating from service.

Recruit training influences diet quality and calorie intake. Recruits with poorer dietary quality on entry appear to improve their overall dietary quality compared to recruits with reported relatively healthy diets at the beginning of training. Williamson and colleagues (203) conducted a pre-post observational study of 139 Army recruits to assess changes in total calorie intake and consumption of food categories (e.g., fruits and grains) at the start and end of recruit training. Only 3% of recruits met recommendations for fruit intake, while 57% met recommendations for vegetable intake. At the eight-week follow-up, there was a slight improvement (5.1%) in fruit intake, but a decline in the percentage of participants (52%) meeting the recommendations for vegetable intake. Dietary fat and sugar exceeded the recommended amount at baseline and increased at week eight. However, the authors reported an overall positive trend toward improvement in healthy eating, presumably because overweight soldiers tended to lose weight and thinner soldiers gained weight during recruit training.

Combat and the Deployed Environment

Combat deployments influence eating behaviors among service members. The deployed environment presents unique challenges related to food availability, time to consume food, and environmental stressors. Service member experiences during deployments vary considerably based on war era, job assignment, location, and combat exposure. Service members who served in earlier conflicts (i.e., World War II, Korea, and Vietnam) reported issues related to food insecurity during deployment (170). These Veterans report surviving on unpalatable C-rations and D bars, resorting to eating rats or snake meat during long missions, and making difficult decisions such as carrying food or ammunition (170). In a 1989 study of the influence of combat on eating behaviors of U.S.

Marines (n = 475) in early/mid 20th century wars, participants reported eating less than usual during combat, particularly on the first day (141). The most frequently reported reasons for eating less were lack of time while engaged in combat and fear (nervous, tense, scared).

The food environment in deployed settings has changed over the last several decades. Palatability of meal replacements has improved, and dining facilities offer a wider range of food items than in the past. Contracted fast food establishments can be found on deployed bases, and many service members receive care packages filled with junk food from family members and well-intentioned supporters. Instead of eating less during combat deployments, many service members may be eating more. Female Veterans reported eating more during deployments, using food to cope with the stressful environment, and eating more for pleasure than sustenance (21).

Deployments can lead to unhealthy eating behaviors and poor diet quality. In a study of U.S. Army special operation forces soldiers, researchers collected pre- and post-deployment nutrition assessments from 33 soldiers by using a food frequency questionnaire and the HEI-2010 (53). All participants had access to the DFAC for up to three meals per day, and some had access to field rations and shelf-stable food items provided through care packages and personal shipment. The authors reported an overall decrease in diet quality as measured by changes in the HEI-2010 total scores, with specific decreases in total fruit (includes fruit juice), whole fruit (excludes fruit juice), and dairy. While scores for empty calories decreased, the percentage of calories from desserts and sweets increased during deployment. The limited data on eating behaviors in deployed settings suggest that overconsumption and availability of unhealthy foods may

be more of an issue in current deployed settings compared to conflicts during the early and mid-20th century.

DFACs and Military Bases

The DoD has made strides to improve the food environment of DFACs. DFACs follow standard menus that must comply with nutritional standards (Military Dietary Reference Intakes /MDRIs) for meals served to service members (48). MDRIs are calculated based on estimated energy needs of the average service member. In the Army, menu standards at recruit training DFACs may differ from all other DFACs, with the former providing a more heart-healthy diet (12). In 2010, the Army implemented the Soldier Fueling Initiative, which included changes to menu standards of recruit training DFACs to improve the dietary quality of recruits (6; 191). As discussed below, Belander and Kwon (12) investigated the impact of partial implementation of the recruit training menus standards to non-training DFACs.

The food environment of DFACs influences service members' eating behaviors. Research shows that increasing the amount of nutrient-dense foods and minimizing the amount of foods high in fat and sugar are associated with decreased calorie intake and improved diet quality among DFAC patrons (12; 30; 35). In a 12-month partial cross-over study that included 10 DFACs (5 control and 5 intervention) at Fort Bragg Army base, researchers made several changes to the intervention DFACs, to include increased availability of fruit, vegetables, and whole grains; reduced availability of foods high in sugar and fat; use of Go for Green® color-coded nutrition labeling to help service members identify healthy items; and educational posters of nutrition topics (35). Dietary intake was measured with digital photography and customer satisfaction was assessed

with questionnaires at baseline, six months, and 12 months. The control DFACs initiated the intervention at six months. At six months, service members who dined at the intervention DFACs had consumed fewer total calories (-116 ± 31 kcal; $p < 0.01$) and less total fat (-8.7 ± 1.9 g; $p < 0.01$) and saturated fat (-0.9% ± 2% kcal; $p < 0.01$) compared to patrons of the control DFACs. However, there was no difference in intake of fruit and vegetables between the control and intervention DFACs. Customer satisfaction (e.g. flavor and choice) scores were higher in the intervention DFAC compared to the control DFAC. Belanger and Kwon (12) and Cole et al. (30) reported similar results with menu changes at military dining facilities. Service members dining at intervention DFACs (i.e., healthier menu options and labeling) had improved diet quality and satisfaction compared to controls. Results of these studies suggest that food availability influences food selection.

Promotional nutrition information alone may not influence food selection and eating behaviors. Researchers conducted a study of 149 service members at an Army DFAC to measure the effectiveness of nutrition labeling on targeted menu items (healthy entrées) and identify factors related to whether the food and price influenced food choice (175). Data were collected using a pilot-tested questionnaire over four lunch periods. The majority (79%) of participants indicated that the labeling and promotion material did not influence their food choice, and 75% stated that the material did not positively influence their attitude about nutrition. Participants rated taste, quality, and appearance as highly influential in their food choice. Gentle nudging toward healthy eating with signs and information may not be a strong influence on eating behaviors if unhealthy food options are more plentiful, visually appealing, and palatable.

The food environment on military bases disproportionately contains unhealthy food establishments. While the DFACs offer a variety of foods to include healthy and unhealthy options, fast food chains are a staple in military exchange food courts and other locations on base. Service members have complained that there are few healthy dining options, which limits their choices (21; 28). Some feel that it is even unrealistic to eat healthy within a military installation, and unit leaders have expressed frustration over the plethora of convenience fast food options and lack of healthy options on base (28). It is likely difficult to consistently engage in healthy eating behaviors when unhealthy food options are more available than healthy options. While there are many possible reasons for the number of fast food establishments on military installations, it is unknown why service members choose these options over DFACs or home-prepared meals and to what extent they desire the food environment on military installations to be different.

Most studies of military food environments are limited to DFACs. This may be because researchers have control over manipulating DFAC menus, and changing selections within DFACs is more feasible than altering fast food offerings. There is limited evidence on how much service members rely on fast food restaurants and convenience stores on base. DFACs have set hours and may only be open for basic meal service (i.e., breakfast, lunch, and dinner) due to funding and operating cost. In addition to providing hyper-palatable food options, other food venues may have greater flexibility in service hours and delivery, making them more appealing and convenient for service members who have variable work schedules.

Research that has been conducted on military food environments has found that food availability influences eating behaviors. Nutrition labeling and choice architecture

alone may be insufficient to change behaviors. However, when service members are offered more tasty and healthy foods, and fewer unhealthy foods, they are more likely to adopt healthier eating habits. All of the research studies on DFACs were conducted at Army facilities with the majority on Fort Bragg. More research is needed on DFACs across the Services to determine how to feasibly improve patrons' nutritional intake and dietary quality. Research on how and where service members who are unable to use DFACs get their food is needed. Additionally, research is needed on the demographics of patrons that visit on-base eateries. Fast food and other restaurants found on-bases are sometimes viewed as morale boosters. However, mixed messages are sent when the number of unhealthy food establishments exceeds the number of healthy food offerings. Service members are encouraged to be nutritionally fit (117), but doing so may be difficult in an environment potentially overrun with unhealthy choices.

Macro-level Environment (Sectors)

None of the studies reviewed identified macro-level influences other than military policies and norms related to physical fitness and body composition standards as discussed in the previous section on disordered eating. Research is needed to identify other potential macro-level influences on service members' eating behaviors, such as food marketing and media or food assistance programs for low-income service members.

In summary, several aspects of military service and the military food environment may influence eating behaviors among service members. Unhealthy eating behaviors appear to be the cultural norm, particularly for service members who struggle to make weight. A healthy eating identity, nutritional knowledge, and an inclination toward intuitive eating are individual factors that may promote healthy eating habits. Little is

known about the social factors that influence eating behaviors among service members, especially social factors such as peer support and social norms. Family relational health is associated with positive health behaviors, and leaders can play a significant role influencing junior service members' eating behaviors through shared information and role modeling. The strength of leaders' influence may rely on consistencies between what is taught and what is observed. Although eating behaviors during deployment may differ from non-deployed settings, the availability of food options appears to be a critical influence on eating behaviors in either setting. Many service members engage in unhealthy eating behaviors, which suggests there are discrepancies between the stated cultural message that a well-balanced and nutrient-dense diet is important for health and performance and the modifiable contextual factors among service members that influence eating behaviors.

Eating Behaviors Among Emerging Adults

The period of emerging adulthood is a distinct phase of life marked by increased autonomy, responsibility, and identity exploration (7). It is the transition period from adolescence to adulthood and includes individuals between the ages of 18 and 25 years. Emerging adulthood is a cultural construct in industrial and individualistic societies, such as the United States, where individuals can take time to explore life's possibilities and slowly transition into formal adult roles and expectations (7). The length of time it takes for individuals to emerge into adulthood varies depending on life circumstances that promote or inhibit exploration (e.g., college, parenthood, occupational responsibilities). Emerging adulthood can be a time for risk-taking behaviors as individuals develop their

identity and seek a wide range of experiences. It can also be a time of developing lifelong habits.

Researchers have identified emerging adults as a critical population in which to study eating behaviors, as dietary intake often becomes unhealthier during this transition period (128; 177). Much of the literature on emerging adults in the United States is limited to college students and only a few geographic regions (i.e., Midwestern U.S.). Additionally, published research using population-based survey data includes varying age ranges (e.g., 19-29 years) that fall outside of the 18 to 25 year range (101; 131; 207). Nevertheless, the literature indicates that the period of emerging adulthood is marked by poor nutritional intake. On average, emerging adults consume a significant amount of fast food and unhealthy snacks, and do not consume a sufficient quantity of fruits and vegetables based on the U.S. Dietary Guidelines. Findings from Continuing Survey of Food Intakes by Individual (1994-1996, 1998) indicate that fast food intake was highest (52%) among adults age 20-39 years (136). In a longitudinal study of emerging adults living in Minnesota ($n = 1,686$), researchers found that frequent fast food intake (consumption of fast food ≥ 3 times/week) increased by 9.4% ($p < 0.001$) among males and 2.3% ($p = 0.16$) among females from baseline (mean age 15.9 years) to follow-up (mean age 20.5 years) (94). The highest increase in the consumption of soft drinks (4.1% to 9.8%) between 1977 to 2001 was among adults age 19 to 39 years (131). The proportion of snacks consumed and the total energy intake from snacks among adults 19-29 years has also increased (207). Unhealthy eating behaviors established as an emerging adult may be difficult to change during the course of life.

A synthesis of the contextual factors that influence eating behaviors among emerging adults in the United States identified in the literature is presented below and is organized similarly to the review of the literature of service members. No studies reviewed discussed macro-level factors. Factors related to the individual, social environment, and physical environment were discussed in 10, 12, and 11 of the studies reviewed.

Individual (Intrapersonal)

Individual factors that influence eating behaviors among emerging adults identified in the literature include demographic factors, food and taste preference, knowledge and skills, and attitudes and beliefs about healthy eating.

Demographics

Eating behaviors are associated with differences in sex, race and ethnicity, and socioeconomic status (SES) among emerging adults. Males tend to eat more fast food (92; 94), express a greater interest in gaining weight (87), eat less healthfully (87; 116), are less health conscious (87), and spend less time on food preparation (93) than females. Kapinos and Yakusheva (84) investigated the environmental influence of living in a college dormitory with on-site dining facilities on weight-related behaviors. The authors found that exposure to on-site dining facilities was associated with males eating more snacks and meals compared to females, whereas females exercised less compared to males.

Increased frequency of fast food consumption and inadequate intake of fruits and vegetables were reported among African Americans and Hispanics compared to Caucasians (92; 94; 101). In one study, researchers investigated food preparation

behaviors in a cross-sectional analysis of 1,674 males and females aged 18 to 23 years and found that African Americans were less involved in food preparation (e.g., grocery shopping and cooking) compared to Caucasians (93). Additionally, African Americans and Hispanics reported inadequate resources for food preparation compared to Caucasians. These findings add to the overwhelming evidence of health disparities among ethnic and racial minorities.

Individuals in lower SES tend to have less healthy eating behaviors compared to individuals in higher SES (92; 94). Although eating at fast food restaurants is reported to be more frequent among individuals of lower SES, eating out at a full-service restaurant is more common among high SES backgrounds (92). Students in lower SES reported having more time constraints and were less likely to report having a healthy balanced diet compared to students with a higher SES status (138). Financial resources also influence choices related to cooking, dining out, and purchasing foods at supermarkets and convenience stores. Dietary intake and diet quality may also differ based on perceived social status, with individuals of lower social standing having less healthy dietary patterns. Researchers investigated the effect of experimentally manipulated social status on acute dietary intake in a pilot feasibility, randomized, crossover study of nine Hispanic emerging adults (23). They found that participants in the low social status group consumed more calories (130 kcal; $p = 0.07$) and a higher percentage of calories from saturated fats (14.3% vs. 12.3%; $p = 0.07$) during an ad libitum buffet lunch than participants in the high social status group (23). Given the small sample size and near significant results, more research is needed with a larger and diverse sample to confirm these findings.

Although demographic factors were reported in several studies, they were generally not the outcome of interests. The majority of literature included samples that were predominantly Caucasians, female, mid/high SES status, and normal weight (BMI ≥ 18.5kg/m^2 and < 25kg/m^2), which limits generalizability to diverse populations. Future studies of emerging adults should include more diverse samples in different regions of the United States.

Food and Taste Preference

Food and taste preference influences eating behaviors. Several factors, to include biology, maternal diet, infant feeding (breastmilk versus formula), culture, and social images, impact individual food and taste preference (57; 58). For many emerging adults, the taste of food was a major determinant of food choice and purchase (90). In choosing what to eat, the taste of food was often more important than the healthiness of food (147; 172). As one group of college students commented, "unhealthy food just tastes better…I think unhealthier food just tastes better to everybody" (p.8) (172). In a qualitative study of a group of young adult women with and without children, taste was an important factor in decisions related to food purchases and dining outside of the home (147). Women reported purchasing foods that they or family members liked versus what was healthy to avoid wasting food and money. These women also reported dining out to enjoy foods they craved or enjoyed the taste of but did not know how to prepare at home.

While many emerging adults seem to prefer unhealthier food options because of taste or personal preference, some reported having a preference for healthy foods (90). Larson and colleagues found that preference for fruit and vegetable intake during adolescence and emerging adulthood may positively influence fruit and vegetable intake

in adulthood, suggesting that healthy eating behaviors adopted early on may continue over the long-term (90).

Knowledge and Skills

Emerging adults have a broad understanding of proper nutrition and the types of foods that are healthy versus unhealthy. Many also report having the knowledge and skills necessary to shop for and prepare healthy foods (93; 121; 172). However, there is a discrepancy between knowledge and behavior. Many emerging adults who possess the necessary skills and resources to cook for themselves do not (93). Preparing food takes time away from other activities (138), and is not perceived as a valuable use of time among those with significant time constraints. Emerging adults would rather pay for ease and convenience. Fast food venues are seen as a public service; they provide grab-and-go foods for those who do not have time to make a meal (121). This is not true for all emerging adults. Some learn how to cook because they find cooking their own meals to be cheaper than eating out every day (172). Emerging adults who are health conscious are more likely to cook and eat foods prepared at home, and those who have more culinary literacy eat fast food less often compared to those who do not have food-preparation skills (93). Frequent food preparation is seen as part of a healthy lifestyle and requires planning ahead (1). Regardless of whether emerging adults possess knowledge and skills of food preparation, time, cost, and convenience appear to be more influential when deciding to cook or not cook.

Motivation, Attitude, and Beliefs

In general, emerging adults believe healthy eating is important for health, chronic disease prevention, and healthy weight maintenance. Those who are motivated to eat

healthfully view healthy eating as a lifestyle, wish to set a positive example for others, and desire to improve their well-being and prevent disease and/or manage their weight (1). Emerging adults who are parents tend to make healthy choices because they believe it is important to be good role models for their children (1). Parents often want their children to adopt healthy eating habits, especially if they themselves struggled to develop healthy eating habits (147).

Early childhood experiences shape attitudes and beliefs about eating. Some emerging adults reported frequent exposure to eating fruits and vegetables in the home, and others reported growing up eating fast food or whatever they wanted (1). Although families of origin have a strong influence in shaping attitudes and beliefs about healthy eating, peer influence and exposure to healthy communities can also shape individuals' attitudes and beliefs about health and healthy eating (87).

Consistent with the social ecological model, individual factors that influence eating behaviors among emerging adults are interconnected at the individual, social, and environmental levels. For example individual food preferences may be influenced by socioeconomic status and peer groups. Nutrition knowledge and food preparation skills can be influenced by family of origin and living situations. As such, it appears that individual factors can be positively or negatively influenced by the environments and social settings in which a person finds oneself.

Social Environment (Networks)

Family and Early Life Experiences

Family of origin and early life experiences with food and mealtimes influence eating behaviors. The family environment is also a place where individuals may adopt

habits related to meal patterns (e.g., skipping breakfast or snacking), social characteristics associated with eating (e.g., eating while watching T.V.), and food preparation skills (e.g., grocery shopping and cooking). Parents or older adults are responsible for shopping and meal decisions, thus controlling availability and exposure of foods (1). Most emerging adults are taught how to eat by their parents and generally reflect learned patterns of behaviors once they leave home. Parents who talk to their children about eating healthy but frequently purchase or prepare unhealthy foods are less influential in helping their children adopt healthy eating habits (172). Conversely, eating family meals and observing consistent healthy eating behaviors, to include shopping for healthy foods and preparing meals, encourage healthy eating once emerging adults leave home (172). In a large prospective cohort study (n = 2,785), researchers evaluated eating behaviors during adolescence to emerging adulthood (101). The authors reported that family meals during adolescence were positively associated with increased intake of fruit, vegetables, and whole grains in emerging adulthood (101). Parents can also influence their emerging adult children's eating behaviors once they leave home and encourage unhealthy eating habits by sending care packages with candy and junk food (129).

Peers and Social Eating

Peers, to include friends, coworkers, and classmates, influence eating behaviors among emerging adults. Peer influence can encourage unhealthy eating behaviors such as snacking, eating fast food, and consuming alcohol and sugar-sweetened beverages. Young adults who live with others (e.g., parents or roommates) are more likely to report social eating (eating with others) than young adults who live alone (91). Meals eaten with friends tend to be unhealthy (172), and eating out is associated with a higher intake of

processed foods and a lower intake of fruits and vegetables than eating at home (120). Dining in social settings with peers can encourage overeating and consumption of unhealthy foods (65). Peers may also encourage eating for social reasons rather than hunger (129). In a qualitative study of fast food employees ($n = 14$) designed to investigate health capability (external conditions that impact an individual's ability to be healthy) related to healthy eating choices, participants reported that employees reinforced one another's eating behaviors, and unhealthy eating tended to cluster within certain groups (121).

Peers can also encourage healthy eating behaviors and provide positive social support. In a cross-sectional analysis of a population-based study of 1,687 young adults, eating with others was significantly associated with higher intakes of fruits and vegetables ($p \leq 0.01$). Women tend to rely on social support from peers to eat healthily more so than men (65; 87). Exposure to peer groups who eat healthily creates positive peer pressure. This may be especially true among active individuals who play sports or attend a university where healthy eating is the norm (172). Healthy eating among peers can reduce food costs and avoid waste when food is shared by the group. As one participant stated, "if you go and get a bag of carrots, they're not going to go bad fast because everyone will eat the carrots" (p. 534) (87).

Social Norms

Social norms, shaped by peers and the larger social culture, influence eating behaviors of emerging adults. Social norms are generally divided into two categories: descriptive norms and injunctive norms. Descriptive norms refer to what people do, whereas injunctive norms refer to what people should do. Research suggests that

descriptive norms may be more powerful at influencing eating behavior because they provide social proof of acceptable or normative behavior (116). Three of the studies in this review included experiments related to social norms and food preference among emerging adults (116; 133; 183).

The impact of descriptive norm messages on food choice was examined in a quasi-experimental study of 231 college students (116). The researchers chose two nearby food stations with comparable pricing and popularity among students—a grill area (unhealthy option) and a salad bar (healthy option) in the campus food court. Signs with healthy and unhealthy descriptive and injunctive messages were posted at different locations in the food court for four weeks. Results of the study showed that many of the students did not notice the signs or incorrectly reported what the signs displayed. Among participants who correctly reported the information on the signs, healthy descriptive norm messages, but not healthy injunctive norm messages, resulted in the purchase of more healthy choices. Additionally, unhealthy descriptive norm messages did not impact the purchase of unhealthy food. Results of this study suggest healthy descriptive norms may be stronger than injunctive norms for changing behavior. However, results of this study should be interpreted with caution as a majority of respondents may not have been exposed to the message and a large portion of the experimental group was removed from analysis because of a lack of exposure.

Social norms can shift stated food preference. Nook and Zaki (133) conducted a pre/post quasi-experimental study of 21 college students by using functional magnetic resonance imaging (fMRI) to determine if social norms influenced behavioral and neural responses to food preference. Participants were shown images of food for three seconds

and asked to rate their desirability to eat the food. The researchers then showed participants peer ratings and manipulated the ratings to produce different norm conditions. Results showed that participants' follow-up ratings shifted in the direction of their peers for unhealthy and healthy food items. The fMRI results suggested that social norms shaped internal valuation of stimuli by modulating activity in the brain and individuals experienced a change in subjective preference, not just public compliance.

Building on the work by Nook and Zaki (133), Templeton and colleagues (184) conducted a similar study with 121 college students to determine if changes in food preference persisted, and if changes in preferences were consistent with behavior. Participants rated desirability of images and were shown peer ratings. In this study, peer ratings were grouped (unknown to participants) as healthy, unhealthy, and control. Participants rated desirability of images again and were offered M&Ms at the conclusion of the session. The researchers measured the amount of M&Ms consumed. Participants returned three days later and rated desirability of the images again as well as the healthiness of the food displayed. Consistent with the findings by Nook and Zaki (133), participants' ratings shifted toward peer rating in the first session and at the three-day follow-up. Participants in the healthy norm group preferred unhealthy food images less than participants in the unhealthy norms. However, there was no significant difference in the amount of M&Ms taken by the healthy and unhealthy norm conditions, which suggests that social norms may impact stated preferences toward healthy eating behaviors, but not behavior.

Physical Environment (Settings)

Factors within the physical environment influence eating behaviors among emerging adults. Among the studies reviewed, factors related to the food environment and food insecurity were frequently reported as barriers to healthy eating. Recurrent themes included overexposure to unhealthy foods, availability of food storage, food preparation resources, and the ease of access and availability of healthy or unhealthy foods. Within these themes, the salient factors were time, costs, and convenience. Collectively, environmental factors that influence eating behaviors among emerging adults relate to food security status. Food security is "access to enough food for an active, healthy life. It includes at a minimum (a) the ready availability of nutritionally adequate and safe foods and (b) and assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)" (p. 43) (206). Food insecurity "exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in a socially acceptable ways is limited or uncertain" (p. 43) (206). Food insecurity can lead to unhealthy eating behaviors and poor dietary intakes (60). Among college students, food insecurity is associated with a lower intake of nutrient-dense foods and increased consumption of unhealthy nutrient-deficient foods (99)

Living Situation

Living situations influence access to food and food preparation. Emerging adults have a range of living situations, to include living (a) in college dormitories, (b) with family members, (c) with friends and/or other individuals, and (d) alone. Full-time college students living in a controlled environment (i.e., college dormitories) have

different experiences that influence eating behaviors than college students living off-campus or emerging adults who are not in college.

The majority of students living in dormitories have access to "all-you-can-eat" cafeteria-style dining facilities. These dining facilities offer a variety of healthy choices, but they are frequently perceived as a barrier to healthy eating (62; 87; 129). For some, this is the first time they have unrestricted access to an unlimited amount of food 24 hours a day (172). While college dining facilities are frequently reported as barriers to healthy eating, they make it possible for some to eat healthily (65). These dining facilities provide a variety of fresh fruit and vegetables as well as balanced meals that students may not otherwise have access to if they live off-campus (121). College students living in a controlled environment (e.g., dormitory) have limited access to food storage and food preparation resources (87), which makes it more difficult to establish healthy eating habits, especially cooking or preparing meals. Without access to conventional cooking appliances and storage, many students may not develop the habit of purchasing and preparing healthy foods. A lack of refrigerators and kitchens discourages them from keeping healthy snacks such as fruits and vegetables on hand and encourages storage of packaged and highly processed food and snacks (130).

Living outside of college dormitories provides access to food preparation and cooking, which generally confers consumption of healthier food options (87; 172). Emerging adults living at home with parents who cook may benefit from having access to healthy home-prepared meals as well as time and costs savings. Unfortunately, living with parents or in other conditions does not guarantee that people will cook. Emerging adults living with family, friends, or alone outside of a campus setting often consume

foods prepared outside the home, to include dining at fast food establishments or restaurants or purchasing prepackaged prepared foods from supermarkets (95). Emerging adults may also rely on food delivery services that are fast and convenient, especially for late night eating (87).

The Food Environment

The food environment refers to access and availability of different types of foods within the physical environment. As mentioned in the previous section, college dining facilities provide increased availability and access to healthy and unhealthy foods. Exposure to these facilities encourages overconsumption and poor dietary habits among many students (65; 130). Students reported feeling pressured to get their money's worth because the dining facilities are part of a pre-paid meal plan (87). Exposure to all-you-can-eat dining presents significant challenges related to self-control of unhealthy food consumption and self-regulation of appetite (87). Students may have good intentions to eat a healthy meal upon entering the dining facility, but their willpower is soon challenged by the abundance of highly palatable and unhealthy foods (129).

Unhealthy food options are disproportionately available compared to healthy foods (65; 129; 200). Emerging adults are targeted by fast food restaurants with marketing of cheap deals that encourage patronage (129). Many find it difficult to consistently eat a healthy diet because of the perceived complexity of procuring and preparing healthy food, or simply because of the perceived lack of healthy options (121). This is also true for the workplace environment. In a longitudinal cohort study (n = 1,538 emerging adults) that investigated associations between workplace environments and weight-related behaviors, only half of the participants reported that it was easy to eat a

healthy diet at work (200). Eighty percent of participants reported frequent availability of sweets, snacks, and soda, and participants with increased exposure to unhealthy foods reported increased consumption of fast food and sugary drinks compared to workers with less frequent exposure (200). The literature suggests there is an association between food availability and food consumption—people will typically eat what is presented to them.

Time, Cost, and Convenience

Time, cost, and convenience are determinants of healthy eating among emerging adults. Perceived time constraints may be considered an individual factor but are frequently associated with convenience in terms of food access and food preparation. A perceived lack of time is frequently reported as a barrier to eating healthy and preparing healthy foods (65; 87; 147; 172). Time constraints lead to skipping meals (172) and "grabbing" foods that can be "eaten on the run" (121). Eating on the run is associated with higher intakes of fast food and sugar-sweetened beverages than planned meals (91). Dining facilities and eateries that provide healthy foods that are prechopped or quickly eaten encourage healthy eating among some individuals (121). Time constraints are also a deterrent to preparing meals at home or eating mindfully (e.g., without multitasking) (87; 95; 147). In a study of 1,200 college students, about a third of participants reported being too busy to grocery shop or sit down and eat a meal (138). Forty-six percent of participants in the same study reported that cooking meals took time away from other activities, but more than half felt confident that they could make time to prepare meals. The relationship between the perception of time constraints and eating behaviors warrants further exploration. Factors such as health beliefs, priorities, and values may also influence how emerging adults perceive the amount of time available to eat healthfully.

Eating behaviors are frequently driven by costs. Eating healthy is perceived to be associated with higher costs among emerging adults (65; 172). Emerging adults perceive fast food and unhealthy foods as cheaper than fresh, nutrient-dense foods (129). This perception may be due to reasons such as the lack of access to cook and store low-cost healthy meals or a lack of culinary and nutrition literacy. Interestingly, one study found that emerging adults who worked in fast food establishments could often get unhealthy foods for free but had to pay for the healthier options (121). The level of convenience associated with food selection, procurement, and consumption is an important determinant of eating behaviors among emerging adults. Emerging adults consume a lot of convenience foods, such as snacks, microwavable meals, and fast food to save time (87; 129).

Eating behaviors among emerging adults are influenced by several contextual factors as identified in the social ecological model. Emerging adults face several social and environmental barriers to eating a healthy diet. Although many report enjoying healthy food, the majority of emerging adults tend to gravitate toward unhealthy food options and eat foods prepared outside of the home. Food insecurity may be an issue in this population as unhealthy food options are widely available and cheaper. Individuals who experience significant cost and time constraints may choose to go against their better judgement and values and consume unhealthy foods because of convenience.

Summary

The literature establishes that multiple factors across environmental levels influence eating behaviors among service members and emerging adults in the United States. Between both groups, the food environment, particularly cost, convenience, and

availability of food options, appears to strongly influence food consumption. Access to dining facilities with numerous choices, especially the all-you can-eat variety, and fast food eateries may predispose many individuals to unhealthy food choices, which can lead to poor dietary intake. However, access to dining facilities that include a variety of low-cost and convenient healthy food choices may improve the dietary intake of others. Social networks to include peer groups, families, and leaders influence eating behaviors through role modeling, training and education, social support, and social norms. Less is known about the macro-level or cultural influences on eating behaviors among service members and emerging adults.

Research Gaps

To this author's knowledge, there is no reported research on eating behaviors among emerging adults in the military. This is a critical knowledge gap given the evidence of unhealthy eating behaviors and poor diet quality among civilian emerging adults. Although service members have access to a robust healthcare system with free health promotion programs and are required to maintain physical fitness and body composition standards, many junior service members, especially enlisted service members who are required to live in a controlled environment (i.e., barracks), likely face similar barriers to healthy eating as their civilian counterparts. For example, junior service members likely have disproportionate access to fast foods and a lack of access to cooking and food storage. Junior enlisted service members are just as at risk for undesirable weight gain (201) as civilian emerging adults (177). Although different factors can contribute to excess weight gain, it is widely accepted that dietary intake plays a critical role in body weight and body composition.

There is a paucity of literature on eating behaviors and determinants of eating behaviors among service members in general. Whereas there is ample evidence of disordered eating behaviors and other eating behaviors related to meal patterns (e.g., skipping meals) and food consumption (e.g., dietary quality), little is known about other behaviors such as dieting, restrained eating, or healthy behaviors such as cooking and meal preparation. Additionally, little is known about the determinants or perceived influences of service members' eating behaviors. For example, why do service members report skipping meals or snacking, or what are common reasons for engaging in disordered eating behaviors other than periodic testing, and when are these behaviors likely to be adopted? None of the literature reviewed discussed peer influences or networks within the work environment of service members. The influence of factors within the social environment warrants exploration as service members do not live and work in isolation. Although they may receive dietary counseling and weight management interventions at the individual level, they are likely to eat in group settings and be exposed to others within the work environment who do or do not adhere to healthy eating behaviors taught in military nutrition programs.

Factors related to military service make it likely that emerging adults in the U.S. military differ from emerging adults in the civilian U.S. population. Although service members age 18-25 years may indeed experience a critical period of transformation from adolescence to adulthood, they are part of a culture that demands high levels of responsibility and self-sacrifice, but with limited autonomy and agency. Unlike emerging adults who are full-time college students or slowly transitioning to increased responsibility, young service members are thrust into "adult jobs" that may require

leading others and working long hours in austere environments and unpleasant conditions. Service members are expected to follow orders and conform to explicit and implicit groups norms for the sake of good order and discipline and mission accomplishment. Although emerging adults in the military may experience a sense of freedom from parental control, limits are placed on their autonomy in different ways. Many junior enlisted service members are required to live on base in living quarters that may be similar to college dormitories, but without access to cafeteria dining and with more restrictive oversight. Finally, unlike their civilian counterparts, emerging adults in the military are required to maintain a certain level of health and fitness or risk losing their job and benefits.

This research study aimed to fill the aforementioned gaps in the literature by studying the factors influencing eating behaviors among emerging adults in the military, specifically junior enlisted Sailors. The majority of the military literature reviewed was conducted with Army personnel and little is known about Navy service members. Enlisted Sailors comprise approximately 82% of the total Navy force (126), and junior enlisted Sailors most likely represent a vulnerable population that is at greater risk for unhealthy eating behaviors than officers due to their average age upon entry, level of education, and income. Many junior enlisted Sailors who remain on active duty will eventually become leaders as senior enlisted or officers. Research is needed to identify factors that influence eating behaviors in this unique population to improve the nutrition and dietary habits of the junior enlisted force today who may ultimately influence the junior enlisted force of tomorrow.

CHAPTER 3: Methods

This chapter describes the research study's methodology, beginning with a review of the study's purpose and specific aims and includes a discussion of the following areas: (a) rationale for the research approach, (b) information needed to address the specific aims, (c) overview of the research design, (d) research sample and setting, (e) data collections methods, (e) data analysis and synthesis, (f) ethical considerations, and (g) delimitations. The chapter concludes with a brief summary.

The purpose of this study was to explore factors influencing eating behaviors of junior enlisted Sailors in non-deployed settings within the context of Navy and military culture. The researcher believed that knowledge of this phenomenon would provide researchers, providers, and military decision makers with salient and culturally relevant data needed to address barriers and facilitators to healthy eating behaviors to promote nutritional fitness among service members. To better understand this phenomenon, the study had three specific aims with six corresponding research questions:

Specific Aim 1. Identify the intrapersonal, social, environmental (physical and macro-level), and cultural factors that influence eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 1A: What are prominent eating behaviors among junior enlisted Sailors?

Research Question 1B: What intrapersonal, social, environmental (physical and macro-level), and cultural (military and Navy) factors influence eating behaviors among junior enlisted Sailors?

Specific Aim 2. Investigate the influence of cyclic physical readiness testing (PRT) on eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 2: In what ways do eating behaviors change during PRT season?

Specific Aim 3: Identify perceived barriers and facilitators to healthy eating behaviors among junior enlisted Sailors in non-deployed settings.

Research Question 3A: How do junior enlisted Sailors define healthy eating behaviors?

Research Question 3B: What individual characteristics hinder or facilitate healthy eating behaviors among junior enlisted Sailors?

Research Question 3C: What aspects of the social, physical, macro-level, and cultural environment hinder or facilitate healthy eating behaviors among junior enlisted Sailors?

RATIONALE FOR QUALITATIVE RESEARCH DESIGN

The ontological assumption that undergirds most qualitative research is the belief of multiple realities: that is, researchers and individuals being studied may hold different realities of the same phenomenon (34). Qualitative research involves using multiple forms of evidence containing participants' words, perceptions, and ideas to understand, describe, and interpret issues related to the human condition. From an epistemological standpoint, qualitative research assumes that knowledge is constructed with subjective evidence requiring the researcher to "get as close as possible to the participants being studied" (p.21) (34). A qualitative approach was most appropriate for this research study because the researcher aimed to understand and identify an underexplored phenomenon within a specific sociocultural context.

The researcher needed to employ inductive and abductive methods of inquiry and analysis to understand how junior enlisted Sailors perceive factors influencing their

eating behaviors. Inductive inquiry begins with an open-ended question as opposed to a fixed hypothesis and involves generating answers about the phenomenon of interest through ongoing data collection and analysis (160). Abductive inquiry relates to investing a range of perspectives, experiences, or possibilities for interpretation and proposing the most plausible explanation after careful and rigorous analysis (160). Although qualitative research is not frequently guided by deductive methods of inquiry, deductions may be made throughout the research process as the investigator draws conclusions about the data and constructs unifying patterns of behaviors or concepts (160). Given the paucity of literature on service members' eating behaviors and the contextual factors influencing these behaviors, it was necessary to employ a research approach involving comprehensive and exploratory methods of inquiry.

RATIONALE FOR FOCUSED ETHNOGRAPHY

Ethnography is understanding and describing a cultural group and a research method, product, and perspective (56; 171; 173). Ethnographic methodology "highlights context and seeks to situate all findings, whether qualitative or quantitative, within the fabric of daily life and encompass systems within which daily lives are lived" (p. 34) (171). Research within a cultural context is critical when investigating health behaviors of a specific group where members of that group are most likely influenced (knowingly or unknowingly) by others within their social networks or culture. Culture has been defined as, "the acquired knowledge that people use to interpret, experience, and generate social behavior" (p. 5) (173). Words, experiences, and phenomena may have different meanings between a cultural group and outsiders, which can lead to misunderstandings if preconceived assumptions are not questioned and explored (171). Accurately

understanding the perceptions, experiences, and needs of junior enlisted Sailors as they pertain to eating behaviors has significant implications for promoting and supporting their nutritional fitness.

Traditional ethnography may not be feasible or even necessary to sufficiently explore a specific phenomenon of interest within a cultural context. Researchers conducting traditional ethnography often spend upwards of six months to a few years engaged in fieldwork—immersion with a cultural group through participation—exploring different facets of a given culture (56). Since its inception by anthropologists in the late 19th century, ethnography has been adopted by other disciplines, leading to new forms of ethnography (122) and ethnographic methods (171). One such form is focused ethnography.

Focused ethnography provides a way to understand the issues and problems of a cultural group to bring change to that community if desired (38) and is applicable "whenever there is a desire to explore specific cultural perspectives held by sub-groups of people within a context-specific and problem-focused framework" (p.1) (74). A focused ethnographic approach allows the researcher to investigate a culture's perspective on a specific topic—influences of eating behaviors among junior enlisted Sailors—within the time period associated with dissertation research.

INFORMATION NEEDED

This focused ethnography concentrated on young (18-25 years old), junior enlisted Sailors from three military installations in Maryland. Three specific aims were explored to collect the information needed to understand the salient factors influencing their eating behaviors. The information needed to address these aims was determined by

the conceptual framework, literature review, and research methodology and fell into four categories: (a) contextual (b) perceptual, (c) demographic, and (d) theoretical. This information included:

- contextual understanding of general military and Navy culture and organizational structures (e.g., DoD, military installation, command, and unit);
- contextual knowledge of military and Navy food service operations and regulations;
- junior Sailors' perceptions of (a) their eating behaviors; (b) the social, physical, environmental, and military-related influences on their eating behaviors; (c) what constitutes healthy eating behaviors; and (d) the facilitators and barriers to adopting and maintaining healthy eating behaviors;
- connected individuals' (e.g., unit leaders, installation dieticians, and food service personnel) perceptions of influences of junior Sailors' eating behaviors;
- participants' demographic information, including age, sex, years in service, and rank; and
- an ongoing review of the literature providing empirical and theoretical explanations of assumptions, propositions, and assertions related to data collection and data analysis.

The above information was collected throughout the entire research process, beginning with proposal development and concluding with writing the dissertation. The researcher's

18 years of active duty military service in the Navy provided extensive contextual knowledge of military and Navy culture. She gained additional insight by reviewing the literature on military culture (presented in Chapter 2) and engaging with participants and members of the culture during data collection. Various methods of data collection and analysis were used to obtain information on perceptions and demographics of the research sample. The researcher conducted an extensive review of the relevant literature to inform the research process and continued to examine theoretical and empirical literature during data collection and analysis to compare and contrast ongoing research findings with current knowledge and also obtain explanations for findings. A step-by-step description of the research design and methods follows.

RESEARCH DESIGN OVERVIEW

The research design for this exploratory descriptive study is focused ethnography. Because focused ethnography shares many of the same philosophical assumptions and methods for data collection and analysis with traditional ethnography, the term ethnography is used for the remainder of this dissertation, unless otherwise specified. This study followed an interpretive philosophical paradigm, consistent with ethnography, where meaning is socially constructed and situated within the context of the group to gain a better understanding where little is known (98). Ethnography is useful for gaining an understanding of the shared patterns of beliefs, values, rules, and behaviors of a cultural group (34). The military is a cultural group with different subcultures (148). The Navy is a subculture of the military with different operational missions, customs, and traditions than the other military Services. Based on personal experience, the researcher assumed that junior enlisted Sailors are a cultural group with similarities and differences in values,

behaviors, and beliefs compared to the larger military and Navy culture. A description of important fundamental principles of ethnography is described below and followed by a list of the steps used to carry out the research.

Fundamental Principles

Fundamental principles of ethnography include holistic perspective, contextualization, nonjudgmental orientation, and cultural interpretation. Holistic perspective refers to gaining a complete picture of the cultural group by discovering interrelationships among individuals and systems (56). Contextualization is important for discovering the meaning of behavioral patterns or beliefs of a group. The researcher should explore participants' behaviors within context, not only describe what is observed and understood from the researcher's perspective (56). As much as possible, it is important for the researcher to suspend personal valuation and have a nonjudgmental orientation, as personal biases and value judgements can hinder the researcher's ability to build rapport and receive factual data, which can lead to misinterpreting or inappropriately describing the culture (56). Different methods (e.g., journaling and discussing biases with research team members) can be used to acknowledge and avoid judgmental orientations that will negatively impact the research and findings. Finally, the researcher develops a cultural interpretation—a description of how the culture behaves, thinks, and ascribes value within the culture's reality—through carefully collected and analyzed data (56).

Emic and Etic Perspective

At the heart of ethnography is the *emic*, or insider's perspective of reality (56). The researcher must learn the *emic* perspective to understand and describe how people

within a given culture ascribe meaning to shared patterns of behaviors, ideas, and knowledge. The *etic* perspective is the outsider's or social scientific perspective on the reality of the culture being studied (56). The researcher filters what is learned from the *emic* perspective through the lens of the *etic* perspective to make sense of the data and provide the most accurate cultural interpretation (56). As noted near the beginning of this chapter, the philosophical assumptions and paradigm of the research approach used embrace a perspective that accepts multiple views of reality and meaning that is socially constructed and situated within a cultural context.

The researcher for this study has both an *emic* and *etic* perspective of junior enlisted Sailors. As an active duty Navy nurse, she has an insider's perspective of military and Navy culture and has experience working with and providing care for junior enlisted Sailors in non-deployed settings. She also brings an outsider's perspective. As a military officer who entered active service through the Reserve Officer Training Program (a four-year program aligned with undergraduate studies), she has no personal experience with recruit training and enculturation of enlisted service members. She has a scientific and clinical perspective of the potential influences of eating behaviors of junior enlisted Sailors because of her review of the literature, conversations with subject matter experts, and observations during clinical encounters. The researcher's situation within this study potentially aided in building rapport among junior enlisted Sailors. However, caution was exercised to avoid bias in data collection and analyses based on *a priori* assumptions and knowledge of the group. The researcher managed these biases through analytic memoing (brief narrative summaries of the researcher's reflections of the data), talking with committee members, and reflective journaling.

Fieldwork

Fieldwork is the hallmark of ethnography (56). The researcher gains a holistic perspective of the culture and discovers interrelationships through immersion with members of the group. Fieldwork most often involves participant observations, interviews, and artifacts (e.g., documents, objects, or other things that people use) (34). The researcher gathers information inductively and "make(s) cultural inferences from what people say, the way people act, and the artifacts people use" (p.8) (173). Fieldwork is truncated in focused ethnography, compared to traditional ethnography, and methods of data collection rely less on observations and more on interviews and artifacts (74). Nevertheless, the essence of fieldwork—working with and getting to know and understand people being studied—remains important in focused ethnography and was essential to this study.

Researcher as Instrument

The researcher is an information-gathering and analytical instrument in qualitative research (113; 189). The researcher makes observations, reviews artifacts (documents or photographs), develops interview questions, conducts interviews, and analyzes data in an iterative, recursive, and systematic manner. (34). As an analytic instrument, it is imperative that the researcher engages in reflection (looking outward) and reflexivity (looking inward) throughout the research process (160) to remain aware of personal biases and her position within the research study.

Reflexivity

Reflexivity refers to how researchers situate themselves within the study and should be conveyed to the reader by disclosing their background, how their backgrounds

inform interpretation of the study, and what they have to gain (34). Saldaña and Omasta (160) define reflexivity as "individual reflection on one's relationships with the data, the participants, and even with one's self as a researcher" (p.419). Another definition refers to reflexivity as the researcher's "self-understanding about the biases, values, and experiences that he or she brings to a qualitative research study" (Creswell & Poth, 2018, p. 229). Reflection and reflexivity were accomplished through reflexive journaling, analytic memoing, and conversations with members of the dissertation committee and individuals with knowledge of junior enlisted Sailors.

Steps in the Research Process

The following section provides a list and diagram (see Figure 4) of the steps in the research process for this study. A more in-depth description of pertinent steps follows this list.

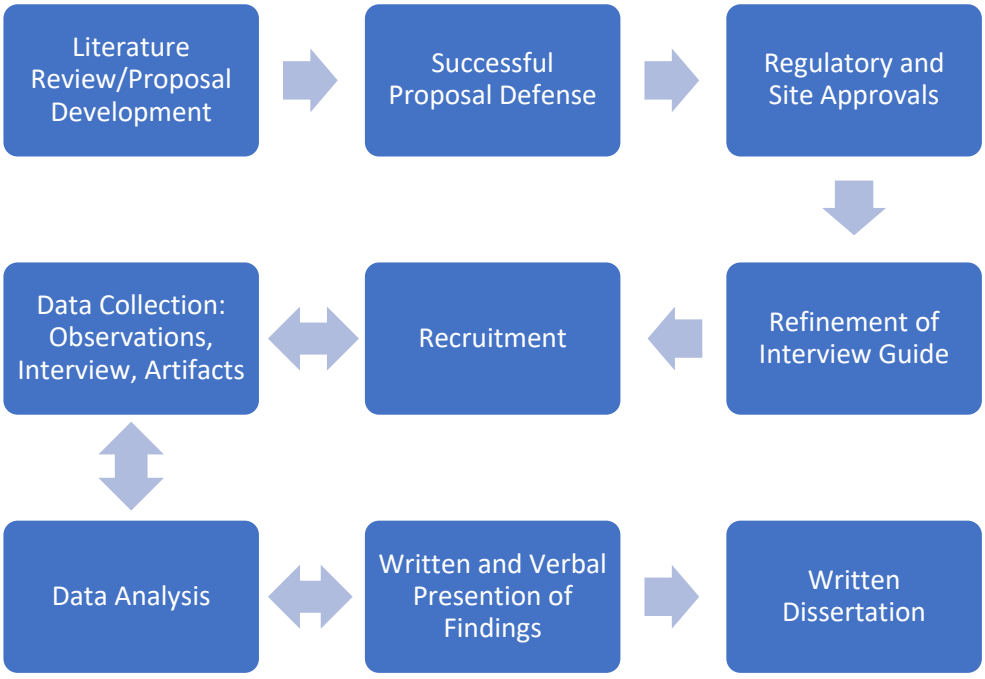


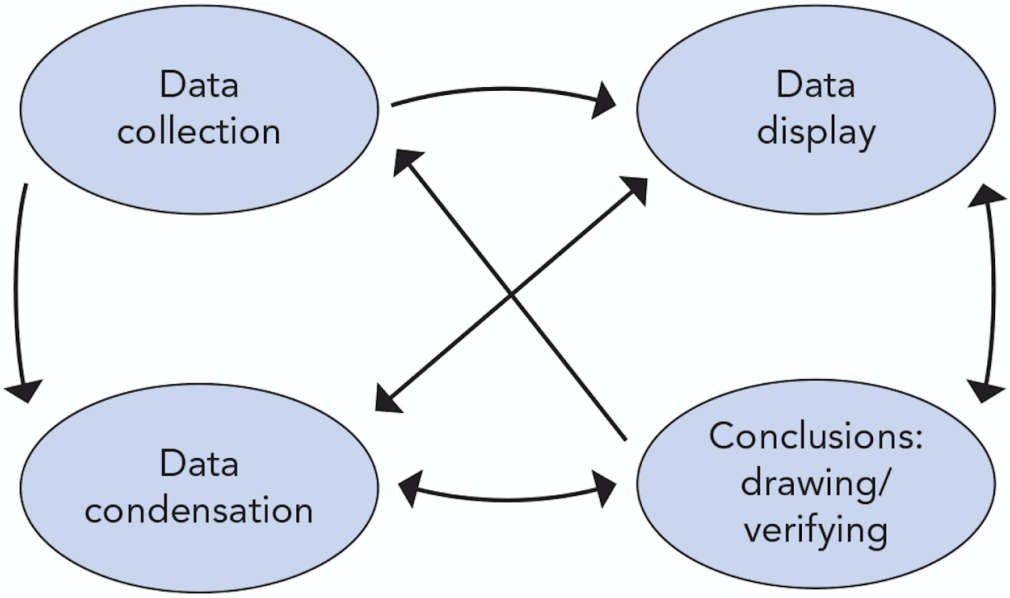
Figure 4. Steps in the research process

1. A selected review of the literature was conducted to study the work of other researchers in the broad areas of eating behaviors and determinants of eating behaviors among service members and emerging adult in the United States. Research gaps were identified, and a preliminary conceptual framework was developed to guide the research process.
2. The researcher obtained IRB and Navy survey approval following the proposal defense. During the approval process, the researcher obtained support from installation and facility commanders and communicated with potential gatekeepers to get a sense of the culture, population of interest, and feasibility of recruitment and data collection. The interview guide presented during the proposal defense was later refined and piloted with individuals similar to the study population before the first interview.
3. Potential participants were recruited through several IRB-approved methods, to include in-person recruitment, email, social media, and flyers.
4. Broad and focused observations were conducted in settings where potential participants live, work, and eat. Observations were ongoing throughout the data collection process and were documented in the researcher's field notes.
5. Semi-structured interviews were conducted with junior Sailors who agreed to participate. Participants completed demographic and dietary questionnaires following the interview. All interviews were recorded and transcribed verbatim for analysis.
6. Informal interviews were conducted with leaders of junior Sailors, healthcare professionals with knowledge of junior Sailors' eating behaviors, and

individuals connected to Navy food, nutrition, and housing policies. Interview conversations and emails were documented in the researcher's field notes.

7. Artifacts such as photographs of the built environment, flyers related to eating behaviors, and policy documents were obtained throughout the data collection process.
8. Items four through seven of this list were collected and analyzed in an iterative manner (113) to allow for constant comparison, member checking, and triangulation of the data (see Figure 5). NVivo (145), a qualitative data analysis software, was used to query all of the collected data and assist in the analysis process. The researcher met regularly (weekly-biweekly) with the methodology expert on the dissertation committee (hereafter referred to as mentor) throughout the data collection and analysis process. Data collection, particularly semi-structured interviews, concluded once the researcher, mentor, and dissertation chair believed data saturation was reached.
9. To ensure trustworthiness, the researcher presented research findings to individuals similar to the research participants or who have intimate knowledge of junior enlisted Sailors (issues of trustworthiness are described in Chapter 5). Outside individual interpretations of findings were reviewed and discussed with the mentor and considered in the final report.
10. A final version of the findings was presented to the dissertation committee in Chapter 4 of the dissertation.

Figure 5. Components of qualitative data analysis: Interactive model.



(113) p.10

Literature Review

An ongoing review of the literature was conducted to inform the study. Two topics of literature were identified: eating behaviors among service members and eating behaviors among emerging adults. The focus of the review was to gain a better understanding of what was known about the eating behaviors of these populations and influences of their food choices and eating habits to identify pertinent gaps in knowledge about determinants of eating behaviors of emerging adults in the military. The literature was guided by a social ecological framework for eating behaviors, and a preliminary conceptual framework was created, highlighting potentially relevant factors for exploration. A discussion of this conceptual framework is presented below. Throughout the data collection and analysis process, the researcher reviewed related empirical and

theoretical literature on eating behaviors, to make sense of the data and situate findings within established bodies of research.

Preliminary Conceptual Framework for the Research Study

A preliminary conceptual framework (Figure 6) was created to help focus the researcher on the "main things to be studied" (p.15) (113). This conceptual framework served as an evolving roadmap and was based on the social ecological model for eating behaviors (Figure 3) (180), salient factors identified in the literature review, and culture of health spheres of influence described by Safeer and Allen (157). As discussed in Chapter 1, spheres of culture influence within the workplace include leadership support, touch points (e.g., built environment), peer support, climate/morale, shared values, and norms. Accounting for culture of health elements in the framework encouraged the researcher to look for factors that may support or inhibit a culture of healthy eating among junior enlisted Sailors, thus providing practical implications for research, policy, and practice.

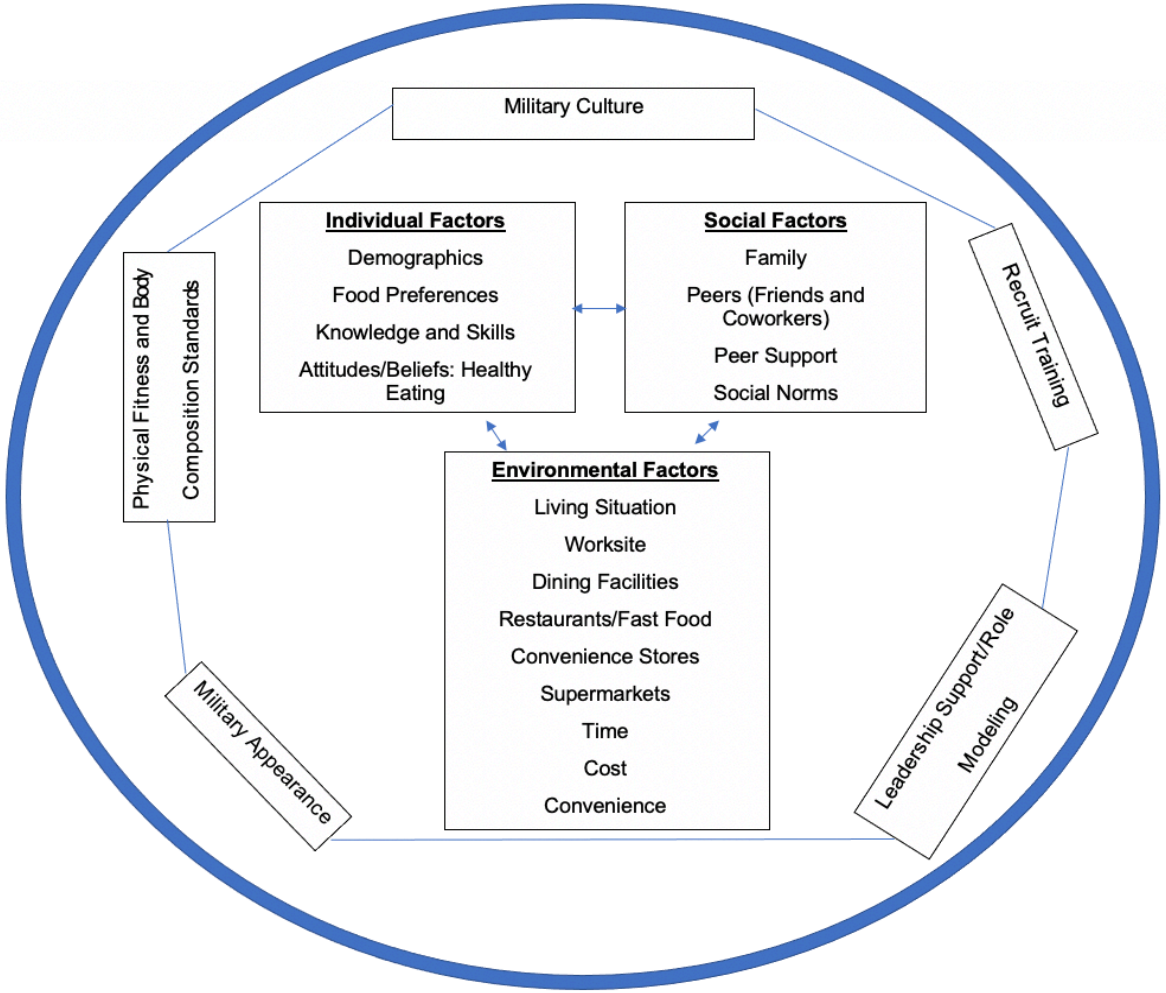


Figure 6. Preliminary conceptual framework for the research study.

The preliminary conceptual framework includes four levels of influence on eating behavior: individual factors, social factors, environmental factors, and military culture. Individual factors include demographic characteristics (e.g., race/ethnicity and military profession), food preferences, knowledge and skills related to nutrition and food preparation, and attitudes and beliefs about healthy eating. Social factors include social networks, such as family and peers, peer support, and social norms. Environmental factors include physical settings where Sailors eat and procure food. These factors include living situation (i.e., on base or off-base housing), work site, DFACs, restaurants, fast food outlets, supermarkets, and convenience stores and impact eating behaviors through food availability and access, time, cost, and convenience. Bidirectional arrows connect each of the first three factors mentioned, representing interconnected interactions. The military culture is the fourth level and graphically represented as a circle encasing individual, social, and environmental factors. Factors related to military culture include recruit training, leadership support and role modeling, military appearance, and physical fitness and body composition standards. Factors within the four levels were assumed to work directly and indirectly to influence eating behaviors among junior enlisted Sailors.

The use of theories or models in ethnography helps the researcher define and address the problem (56), connect initial findings, construct understanding and meaning from the data collected, and generalize findings about the studied culture (151). The preliminary conceptual framework was used to guide the development of interview questions, observations during fieldwork, and creation of a few *a priori* codes.

Protection of Subjects

Following a successful proposal defense, the Uniformed Services University's Human Research Protection Program (HRPP) Office reviewed the research protocol and determined the study to be considered exempt human subject research under Category 2 as defined by 32 CFR 219.104(d)(2). The protocol did not require Institutional Review Board (IRB) review because the research included only interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior.

The researcher ensured the protection of participants by complying with 32 CFR 219.116 regulations, DoDI 3216.02, and USU IRB policy (45; 143). Documentation of informed consent was not required based on the HRPP determination, but the researcher informed participants and individuals about the nature of the study and provided an information sheet with comprehensive information. To minimize the influence of rank, the researcher recruited, conducted interviews, and performed observations in civilian attire, except in circumstances where military attire was deemed more appropriate by command leadership and staff. Participants were informed that participation was voluntary and that they could withdraw at any time before publication of results. They were also informed that the researcher would not disclose research participation or withdrawal to anyone in their chain of command. This study did not provide direct benefit to participants and no compensation was provided in accordance with DoD Instruction 3216.02 (45). However, participants were informed that results of this study could lead to positive social, environmental, and policy changes that support and encourage healthy eating behaviors among junior enlisted Sailors.

All data collected for this study were de-identified and stored on a password-protected computer. The participant contact form and key (i.e., participant name and study ID) were kept in a separate password-protected file folder away from the other participant research data. All information was kept confidential in that each interview participant was assigned a study ID, with no identifying data appearing on the audio recording, notes or interview transcripts.

THE RESEARCH SAMPLE

Setting

The settings for this study were Naval bases in Maryland within the National Capital Region. Three bases were chosen based on feasibility, installation mission diversity, and the researcher's access to the installation and research population. The initial protocol included Naval Support Activity Bethesda (NSAB) in Bethesda, Maryland and Naval Support Activity Annapolis (NSAA) in Annapolis, Maryland. A third site was added, Naval Air Station Patuxent River (NAS Pax River) in Patuxent River, Maryland, due to temporarily restricted access to NSAB because of COVID-19-related restrictions. Adding the third site provided the researcher with a larger pool of potential participants and additional areas for observation without compromising the research methodology.

The three sites provided geographical and installation diversity to compare and contrast potential variations between the social and physical environments of the target population. NSAB supports more than 40 tenant commands, to include Walter Reed National Military Medical Center and the Warrior Transition Brigade. NSAB is situated in a densely populated and high-traffic U.S. region. NSAB provides many of the

amenities (e.g., fitness center), stores (e.g., retail shopping center), eateries (e.g., fast food venues) and dining facilities (DFAC or "galley") found on most military bases with the exception of a commissary (i.e., supermarket). NSAA is situated in a more remote location and supports several tenant commands, including Naval Health Clinic Annapolis and the U.S. Naval Academy. Supporting the U.S. Naval Academy is arguably NSAA's top mission and as such may represent an older and more affluent community at least in terms of Navy culture and general officers compared to NSAB. Unlike NSAB, NSAA has a commissary but no galley for service members. Finally, NAS Pax River has more than 50 tenant commands, including Naval Health Clinic Patuxent River and Naval Air Systems Command (NAVAIR), and is home to a full range of research, development, test, and evaluation (RDT&E) for all of naval aviation. NAS Pax River has many of the amenities, stores, and eateries of a typical military installation, including a commissary, but it does not have a galley.

These three bases are responsible to Commander, Naval Installations Command (CNIC), who is responsible for the Navy's shore infrastructure, including operations, maintenance, and quality of life programs. Junior enlisted Sailors are stationed at all of these sites and were assumed to be representative of the cultural group. This assumption is based on the researcher's knowledge that young junior enlisted Sailors frequently are assigned to shore bases for a variety of reasons (e.g., manning requirements, personal desires, etc.), leading to heterogeneous groups across Naval bases.

Sample

Stratified, purposeful sampling was used to target junior enlisted Sailors stationed on NSAA, NSAB, and NAS Pax River. Inclusion criteria included rank of E1 to E4, age

18 to 25 years old, and rating of Hospital Corpsman (HM) or Masters-at-Arms (MA). The Navy classifies junior enlisted Sailors as E4 and below, and the age range for emerging adulthood is 18 to 25 years (7). HM and MA are two of more than 50 enlisted ratings (occupations) in the Navy and can be found at almost any shore naval installation. HM is an enlisted medical specialist trained to provide a wide range of medical care (e.g., in-patient and out-patient services) to service members and DoD beneficiaries in deployed and non-deployed settings (47). MA is an enlisted security specialist who provides force protection, anti-terrorism, physical security, and law enforcement in deployed and non-deployed settings (47). These two service ratings (HM and MA) were selected to account for different occupational perspectives and control for variations among the many Navy ratings of junior enlisted Sailors.

In most instances, the intent of qualitative research is not to generalize findings, but to elucidate the particular and the specifics of the phenomenon of interest (34). Determining the sample size for a qualitative study "generally follows the guidelines to study a few individuals or sites, but to collect extensive detail about the individuals or sites studied" (p.327) (34). A target number of participants may be identified as part of the sampling strategy or out of necessity for regulatory protocol requirements, but the final number of participants is based on data saturation. Data saturation refers to the researcher's assessment that no new salient information is presented with subsequent data collection or "an intuitive feeling that they are learning nothing new about the site and its participants" (p.47) (160). The target number of participants for this study was 60 junior enlisted Sailors (30 MAs and 30 HMs). This number was based on the high end of sample sizes reported in qualitative studies of eating behaviors among U.S. Veterans

(170), Drill Sergeants (81) and college students (172). These studies used different qualitative methods (not focused ethnography) and primarily included focus groups, not individual interviews. A targeted enrollment plan (see Appendix A) was used to recruit a demographically (i.e., sex, race/ethnicity) representative sample of junior enlisted Sailors in the Navy based on data from the FY19 Total Force Demographic Report: https://www.navy.mil/strategic/Navy_Demographics_Report.pdf). The researcher concluded recruitment once data saturation was reached. This decision was discussed and approved by the mentor and dissertation chair.

Recruitment

A big-net approach that includes "mixing and mingling" with the culture and keeping a "wide angle view of events" was used to recruit participants (56). IRB-approved recruitment flyers were posted in usual gathering places (e.g., clinics, fitness centers, dining facilities) and communication venues (e.g., newsletters and email groups) at each of the research sites. The researcher connected with gatekeepers through in-person meetings, phone calls, and emails during the protocol development phase and throughout the early stages of recruitment to discuss the nature of the study and potential implications, build rapport, and gain unencumbered access to the target population (34; 122).

The researcher maintained ongoing communication during data collection and data analysis with gatekeepers as needed. Gatekeepers included commanding officers, executive officers, senior enlisted leaders, and unit leaders (officer and enlisted). Gatekeepers assisted with disseminating approved emails with flyers about the study, provided information during informal interviews, and in some instances, served as key

informants. Key informants are accessible and well-informed individuals who can provide knowledge and connections to members of the culture or pertinent information (34).

The researcher also engaged in limited active recruitment efforts. One engagement was at the Naval Health Clinic Annapolis, where a recruitment table was set up with flyers and a sign-up sheet. No other similar engagement was conducted because of COVID-19 restrictions. However, the researcher engaged in active recruitment during small unit group meetings (i.e., "muster" or "guard mount") where the researcher was granted access to talk with potential participants about the study in an open forum. During these recruitment efforts, the researcher provided a brief overview of the study and stayed around to answer questions, signed Sailors up for the study, or conducted on-the-spot interviews. Lastly, the researcher employed snowball sampling by asking participants to tell similar others about the study and encouraging eligible individuals to participate.

DATA COLLECTION METHODS

Ethnographic research involves multiple methods of data collection, which occur iteratively and recursively with data analysis. These methods include on-site fieldwork, observations, formal (semi-structured) and informal (unstructured) interviews, and artifacts (e.g., documents, photographs, or records that provide clarity or meaning of phenomenon within a culture) (34; 122). Each of the aforementioned methods were employed in this study, but semi-structured interviews, rather than participant observations, were the principal method of data collection because this was a focused ethnography and not a traditional ethnography (74). These methods were chosen to assist

the researcher in creating an adequate cultural description that uncovers explicit cultural knowledge and tacit knowledge (173) of junior Sailors' eating behaviors. Methods of observations, interviews, and artifacts are discussed below and may appear to be linear in the collection processes; however, the reader is reminded that the process of data collection was iterative, moving from a broad to narrow focus. Lastly, fieldwork is not discussed as a separate method of data collection, as fieldwork—data gathering in the field—was encompassed while conducting observations and interviews and collecting artifacts. Fieldwork began during protocol development with the researcher making connections and developing relationships with gatekeepers and key informants and continued throughout data collection and data analysis. The researcher met with the mentor frequently throughout data collection and data analysis to discuss findings, assumptions, propositions, and emerging themes.

The researcher proposed spending approximately four months observing behavior, listening to conversations, and asking questions in public settings frequented by participants. Data collection began in March 2020, just days before the DoD, military bases, and local authorities instituted restrictions on travel and social gatherings due to COVID-19, and ended in October 2020 with most restrictions remaining in place. These restrictions impacted recruitment and data collection, particularly observations and in-person interviews, primarily by limiting access to participants and observations of behaviors. Additionally, routine behaviors such as eating lunch in a restaurant or military dining facility were different during this time period, with some services closing and others altering the method of service (e.g., carryout only). Despite these restrictions, the researcher carried out data collection as proposed and described below.

Observations

Participant observation is a crucial component of fieldwork and involves close contact and immersion within the culture to discover recognizable patterns, identify ritualistic behavior, and understand the culture. Roper and Shapira (151) identified four levels of ethnographic observation—participant, participant-as-observer, observer-as-participant, and observer—ranging from the most engaged and time-intensive to the least level of engagement by the researcher. The level of observation for this study was constrained to the latter two levels of observation (observer-as-participant and observer) because of the researcher's position as a military officer and the timeframe for conducting the dissertation research.

Military regulations and customs dictate that the relationship between officers and enlisted personnel maintain good order and discipline and avoid real or perceived fraternization in professional and social situations. Thus, the researcher conducted participant observations in a manner that avoided the perception of coercion and fraternization, and limited intensive observations in situations where military officers and enlisted personnel do not normally mingle (e.g., barracks lounge areas and after-hours enlisted-only social gatherings). To mitigate the challenges associated with limited observations, the researcher worked to develop rapport with command leadership and gatekeepers before data collection and asked for their input on areas to observe eating-related behaviors. Additionally, photo-elicitation—the use of photographs during interviews—was used to fill gaps with limited observations by gaining visual data on places where junior enlisted Sailors eat and prepare food and where the researcher may

not have access (89). Photo-elicitation is discussed in more detail in the section on interviews.

The researcher conducted observations at the levels of observer-as-participant (brief and formal interactions) and observer using methods described by Spradley (174) to identify patterns of ideas, beliefs, and eating behaviors of junior enlisted Sailors and triangulate information gathered from interviews and artifacts. This method involved beginning with descriptive observations, moving toward focused observations, and ending with selective observations. The researcher began with "grand tour observations" by identifying social situations related to influences of eating behaviors of junior enlisted Sailors, focusing on the elements of place, actor, and activity (174). Grand tour observations can be thought of as someone giving you a tour of their home or office space to get a lay of the land or general overview. In some instances, the researcher was given grand tours by gatekeepers of installations and work sites, and in other instances, the researcher engaged in her own grand tours. Following grand tour observations were "mini-tour observations" in which the researcher dealt with smaller experiences (174). Examples of observed social situations included participants' work areas and breakrooms, on-base dining facilities and eateries, on-base shopping centers and convenience stores, on-base areas where participants engage in social eating (e.g., bowling alleys), and off-base restaurants, eateries, and shopping centers within close proximity to the research sites.

In the beginning phases of the study, observations were global and descriptive and guided by *a priori* themes derived from the conceptual framework and nine major dimensions of social situations: (a) space (the physical place or places), (b) actor (the

people involved), (c) activity (a set of related acts people do), (d) object (the physical things that are present), (e) act (single actions that people do), (f) event (a set of related activities that people carry out), (g) time (the sequencing that takes place over time), (h) goal (the things people are trying to accomplish), and (i) feeling (the emotions felt and expressed) (174). Using *a priori* themes and the nine dimensions, the researcher considered a variety of questions to identify pertinent data. Whereas the researcher did not follow a prescribed set of questions with each observation, she did repeatedly consider questions such as, "Can I describe in detail the eateries on an installation?" (space) or "Where do Sailors eat during working hours?" These initial observations helped the researcher identify important domains or areas for focused observation.

During focused and select observations, the researcher examined social situations with knowledge gained from previous observations and ongoing interviews, by using emerging themes and the nine dimensions previously mentioned to refine and clarify assumptions. For example, during observations, the researcher asked and answered questions such as, "Who is involved in organizing and patronizing command potlucks?" (actor/activity). The researcher also used structural questions to guide the focused observations. Structural questions are those that get at the particulars of or semantic relationships within an identified domain (174). For example, "the galley" is a domain, and "kinds of people who eat in the galley" or "kinds of food served in the galley" are semantic relationships within the domain. Structural questions pertaining to these domains could include, "What are all the kinds of foods served in the galley during lunch?" or "Who sits down to eat in the galley during operating hours?" During selected observations, the researcher asked contrast questions, questions based on differences

among domains (174), to identify cultural meaning and clarify assumptions and propositions. These could include questions such, "What are the differences between Sailors who bring their lunch to work and Sailors who order food for lunch during work?" Given the iterative nature of data collection and data analysis, the researcher can obtain answers to any of the aforementioned questions from memory of previous observations, new observations, or field notes (174).

Field Notes and Analytic Memos

Field notes are foundational to ethnography and include data from observations and interviews (56). Field notes can be written and organized in different ways depending on the nature of the study and researcher's preference; however, the most important rule is to write down the most pertinent information comprehensively and immediately (or as soon as possible) after observations and interviews (56). Field notes were compiled from jottings—quickly written hand notes with brief descriptions, symbols, or quotes (160)—created during observations and informal interviews. Jottings provide a way for the researcher to make note of important details while remaining engaged in the activity or observation. The researcher transcribed detailed field notes on a word processing application for all observations and informal interviews (described below) within hours to a maximum of three days following the activity. Based on recommendations in the literature (34; 56; 160; 173; 174), all field notes included the following: (a) day and date, (b) specific location or observation, (c) start and end time of fieldwork, (d) a descriptive or evocative title, (e) descriptions of the setting, event, or conversation, including answers to the types of questions described above, (f) direct quotes, (g) the researcher's reflections of the event, (h) emerging questions and analysis, and (i) future actions. All

field notes were numbered sequentially for easy retrieval and uploaded to NVivo (145) for query and analysis.

In addition to field notes, the researcher also captured reflections and ongoing analysis in a research journal and analytic memos. Research journal entries were less formal than the field notes described and included the researcher's more personal thoughts and reflections of the data and research process. In contrast, analytic memos are brief narrative summaries of the researcher's reflection and thinking processes that provide clarity or insight into the meaning of the data, a higher level of synthesis, and an audit trail for validation (34; 113). The researcher wrote analytic memos almost always during periods of analysis while reading field notes, interview transcripts, documents, or photographs. Analytic memos were written and maintained in NVivo (145). No documentation contained personally identifiable information (PII).

Interviews

Interviews are social interactions that provide a means of building rapport with members of a culture and serve to classify and organize the *emic* perspective (56). Semi-structured individual interviews with junior enlisted Sailors were the primary method of data collection for this study. The researcher also conducted informal interviews of leaders and other relevant individuals during periods of observations or as a standalone.

Semi-structured Interviews

The researcher conducted semi-structured interviews of junior enlisted Sailors who met the study's inclusion criteria and agreed to participate. Participants were given an information sheet, a verbal overview of the study, and an opportunity to ask any questions before the interview. Participants were informed that the interview would be

audio recorded and that the researcher was obligated to report any information disclosed that violates the Uniformed Code of Military Justice. They were also informed that they could stop the interview at any time or provide comments "off the record." No participant chose to stop recording or provide information "off the record." Documentation of informed consent was waived as previously described, and interviews were conducted only after participants gave verbal consent to be interviewed. Participants were given the option to interview in person, via video conference, or by telephone. The latter options were a necessity during times when the researcher had to maintain physical distance because of COVID-19 restrictions. In-person interviews took place in a mutually agreed upon semi-private location (i.e., location where conversations could not be overheard by others) on NSAB, NSAA, and NAS Pax River. Participants were given a study ID generated in the following format: EB01, EB02, and so on, with EB01 given to the first participant.

All interviews were audio recorded on two devices as a precaution in the event of a malfunction with one of the recording devices. NVivo transcription service was used to transcribe all recorded interviews. NVivo transcription allowed the researcher to upload audio recordings to a password-protected NVivo account using a secure cloud service and electronically transcribe the interview in approximately half the time of the actual recording. The transcription service is Health Insurance Portability and Accountability Act (HIPAA) compliant. The researcher conducted quality controls for every interview transcribed with the NVivo service, ensuring verbatim transcription. Once the initial quality control was completed, the researcher reviewed the final transcript against the

audio recording and made corrections as needed. The mentor provided a second verification of transcription accuracy of three interviews selected at random.

The researcher conducted semi-structured interviews by using ethnographic interview methods described by Spradley (173). This method involved beginning with a "grand tour" or broad picture question to define the boundaries of the interview and following with more specific subsequent questions to provide meaningful data to answer the research question (173). The interview method paralleled the methods of observation described above with descriptive, structural, and contrast questions to gain depth and meaning (173).

An interview guide was used for all semi-structured interviews and was minimally modified with subsequent interviews. The interview guide provides flexible structure to the interview, ensuring data is collected comprehensively and systematically to answer the research question (34). A copy of the initial interview guide is provided in Appendix B. The interview guide included an introduction, ground rules, and open-ended questions with prompts and probes. The interview questions were structured to elicit data for the three specific aims. Prompts and probes were used when the researcher wanted to elicit more information on a topic or sought clarification. Examples included silence or statements such as "tell me more about that." Before the first individual interview, the researcher consulted with subject matter experts to refine the interview questions and piloted the interview guide with enlisted Sailors to ensure the questions were worded appropriately to elicit meaningful responses.

All of the interviews began with the same two ice-breaker questions: "How long have you been at the command?" and "What's one of your favorite foods?" These

questions served to create a relaxed and comfortable environment and also provided some context for the interview. The final interview question gave participants the opportunity to provide any additional information they wanted to share. Participants were asked to complete a basic demographic questionnaire (see Appendix C) and a questionnaire related to dietary intake (see Appendix D) at the end of the interview. These questionnaires were used to describe the research sample and provide artifacts on their reported dietary quality. The questionnaires are described at the conclusion of this section. The researcher wrote brief analytic memos immediately following each interview to document initial thoughts, contextual data, and ideas related to the interview. Comments included elements such as the participant's composure, the researcher's self-evaluation of the interview process, and hunches to be explored in subsequent interviews or observations. Analytic memos were documented in NVivo (145).

Photo Elicitation

The researcher used photo elicitation as a method to supplement gaps in observations and gain insider information on places where participants eat and prepare food, which the researcher may not have access to. Photo elicitation has been used as a primary and supplementary method of data collection in qualitative research since 1957 (72; 89; 114). Photo elicitation involves the use of photographs—taken by participants or selected by the researcher—during the interview process to elicit deep and meaningful talk, provide visible data that otherwise may be invisible to the researcher, or reduce areas of misunderstandings (72; 89). Interviewers may choose to discuss photographs at any point during the interview, as an ice-breaker to frame the interview or as a way to clarify or amplify verbal data.

Junior Sailors who provided verbal consent were asked to provide photographs of places where they usually ate, elements that depicted barriers or benefits to healthy eating behaviors, or food preparation and food storage areas in their living or workspaces. Participants were informed that providing photographs was completely optional and that photographs could not include people, including themselves. Participants were asked to email or text photographs before the interview but given the option to bring them (in print or on the participant's phone) if they forgot. Photographs were discussed at the end of the interview by using questions or statements such as, "Tell me about the photos you sent/brought." Photographs were uploaded to NVivo (145) and linked to the participant interview for analysis.

Informal Interviews

The researcher conducted informal interviews (in person and via phone) with leaders, individuals within the observed settings, and individuals outside of the observed setting, but who had knowledge of or connections to the eating behaviors of junior enlisted Sailors (e.g., Navy dieticians and Navy Exchange Food Service representatives). Informal interviews are casual conversations that further help to discover categories and meaning, identify values, and confirm or elucidate data gathered from semi-structured interviews, observations, or artifacts (56). The researcher did not use an interview guide for informal interviews, nor were the interviews recorded. Written informed consent for these discussions was not obtained, but the researcher was transparent and forthcoming about her identity and reasons for inquiry (gathering data for a research study on eating behaviors of junior enlisted Sailors). Verbal affirmative consent was assumed if individuals willingly engaged in conversation and answered questions. The researcher

wrote field notes for individual interviews as described in the observation section. The researcher also maintained records of email communication with people who might have engaged in informal interviews but communicated via email for other reasons such as convenience or brief responses to questions. The researcher was forthcoming about the reasons of inquiry and record keeping (i.e., email communication) for those with whom she communicated with via email. Email communication was also documented in the researcher's field notes.

Artifacts

Artifacts include different sources of data such as objects, documents, photographs, and audio or visual recordings that help the researcher to understand and describe characteristics of the cultural group (34). Artifact analysis can assist the researcher in understanding explicit and tacit knowledge and provide context to data gathered from observations and interviews (122). Artifacts in this study included signs or flyers related to food and eating at military bases, military and/or command policies and procedures, and information on public and social media channels related to eating behaviors of junior enlisted Sailors. Artifacts (documents and photographs) were uploaded to NVivo (145) for analysis.

Questionnaires

A demographic questionnaire (see Appendix C) and the Healthy Eating Score-7 questionnaire (see Appendix D) were administered to interview participants to obtain descriptive quantitative data on participants' demographic characteristics and overall dietary quality. The demographic questionnaire included information related to age, sex,

race/ethnicity, rate, years of active service, living situation, members within the household, and self-reported height and weight.

The HES-7 is a seven-item self-report questionnaire designed to rapidly assess overall dietary quality of service members and is adapted from the Healthy Eating Index 2015 (HEI-2015) questionnaire that assesses the extent to which individuals comply with 2015-2020 Dietary Guidelines for Americans (167). HES-7 assesses seven dietary components (fruit, vegetables, dairy, whole grains, fish, post-exercise snacks, and sugar-sweetened beverages) via seven questions rated on a 5-point scale, with higher total sum scores indicative of higher dietary quality. Reliability of HES-7 has not been reported. However, internal consistency (Cronbach $\alpha = 0.81$) of HES-5 was reported in a study of 13,858 service members with a mean age of 28 ± 9 years. Data from the HES-7 provided a global assessment of participants' self-reported dietary intake and was used as an artifact to compare to qualitative responses provided during semi-structured interviews.

Participants completed both questionnaires electronically on Google Forms following the interview. Study IDs were included on the questionnaires to accurately link the questionnaires with the same participant's semi-structured interview. Questionnaires took no longer than five minutes to complete. The researcher sent a link to complete the questionnaires to participants who were interviewed virtually. Follow-up messages were sent to participants who did not complete the questionnaires within 24 hours.

METHODS FOR DATA ANALYSIS AND SYNTHESIS

Ethnographic data analysis is a continuous and iterative process, beginning with the first iteration of data collection (173). As previously mentioned, the researcher worked closely with a mentor during data collection and data analysis to ensure accuracy

in the methodology, examine the researcher's potential biases, and evaluate the credibility of findings. The researcher and mentor met almost weekly or biweekly for two to three hours to discuss and analyze data. Data collected from observations, interviews, and artifacts were analyzed concurrently and triangulated to provide a thick description of the culture. Thick description is the researcher's written record of a detailed, comprehensive, and contextual description of the cultural scene or phenomenon studied within a cultural context (56). "The goal is to represent reality concisely and completely but not to reproduce every word in detail" (p.126) (56).

Triangulation

Triangulation involves comparing and contrasting the different forms of information collected to identify patterns, confirm assumptions, and make sense of the data (56). Miles and colleagues discuss triangulation as, "a way to get to the findings in the first place—by seeing or hearing multiple *instances* of it from different *sources* by using different *methods* and by squaring the findings with others it needs to be squared with" (p. 294) (113). The researcher triangulated by data source (e.g., participants and military bases), method (e.g., interviews and observations), and data type (e.g., quantitative data and interview transcripts) at multiple time-points to verify data, confirm assertions, enhance the quality of the data, and provide strength and accuracy to the findings and conclusions.

Steps in the Data Analysis Process

The researcher followed the iterative and cyclic qualitative data analysis process described by Miles et al. (113), which includes four concurrent processes for data analysis: data collection (discussed above), data condensation, data display, and drawing

and verifying conclusions (see Figure 5). The researcher also used ethnographic analysis methods (i.e., domain analysis, taxonomic analysis, and componential analysis) described by Spradley (173; 174) to ensure cultural analysis and interpretation of the data. These two methods were complementary and consistent with basic paradigms and assumptions of qualitative research methodology and ethnography. The concurrent processes of data condensation, data display, and drawing and verifying conclusions, including Spradley's analysis methods, are discussed below.

Data Condensation

Data condensation is "the process of selecting, focusing, simplifying, abstracting, and/or transforming the data that appear in the full corpus (body) of the written-up field notes, interview transcripts, documents, and other empirical materials" (p. 8) (113). Anticipatory data condensation occurred with the development of the research question and selection of the conceptual framework (113). The researcher continually condensed data concurrently with data collection to focus and organize the data in a way that strong conclusions could be drawn and verified.

With support from the mentor, and an NVivo consultant, the researcher used NVivo (145) to organize and query all written (e.g., interview transcripts) and visual (e.g., participant photographs) data for analysis. Data were organized according to data type (e.g., transcripts, field notes, participant photographs, and memos) and read or reviewed several times to gain familiarity and a general sense of the data before organizing into codes, categories, or themes (34). All interview transcripts and field notes were coded, and where appropriate, artifacts (e.g., policy documents and photographs) were also coded. Coding involves organizing texts into summative and salient words or

short phrases termed "codes" (113). Codes are researcher-generated labels—ranging from descriptive to complex—that give meaning to small or large portions of data. Various coding methods can be used based on the research question and/or the research method (159).

The researcher followed first and second cycle coding methods described by Saldaña (159), which involves the initial process of labeling the data (first cycle) and then recoding, reorganizing, and reanalyzing data coded during the first cycle (second cycle). An eclectic combination of descriptive, *a priori*, *in vivo*, process, and value codes were applied to the qualitative data (159) during first cycle coding. Descriptive codes are words or short phrases that summarize the basic topic of the data and are appropriate for ethnographies and various data forms (159). *A priori* codes, also referred to as provisional codes, are predetermined words or phrases developed from preparatory work such as the literature review or conceptual framework related to a study that can be "revised, modified, deleted, or expanded to include new codes" (p.168) (159). *In vivo* codes are useful for capturing the *emic* perspective, as they are words or phrases used by the participants themselves (159). Process codes are gerunds ("-ing" words) that label or summarize observable and conceptual actions (159) and are useful for identifying behaviors and patterns of a cultural group. Finally, value codes are words or phrases that capture participants' values, attitudes, and beliefs and can be useful for research that explores cultural values and belief systems (159). Table 1 provides a list of some of the codes created in first cycle coding.

Table 1. Example of codes created during first cycle coding

Descriptive Codes	*A Priori* Codes	In Vivo Codes	Process Codes	Value Codes
weight management	access	"a setback"	snacking	mission accomplishment
culinary literacy	availability	"try to eat healthy"	dieting	warfighter readiness
shift work	cost	"the galley"	living in the barracks	health orientation
fast food	convenience	"days off	fundraising with food	do the minimum

During first cycle coding, the researcher, with oversight from the mentor, applied definitions to codes, wrote reflections of the codes, reviewed pertinent literature, kept an audit trail of code revisions and deletions, discussed emerging thoughts and ideas with members of the dissertation committee, and created a codebook. A codebook is "a compilation of codes, their content descriptions, and a brief data example for reference" (p. 27) (159). The researcher coded the first three interview transcripts independently and reviewed each coded transcript line by line with the mentor to ensure thoroughness and accuracy of coding. During these initial code review meetings, the researcher provided rationale for coding methods and revised any discrepancies or concerns presented by the mentor. Once the mentor was confident in the researcher's coding, subsequent meetings involved discussions of the evolving codebook, analysis, and emerging categories and themes.

Second cycle coding involved finalizing the codebook and making domain and taxonomic analyses based on methods presented by Spradley (173; 174). The codebook contained: (a) the code; (b) the definition of the code based on the researcher's analysis of the data and/or the literature; (c) an exemplary quote; (d) an indicator if it was an *a priori* ("P") or *In vivo* ("Inv) code; and (e) a classification label related to the presumed level of influence within the social ecological framework (e.g., individual factor or

physical environment). An excerpt of the codebook is shown in Figure 7.

Codes

Name	Description	Files	References
A goal	INDIVIDUAL FACTOR: Eating behaviors influenced by reaching a personal goal, usually related to body weight or composition (e.g. weight loss for a wedding). Exclusion: Does not include PRT - making weight. EB18: "So normally they change eating habits so that they can lose weight to achieve their goal…after they achieve that goal, they will stop doing it."	5	7
A School (InV)	PHYSICAL ENVIRONMENT: The influence of "A" School on eating behaviors. This includes the food environment, leaders, and rules/norms. Also includes "C" School EB11: " In "A" School, everybody ate like trash."	12	47
A setback (InV)	CULTURAL ENVIRONMENT: Feelings of regression, lack of agency, and setbacks due to military policies/service. Possibly more common among older sailors. EB15: "And then I joined, it was almost like a setback in my life as far as like my adult level cause I was cooking regularly and like healthy."	3	7
Access (P)	PHYSICAL ENVIRONMENT: Refers to the accessibility (foods in plain view, can I see it, can I get to it easily) of foods as an influencers on eating behaviors. In general, food/store/etc. must be available to be accessible. EB01: "It's super easy because the commissary is right there." EB22: "…then just accessibility of of fast food. You know, you have uh Panda Express right here on base."	10	15
Availability (P)	PHYSICAL ENVIRONMENT: Refers to the availability (is it there/do we have it) of food and food establishments as an influencers on eating behaviors. In general, food/store/etc. can be available, but may not be accessible. EB20: "I usually order breakfast from somewhere because we don't have a galley, so it's not like we have any option."	14	26

Figure 7. Excerpt from codebook

The reader is reminded that many of the data collection and data analysis steps described in this chapter occurred in parallel and not sequentially. Domain and taxonomic analyses occurred during first cycle coding with identifying *cover terms* for potential domains and taxonomies and after the codebook was finalized. Cover terms are names for categories (i.e., domains) and are derived from *folk terms*—participants' names for things—or *analytical terms*—the researcher's names of things when folk terms are not generated by participants (173). Domains are symbolic categories that include other categories referred to as taxonomies (173). For example, the domain of this chapter and its cover term could be labeled *research methods*. Continuing with this example, the taxonomy of terms included in the domain *research methods* could be the categories *data collection and data analysis* and subcategories *observations, interviews, and artifacts*.

The researcher carried out each of the following interrelated steps recommended by Spradley for conducting domain analysis (p.118) (173):

1. Select a single semantic relationship.
2. Prepare a domain analysis worksheet.
3. Select a sample of informant statements.
4. Search for possible cover terms and included terms that appropriately fit the semantic relationship.
5. Formulate structural questions for each domain.
6. Make a list of all hypothesized domains.

A semantic relationship is the relationship that exists between the meaning of words or phrases that are often apparent when identifying folk terms (173). Spradley proposed nine universal semantic relationships for beginning an analysis (see Table 2.) (173) (p.111)

Table 2. Spradley's proposed universal semantic relationships

Strict inclusion	X is a kind of Y
Spatial	X is a place in Y, X is a part of Y
Cause-effect	X is a result of Y; X is a cause of Y
Rationale	X is a reason for doing Y
Location for action	X is a place for doing Y
Function	X is used for Y
Means-end	X is a way to do Y
Sequence	X is a step (stage) in Y
Attribution	X is an attribute (characteristic) of Y

The researcher began with looking for strict inclusion relationships (X is a kind of Y) and reviewed field notes and interview transcripts to identify cover term and included terms. For example, one major domain includes *kinds of eating behaviors* (the researcher's analytical terms). Figure 8 provides an excerpt of analysis. Words or phrases in

quotations are the participants' language. Words or phrases not in quotations are the researcher's descriptions or interpretations based on review and analysis of the data.

Kinds of Eating Behaviors

A. "Dieting"
1. "Counting Calories/Macros"
2. "Snake Diet"

B. "Snacking" (Grabbing something)
1. Grazing
2. "Eating something to keep you going."

C. Skipping Meals
1. "Skip breakfast"

D. Restrained Eating
1. "Watch what you put in your body"
2. "Try not to eat too many snacks"

E. Regimented Eating
1. "Eating on a schedule"*
2. "Keep everything the same, but kind of different"
3. "Stricter diet"

F. "Sporadic Eating"
1. "Whatever you can eat when you can take it."

G. Disordered Eating
1. "Not eating at all"
2. "Eating less than normal"
3. "Very, very, crazy crazy fad diets"

Figure 8. Excerpt from domain analysis – *Kinds of Eating Behaviors*

The researcher identified numerous folk terms and domains for analysis. These domains were reviewed with the mentor, and those domains relevant to the specific aims were fully explored using Spradley's methods. Through this analysis, the researcher identified important "native categories" and developed a focused overview of the cultural scene (173).

Data Display

Data display involves organizing and assembling the data to provide analytic reflection and action and may include extended text, matrices, networks, and graphs (113). Data display provides a condensed visual method for analyzing large amounts of data. The researcher used various types of data displays, to include tables, matrixes, and visual models, to explore, describe, explain, and make predictions with the data (113). For example, matrixes were created to explore variations in eating behaviors and influences among groups, and visual models helped to make connections from sequence domains (e.g., stages in acculturating to military life/food environments).

The researcher also used displays when making componential analysis by using Spradley's method (173; 174). "Componential analysis is the systematic search for the attributes associated with cultural categories" (174) and builds on the work of domain and taxonomic analysis. Within a domain, the researcher identified dimensions of contrasts between categories that have binary and multiple values (e.g., *Kinds of Sailors*) and plotted these data in simple tables to quickly and comprehensively identify nuances within the culture related to the phenomenon of interest. Because of the iterative nature of data collection and data analysis, the researcher asked selective questions and conducted selective observations when applicable in subsequent interviews to fill gaps in the analysis (173; 174).

Drawing and Verifying Conclusions

During the stream of drawing and verifying conclusions, the researcher "interprets what things mean by noting patterns, assertions, propositions, explanations, and causal flow" (p.9) (113) from the start of data collection to the final written report. The researcher employed various tactics described by Miles et al. (113) to minimize bias, test

or confirm meaning, and draw conclusions. These tactics included: (a) noting patterns and themes, (b) seeing plausibility, (c) clustering, (d) counting, (e) making contrasts and comparisons, (f) partitioning variables, and (g) subsuming particulars into the general. Each of these tactics was employed in concert with, or as part of, the data condensation and data display processes described above, and during meetings with the mentor. For example, noting patterns and themes and clustering occurred while reading and reflecting on the data, during first and second cycle coding, and identifying overarching themes. The researcher employed counting when exploring how frequently certain issues were reported or the number of participants that mentioned a certain concept. Counting is not quantitative analysis, but is important when making generalizations about the data, such as estimates on the recurrence or "significance" of a particular (113). Greater frequency of a particular or occurrence does not inherently imply greater significance of a concept or issue under study; the researcher must consider the data corpus with contextual information to determine what is meaningful.

The final stages of drawing and verifying conclusions manifested in identifying cultural themes related to the specific aims (174). As described in the section on data condensation, data were initially condensed into codes, domains, and categories. Throughout the analysis processes, the researcher, in consultation with the mentor, identified themes that represented different particulars of the data. Themes emerged during the process of making contrasts and comparisons of data, identifying stages in certain processes, and recognizing generalities of particulars.

Quantitative Data Analysis

Questionnaire data completed in Google Forms populated to Google Sheets. The data were reviewed in Google Sheets for accuracy and exported to Excel, where they were cleaned and independently reviewed for accuracy again before they were imported into the Statistical Package for the Social Sciences program (SPSS v 27.0) for analysis. Frequency calculations and descriptive statistics were computed according to the appropriate level of measurement (e.g., nominal or ratio) to describe the self-report data. HES-7 responses were summed for an overall score ranging from 7-35. Participants' HES-7 scores were grouped into quartiles for additional analysis. The top quartile consisted of scores above 26.1 points, or above the 75th percentile. Scores in the third quartile ranged from 21.5 to 26, those in the second were between 16.76 to 21.5, and scores 16.75 or below comprised the lowest quartile. Subscores were computed for intake of fruits, vegetables, whole grains, dairy, and fish ranging from 1-5, with five indicating the participant met the U.S. Dietary Guidelines recommendations for that category. Inferential statistics were not performed because of the small sample size and unequal distribution of participants across strata (i.e., race/ethnicity, sites, and service rating [i.e., MA and HM]).

ETHICAL CONSIDERATIONS

The protection of human subjects in biomedical and behavioral research is paramount to preserving the integrity and credibility of science, researchers, and research institutions. Equally important is the ethical and moral responsibility to protect participants' basic human rights. The U.S. military operates within a hierarchical command and control structure, and customs and traditions reinforce the deeply rooted senior-subordinate relationship. Researchers who are also military officers must be

mindful of the risk for coercion and undue influence when working with junior enlisted participants and take the necessary steps to safeguard participants' autonomy, confidentiality, and anonymity as much as possible. Although there were no anticipated risks of harm, this research study employed various safeguards to protect the rights and well-being of participants.

The researcher obtained USU IRB approval for this study and complied with 32 CFR 219.116 regulations, DoDI 3216.02, and USU IRB policy to ensure participants' protection (45; 143). Participants were repeatedly informed about the voluntary nature of the study and were free to stop taking part in the study at any time. They were informed that withdrawal from the study would not result in any punitive actions or loss of benefits to which they were otherwise permitted. Participants were informed that the researcher would not notify their chain of command or anyone else about their decision to participate or withdraw. The researcher also stressed with various leaders that participation was voluntary and that even if recruitment were low, they should not coerce or impose undue influence to increase participation.

All participants provided verbal informed consent before participating, and individuals who were informally interviewed were also informed about the nature of the study. Participants were informed about the researchers' intent for reporting and disseminating the data in multiple venues such as scientific peer-reviewed journals, professional meetings/conferences, DoD and Navy communication channels, and installation and command leadership briefs. The researcher was committed to maintaining participants' privacy and confidentiality to the fullest extent possible. All participant data was de-identified. Participants were given a unique study ID that was

linked to the interview, questionnaires, and applicable artifacts. Participants were informed that strict anonymity could not be guaranteed; however, the researcher would make every effort to ensure published data did not include information that could be linked with their identity.

The researcher was committed to presenting an accurate and balanced presentation of the findings that honors the voice and dignity of participants and maintains the integrity of the research process. To accomplish this aim, the researcher engaged with committee members, military leaders, junior enlisted Sailors, and public affairs personnel at multiple time points before disseminating findings. The researcher will continue this level of engagement with subsequent dissemination efforts.

DELIMITATIONS OF THE STUDY

The scope of the study and research sample was limited to junior enlisted Navy service members in one geographical region in the United States. This study did not intend to cover senior enlisted Sailors and officers, or Sailors stationed in deployed environments, outside the continental United States, or multiple U.S. Navy bases. The scope of this study was limited to junior enlisted Sailors based on significant gaps in the literature and the need for early and targeted interventions to improve the nutritional fitness of this population. The research design and feasibility of time-constrained dissertation research did not lend itself to including Sailors from other demographics (e.g., age and rate) and bases. To the researcher's knowledge, little to no qualitative research has been published on influences of Sailors' eating behaviors in general; thus, the researcher deemed it necessary to conduct this study with a narrow scope of Sailors to gain in-depth and contextual knowledge that can inform future studies.

CHAPTER SUMMARY

The research design for this study was a focused ethnography that included observations, interviews, and artifacts as the primary methods of data collection. Junior enlisted Sailors in the rate of HM and MA between the ages of 18 to 25 years old were recruited from three Naval bases in Maryland to participate. The researcher engaged with multiple sources from disparate communities to gather contextual knowledge of factors influencing junior Sailors' eating behaviors. Data analysis involved a rigorous, systematic, recursive, and iterative process to ensure a rich interpretation of trustworthy findings that addressed the research purpose and specific aims. NVivo (145) was used to store, manage, and query data for analysis.

The researcher received ongoing mentorship and review of all aspects of the methodological process with the methodology expert on the dissertation committee. Emerging findings were shared with members of the dissertation committee and individuals familiar with military service and junior enlisted Sailors, and their feedback was included in the analysis to ensure a comprehensive exploration and interpretation of the phenomenon of interest. The unforeseen occurrence of a global pandemic minimally impacted proposed observations and recruitment efforts and did not significantly alter the research purpose or methodology. Interpretations and conclusions were drawn through a comparison of the current literature with the research findings. The researcher aimed to fill a critical gap in research on determinants of eating behaviors of service members and provide new knowledge that can be used to inform future research, creation of effective policies, and development of targeted interventions to support and promote nutritional fitness of junior enlisted service members and create a culture of healthy eating.

CHAPTER 4: Findings

The purpose of this focused ethnographic study was to explore intrapersonal, social, and environmental factors influencing eating behaviors of junior enlisted Sailors in non-deployed settings within the context of Navy and military culture. This chapter presents the findings obtained from 32 semi-structured participant interviews, informal interviews with military and civilian professionals, observations, and artifacts (i.e., questionnaires, documents, and photographs). It begins with a description of the research participants, individuals informally interviewed, and the settings. Next is a discussion of the major findings organized by the specific aims and research questions presented in chapter one. Illustrative quotations from interviews, excerpts from field notes, and images of artifacts are included throughout to capture the complexities of eating behaviors within the culture and to better understand the reality of participants' experiences and how they ascribe meaning to these experiences. To maintain anonymity, participant quotes are identified by their study ID (e.g., EB01). Similarly, narratives of conversations or quotes from informal interviews are labeled by the field note record number (e.g., FN27).

DESCRIPTION OF THE SAMPLE

Thirty-two junior enlisted Sailors participated in this study, and the majority (n = 28) of interviews were completed in person (see Table 3 for participants' demographic characteristics and HES-7 scores). Because of COVID-19 restrictions and variable work schedules, participants were given the option to choose the interview format (i.e., in person or virtual). Participants ranged in age from 18 to 25 years (mean = 21.4±2.4 years), were mostly HMs (n = 21), primarily lived in the barracks (n = 24), and had a

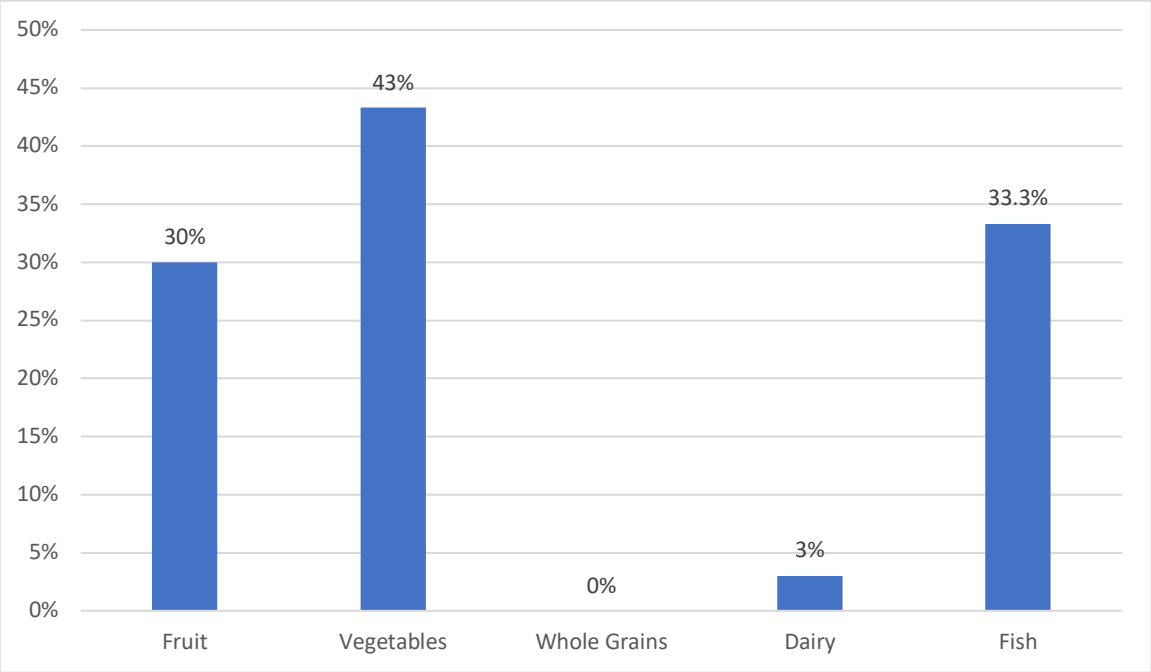
mean BMI of 25.8 ± 3.6. Females (n = 17) and Caucasians (n =17) represented just over half of the sample. The mean HES-7 score was 21.5± 5.8 and ranged from 10 to 32 (the lowest possible score is seven and the highest possible score is 35). Males (23.6±4.5) and Mas (22.8±5.1) had higher HES scores than females (19.6±6.2) and HMs (20.7±6.1), respectively. Mean HES-7 scores gradually increased with each pay grade: E-1 = 19.3±10.7, E-2 = 20.2±5.2, E-3 = 21.8±5.6, and E-4 = 22.5±4.9. Participants who lived in the barracks had the lowest mean HES-7 (20.4±5.45) compared to participants who lived in base housing (30±2.8) or off-base (22.5±5.5). Data are missing for two participants who were interviewed virtually and did not complete the questionnaires despite three reminders encouraging them to do so. However, their sex, rate, and housing status were obtained during the interview and are included in the analysis.

Only 30% and 43% of participants met dietary recommendations for fruit and vegetable intake, respectively (see Figure 9). No participants met the recommendation for whole grains, but 33% reported eating at least two servings of whole grains daily. Three percent of participants met the recommendation for dairy intake, and 33.3% met the recommendation for fish intake. Data on recovery fueling and sugar-sweetened beverages are not shown, but 40.6% of participants reported consuming a healthy snack within 60 minutes after strenuous exercise most of the time. Forty percent of participants reported drinking sugar-sweetened beverages one or more times daily.

Table 3. Demographic characteristics of junior enlisted Sailor participants

Demographic characteristics of junior enlisted Sailor participants (n = 32)		
Frequencies (n/%)		**HES-7 Mean±SD**
Sex		
Female	17 (53.1%)	19.6±6.2
Male	15 (46.9%)	23.6±4.5
Age (Mean ± SD)*	21.4±2.4	
Years Range	18-25	
Ethnic Background*		
Hispanic or Latino	5 (15.6 %)	20.4±6.1
Non-Hispanic or Latino	25 (78.1%)	21.7±5.8
Racial Background*		
African American/Black	4 (13.3%)	22±5.7
American Indian/Alaskan Native	1 (3.3%)	11
Asian American/Pacific Islander	4 (13.3%)	23.8±2.1
Bi-racial/Multiracial	3 (10%)	20.0±6.6
Caucasian/White	17 (56.7%)	21.7±6.3
Declined to answer	1 (3.3%)	21
Years of active service (Mean ± SD)*	1.9±1.2	20.4±6.1
Pay Grade*		
E-1	3 (10%)	19.3±10.7
E-2	5 (16.7%)	20.2±5.2
E-3	16 (53.3%)	21.8±5.6
E-4	6 (20%)	22.5±4.9
Rate		
Hospital Corpsman	21 (65.6%)	20.7±6.1
Master-At-Arms	11 (34.4%)	22.8±5.1
Housing status		
Barracks	24 (75%)	20.4±5.45
Base housing	2 (6.3%)	30.0±2.8
Off-base housing	6 (18.8%)	22.5±5.5
BMI Categories*		
Normal/healthy weight (18.5-24.9 kg/m^2)	15 (50%)	21.3±6.8
Overweight (25-29.9 kg/m^2)	10 (33.3%)	23.0±4.8
Obese (≥30 kg/m^2)	5 (16.7%)	19.0±3.8
BMI Mean ± SD (kg/m^2)	25.8±3.6	
BMI Range (kg/m^2)	19.6-34.0	
HES-7 Quartiles **		
Low HES-7 – Quartile 1	7 (23.3%)	13.6±2.4
Quartile 2	8 (26.7%)	19.8±1.4
Quartile 3	9 (30%)	24.0±1.7
High HES-7 – Quartile 4	6 (20%)	29.1±1.9
HES-7 Mean ± SD	21.5±5.8	
HES-7 Range	10-32	

Note: Scores for Healthy Eating Score-7 were totaled for a range of 7 to 35
(*) Missing data for n = 2, valid % reported
(**) HES-7 (Healthy Eating Score-7): High HES-7 is defined as a total >26.1 out of 35 or above the 75th percentile; a low HES-7 is defined as a score of 16.75 or below (lower 25th percentile)



Recommendations: Fruit (2 servings/day), vegetables (2-3 servings/day), whole grains (3 servings/day), dairy (3 servings/day), and fish (2-3 servings/week).
Note: No participants met recommendations for whole grains, but 33.3% reported 2 servings/day.

Figure 9. Percentage of participants meeting the U.S. Dietary Guidelines by category

Qualitative Descriptions: Kinds of Sailors

Participants and informal interviewees described Sailors in various terms based on their rank, social position, and/or job. Junior enlisted Sailors were frequently referred to as *junior Sailors* or *kids*, senior enlisted (usually E7-E9) as *higher enlisted*, and officers as *the higher ups* or *higher-ranking community*. *Dental techs* and *FMF Corpsmen* (Fleet Marine Force Navy Corpsmen trained to work with the Marines) were distinguished from other HMs because of their different job scopes and physical fitness requirements. MAs also distinguished among themselves by responsibilities with labels like *patrolman (*an MA working on patrol and driving around the installation), *gate sentry* (e.g., an MA working at the entry gate of a base), or *admin staff*. Admin staff worked in office settings,

had routine working hours, and were primarily higher enlisted, officers, or junior enlisted MAs who could not perform their designated duties because of personal or physical limitations (i.e., "*MAs that can't arm up")*.

Participants used various terms for junior Sailors who could not or would not perform their jobs well. These terms included *broken Sailors* (often a Sailor with a mental or physical injury preventing them from performing their job), *decaying Sailors (*broken Sailors who do not improve*), retired on active duty* (Sailors who are on active duty, but not meeting the expectations of their job assignment for reasons spanning from disinterest to physical injury), and *dirt bags or shit bags* (usually a malingering Sailor who performs poorly and makes the organization "*look bad*"). Sailors who did their job but underperformed to some degree were described as Sailors who *just do their job*, *do the minimum,* or at worst *just don't care*.

The *average Sailor* represented the Sailor who does what is typically expected (good or bad) for someone of that age, rank, and job. Leaders assumed the average Sailor is "*going to Panda Express*" or "*eats crap*." In stark contrast to average Sailors who ate crap, were *the fitness guys* (usually males) who typically ate healthily (or followed a strict high-protein diet) to meet physical fitness or aesthetic goals. Fitness guys were also referred to as *muscle heads*, *body builders*, or *alpha male types*.

Informal Interviewees

Thirty-six individuals were informally interviewed or consulted during the study (see Table 4). Discussions with command and unit-level leaders occurred in person and were the gateway to recruiting participants and gaining access to the culture and settings. The only exceptions were telephone interviews with two officers who were previous

senior leaders of MA "A" School. "A" School is a technical training school (e.g., MA or HM) immediately following recruit training. Interviews with health promotion professionals, dietitians, and other food service workers occurred throughout the data collection process; most introductions were made by senior leaders, the dissertation chair, or previous interviewees. Other individuals were approached by the researcher (in person or virtually) without previous introductions, to gather more information based on participant interviews, observations, or analytical hunches to triangulate data. Individuals informally interviewed answered all the researcher's questions, willingly engaged in ongoing discussions, provided requested data (e.g., policy documents), and demonstrated genuine interest and support for the study.

Table 4. Characteristics of key individuals informally interviewed or consulted

Position	**Total**
Command Senior Leader (e.g., Commanding Officer, Executive Officer, Senior Enlisted Leader)	10
Unit-Level Leader (e.g., Department Head, Leading Chief Petty Officer, Leading Petty Officer)	13
Military-Community Leader or Personnel Manager	2
Command Dietician or Health Promotion Professional	5
Dieticians/Food Service Professionals (Office of Chief of Naval Operations [OPNAV] Naval Supply Command [NAVSUP], Commander, Navy Installations Command [CNIC], and Navy Exchange Service Command [NEXCOM])	6

DESCRIPTION OF THE SETTINGS

The three Naval bases (NSAB, NSAA, and NAS Pax River) and their associated medical treatment facilities (MTFs) had several important similarities and differences

related to the installation food environment, housing, and local community. Each installation had the same command structure with a commanding officer, executive officer (NSAA had a civilian Deputy Commanding Officer), and senior enlisted leader (a Senior Chief [E-8] or Master Chief [E-9]) responsible for the operations and personnel within their command. The MTFs had the same senior leadership structure as the bases. Walter Reed National Military Medical Center (WRNMMC), a joint MTF on NSAB, was the only MTF that had a galley, fast food restaurants, and convenience stores. The smaller clinics Naval Health Clinic Annapolis (NHCA) and Naval Health Clinic Patuxent River (NHCPR) did not have any eateries, only vending machines. NSAA has two health clinics on the installation; the main clinic, North Severn, is located across the river from the Naval Academy and sits directly across from *the commissary* (military grocery store), and *NEX food court* (Navy Exchange Food Service operated fast food eateries). The other clinic, Bancroft Hall, is located within the Naval Academy grounds and provides care only to midshipmen. All the HMs who participated from NSAA worked at Bancroft Hall, although recruitment efforts targeted both clinics.

Installation Food Environments

Fast foods and convenience food were the primary options on-base. Every installation had a NEX food court with two to three brand fast food restaurants with usual operations between 0900 and 1800 daily. NSAB and NAS Pax River had an additional stand-alone fast food restaurant and a Navy Exchange convenience store (also referred to as *the mini NEX, the mini mart,* and *quick store*) that sold a variety of snacks and beverages. NSAB had several other coffee shops, fast food eateries, and convenience stores in several buildings on the installation, and most were located within WRNMMC.

WRNMMC had three coffee shops that sold beverages, pastries, and light fare; two convenience stores that sold typical snacks and beverages; two fast food restaurants; and a contract café, *Main Street Café*, which served a variety of foods (e.g., hot meals and deli sandwiches) during breakfast and lunch hours.

Beverage and snack vending machines were available in multiple buildings (e.g., gyms and classrooms) at every installation and in every medical facility. WRNMMC had the most vending machines and the largest vending area—*Flagship Vending Center (see Figure 10)*. Beverages included water, a variety of sugar-sweetened beverages, and energy drinks. Most machines contained a variety of snacks, to include candy, chips, nuts, and high-protein bars. There were signs on or near most vending machines about healthy snack options (see Figure 11).



(Photograph taken by author July 20, 2020)

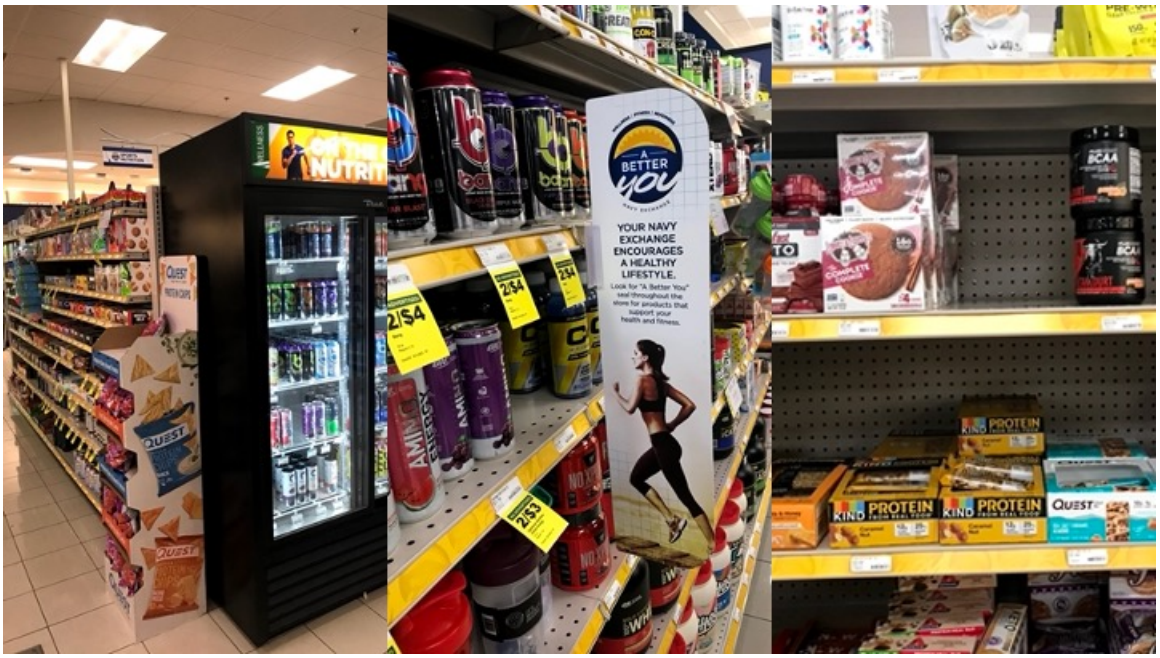
Figure 10. Flagship Vending Center in WRNMMC



(Photograph taken by author July 16, 2020)

Figure 11. Sign near vending machine in NHC Pax River lounge

Supplements and pre- and post-workout snacks (e.g., protein bars) were available at every base's NEX. Typical options included an assortment of protein powders, protein bars and snacks, and energy drinks. There were signs recommending patrons choose items that were labeled with "A Better You" logo as these options supported health and fitness (see Figure 12). There were far fewer items without logos than items with logos in all three of the exchanges visited.



(Photograph taken by author June 23, 2020)

Figure 12. Snacks and supplements available at NSAA NEX and "A Better You" logo

NSAB was the only installation with a galley open to staff. The galley was in the basement of WRNMMC (*Café 8901*) and included different food stations (e.g., salad bar, grille station, Fit and Flavorful, and desserts); it served breakfast, lunch, and dinner. Adjacent to the Café 8901 was an express galley (*8901 Express*) that served grab-and-go (e.g., premade salads or sandwiches) and quick order options. A second galley (*Warrior Café*) was in a separate building on NSAB and served full meals and grab-and-go options for breakfast, lunch, and dinner. NSAA had a galley (*King Hall)* on the Naval Academy grounds in the same building of the midshipmen clinic, but HMs were not allowed to eat there. Across from the midshipmen clinic on NSAA was a sit-down restaurant that served typical American fare (e.g., hamburgers and salads). NAS Pax River had two to three rotating food trucks, a restaurant/conference center, and café open to staff. The bowling center on NAS Pax River also had a snack bar that sold beverages and fast food.

There was no commissary on NSAB, but the MWR Liberty Center (*Morale Welfare and Recreation* service) offered trips to the nearest commissary (see Figure 13) twice a month to junior enlisted service members.



Figure 13. Flyer for Liberty commissary runs

The commissary at NSAA was newer and larger than the commissary at NAS Pax River, but both had similar food options (e.g., produce, dairy, meats, dry goods, and processed foods) found in traditional U.S. supermarkets. Both commissaries had a deli, sushi stations, and a "healthy grab n' go section" (energy drinks were also provided in or near these sections) at the entrance of the store (see Figure 14). The NSAA commissary was about half a mile from the enlisted barracks, whereas the NAS Pax River commissary was slightly over a mile from the enlisted barracks.



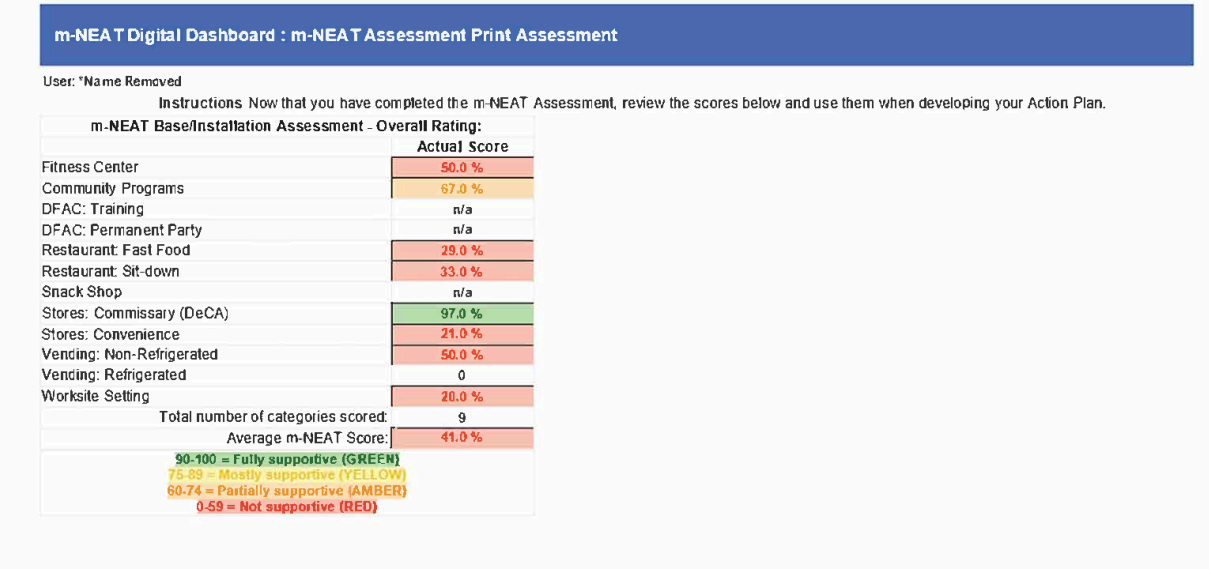
(Photograph taken by author June 20, 2020)

Figure 14. Photograph of NSAA commissary's healthy grab n' go

COVID-19 restrictions impacted the availability and accessibility of food on base. The fast food restaurants in NEX food courts were only open for takeout, and patrons were not allowed to sit in the common dining areas. One of the restaurants at NSAA closed during the data collection period, which left the commissary and one fast food restaurant as the only sources of food on the installation. Several contract restaurants on the other bases reduced hours, changed service options (e.g., carryout only), or closed due to COVID-19 restrictions. The galleys at NSAB also made similar adjustments to services during the study period, ranging from grab-and-go only to limited service hours and physically distant seating.

The health promotion specialist at NAS Pax River completed a Military Nutrition Environment Assessment Tool (*m*-NEAT) assessment during data collection and gave the

researcher a copy (see Figure 15). Various aspects of the food environment are assessed with *m*-NEAT to objectively determine the overall healthiness of the community and identify areas for improvement. NAS Pax River's m-NEAT score was 41% (out of 100%), indicating that the overall environment was not supportive of healthy eating. The lowest score (20%) was the work site setting, and the highest score (97%) was the commissary. The commissary was the only category that was fully supportive.



m-NEAT Digital Dashboard : m-NEAT Assessment Print Assessment

User: *Name Removed

Instructions Now that you have completed the m-NEAT Assessment, review the scores below and use them when developing your Action Plan.

m-NEAT Base/Installation Assessment - Overall Rating:

	Actual Score
Fitness Center	50.0 %
Community Programs	67.0 %
DFAC: Training	n/a
DFAC: Permanent Party	n/a
Restaurant: Fast Food	29.0 %
Restaurant: Sit-down	33.0 %
Snack Shop	n/a
Stores: Commissary (DeCA)	97.0 %
Stores: Convenience	21.0 %
Vending: Non-Refrigerated	50.0 %
Vending: Refrigerated	0
Worksite Setting	20.0 %
Total number of categories scored:	9
Average m-NEAT Score:	41.0 %

90-100 = Fully supportive (GREEN)
75-89 = Mostly supportive (YELLOW)
60-74 = Partially supportive (AMBER)
0-59 = Not supportive (RED)

Figure 15. NAS Pax River m-NEAT Assessment completed in 2020

Off-Base Food Environments

The food environments off-base included a mix of convenience stores, fast food and sit-down restaurants, and grocery stores. Independent sit-down restaurants and high-priced grocery stores were more prevalent in the area surrounding NSAB, and few eateries off-base could be accessed by walking during a 30-minute lunch break. No eateries or grocery stores were in walking distance from the North Severn side of NSAA; however, several fast food and independent dining options were in walking distance from the Naval Academy side of NSAA. A convenience store and local grocery store were also

less than a mile from the Naval Academy. A vast assortment of grocery stores, fast food chains, convenience stores, and sit-down restaurants were located along a three-mile stretch of highway that ran past NAS Pax River's two main gates. Most food delivery services were not allowed on base, but food could be delivered to the base's gate for pick-up.

Unaccompanied Housing: Barracks

Military regulations require unaccompanied Sailors E-1 to E-3 and E-4 with less than four years of service to live on-base in unaccompanied housing (from here on referred to as barracks) with few exceptions (e.g., limited or no availability) (32). Most participants (75%) lived in barracks, and the rest lived in base housing (n = 2) or off-base (n = 6). NSAA was the only installation that provided base housing (e.g., single family homes)—about a 5- to 10-minute walk from the barracks. All the barracks met Navy service standards (32), but varied in configuration, room size, amenities, and aesthetics. Photographs of barracks rooms and community kitchens on the installations are shown in Figures 16-19.

NSAB had two barracks, one for Sailors E-3 and below and the other for E-4s, with total occupancy of about 550 (~250 in the E-4 barracks). The barracks were in walking distance to galleys, food services, retail and convenience stores, and recreation centers. Sailors in the E-3 and below barracks lived two to a room with a shared bathroom, were supplied with one microwave and refrigerator, and shared a community kitchen stocked with several appliances. Room furnishings varied (e.g., twin vs. full bed or small vs. larger refrigerator) based on availability, not seniority. The E-4 barracks were in a modern, multi-story building with fully stocked kitchens on each floor.

Approximately 50 Sailors shared a kitchen on their respective floors. Sailors lived in single rooms with a bathroom and were provided a refrigerator and microwave of standard proportions.



(Photograph taken by author March 4, 2020)

Figure 16. Photographs of the community kitchen and a room in the E3 and below barracks on NSAB



(Photograph taken by author March 4, 2020)

Figure 17. Photographs of a community kitchen and a room in the E-4 barracks on NSAB

NSAA had a two-story barracks with a community kitchen combined with a lounge area for approximately 55 E-3 and below Sailors. Sailors were housed two to a room with a shared bathroom. The rooms had standardized furnishings with cabinets, a small dining counter, a sink, a microwave, and standard size refrigerator/freezer. E-4 Sailors were permitted to live off-base because of limited availability while the E-4 barracks was being renovated to include a kitchenette and other modern amenities. There was a fitness center and recreation building near the barracks, but there was no restaurant or eatery nearby. During a couple of informal interviews, the NSAA Deputy Commander mentioned that leaders recommended new Sailors find a friend with a car because there were few food options within walking distance, and it was a long walk to the commissary. NSAA's galley closed around 2012, when CNIC had budget cuts and decided to close many of the small galleys [FN1/FN13].



(Photograph taken by author February 19, 2020)

Figure 18. Photographs of the community kitchen and food storage area in a room in the barracks on NSAA

The NAS Pax River barracks had a different configuration in which Sailors had individual rooms with standardized furniture, a microwave, and standard refrigerator, but shared a community area (e.g., tv and chairs), toilets, and showers among a group of five rooms. There were approximately 220 Sailors in the NAS Pax River barracks. There was one community kitchen in a building adjacent to the barracks—Sailors had to walk outside to access the kitchen. The barracks were located a little more than a mile from the commissary and NEX food court, but a standalone fast food restaurant and food trucks were less than half a mile away. During data collection, new barracks were being built with a configuration of two room/two bathroom quad with a shared common area and full kitchen; construction concluded by the end of 2020. These new barracks were located across the street from the commissary, convenience store, and NEX food court.



(Photograph taken by author August 19, 2020)

Figure 19. Photographs of a room and the community kitchen in a room in the barracks on NAS Pax River

Housing and Subsistence Allowances

Participants received financial allowances based on housing status (i.e., barracks or off-base), availability of a galley, and access to a kitchen in accordance with military policy (32; 44). According to policy, installation commanding officers are responsible for implementing housing policies and determining eligibility for basic allowance for housing (BAH), basic allowance for subsistence (BAS), and basic allowance for subsistence II (BAS II). Sailors who live off-base receive BAH at a set rate based on rank, time in service, dependents, and cost of living in the area. To offset the cost of meals, most Sailors who live on- or off-base receive BAS monthly. Junior Sailors do not receive a meal card like enlisted personnel in other Services; instead, they either receive BAS or have BAS taken from their pay to cover the cost of eating in the galley (even if they choose not to eat in the galley). BAS II—sometimes referred to as *Double BAS* (*save*

pay was another term) because it is twice the amount of BAS—is authorized for enlisted personnel assigned to barracks that do not have adequate food storage or preparation facilities and where an appropriated fund (APF) dining facility (e.g., galley) is not available. Sailors' parent commands (e.g., clinic) are responsible for managing issues related to financial allowance. Sailors who lived in barracks at NSAA and NAS Pax River were authorized BAS II, but many reported issues with not receiving their entitlement for several months despite repeated attempts to address the problem with their command. As mentioned by one participant: *"A lot of the newest guys don't get the double BAS for months, so they're missing on $350…$700 a month…and that's money that's supposed to be for food"* [EB29]. Preferences for receiving BAS II or having a galley varied among participants, with some preferring the additional money to spend as they choose (e.g., buying healthy foods or paying down debt) and others preferring a galley providing a reliable source of food three times daily.

FINDINGS: CODES, DOMAINS, CATEGORIES, AND THEMES

The study findings presented in the following sections emerged from rigorous and in-depth engagement with the data, iterative and recursive data collection and analyses, and frequent communication with dissertation committee members and other individuals with knowledge of the culture and phenomenon of interest. One hundred and forty codes and 34 domains (see Table 5) were derived from the data, which were further analyzed and organized into different categories and themes according to the specific aims and research questions. Where applicable, tables with themes, categories, and illustrative quotations are presented.

Table 5. Research study domains

1. Kinds of eating behaviors	18. Reasons for grabbing something quickly
2. Kinds of Sailors	19. Reasons for eating meals
3. Kinds of social networks	20. Reasons for taking food to work
4. Kinds of barriers to healthy eating	21. Ways peers influence eating behaviors
5. Kinds of facilitators for healthy eating	22. Ways leaders influence eating behaviors
6. Reasons for meal prepping	23. Ways social networks influence eating behaviors
7. Reasons for snacking	24. Ways workplace structure and systems influence eating behaviors
8. Reasons for skipping meals	25. Ways living situations influence eating behaviors
9. Reasons for eating fast food	26. Ways to learn about cooking and nutrition
10. Reasons for eating healthily	27. Ways eating behaviors change during PRT season
11. Reasons for eating unhealthily	28. Attributes of living in the barracks
12. Reasons for dieting	29. Attributes of cooking in the barracks
13. Reasons for drinking energy drinks and coffee	30. Attributes of eating in boot camp
14. Reasons for “watching what you eat”	31. Attributes of eating in “A” School
15. Reasons for sporadic eating	32. Attributes of the galley
16. Reasons for disordered eating	34. Places to get food
17. Reasons for stress and emotional eating	

SPECIFIC AIM 1: IDENTIFY THE INTRAPERSONAL, SOCIAL, ENVIRONMENTAL (PHYSICAL AND MACRO-LEVEL), AND CULTURAL FACTORS THAT INFLUENCE EATING BEHAVIORS AMONG JUNIOR ENLISTED SAILORS IN NON-DEPLOYED SETTINGS OR "MISSION DRIVES BEHAVIORS"

The central theme identified within the junior enlisted culture is that mission drives behaviors. In the context of this study, mission is defined as any duty, task, assignment, or goal deemed important by "Big Navy," command or unit leaders, or oneself. Participants' and leaders' reference of "mission" focused on the day-to-day tasks, not the larger Navy mission. For example, the mission included ensuring no backlog of patients in the waiting room, keeping the line of cars at the front gate short to prevent an unwanted phone call from leadership, or ensuring required training was completed so the "*higher ups*" would not single out delinquents. From recruit training onward, meeting the mission fostered a culture of "*hurry up and eat,"* which encouraged junior enlisted Sailors to choose foods that were "*quick, cheap, and easy*." In most instances, encouragement and support of healthy eating behaviors were only explicit when the mission was to graduate Sailors from recruit training, pass the PRT, or "*get ready*" to deploy.

When it came to eating, it seemed that almost everyone was in a hurry. From "*grabbing something quickly*" to "*eating quickly*," junior Sailors described a culture of eating mindlessly and eating on the go. Factors at every level—intrapersonal to cultural—were associated with the phenomenon of "*hurry up and eat*." The "*slow life*"—sitting down to eat "*real meals*," cook, and "*meal prep*"—was described by participants to a lesser degree and primarily associated with intrapersonal factors (e.g., personal values of health and vitality) and support systems within the social and physical environments. The following findings address the two research questions for Aim 1,

which asked: (a) What are prominent eating behaviors among junior enlisted Sailors? and (b) What intrapersonal, social, environmental (physical and macro-level), and cultural (military and Navy) factors influence eating behaviors among junior enlisted Sailors?

Findings for Research Question 1: Prominent Eating Behaviors of Junior Enlisted Sailors

Participants described a range of eating behaviors that related to the quality and quantity of food choices and food intake, feeding patterns, meal timing, food preferences, motives, and culinary practices. Figure 20 provides a model of prominent eating behaviors of junior enlisted Sailors along a continuum—"*eating like garbage*" (unhealthy) to "*eating as clean and as fresh as possible*" (healthy).

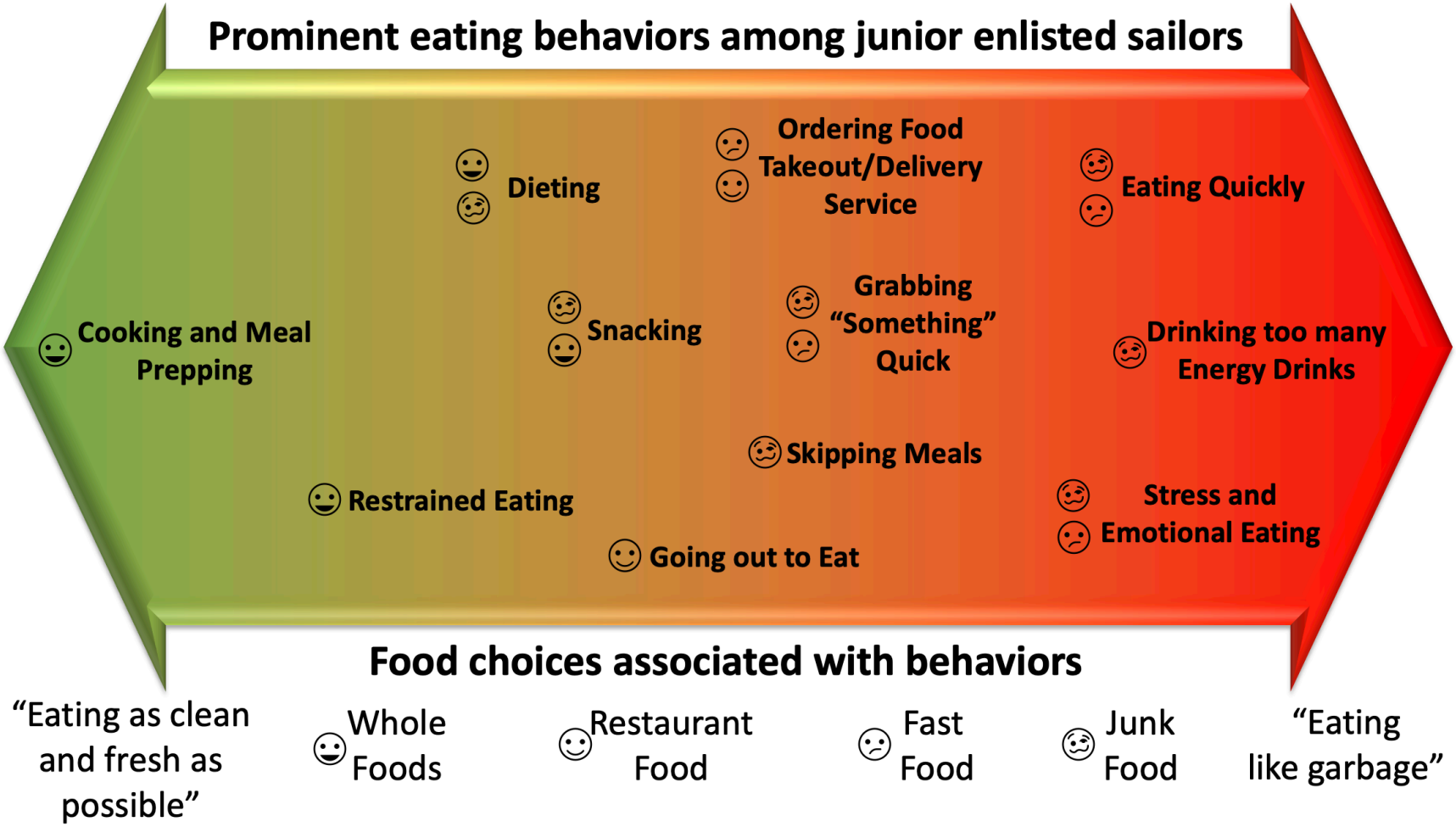


Figure 20. Prominent eating behaviors among junior enlisted Sailors

Eating Quickly and Grabbing Something Quick

Grabbing something quickly and easy to eat was the norm. Whether it was due to a perceived lack of time, busy work schedules, or habit, participants described a culture of eating quickly and on the go: "*Sometimes I only have like ten minutes to eat which is fine 'cause I mean I'll just grab a quick banana, apple, whatever…"* [EB01]; *"I just need to have something quick or something that I can grab a hold of while I'm driving, while I'm doing my duties"* [EB30]. Convenience was a necessity; Sailors desired eating foods that could be quickly prepared and purchased without too much hassle: *"I normally eat out for lunch 'cause it's quick and I can just go grab it and come back"* [EB10].

Many participants complained about the lack of opportunity to sit down and eat a meal during working hours. Sitting down to eat and enjoy a meal primarily occurred in social settings, such as having lunch or dinner with family or friends. It was only on their days off that participants reported slowing down and eating more: "*So on the day that I don't work, I'll actually have time to sit down, eat some breakfast, some cereal, oatmeal, and maybe a banana if I have it."* [EB19].

Snacking and Skipping Meals

Skipping meals—breakfast, lunch, or dinner—was a cultural norm. Breakfast was the most frequently skipped meal, followed by lunch and dinner. Sleep trumped eating breakfast, and some junior Sailors were not hungry enough to eat before starting their early morning (0500 or 0630) shift: "*I just skip breakfast. For me, it's just too early to eat…"* [EB03]; *"A lot of people skip breakfast, and a lot of places are not open when we wanna get breakfast 'cause we start at 0600"* [EB16]. Participants, such as an MA working the gate, often skipped lunch because of work demands, not a lack of hunger:

"*And then sometimes you have to skip a meal, 'cause if traffic gets backed up, then the chain of command comes down on us saying, 'why is it so packed?' And then you skip a meal and then now you're hangry."* [EB31]. Surprisingly, some participants skipped dinner because "*they weren't hungry*," "*didn't feel like getting up to make it,*" or for reasons that eluded them.

Skipping a meal did not always mean not eating. Participants discussed eating a meal in the traditional sense of eating "*actual food*" or a "*real meal*" during standard times for breakfast, lunch, or dinner. In many instances, snacks, coffee, and energy drinks replaced meals, especially breakfast: *"...like this morning, I didn't eat breakfast, I got pretzels and goldfish from the vending machine. I just eat that"* [EB10]. For some, having snacks on hand was a matter of necessity, because opportunities to break and eat a meal were not guaranteed.

Participants snacked for different reasons. Candy, chips, cookies, and other similar junk foods were the snacks of choice when bored, stressed, or having fun in social settings. Healthier snacks such as fruit, vegetables, nuts, or granola bars were usually planned snacks to avoid eating less nutritious options. Some participants intentionally avoided snacks or did not identify themselves as a snacker: *"I almost never touch the vending machine. The only time I ever touched the vending machine is if I accidentally forgot my meal prep"* [EB05].

Drinking Energy Drinks

Drinking energy drinks was the norm. Many junior Sailors drank energy drinks religiously at the beginning of the day to wake them up and give them energy: *"When I wake up, I usually have like an energy drink 'cause I need a boost"* [EB23]. Energy

drinks and coffee were also appetite suppressants: *"…we drink a lot of coffee so that we're not hungry, 'cause you just can't eat…*" [EB20]. Energy drinks were widely available for purchase at worksite vending machines, on-base convenience stores, and the commissary as well as many off-base establishments. Sailors also stocked the unit refrigerators with energy drinks and shared them with others:

> *One of my co-workers yesterday … bought a 24-pack of Red Bulls and put it in the fridge and told anybody who wants one, they can get one. That's probably something a lot of people are going to be drinking.* [EB25]

Energy drinks were the preferred, but not the only, source of caffeine: *"Caffeine is definitely an essential product to get us through every single day… I prefer energy drinks, coffee, and caffeine pills, not combined. I'd explode at that point"* [EB08]. One leader noted that compared to his generation, junior Sailors drank less coffee and more caffeinated sodas and energy drinks [FN 32]. Participants who preferred coffee over energy drinks kept coffee makers in their rooms and tended to bring coffee to work with them or purchase coffee from a nearby café or fast food eatery.

Stress and Emotional Eating

Participants noted that stress and/or emotional eating contributed to their unhealthy eating habits. Stress, low moods, and emotions like sadness led to eating too much, eating junk food, not eating at all, or eating foods they would not otherwise choose if trying to eat healthfully: *"Some people deal with stress not eating at all … some people are stress eaters, so for them, they overeat"* [EB06]. Stressors included living in a new environment far from family and friends, demanding work schedules, numerous collateral

duties, or high self-imposed expectations. Leaders noted witnessing junior Sailors who stress ate especially during inspections and training cycles.

> *She [senior enlisted leader] stated that many of the MAs live "a lifestyle of necessity;" they have a lot of stress in training. With that stress comes poor eating. She stated that recently they had an inspection that was stressful, and they all "ate jellybeans, a lot of jellybeans" during that time. "When you're stressed and not eating well you don't want to exercise, and so it's a vicious cycle and of course you gain weight"* [FN 3].

Good moods and happy emotions triggered emotional eating, which served as a reward rather than a cure for stress eating.

Ordering Food and Going Out to Eat

After arriving at "A" school, the "*training wheels*" came off and Sailors were no longer restricted to eating in the galley—ordering food and going out to eat became routine: "*We all ordered Grubhub and Uber Eats or whatever … there was no way to cook food in "A" School at all, so everybody ate out"* [EB20]. Ordering food included using delivery services, collecting food orders from coworkers and designating someone to pick up the food and bring it back to work, or getting "*carryout"* and "*takeout"* from a local restaurant and eating it in the barracks. Even though it was costly, ordering food appealed to participants because it was convenient. For some, ordering food was the only viable option during work if they did not bring any with them: "*If you didn't make food, you have to order it. … So, it's mostly, always order, order, order, order. Kind of sucks, but I have to eat* [EB27].

Going out to eat primarily occurred in social settings on and off duty. In one department, going out for lunch at nearby fast food restaurants off-base was a regular occurrence—"*Moe's Mondays*." Participants enjoyed eating out because of the good-tasing food options, the convenience of not having to cook, or just being able to hang out with others. Going out to eat was also a way to "*get out of the barracks*."

Dieting and Restrained Eating

Dieting was popular among junior Sailors. Most participants knew a peer who was either on a diet, just finished a diet, or about to start a diet. Weight loss dieting was more common during PRT season, but participants noted that many people were often trying some kind of diet: *"I've tried keto. I've tried vegan. I've heard people talking about carnivore diet, [and] the paleo diet. I don't know how many people have stuck to it, but I know people do change it up every now and then"* [EB02]. Dieting was not always about losing weight. Junior Sailors went on a diet or changed their dietary patterns for various reasons such as improving their overall health or seeing if they could "*stick to a plan*."

Dieticians and leaders saw dieting as a problem among junior Sailors, noting that high-protein/low-carbohydrate diets were the most popular and potentially problematic. They wished that junior Sailors would be as dedicated to following a healthy lifestyle as they were to adhering to restrictive diets that promised results. During an informal interview, one Command Fitness Leader (CFL) discussed his frustration with Sailors' misguided dieting habits:

> *I try not to be negative because they are trying …I asked him [a Sailor following a keto diet], what are you eating? He replied, 'bacon and eggs for breakfast, and*

some other stuff' … I told him, that sounds like garbage. He wasn't eating any fruit or vegetables. I told him to throw in some carbs, but he said, 'No, I'll break the diet.' I told him that apples and broccoli didn't 'cause the obesity problem in the U.S. … But they will latch on to an idea, and eventually give up. [FN 14]

One dietician reported "*butting heads*" with one of the physicians in the clinic because he was promoting keto within the department and she thought keto was exacerbating some of her clients' problems [FN 24]. It was hard to provide balanced nutrition advice that was counter to cultural norms and social media.

Along the lines of dieting, participants' narratives highlighted a pattern of restrained eating by consciously eating less or restricting or limiting certain foods to lose weight, prevent weight gain, or change their body composition: "*I've been trying really hard. I try to avoid things like McDonald's and like Checkers and stuff, although they call my name every day*" [EB15]; *"So that's the biggest thing for me, staying away from processed and prepackaged foods as much as possible*" [EB22]. Participants' attempts at dietary restraint were often undermined by their peers or "*temptations*" in their environment. Restrained eating was common, but often unsuccessful, which left participants frustrated by the incongruencies between their intentions and behaviors: *"I always try to eat healthy like overall, but have like up and down spikes of being very, very healthy, and then sometimes I go off the deep end with it … it's so difficult, so hard"* [EB16].

Cooking and Meal Prepping

Participants enjoyed cooking and meal prepping. Enlisted leaders believed that in some respects, "*this generation is healthier than we were—they actually like to cook and*

meal prep." Methods and food choices for meal prepping varied but always included preparing one or more meals (breakfast, lunch, or dinner) ahead of time to eat later in the week. The more intense meal prepping usually involved cooking different meals or large batches of food to last four days to a week: *"It'll be for five meals, Monday through Friday … I didn't really like eating the same thing every day, but it's honestly the easiest and the least expensive way to live in the barracks"* [EB28]. Several participants aimed for this type of intense meal prepping, but it was unrealistic because it took a lot of time and participants got bored with eating the same food by the third day. Leaders and participants agreed that it was often "*the fitness guys who meal prepped*" or did so consistently. Less intense meal prepping involved preparing food for one or two meals or packing a lunch the night before a shift.

Participants living in the barracks found it difficult to cook and meal prep as often as they wanted. For some, their initial aspirations of cooking and meal prepping fell by the wayside as life and work demands got in the way: *"I really need to meal prep, but I definitely don't … I'd have to get up earlier to do it, and I value sleep a lot"* [EB08]. Some participants, however, remained consistent with cooking, despite demanding work schedules and living in the barracks. One participant who lived in the barracks and worked shift work described how he managed meal prepping without feeling overwhelmed by the process:

> *I keep it real simple … I'll do it [meal prep] the night before a work set … I'll make two days' worth, or if it's like a three day work set, I'll do three days' worth. And then you know, I'll just put it all in the containers in the fridge … I*

found it easier to just meal prep the day before a work set.… it's mostly like stuff that I don't have to do extensive amount of cooking with [EB22].

Meal prepping required intention and planning but provided the benefits of eating nutritious foods on a budget and having a go-to meal: *"So that's why people do meal prep so that their options are healthy but fast at the same time*." [EB16]. Leaders and dieticians also encouraged junior enlisted Sailors to meal prep, or at least budget and plan to ensure they were eating a nutritious diet.

Findings for Research Question 2: Factors Influencing Junior Enlisted Sailors' Eating Behaviors

Junior Sailors' eating behaviors were influenced by many internal and external factors (see Figure 21 and Table 6). Every factor did not fit neatly into one category or level, which underscores the interconnectedness of Sailors' eating behaviors and their environments.

Intrapersonal (Individual) Factors

Intrapersonal factors influencing eating behaviors among junior enlisted Sailors are characterized by seven themes: (a) knowledge and skills; (b) values, attitudes, and beliefs; (c) moods, feelings, and emotions; (d) food preferences; (e) resource management; (f) motivation and goals; and (g) physical activity level.

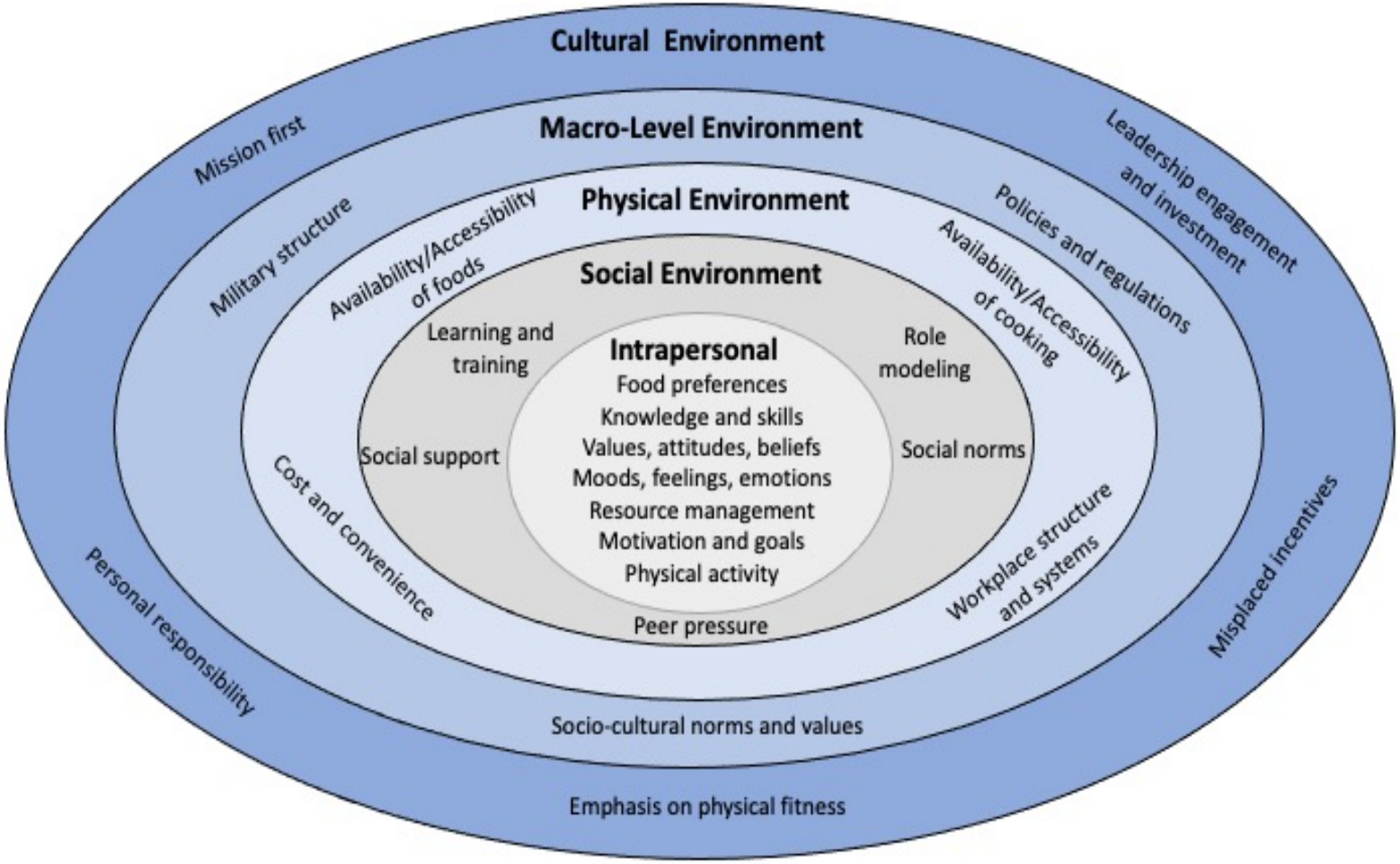


Figure 21. Social ecological model of eating behaviors among junior enlisted Sailors

Knowledge and Skills

Participants' nutrition knowledge influenced their food choices and dietary quality. Almost all participants reported having basic nutrition knowledge, such as fruits and vegetables are healthier than fast food and that their diets should include a balance of proteins, carbohydrates, and fats. Nutrition knowledge and confidence in their knowledge beyond these basics varied widely. Knowledge deficits revolved around: (a) how to prepare and incorporate healthier foods in their diets, and (b) why nutrition was important to their health, well-being, physical performance, and weight management. Participants were confused about what constituted a healthy dietary pattern because of conflicting messages from the media, their social networks, and health professionals. As one participant said: *"… they want to [cook and eat healthfully], but they don't know where to start … there's so much information. They don't know what to pay attention to"* [EB25]. Participants who reported fewer knowledge deficits and were more confident in sifting through the clutter of nutrition information reported eating nutritious foods as part of a balanced diet.

Knowing how to cook and prepare foods, often in unconventional ways, influenced participants' eating behaviors. Some junior Sailors did not know how to cook, or they did not know how to prepare foods using only a microwave. The lack of flexibility in culinary skills led many Sailors to order food, eat out, or eat ramen noodles and frozen meals. Some participants knew how to cook because their parents had taught them, or they started experimenting on their own, learning from friends and social media. Experimenting with spices and flavors enhanced the culinary experiences and encouraged some to eat more healthily.

Values, Attitudes, and Beliefs

Participants' eating behaviors were influenced by the value they placed on their health and vitality and their attitudes about body image and military physical fitness/body composition requirements. They were also influenced by their beliefs about the impact of nutrition on their health and about the source (internal vs. external) of their success or failure in eating healthfully. Most participants believed that their nutrition was out of their control because of work demands and time pressure, the lack of healthy foods available on-base, and challenges with cooking in the barracks. Those who reported a greater sense of control over their dietary intake placed a high value on their long-term physical and mental health and energy: *"… it's just taking care of myself for the long run and being as healthy as I can for my future"* [EB28]. Participants who had a positive body image or placed less value on their weight were less focused on counting calories or following rigid dietary practices, whereas participants who expressed body dissatisfaction talked more about dieting and restrained eating.

Participants understood that the Navy expected them to maintain physical fitness and weight standards, but beyond passing the PRT, few participants reported sustaining eating behaviors that would support being ready to take the PRT or deploy at a moment's notice. Several leaders voiced concerns about junior Sailors' poor eating habits and the negative impact on their ability to do their job in garrison and in deployed environments. Participants' attitudes and beliefs about what it meant to be a Sailor and "*be ready*" influenced some, but not many, to eat healthfully: "… *Sailors don't understand that there is a requirement to be healthy … you'll hear things like I don't need to run three miles, I just need to run 300 feet, or I just need to fit through the scuttle*" [FN31]. In fact, to the

chagrin of some participants and leaders, maintaining military appearance and standards throughout the year seemed to be unimportant to many junior Sailors.

> *I don't think they care. When I came in, we had a sense of pride. Mas were very sensitive about our uniforms. We would talk trash to each other if you looked like a dirt bag. But it's not the same. Some don't care at all … it's just the clothes [they] put on today.* [FN14:]

Moods, Feelings, and Emotions

Participants reported eating foods based on their moods, feelings, and emotions. Bad moods, feeling overwhelmed or stressed, and negative emotions led to eating foods high in fat and sugar. Feelings of boredom, especially among those who worked night shifts, led to eating junk food and overeating: *"They [MAs] are 24/7 emergency responders … They get bored, and when you get bored, you eat"* [FN32]. When eating in social groups or going out to eat, participants often discussed choosing the restaurant based on "*the mood they were in*." For many, the end of the workday signaled stress and emotional eating. A participant described a habit of eating a bunch of junk food after work to cope with stress: "*I actually got burnt out really, really quickly … at the end of the day, all I wanted to do was eat a really big bag of chips or eat some like unhealthiest thing you could think of"* [EB28]. Making time to prepare a healthy meal at the end of a workday was burdensome and stressful. When participants retired to their homes or barracks at the end of a shift, they wanted to relax and "*take off the uniform*," shedding mission responsibilities and leaders' demands. This meant choosing foods that were quick, easy, and low nutrient density.

Food Preferences

Participants' eating behaviors were influenced by their food preferences, which centered around taste, cravings, and enjoyment as well as their familiarity with foods they grew up eating. Preferences ranged from fresh and nutrient-dense foods to ultra-processed snacks. Whatever the preference, it was important for participants to enjoy what they ate. A participant who described having healthy eating habits most of the time had a "*little system*" for eating: "*…it's got to be affordable … it's got to be convenient … and you gotta enjoy it*" [EB05]. Participants were more likely to report cravings for sweets and junk foods rather than fruits and vegetables.

Food preferences and eating habits stemmed from participants' racial and ethnic cultures, such as Italian, Irish, Mexican, and Pacific Islander. Enjoying foods "*from back home*" was important and brought a sense of joy, especially if those foods were hard to come by. Food preferences were not static; some participants described shifting from old eating habits and food choices that were less healthy to enjoying more nutritious foods and limiting their portions. Exposure to new foods during recruit training or at social events with peers and coworkers who followed different dietarian patterns (e.g., vegan or pescatarian) encouraged some participants to adopt preferences for foods that they previously disliked:

> *Like in boot camp, it was things that I would eat, and I was like I've never eaten this before, like wheat bread … I'd always looked at that in the store and was like heck no, I'm not eating that. But being kind of forced to eat that, I felt like, wow, wheat bread isn't nasty, you know* [EB06].

Resource Management

Participants' management of resources influenced their eating behaviors. Differences in perceived resource constraints (i.e., time and money) among Sailors who shared the same work schedules, living conditions, and pay, suggested that management of their resources influenced eating behaviors more than the availability of resources. One leader's comments supported this assessment: "*it's not a lack of time, because I've seen their barracks and they have big TVs and gaming systems, and most of them spend their time playing video games*" [FN2]. Participants acknowledged that time management and money management were hard. One participant reflected on the realities of money management with buying groceries: "*I was never used to shopping before the military. I was like mmm, money management hurts"* [EB21].

Many junior Sailors believed that they had to sacrifice their sleep, relaxation, and free time to eat healthily: "… *it's not the easiest, 'cause our healthier eaters that are single, they don't have the downtime after work to decompress …"* [EB19]. More sleep was a major reason for skipping breakfast, and the desire to relax and recharge at the end of the workday encouraged many to order food or go out to eat instead of cook: "… *a lot of people feel like they don't have that much time, so they just grab whatever's there … they wanna maximize their time they have to just eat and hang out"* [EB09]. Participants who prioritized their nutrition made time to grocery shop and cook and prepare their meals and snacks ahead of time. Meal planning and packing a lunch required participants to invest more time upfront but provided more time to sit and eat during a lunch break at work and minimized decision fatigue about what to eat later in the day: "*It [meal prep] does help a lot and it opens up more time to do other things …" [EB05].*

Many junior Sailors preferred to pay for the convenience of ordering food and eating out rather than saving money by planning and preparing foods. Some participants reported strained financial situations because of constantly eating out, having debt, or helping family members back home. One participant described how his financial situation dictated his food choices: *Wherever I wasn't like down on money I was definitely picking the better foods, but wherever I was low on money, it turned back to the cheaper, more plentiful options" [EB19].*

Sailors who were stationed on NSAA and NAS Pax River were allotted double BAS because there was no galley and kitchen access was limited. When received, some people used the extra money to buy healthier food options while others preferred to use the money to pay for bills or buy a car. There were mixed feelings among participants and leaders about whether junior Sailors should receive allotments to buy food or have a galley. Participants who prioritized cooking and meal planning reported that they saved money because they were not eating out as much, and some even budgeted so that they could buy quality foods and shop at "nicer" grocery stores. One participant's transition from spending money on fast food to saving money with meal prepping captures many junior Sailors' experience with money management and eating:

> *I actually really struggled with my debt at the time because I was spending so much money unnecessarily … I realized that I was spending the most amount of my money in fast food or going out to eat … and so what I decided to do is start doing a breakfast and a lunch prep for myself first, see how I would feel with that … I was helping my boyfriend as well … so we decided that, you know what? I think it's better if we try to meal prep together and try to make it easier for*

ourselves spending wise and just sacrificing … So, we took that on together and it was it was great. We saved a lot of money. [EB28]

Motivation and Goals

Participants' motivation to achieve aesthetic, physical fitness, and weight loss goals influenced their eating behaviors: *"… how determined you are to get there… Do you have somewhere that you want to be? I feel like that determines really where your eating habits lie"* [EB 03]. Depending on their goals, junior Sailors adopted various diets and eating behaviors ranging from "*counting calories and macros*," to eating "*a lot of protein,*" or sticking to eating home-prepared meals and minimizing junk food. Whereas most participants discussed trying to lose weight or "watch their weight," three participants (male and female) discussed wanting to gain weight. Their approach to gaining weight was to eat more food with little regard for nutrition quality: "*I'm trying to bulk up personally, so I'm trying to eat like Panda [Panda Express] and things like that. Not like extremely bad, extremely, but things that'll like get me fatter" [EB21].*

Physical Activity Level

Participants' level of physical activity influenced their eating behaviors in several ways. Junior Sailors who worked out or exercised a lot tended to eat healthier than those who were more sedentary. Participants reported consuming pre- or post-workout snacks, adjusting protein intake, and modifying caloric intake based on their exercise routines. Leaders and participants asserted that there is always a group of Sailors who are "*driven to be fit,"* and will do whatever they need to do to be healthy and fit regardless of external demands and conditions. Some participants relied on exercise to compensate for unhealthy eating behaviors: "*I have this other co-worker who doesn't really eat healthy,*

but she goes to the gym all the time and her thought processes [is] she goes to the gym so that she can eat whatever she wants" [EB01]. Junior Sailors tended to shift toward unhealthier eating behaviors when their level of physical activity decreased. When gyms closed due to COVID-19 restrictions, many participants stopped working out and started eating less healthily than before the pandemic: *"We kind of correlate like meal planning with the gym. So, like now that there's no gym, we don't have to meal plan"* [EB11]. Musculoskeletal injuries were a catalyst for unhealthy eating behaviors. Following an injury, participants reported a dramatic reduction in physical activity which often led to a vicious cycle of overeating, gaining weight, and feeling depressed: *"I had a big knee injury, so I was out for a while … I was definitely down ... I felt useless, so I was just like, let's just keep like snacking on whatever"* [EB29].

Social Environment (Network) Factors

Factors within the social environment that influenced junior enlisted Sailors' eating behaviors are characterized by five themes: (a) learning and training, (b) peer pressure, (c) role modeling, (d) social norms, and (e) social support.

Learning and Training

Participants primarily learned about nutrition, diets, and cooking from their parents, peers, online resources, and social media (e.g., YouTube). Some participants clung to the knowledge they received from their parents, and others changed their thinking and behaviors around eating as they learned from others in their social networks: "*I think being out in the world and being in the Navy has definitely helped me learn how to eat better and I'm grateful for it"* [EB09]. Other than a one-hour mandatory nutrition lecture during recruit training, participants stated that they did not receive formal

nutrition education or training through the Navy. Participants who desired to learn about nutrition had to actively seek out information, which meant taking the path of least resistance, like asking their friend or following people on social media instead of scheduling an appointment with a dietician or reading printed information: *"I would say social media is a huge way for them to get their nutritional information"* [EB11]. Unlike other military training, nutrition education was not mandatory nor was it part of daily operations.

Participants were open to learning about nutrition and cooking and desired more proactive engagement and training from leaders and healthcare professionals. The leaders who proactively talked with Sailors about their nutrition and eating behaviors were the recruit division commanders (RDCs) in boot camp, command fitness leaders (CFLs), and a handful of motivated individuals in the unit. CFLs were a respected source of nutrition information but were limited in the advice they could provide because they lacked formal training, certification, and licensure.

> *He [a CFL] knows a lot about nutrition from what I've talked to him about, but he's not allowed to give you nutritional plans and all that stuff because he's not qualified, he has to go to a school for it or something like that … which I think is weird because if you're in charge of all the FEP people and having them work out and stuff like that, if you can't give them a plan or help them with nutrition, then how are you going to help them lose weight or get within those physical standards to be able to pass their PRT?"* [EB13]

Most participants were unaware of the nutrition resources and training available online or on-base through Navy or military programs, and many did not know that they

had access to a dietician at the MTF: *"I did a lot of YouTubing … I didn't realize that there's not a lot of information out there for Navy or for Army or Air Force, nobody really puts that information out"* [EB28]. Dieticians and health promotion professionals wanted to help junior enlisted Sailors improve their eating behaviors and improve their nutrition. They posted flyers, passed out printed materials (e.g., cookbooks), and offered a variety of classes, but believed that it was hard to get participation. A few weeks before the COVID-19 lockdown, a health promotion specialist partnered with other services on base and offered a cooking class targeted to junior Sailors (see Figure 22). Participation was low, but she reported that it was well received and planned to offer more classes.

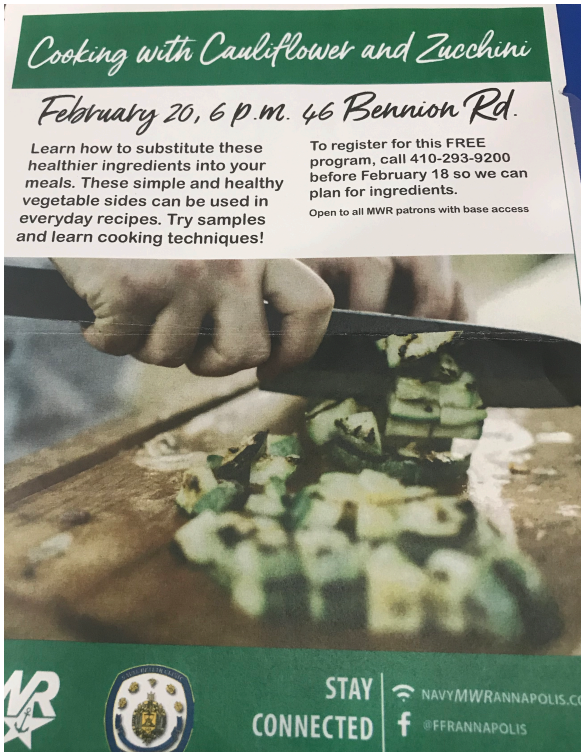


Figure 22. Flyer for cooking class

Peer Pressure

Peers influenced participants to eat healthily and unhealthily through subtle and explicit peer pressure: *"So if I'm with a healthy person, I'll eat healthy. With someone*

who's like, no, I don't wanna eat healthy today, I'll eat with them—okay, cheat day" [EB16]. Most participants' friends and close social contacts were other junior service members who worked or lived with them. Participants reported feeling pressured to order food or go out to eat during lunch or at the end of the workday and drink energy drinks and eat junk food, especially if someone brought it in to share. *"I realized that when I was in a social situation, I would let whatever my peers were eating influence [me] … I would feel like I was a party pooper for not eating whatever they were eating"* [EB28]. Negative peer pressure was a major barrier to eating healthily, especially for those who were dieting or had restrictive diets (e.g., vegetarian). Participants believed that they were more likely to get teased or pressured if they ate healthy rather than unhealthy foods.

> *So, if you eat healthy, everybody kind of laughs at you. I don't know, that's how it is for me. Now, if someone's like out of control with their eating habits, people go, hey, you've had a dozen donuts, why are you doing that? But like for me, I constantly get ragged on for eating healthy. I know it's all in good fun, but … you get more shame, I guess you could say if you're a healthy eater [EB20].*

Some participants described being pressured by their peers to eat better and improve their diet. Positive peer pressure was often direct and explicit with friends "*getting on their case or pushing them to eat better*."

Role Modeling

Participants identified people outside of the Navy or work environment (e.g., social media influencers and family members) as role models more than their peers or leaders. Junior Sailors followed the advice of people they aspired to look like or eat like:

I like to follow a lot of people on social media that are into lifting and working out and fitness … they do a lot of meal prep videos and they have guides and stuff … they're big inspirations for me and they kind of motivate me to do that. [EB10]

Participants identified their peers who were physically fit, worked out a lot, had lost a lot of weight, or had restrictive dietary habits as role models. When participants described peers or leaders who ate healthily, they almost always referenced individuals who were vegans or vegetarians, or who had dietary habits that were vastly different from the social norm: *"Our director, she's really good about eating healthy. She's a vegan … it's pretty strict as far as like what you can and cannot eat"* [EB09].

Many participants stated they did not know much about the eating behaviors of the leaders outside of their immediate work area (e.g., officers and E-7s and above), and from what they did notice, many of their leaders ate no differently than they did. Participants reported that leaders', especially Chiefs, eating behaviors were bad or "*questionable*." Leaders agreed with participants' assessments that many leaders did not eat healthily or make their nutrition a priority.

Social Norms

Injunctive social norms dictated that service members should eat healthily, but observations and participants' reports suggested unhealthy eating behaviors were the norm. Many participants reported eating like everyone else did, which often meant eating fast food, going out to eat, drinking energy drinks, and eating on the go.

"... it's eat whatever you can eat on the go... and I think if I see everyone else go out for lunch and order something I think it makes me comfortable enough to say,

oh okay, I'm gonna order too. Because that's what everyone else is doing, and you wanna, I do what, I truly do what society does. [EB27]

Signs and messages posted near vending machines, eateries, and other areas around the bases encouraged service members to make healthy choices, but they seemed to have little influence on their behaviors, especially when healthy options were limited or less appealing than less nutritious options: *"There's a poster on the wall with things that say these are healthy snacks and there's probably only two of the 20 things that they have in there, actually in the vending machine*" [EB21]. Participants and leaders also acknowledged a norm among some Sailors to just "*do the minimum"* or become complacent with their health and work performance. These Sailors were not concerned about their nutrition and eating habits if they could meet the minimum standards to remain on active duty.

Social Support

Support from family and friends influenced participants to eat healthily. Spouses or nearby relatives supported participants by cooking healthy meals for them or with them, packing their lunches, and pushing back on participants' requests to eat out or eat junk food. Leaders and participants agreed that support from spouses and family members was critical to their health and overall well-being. Participants discussed "*looking out for their shipmates*" when their peers did not have food or time to eat because of work demands: "*It's been times I went and dug in my book bag and I had fruit. So, it was like, can this hold you over … we try to figure it out … we try to help each other out as much as possible"* [EB06]. Support from peers to eat well or stay fit most often occurred in departments that had good morale and leadership, and where

Sailors were empathetic and understanding of one another: *"… we're not just here for ourselves … the other shifts are just here for themselves"* [EB19].

Physical Environment (Settings) Factors

Factors within the physical environment—settings where participants lived and worked—that influenced junior Sailors' eating behaviors are characterized by four themes: (a) availability and accessibility of foods, (b) availability and accessibility of cooking and storing food, (c) workplace structures and systems, and (d) cost and convenience. The theme of cost and convenience is discussed throughout this section, and not as a separate theme because of the significant interconnectedness with other factors and levels.

Availability and Accessibility of Foods

Participants reported that their eating behaviors were strongly influenced by the foods available and accessible to them. They believed their options were limited to junk food and fast food, unless a galley was available; but even then, accessing the galley was difficult because of conflicts with their work schedules: *"A lot of the times nutrition isn't really an option. You just get what you gotta get at the start of the day and then make sure it lasts you until the end of the day"* [EB 02]. Leaders and healthcare professionals agreed there were not a lot of healthy options available, which made it harder for junior Sailors to make good choices. Many participants agreed the galley and the commissary provided healthy foods at a reasonable price, but some perceived the options to be of low quality or undesirable.

Military Training Environments

There were differences in accessibility and availability of foods in the recruit training environment, "A" School, and the participant's current command. In recruit training, junk food and fast food were restricted, and Sailors were "*only allowed to eat in the galley*" for breakfast, lunch, and dinner. According to participants, they were given access to plenty of healthy foods and sufficient time to eat (if they were not the last group to enter). Calorie-dense options, like "*fried food"* or "*pizza*" were limited, and Sailors were encouraged by their RDCs, posted signs, and color-coded labeling of entrees to choose nutrient-dense foods and be mindful of their caloric intake.

> *[In] boot camp you were limited to what you can eat 'cause, you know, you got your RDCs breathing down your neck. All I can say, boot camp is the best place you're gonna eat the healthiest … when you get to boot camp, you're not allowed to touch the desserts 'til you graduate, that's a good thing, 'cause I would have touched the desserts*. [EB27]

These healthy nudges in the recruit training environment helped some participants improve their eating behaviors and lose weight, but not all participants reported eating healthier. Because recruits were not limited by the amount of food they could eat in the galley, some reported overeating and gaining excess weight during training. *"I ate way too much food in boot camp. A lot of people lost weight, I gained weight in boot camp. I had never eaten so much food in my life"* [EB20].

Participants described their experiences with food and eating in recruit training and "A" School as "*night and day*." Once in "A" School, the regimented mealtimes and food restrictions of recruit training ceased, which gave Sailors the freedom to choose what and when they ate. Because they had the freedom to choose whether they ate in the

galley, many participants ordered food from off-base, got fast food from the on-base food court, or got snacks from vending machines: "*It definitely went down in 'A' School. I feel like that's where it kind of got in the slope of, oh, hey, pizza's the norm, you know"* [EB19]. According to participants, food in the galleys in "A" School was less healthy than the galleys in recruit training: "*... it was much more unhealthy stuff [in 'A' school] than there was at boot camp. For example, where you would have one or two unhealthy choices, now you had an entire line of unhealthy choices …"* [EB14].

Participants also complained about the quality of the food and sanitation in "A" School galleys, which influenced them to eat elsewhere: "*I remember one time we saw a cockroach in our salad, so we all quit eating there and we ordered out. So that cost a lot of money, but I didn't want to eat cockroach salad"* [EB20]. Some participants attributed eating out and ordering food to not having a kitchen in the barracks in "A" School; they wanted the option to cook but were limited to a refrigerator and microwave.

According to one of the former leaders of MA "A" School, he thought access to a refrigerator and microwave encouraged storage and preparation of junk foods and unhealthy snacks. He did not believe that building kitchens in the barracks was feasible because of budget and logistic constraints and wished more Sailors would utilize the galleys instead of wasting their money eating out. He described a culture in which Sailors had "*newfound freedom*" with eating:

> *He [MA Leader] stated that there is a "weird dynamic" with this generation of Sailors in school. Many of them eat a lot of junk food and fast food and like to "order out" using things like "Grubhub, Uber Eats," and other delivery services. He explained many of them don't want to eat in the galley … About "25% would*

> *eat breakfast at the galley." Most of them "preferred to skip breakfast so they could sleep in." He stated that the ordering out is "the downfall — they don't eat healthy … More students complained about the galley than used the galley … A lot of them drank a lot of Monsters and would just eat one meal" … He stated that he would get the roster, and last year, only "25% used the galley and that was primarily for lunch … If you don't force it they're not going to eat healthy"* [FN34].

A different former leader of MA "A" School reported a different assessment of Sailors' use of the galley. According to him, it was "*not easy to get fast food … During the day, most Sailors went to the galley*," and he thought "today's Sailor" made an effort to eat more healthily than his generation [FN32].

On-Base and Off-Base Food Environments

Participants, leaders, and healthcare professionals believed that there were not enough options for healthy foods on-base. Most options available were fast food and ultra-processed foods sold in vending machines and convenience stores. Few participants reported bringing their own food to work, and most relied on the vending machines and fast food options for sustenance because of convenience, cost, and taste: *"People use them [vending machines] a lot. They have to refill them at least once a day"* [EB23]; *"… fast food, it's much, much easier, much easier to get your hands on … fast food is readily available"* [EB14]. It was "*much easier to get your hands on fast food*" and junk food than healthier foods, especially at the bases without a galley. Some participants sought out fast food restaurants that offered healthier options, such as salads, sandwiches, or protein and vegetable bowls, and tried to choose the healthier options from the vending

machines whenever they were available. Some participants mentioned having limited access to healthy food when they were restricted to their barracks (restriction of movement [ROM)]) for COVID-19 related quarantine. Leaders provided them with food and snacks, but most of it was not nutritious, and participants were limited to what they could have delivered:

> *It was a little hard when I got here because when we had to get ROM, they had a bunch of food there for us, so it's like a bunch of cans of soup. So that's really sodium rich, and hot pockets, stuff I don't eat. They did have salads and stuff, but those went really quick. Also, a ton of snacks … Like crazy amount of Slim Jim's … just a lot of carb stuff, basically. So, it's kind of hard when I got here.* [EB13]

Nutrient-dense food options were limited to the galley and commissary, and participants had mixed feelings about the galley. Many of the participants who did not have a galley on their bases (NSAA and NAS Pax River) desired to have one because they would have access to a variety of food options at low cost, and it "*contributed to their healthy eating habits*." Participants and leaders at NSAA and NAS Pax River believed that their Sailors needed a galley as an alternative to fast food: *"I think that if they had a galley, it would be different. People would have access to free, quote, food, and they wouldn't be buying so much fast food all the time"* [EB30]. Not all participants at NSAA and NAS Pax River wanted a galley because it meant that they would lose their BAS II and have money deducted from their pay whether or not they ate in the galley. Participants at NSAB liked having the galley as an option, but disparaged the quality of

the food, limited options, and restricted hours. Many were willing to pay more at the contracted cafeteria for foods they thought were of better quality compared to the galley:

> *I'll go to either the DFAC [galley] or the first floor where there's like better food. Where it's like done better, but I don't know, like taste better. I would say like [the] DFAC, it's like gelatinous chicken. It's not that great, I don't know. And then the vegetables are boiled till they're like gray. I don't think they taste very good or are healthy for you … upstairs it's just really good, I don't know, burgers, Subway sandwiches, so I just rather go to the first floor" [EB16].*

Participants at NSAB also found it easier to get fast food or junk food from the vending machines or convenience stores than to get food from the galley because of their work schedules. Regardless of the base, participants wanted options, and many did not like being forced to eat in the galley, that is, having money automatically deducted if there was a galley on-base.

The commissaries on NSAA and NAS Pax River provided healthy grab-and-go options at the front of the stores and offered other quickly prepared options such as sushi and deli sandwiches, but participants did not mention grabbing these options. One of the leaders at NAS Pax River noted that the commissary had tried to offer healthy grab-and-go foods, but he had "*never heard anyone under E7 talking about it*" [FN 31]. Most participants stationed at bases with a commissary appreciated having a conveniently located grocery store that was affordable. *"So, if I ever go get groceries, I'll always go to the commissary. It's very convenient"* [EB03]. Some participants at NSAA and NAS Pax River noted that they did not like to buy produce at the commissary because it tended to "go bad" fast: "… *it [fruits and vegetables] tends to go bad very quickly …I bought*

something from the commissary one time and literally the next day it was bad, and it looked perfectly fine the day before" [EB22]. Several participants chose to shop at more upscale grocery stores off-base because they thought the quality of the food was better.

Availability and Accessibility of Cooking and Storing Food

Having access to a full kitchen and cooking, preparing, and storing foods at their convenience were major influences of participants' eating behaviors. Participants and leaders agreed that living in the barracks made it hard to eat healthily, primarily because it was difficult for Sailors to cook whenever they wanted. Depending on the barracks set-up, participants had to share a community kitchen with 50 to 300 other Sailors. They had to transport their ingredients and cookware to and from the kitchen, which could be a short walk down the hall, or a much longer trek down "*three flights of stairs and across a courtyard*" to another building. Sharing a community kitchen meant there were times they had to wait, which was less than ideal if they were hungry. Cooking in an open environment was also intimidating for some Sailors.

Many Sailors navigated the issues related to the community kitchen with cooking "undercover" in their barracks, by using restricted appliances and keeping them out of site during inspections: *"I know a few of my friends. They also have their own hot plates, and they don't use the kitchen either"* [EB07]. However, "*cooking on the floor*" or "*washing a crockpot in the sink or shower*" could be "*embarrassing*" and "*unappealing*." Most participants had sufficient access to store foods properly (e.g., cupboards and large refrigerators), but adequate space for food storage was a problem for participants living in the E-3 barracks at NSAB. One participant provided a photo to show the limited space

(see Figure 23) and stated, "*see, you really don't have much … not a lot of space so you make it work*" [EB06].



Figure 23: Participant photographs of storage and appliances in a barracks' room

Some reported that their refrigerators stopped working at times, which caused them to have to throw food away and lose money. They reported these issues to maintenance and their chain of command—resolution was slow, if it occurred at all. For many participants, the lack of a personal kitchen and storage space decreased their desire to cook and encouraged ordering food, eating out, or eating ultra-processed microwave meals: "*A lot of people gave up cooking … you could tell the people who first come to command really wanna cook. They wanna eat healthy, meal prep, and then the people who have been there awhile, they just take out…*" [EB16].

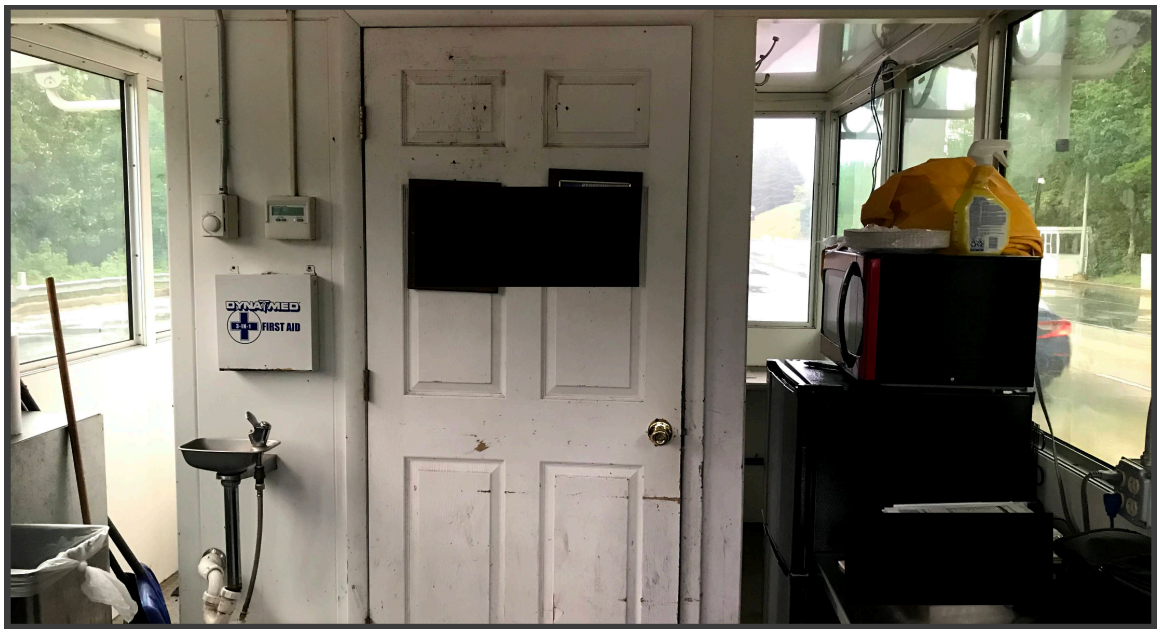
Participants who lived off-base or in on-base housing reported that having their own kitchen made it easier and more desirable to eat healthily: "*it really does help, healthy eating once you leave the barracks due to the ease of access of the stove and your appliances compared to living in the barracks*" [EB05]. Some participants avoided the community kitchens in the barracks and used the kitchens of nearby friends or family

members to meal prep: *"I just kind of take over a friend's apartment for the day and I cook a whole bunch of food that may last me throughout the week"* [EB17].

Workplace Structure and Systems

Participants' eating behaviors were highly influenced by the physical environment of the workplace (e.g., breakrooms with refrigerators and microwaves), work schedules (e.g., shift work and work-tempo), workplace events and traditions involving foods, and coworkers bringing in food. HMs and MAs reported busy work schedules and frequently eating fast food and junk food, but several differences between their workplace structures and cultures related to the access and availability of food were noted.

Most junior MAs are required to work shift work and assigned to patrol ("*go around making sure no one's doing anything illegal*") or guard duty on "*the gate*." They did not get lunch breaks and the limited space in the "*guard shacks*" (structure where security sits at the gate) made it challenging to sit down and eat: "… *So we walk in the shack, there's a little desk thing that faces traffic. You eat a couple bites, and as you see a car pulling up, you swallow it really quick, and you go back outside*" [EB20]. The interior of one of the guard shacks visited was sparse and grimy—the restroom was less than two feet away from a water fountain that was inoperable, a refrigerator, and a microwave (see Figure 24). Not all guard shacks had a refrigerator or a microwave, so many reported eating perishable snacks and ordering food. Few brought their lunch to work or had time to eat it if they brought it. Many MAs reported having sporadic eating patterns ranging from fasting for the entire shift to grazing throughout the day.



(Photograph taken by author August 20, 2020)

Figure 24. Photograph of the inside of a guard shack

Only one MA stated that "*you don't feel rushed*," and that there is time to sit and eat your food when working on the gate [EB22]. The eating behaviors of MAs were largely dictated by their work schedules and whether or not they brought food to work. Many felt that night shift workers had the greatest challenges because "*nothing was open*" except convenience stores off-base.

> *What's open [at night] is Wawa's and McDonald's … I put on weight when I'm in nights … So, you're less active, but you have less ability to eat healthier foods unless you bring your own foods. So, it's like a perfect storm for gaining weight and getting sedentary*. [EB29]

MAs who worked patrol faced similar challenges as those who worked the gate because they had to be available at a moment's notice. Many reported getting food from the convenience store or fast food restaurants on base and eating in their cars. Going off-

base to get food while on duty was a challenge. They were encouraged to use drive-throughs or get takeout and not stay too long in a restaurant because they did not have the authority to operate as police outside the base and could attract unwanted attention. One participant's description of what he ate during a workday likely captured the eating behaviors of many MAs:

> *When they [the Mini NEX—convenience store] open, I go in there, I grab my little pack of donuts because they're less than a dollar. I grab two energy drinks and a Gatorade. I'll eat the donuts just to hold me over to about noonish. And I'll have the energy drink to keep me awake. And in between the two energy drinks, I'll have the Gatorade. And around noonish I'll probably suffer and tough it out until I get home, or I will go to Panda on-base or just something that's cheap and quick 'cause they don't like us uh being out of service for eating too much or uh going off-base to go get food or whichever*. [EB30]

Some patrolmen and leaders on the shift looked out for other members of the team, particularly Sailors working at the gate, and brought food and water to them. A couple of shifts mentioned having cookouts on slow days and taking food out to "*all the guys*," but this seemed to be highly dependent on section leaders' engagement. Some sections socialized after work and had cookouts and get togethers to support one another. Many MAs believed that the eating behaviors of Sailors in their community were bad, but they could do little about it. Many participants believed that their leadership did not care. One of the dieticians confirmed this sentiment:

> *She [the dietician] stated that "greatest group at risk is security." Their circadian rhythm is off, they have poor habits, and it "shows in their labs and weight." They*

drink "a lot of energy drinks and sit for hours at a time." "They have really poor eating habits." They feel like "their supervisors don't care; the Navy doesn't care." [FN 24]

The HMs interviewed had less demanding work schedules and better access to foods and eating spaces than the MAs, but many still reported their busy schedules negatively impacted their eating behaviors, especially those who worked in the surgery department: *"…work is like really busy, so it's really hard to have the motivation to eat healthy"* [EB16]. All the HMs interviewed had access to a staff lounge (or place to sit and eat), a refrigerator, and a microwave. Vending machines were plentiful, and there was space for them to store snacks as well. Apart from the HMs working in the surgery department, HMs were allotted a lunch break (30-60 minutes). Some reported working through their lunch breaks if the clinics were busy; it was expected that they would get the job done before taking a break: "*it just depends on how busy the clinic is. So that will kind of determine what I eat, and sometimes it's just so busy I don't eat. I have to wait until after work"* [EB06]. Some chose not to eat lunch near their work area because they could be summoned to help and work—their lunch time was not always respected. Lunch breaks were sometimes seen as a privilege, and at one installation, the entire junior enlisted staff's lunch breaks were shortened from one hour to thirty minutes as punishment because some people were taking longer lunch breaks than allowed.

Potluck and social gatherings with food occurred frequently within the clinics and hospitals to boost morale, relax, and celebrate each other. There were potlucks for holidays, celebrations (e.g., birthdays and baby showers), and "*hail and farewells*" (people coming to or leaving the unit/command), or if people wanted to get together and

eat for no reason at all. Participation was voluntary, but people were encouraged to bring something. The officers and senior enlisted usually brought main dishes or more expensive items (e.g., meat), and the junior Sailors brought the desserts and snacks. The foods were not always the healthiest options, and some believed that these events resulted in them eating more sweets and tempting foods than they would otherwise. It was also common for co-workers, especially leaders, to bring in food for the department.

> "*… they always have snacks and stuff … sometimes they'll bring lunch, like one of the officers will always bring lunch. I think two times a week, and it's like pasta and like fried chicken, like all this stuff and we can all eat it"* [EB10].

Staff/co-workers would also bring donuts in the mornings or other small snacks. Most of them ate whatever someone brought in, but a few stated they stuck to their diets and tried to avoid the free food.

Food fundraisers were popular in the hospital and clinics; this was not observed or reported among the security departments. Participants reported that most of the fundraisers were organized by enlisted groups like the Corpsman Ball Committee or the Junior Enlisted Association [JEA] to raise money for events. These fundraisers typically involved selling food from local fast food restaurants at a higher price than what was charged at the restaurant. One of the leaders of a committee reported that the food fundraisers provided Sailors on the installation (NSAA) with convenient options they would not otherwise have, so, in some way, this was a public service [FN7]. Several Sailors mentioned it would be a good idea to sell healthier items at fundraisers but thought it would be more difficult and bring in less profit. According to participants, there were no fundraisers that they could think of that did not involve food.

Macro-level Environment (Sectors) Factors

Factors within the macro-level environment that influenced junior enlisted Sailors' eating behaviors are characterized by three themes: (a) military structure, (b) policies and regulations, and (c) socio-cultural norms and values.

Military Structure

The hierarchical structure of the military promotes class systems among the ranks, which creates inequities (real or perceived) in autonomy and resources for junior enlisted Sailors. Many participants and leaders described a precarious situation in which junior Sailors have tremendous responsibility at work and limited autonomy over their social situation: *"…it's never a good feeling to be treated like a kid in high school when we have adult jobs"* [EB26]. They felt that they were required to follow orders, get the job done, and take care of "the Navy," but the Navy did not necessarily take care of them. For some, this led to a lack of motivation in doing their job and maintaining their health.

> *You're not gonna be motivated to do anything or better yourself if your chain of command doesn't recognize who you are as a Sailor … "I exist here. I am a body filling a spot and that also correlates to at home. I go home, I don't want to do anything. Why should I do anything if it doesn't matter in the long run.* [EB30]

One leader noted that junior Sailors were encouraged to make good choices regarding their health and nutrition, but were not always given the knowledge, skills, or resources to do so: "…*many feel a lack of ownership and they don't feel like they are part of the team*" [FN 23].

The military provides a salary, housing, and allowances for subsistence (e.g., food) to junior Sailors, and in most instances, regulates where they can live and how

resources are allocated for food. All unaccompanied junior enlisted Sailors are required to live in the barracks if there is available occupancy. This requirement ensures junior Sailors will have access to reasonable accommodations near their work settings, and many leaders believe it is the best way to keep junior Sailors safe and out of trouble. Many junior Sailors do not have cars, which makes it crucial for them to live on-base and have access to nutritious foods. However, many participants disliked being forced to live in the barracks and complained about the lack of privacy, autonomy, and access to cooking. Living in the barracks seemed more difficult for older junior enlisted, especially those who had lived on their own before joining the Navy. To them, it was "*a setback*." Most participants believed that living in the barracks was a major reason for eating unhealthily, and if they could move out or have access to their own kitchen and food storage their lives would be better. The only way to "*get out of the barracks*" was to make rank or get a dependent (i.e., spouse or child). One participant explained that some people take drastic measures, like getting into "*contract marriages*" (pairing solely for monetary or medical reasons), just to move out and improve their quality of life:

> *Nobody seems to care about the junior Sailors in the barracks … Almost feel like they kind of mock you, like, hey, my room is flooding like oh, sucks to suck or hey, like there's mold on my walls and my showers, uh sucks to suck. It's almost this mentality of, you have to earn your stripes. But what they don't realize is like, this is gonna be my life … Like, why is my quality of life so bad? It's almost like they force you to get a contract marriage … otherwise you're just stuck there. It's like they punish you for being single*. [EB16]

Informal conversations with other service members and information on the internet suggested that contract marriages may be common, even though they are a punishable offense.

Junior enlisted Sailors are encouraged to get their meals from the galley, and money is automatically deducted from their pay to cover the cost. Many Sailors preferred to choose how they spent their money on food, especially if they did not like eating in the galley. Automatic deductions meant some lost money because they spent money eating from other venues:

> *So, they're just taking all this money out for something [galley in "A" School] I didn't use. I feel like that would be the same thing here. If we were to get one [a galley], a lot of people still wouldn't use it. So, it' just easier for the double BAS, 'cause we can get what we want. And we can like stock up groceries for like two weeks and then those other paychecks like, you can keep like whatever's left, you know*. [EB10]

Not receiving subsistence and housing allowance on time negatively influenced participants' eating behaviors and further supported the narrative that "*no one cares about them*." Participants and leaders reported it was common for Sailors to not receive their BAS II for months despite repeated attempts by the local personnel to correct the issue at higher levels. Not getting paid encouraged some Sailors to choose foods that were less nutritious because they were cheaper and filling.

Policies and Regulations

Housing, nutrition, and physical fitness and body composition policies influenced junior enlisted Sailors' eating behaviors directly and indirectly (see Table 6).

Unaccompanied Housing policies established requirements for residency, resources, and cooking, which influenced many participants' food choices, feeding patterns, and motivation to cook, as previously described. Interestingly, leadership was aware that many barracks residents used prohibited appliances in the rooms but did not make a major issue out of it. They did not want safety or sanitation issues, but understood the challenges residents faced, so leaders encouraged them to be responsible and "*not get caught*," by saying things like, "make sure that's (e.g., unauthorized cooking appliances) locked up or out of sight during inspection."

DoD nutrition, food service, and health promotion policies (see Table 7) encouraged nutritional fitness for optimal cognitive and physical performance but failed to regulate the disproportionate availability of unhealthy options available on military bases or mandate nutrition education beyond recruit training. Policies and regulations on food service and nutritional standards in garrison are limited to dining facilities (e.g., galleys) that rely on appropriated funds (APF). Food and food services provided through Non-appropriated funds (NAF), such as vending and fast food restaurants, are not regulated by the same health and nutrition standards as military dining facilities (see Figures 25-28).

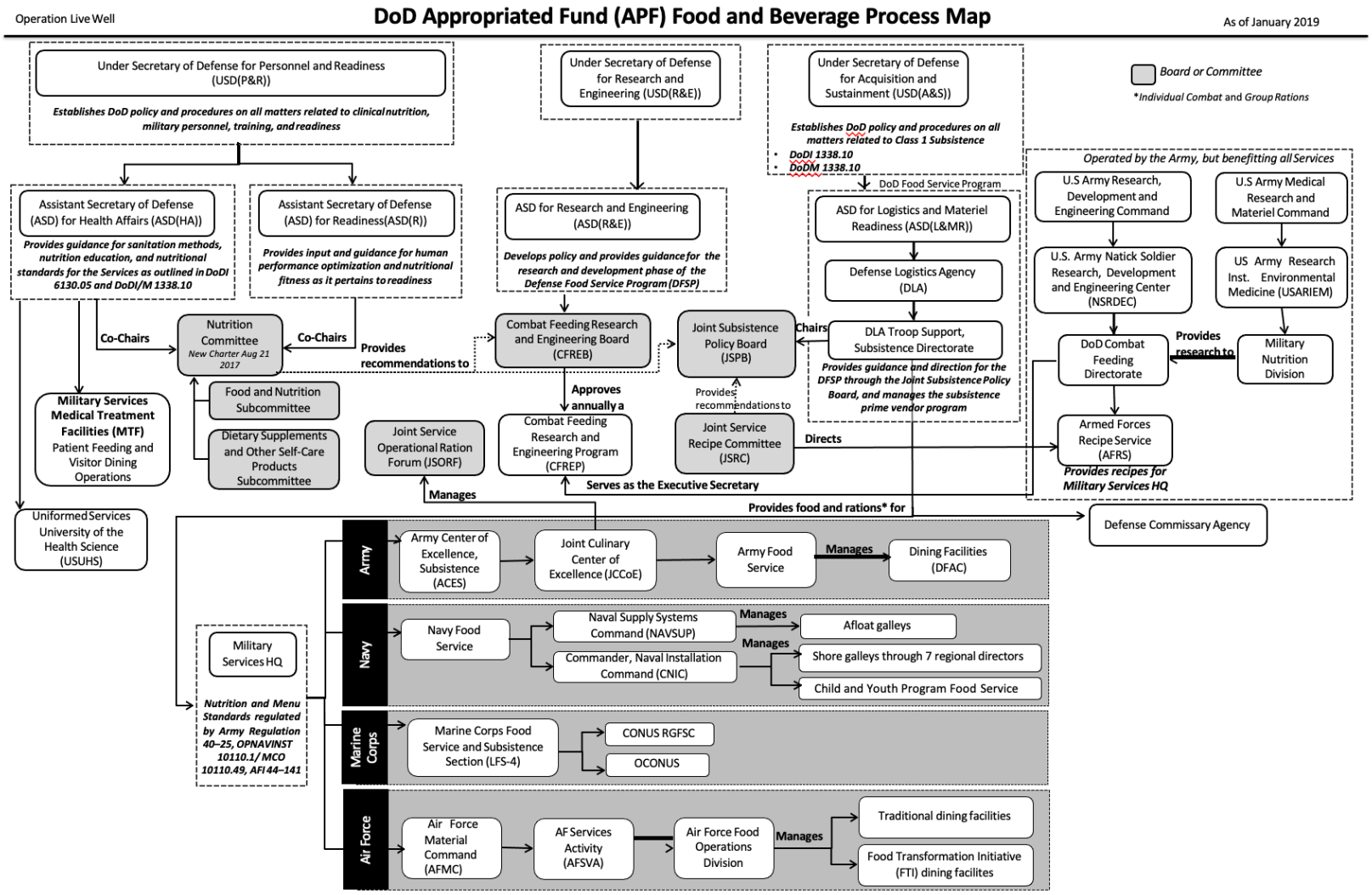


Figure 25. DoD appropriated fund (APF) food and beverage process map

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Operation Live Well

DoD APF Food and Beverage: Key Information

As of January 2019

Joint Subsistence Policy Board (JSPB)

Chaired by: DLA

- Develops revisions to food service policy and practices
- Provides standard DoD recipes developed and tested by Natick Solider Research & Development Engineering (NSRDEC) for incorporation into the AFRS
- Develops and coordinates JSPB positions in the areas of nutrition, R&D, finance and accounting, sanitation, training, food service management information systems, dining facility equipment and facilities
- Charter: DoDM 1338.10 Enclosure 4

Joint Service Recipe Committee

Chaired by: Secretary of the Navy

- Directs the Armed Forces Recipe Services (AFRS) program, and develops and maintains AFRS recipes
- Ensures recipes comply with policy and to maximize health and promote optimal cognitive and physical performance of the warfighter
- Reports to the JSPB
- Charter: DoDM 1338.10 Enclosure 5

Nutrition Committee

Chaired by: ASD(HA) and ASD(R)

- Develops and coordinates proposed nutrition policy to support a healthy and fit force and healthy communities, and enhance combat rations and feeding
- Identifies and recommends nutrition research priorities to the DoD Combat Feeding Research & Engineering Board (CFREB)
- Applies scientific consensus from nutrition-related research to DoD policies that affect nutrition standards and food service, combat feeding, weight management, and physical fitness
- Advises on the development and modification of recipes

Joint Service Operational Ration Forum (JSORF)

Chaired by: JCCoE

- Provides guidance and direction to the combat feeding and operational rations programs
- Provides final approval of all new ration items, components and systems
- Reviews R&D outcomes and acquisition data with voting representatives from each of the Military Departments to develop consensus per decision
- Conducts program decision reviews within the proposed acquisition cycle or out of cycle by request for urgent or special case situations
- Meets annually
- Charter: DoDM 1338.10 Enclosure 6

Combat Feeding Research and Engineering Board

Chaired by: ASD(R&E)

- Consists of representatives of the Army, Navy, Air Force, Marine Corps and DLA
- Jointly integrates and assigns priorities to all combat feeding research and engineering needs/requirements from the DoD components into a proposed Combat Feeding Research and Engineering Program

Army Food Service Operations

- The Joint Culinary Center of Excellence provides policy direction for local levels, provides management oversight to the installations, and provides some nutrition training and other trainings at the school house
- Several (approx. 12) Army dining facilities (DFAC) were closed due to utilization and financial reasons. This required the Army to develop innovative ways to provide meals to soldiers with meal cards:
  - Food trucks may enable bases to offer dining facility options to soldiers who cannot travel across the installation to reach the open dining facility during their allotted mealtime. There are currently 3 trucks
  - Kiosks provide grab-n-go options that abide by similar nutrition standards to the dining facilities

Navy Food Service Operations

- There are 283 AFLOAT Galleys (162 surface ships/71 subs) and 50 ASHORE galleys. The food available on ships may differ from ASHORE galleys. There are 5 platform-specific AFLOAT standard menus: Submarine, Aircraft Carrier, Large-deck Surface Ship, Medium/Small Surface Ship and the Littoral Combat Ship (LCS). These 5 menus are specific to the crew size, culinary specialist manning, storage and equipment for each platform. ASHORE galleys operate on 7 regional standard menus. Ships load-out prior to getting underway and receive replenishment from SPV worldwide. For example, aircraft carriers load-out with 60 days dry/45 day freeze/30 day chill supplies. Fresh fruits and vegetables (FFV) are available for approximately the first 2 weeks of a deployment. Frozen and canned products supplement the FFV until replenishment occurs.
- The Navy's 800+ item Master Load List (MLL) identifies subsistence items required to support all 5 platform specific menus. SPV are required to carry items specific to the platforms operating in their AOR and must meet a 98% line item fill rate on all items. ASHORE galleys also operate from the MLL and may have additional items available to them that are not available to ships.

Marine Corps Food Service Operations

- 47 CONUS and 14 OCONUS mess halls.
- All menus are approved by the HQMC Registered Dietitian and put in a COTs program that is utilized by all mess halls.
- All recipes are color-coded with posted signage to influence patron choice.
- Prime Vendors/catalogs must utilize the Marine Corps buyers guide to ensure minimum ingredient standards are set.

Special Operations Command (SOCOM)

- Special Operations Command follow the food service guidelines for all Services but have exceptions to certain policy and qualify for additional funds for basic daily food allowance amounts, due demonstrated need for higher caloric intake.
- Some units follow the food service guidelines for their respective Services, while others follow their own performance-based menu standards with the oversite of a registered dietitian (RD) (ie ARSOF Policy 7-18).

Air Force Food Service Operations

- Air Force Food Operations Division oversees the prime vendor program, approves items to be added to the catalog, and manages APF dining
- The Food Operations Division alters items in the catalog based on:
  - Requests from Service members to dining managers
  - Trends in the food industry
  - The supply chain (90 days to move from shelf to sold for OCONUS Activities and Just in Time Inventory; 3 days for CONUS); develop a deadstock list on products not being sold
- Installation Mission Support Center (IMSC) provides budgeting and distribution of support dollars to installations. HAF A1S develops Air Force policy on food operations (APF and NAF)
- Food Transformation Initiative (FTI) now known as Food 2.0 is replacing many traditional dining facilities

Defense Logistics Agency (DLA)

- DLA runs the Subsistence Prime Vendor (SPV) Program
  - SPV Program works with commercial food distributors through wholesale contracts (Prime Vendors) on a regional basis
  - A new prime vendor requires a new contract, which includes multiple bases and potentially multiple Services
    - Contracts are long-term (3-5 yrs) and require a minimum product purchase before a re-solicitation can occur. If issues arise with the contractors, DLA can re-solicit before the end of contract
- DLA purchases fruits and vegetables, dairy, and bakery items outside the SPV Program from small businesses
- Food offerings in DFAC are based on need provided during initial contract solicitation period
  - SOW for solicitations have a list of items (top 100 items) that dining facilities have been using that the vendor must be able to meet demand at a minimum; additional items can be added to the contract beyond this list
- Defense Food Service Program Criteria and Standards and DoD Menu standards are in DoDM 1338.10

DLA Troop Support Food Acquisition Process:

1. Customer identifies a need
2. Customer receives an intro presentation about the SPV Program, and the electronic order and receipt system used for managing the food distribution system
3. Customer identifies their organization's ongoing, new or anticipated requirements
4. DLA Troop Support gathers customer needs and develops a formal solicitation package, which includes federal laws, regulations, and guidelines
5. Potential vendors are invited to participate in an industry forum to learn more about requirements and resolve or clarify questions
6. DLA Troop Support announces the solicitation (open for approx. 50 days)
7. Each technical proposal is received from prospective vendors and individually evaluated by a team of SMEs
8. Contract is awarded and becomes effective 30-60 days after announcement
9. Post-award conference at the vendor's facility is conducted by the DLA Troop Support specialist and the vendor to resolve all issues involving the structure and execution of the contract
10. DLA Troop Support specialist will develop a catalogue of the vendor's product line, which ensures all items required by the customer are properly coded and contained in the catalog
11. Once contract is in place, customers can receive their food 48 hours after placing an order through the SPV program (STORES web-based ordering system) and direct vendor delivery

Figure 26. DoD APF food and beverage: Key information

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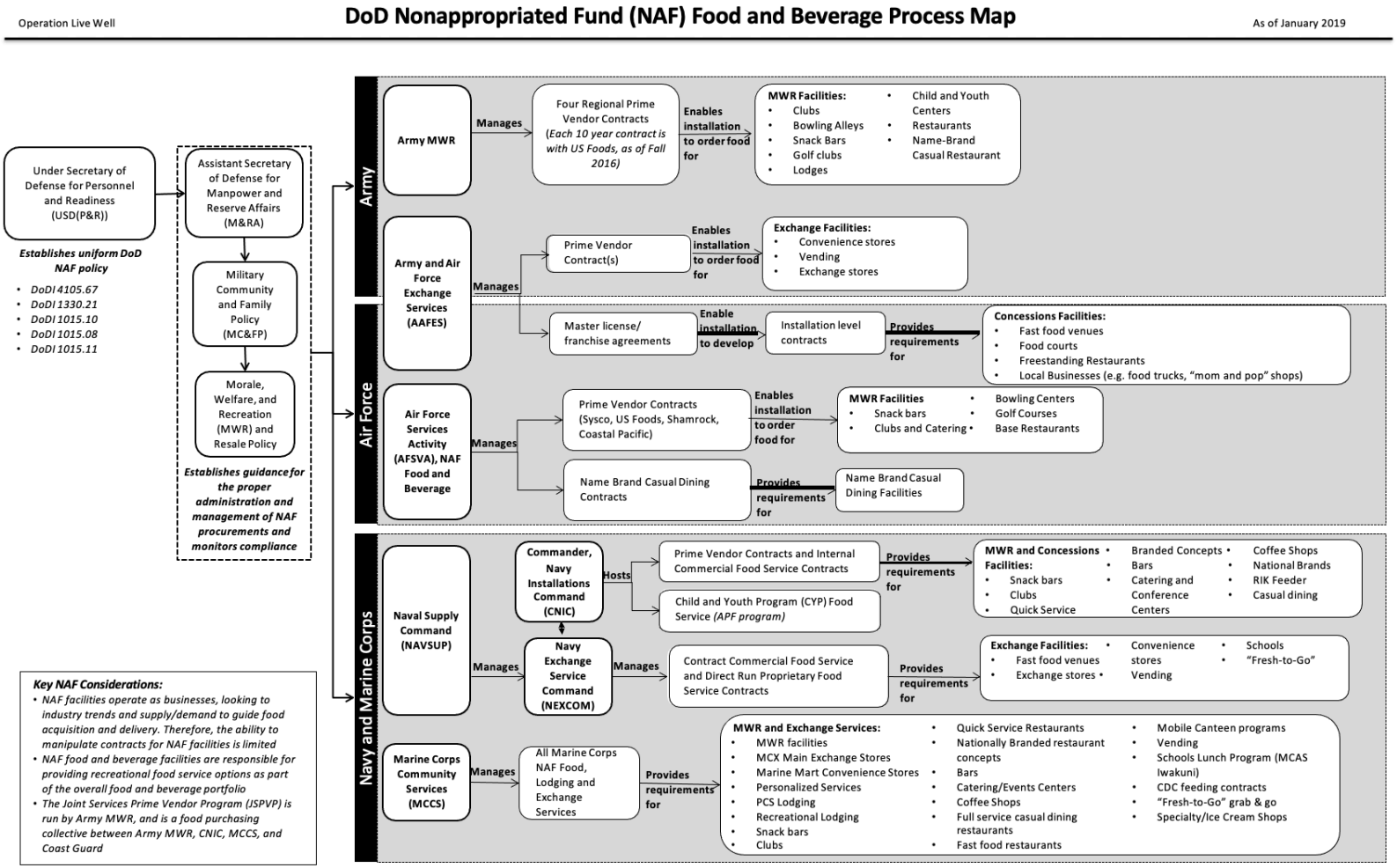
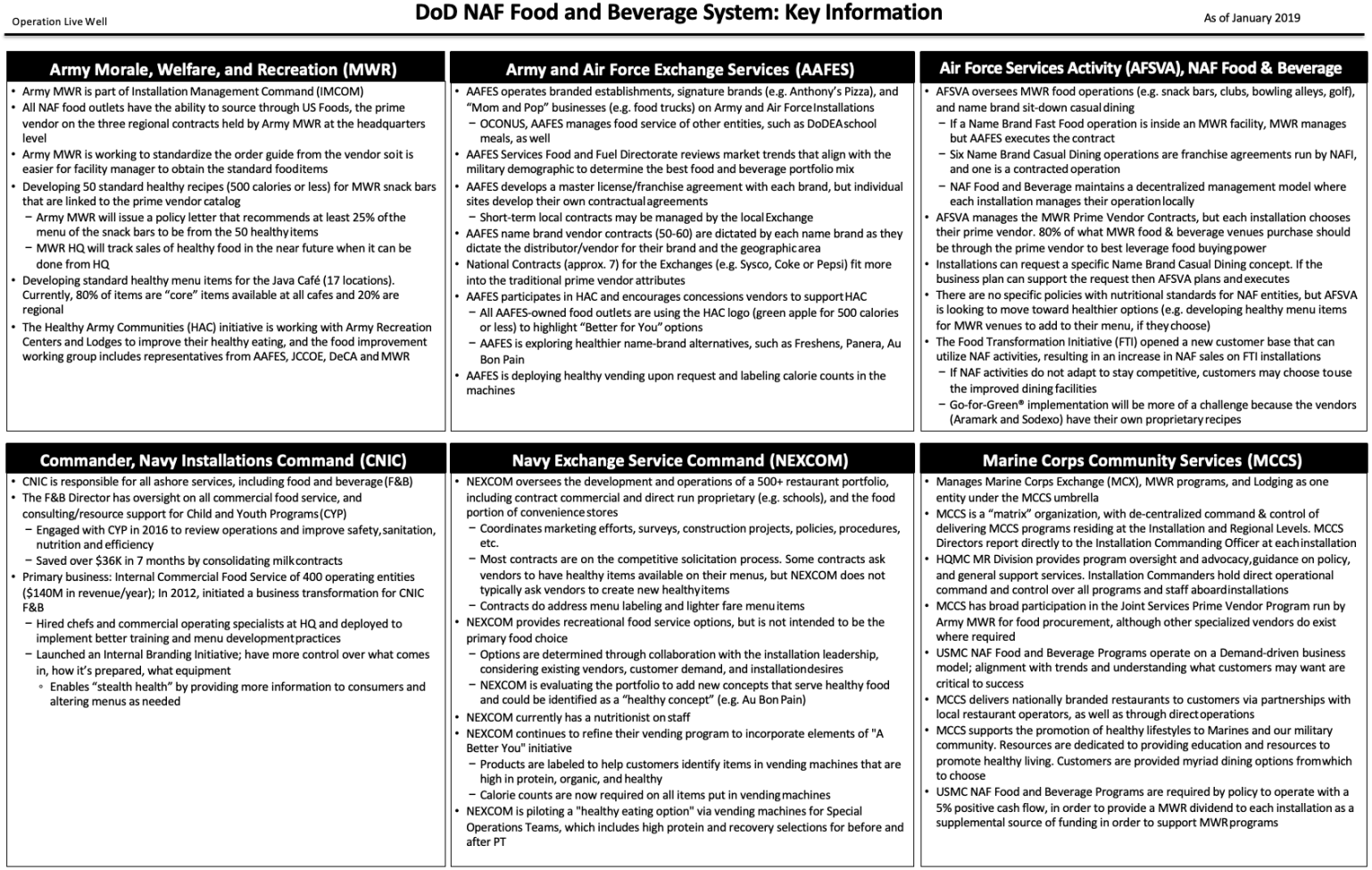


Figure 27. DoD Non-appropriated fund (NAF) food and beverage process map

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Operation Live Well

DoD NAF Food and Beverage System: Key Information

As of January 2019

Army Morale, Welfare, and Recreation (MWR)

- Army MWR is part of Installation Management Command (IMCOM)
- All NAF food outlets have the ability to source through US Foods, the prime vendor on the three regional contracts held by Army MWR at the headquarters level
- Army MWR is working to standardize the order guide from the vendor so it is easier for facility manager to obtain the standard food items
- Developing 50 standard healthy recipes (500 calories or less) for MWR snack bars that are linked to the prime vendor catalog
  - Army MWR will issue a policy letter that recommends at least 25% of the menu of the snack bars to be from the 50 healthy items
  - MWR HQ will track sales of healthy food in the near future when it can be done from HQ
- Developing standard healthy menu items for the Java Café (17 locations). Currently, 80% of items are "core" items available at all cafes and 20% are regional
- The Healthy Army Communities (HAC) initiative is working with Army Recreation Centers and Lodges to improve their healthy eating, and the food improvement working group includes representatives from AAFES, JCCOE, DeCA and MWR

Army and Air Force Exchange Services (AAFES)

- AAFES operates branded establishments, signature brands (e.g. Anthony's Pizza), and "Mom and Pop" businesses (e.g. food trucks) on Army and Air Force Installations
  - OCONUS, AAFES manages food service of other entities, such as DoDEA school meals, as well
- AAFES Services Food and Fuel Directorate reviews market trends that align with the military demographic to determine the best food and beverage portfolio mix
- AAFES develops a master license/franchise agreement with each brand, but individual sites develop their own contractual agreements
  - Short-term local contracts may be managed by the local Exchange
- AAFES name brand vendor contracts (50-60) are dictated by each name brand as they dictate the distributor/vendor for their brand and the geographic area
- National Contracts (approx. 7) for the Exchanges (e.g. Sysco, Coke or Pepsi) fit more into the traditional prime vendor attributes
- AAFES participates in HAC and encourages concessions vendors to support HAC
  - All AAFES-owned food outlets are using the HAC logo (green apple for 500 calories or less) to highlight "Better for You" options
  - AAFES is exploring healthier name-brand alternatives, such as Freshens, Panera, Au Bon Pain
- AAFES is deploying healthy vending upon request and labeling calorie counts in the machines

Air Force Services Activity (AFSVA), NAF Food & Beverage

- AFSVA oversees MWR food operations (e.g. snack bars, clubs, bowling alleys, golf), and name brand sit-down casual dining
  - If a Name Brand Fast Food operation is inside an MWR facility, MWR manages but AAFES executes the contract
  - Six Name Brand Casual Dining operations are franchise agreements run by NAFI, and one is a contracted operation
  - NAF Food and Beverage maintains a decentralized management model where each installation manages their operation locally
- AFSVA manages the MWR Prime Vendor Contracts, but each installation chooses their prime vendor. 80% of what MWR food & beverage venues purchase should be through the prime vendor to best leverage food buying power
- Installations can request a specific Name Brand Casual Dining concept. If the business plan can support the request then AFSVA plans and executes
- There are no specific policies with nutritional standards for NAF entities, but AFSVA is looking to move toward healthier options (e.g. developing healthy menu items for MWR venues to add to their menu, if they choose)
- The Food Transformation Initiative (FTI) opened a new customer base that can utilize NAF activities, resulting in an increase in NAF sales on FTI installations
  - If NAF activities do not adapt to stay competitive, customers may choose to use the improved dining facilities
  - Go-for-Green® implementation will be more of a challenge because the vendors (Aramark and Sodexo) have their own proprietary recipes

Commander, Navy Installations Command (CNIC)

- CNIC is responsible for all ashore services, including food and beverage (F&B)
- The F&B Director has oversight on all commercial food service, and consulting/resource support for Child and Youth Programs (CYP)
  - Engaged with CYP in 2016 to review operations and improve safety, sanitation, nutrition and efficiency
  - Saved over $36K in 7 months by consolidating milk contracts
- Primary business: Internal Commercial Food Service of 400 operating entities ($140M in revenue/year); In 2012, initiated a business transformation for CNIC F&B
  - Hired chefs and commercial operating specialists at HQ and deployed to implement better training and menu development practices
  - Launched an Internal Branding Initiative; have more control over what comes in, how it's prepared, what equipment
    - Enables "stealth health" by providing more information to consumers and altering menus as needed

Navy Exchange Service Command (NEXCOM)

- NEXCOM oversees the development and operations of a 500+ restaurant portfolio, including contract commercial and direct run proprietary (e.g. schools), and the food portion of convenience stores
  - Coordinates marketing efforts, surveys, construction projects, policies, procedures, etc.
  - Most contracts are on the competitive solicitation process. Some contracts ask vendors to have healthy items available on their menus, but NEXCOM does not typically ask vendors to create new healthy items
  - Contracts do address menu labeling and lighter fare menu items
- NEXCOM provides recreational food service options, but is not intended to be the primary food choice
  - Options are determined through collaboration with the installation leadership, considering existing vendors, customer demand, and installation desires
  - NEXCOM is evaluating the portfolio to add new concepts that serve healthy food and could be identified as a "healthy concept" (e.g. Au Bon Pain)
- NEXCOM currently has a nutritionist on staff
- NEXCOM continues to refine their vending program to incorporate elements of "A Better You" initiative
  - Products are labeled to help customers identify items in vending machines that are high in protein, organic, and healthy
  - Calorie counts are now required on all items put in vending machines
- NEXCOM is piloting a "healthy eating option" via vending machines for Special Operations Teams, which includes high protein and recovery selections for before and after PT

Marine Corps Community Services (MCCS)

- Manages Marine Corps Exchange (MCX), MWR programs, and Lodging as one entity under the MCCS umbrella
- MCCS is a "matrix" organization, with de-centralized command & control of delivering MCCS programs residing at the Installation and Regional Levels. MCCS Directors report directly to the Installation Commanding Officer at each installation
- HQMC MR Division provides program oversight and advocacy, guidance on policy, and general support services. Installation Commanders hold direct operational command and control over all programs and staff aboard installations
- MCCS has broad participation in the Joint Services Prime Vendor Program run by Army MWR for food procurement, although other specialized vendors do exist where required
- USMC NAF Food and Beverage Programs operate on a Demand-driven business model; alignment with trends and understanding what customers may want are critical to success
- MCCS delivers nationally branded restaurants to customers via partnerships with local restaurant operators, as well as through direct operations
- MCCS supports the promotion of healthy lifestyles to Marines and our military community. Resources are dedicated to providing education and resources to promote healthy living. Customers are provided myriad dining options from which to choose
- USMC NAF Food and Beverage Programs are required by policy to operate with a 5% positive cash flow, in order to provide a MWR dividend to each installation as a supplemental source of funding in order to support MWR programs

Figure 28. DoD NAF food and beverage system: Key information

Image used with permission and provided by OSD-OUSD (P&R)

APF and NAF services both offer healthy and nutritious options for service members, but not to the same degree. NAF services are for-profit and "are responsible for providing recreational food service options." They are not responsible for ensuring the foods they provide support a fit and ready force. A food service manager communicated that NEXCOM (Navy Exchange Service Command) uses various surveys and measures to meet the needs and desires of customers across Naval bases and are working to add new concept restaurants. He provided the following response when asked why there seemed to be a Panda Express and Subway at most bases:

> *Panda ($3.95B) & (Subway $10.2B) are in the top 20 National Brands in the world in annual sales according to the National Restaurant Association so they have the capability to develop and provide services on bases that have an average population. These concepts provide healthy options and customers do appreciate these name brand concepts according to past surveys and feedback from customers*. [FN29]

Participants, leaders, and health professionals noted the discrepancies between policy goals and the food environments on-base. Leaders wanted to improve their Sailors' access to healthier foods but believed that it was beyond their control to dictate what was provided in vending machines or the NEX food courts. Health promotion professionals mentioned that they appreciated having the food environment assessment tool—mNEAT—but were frustrated that nothing seemed to be done at a higher level to improve the environment even when an assessment showed the installation's food environment was in the red (see Figure 14). Navy dieticians also reported challenges with implementing highly encouraged, but not mandated or fully funded, initiatives like Go for

Green®, designed to improve availability and access to nutritious foods in galleys [FN 5]. Several nutrition-related policies were in revision (see Table 7), and a Navy Nutrition Instruction was in development during the data collection process. Personnel involved in developing and writing these policies aimed to improve the food environment for service members and provide nutrition education for leaders and service members throughout their career.

The goal for the Navy's physical readiness program policies is to ensure Sailors "maintain physical fitness required to support overall mission readiness" (127). To this end, Sailors' physical fitness and body composition are assessed biannually. Failure to pass either portion of the assessment results in automatic enrollment in the Fitness Enhancement Program (FEP) until the member passes the next assessment. Failures can also result in punitive actions such as negative comments on evaluations, inability to promote or advance to the next rank, or involuntary separation. FEP is run by CFLs and Assistant CFLs (ACFLs) and almost always involves three days of group exercise each week. Sailors who fail the body composition assessment (BCA) are required to enroll in a weight management program or receive nutritional counseling (only one visit is required). Nine policy changes were made to the July 2011 Physical Readiness Program Instruction (see Table 7) with an attempt to "strike a better balance between physical health and mission accomplishment." Significant changes involved relaxing body composition standards, instituting separations for multiple failures and later discontinuing separations for multiple failures, and suspending the physical assessment during the COVID-19 pandemic.

Cyclical PRTs prompt most Sailors to improve their eating behaviors and increase their physical activity to pass the test, but are not an accurate assessment of Sailors' maintenance of health and physical fitness. Participants and leaders reported that most Sailors just want to do well enough to avoid being put on FEP: "a *lot of people call it the fat enlisted program*" [EB13]. Despite explicitly stated prohibitions on compensatory behaviors (starvation diets and sauna suits) to alter body composition assessments, participants reported it was not uncommon for people to "*fast for an entire week*" or use laxatives to "*make tape*." Participants reported that most Sailors' improvements in their eating and physical activity were short-lived—almost everyone went back to their normal habits after the PRT.

Leaders reported that relaxed body composition standards and suspension of mandatory separations for multiple failures resulted in negative consequences—Sailors were getting bigger and complacent: *"He's [the CFL] got a bunch of people on FEP right now, and those people just don't care … they would typically just separate you, but apparently they don't do that anymore"* [EB14]. One CFL interviewed stated that in the past, Sailors used to work harder to get off FEP, but now, he has noticed an "*awkwardly high rate of recidivism:*"

> *Everyone who gets off of FEP goes back on. They'll ask what they can do to get off, but then they don't listen. Many of them want to know what is the bare minimum to get off. They'll go to ShipShape but not do what they're told to do … At least when they knew they were going to get kicked out people tried, now many of them don't care*. [FN 14]

Socio-cultural norms and values

Participants' eating behaviors were influenced by the socio-cultural norms and values of the United States—specifically following and emulating people on social media and experimenting with popular diets and dietary patterns. Participants followed people on social media, often YouTube, for advice and inspiration on diets and eating plans, cooking, and meal preps. They chose people to follow based on their body image and appeal, not necessarily for their credentials. Getting information from social media was easier and more appealing than seeking out information from a healthcare professional at the MTF.

Going on a diet seemed to be a rite of passage and had little to do with maintaining the Navy's fitness standards (except during PRT). Dieting and trying various dietary patterns were not limited to participants who wanted to lose weight or change their body composition. Many people liked the idea of "going on a plan" or trying something new. Keto, Paleo, and Intermittent Fasting were the most popular diets:

> *I know one of our physicians here, he's doing the Keto diet. He was showing me how he's like logging everything. He's like, look, I even logged my whiskey that I had last night. And I'm like oh, that's so cool.* [EB07]

Some people identified themselves as pescatarian, vegetarian, or vegan and chose to eliminate animal products and/or grains because of health reasons or to improve physical symptoms: *I keep the carbs relatively light while I'm at work because they make me a little groggy, a little tired.* [EB20]

Cultural Environment

Factors within Navy and military culture that influenced junior enlisted Sailors' eating behaviors are characterized by five themes: (a) mission first; (b) leadership

engagement and investment, (c) personal responsibility, (d) misplaced incentives, and (e) emphasis on physical fitness. Each of these factors were interconnected with factors identified in the previous four levels, highlighting the bidirectional influence among Sailors, their environments, and the culture.

Mission First

The military mission or job requirements took priority over personal desires, preferences, and/or needs, which meant Sailors learned to "*suck it up*." Eating for health and performance was not seen as an important part of the mission. Sailors were encouraged to eat healthily, but not at the expense of completing training, seeing patients, and/or responding to calls on base. Many participants felt pressured to work through lunch, avoid hydrating so they would not have to use the restroom, skip meals, or snack throughout the day to avoid interruptions in their workflow: *So, it's very accepted and normalized here at this workplace … if you don't take your lunches and you don't do that kind of stuff, it's almost like, wow, that's a really good worker … It's like praised*. [EB15] None of the participants stated that their leaders demanded this behavior, but it was an unwritten expectation, especially since many of their leaders did the same. As one of the senior leaders described in a telephone conversation:

> *"No one wants to tell the CO that we can't do the job. No one wants to say we're too tired…" He explained that this is an issue for the Navy. People are stressed, tired, and overworked, but they still have to get the mission done and no one wants to tell higher leadership they can't do it. This is why the Navy has seen some of the ship/aircraft accidents. He stated that unfortunately, "nothing is gonna happen until something happens." He mentioned that he was prior enlisted*

and was "in their shoes as an E-1." He too thought, "these people don't care about me." That's why he wanted to cross over to be an officer to do more for them. But now he sees that "it's not that they didn't care," it's that they have to answer to someone else to get the job done with limited resources. [FN 33]

If participants wanted to engage in other health behaviors such as taking a walk or working out at the gym, they believed it all had to be done on their own time, outside of working hours. Even though Sailors were told they could work out during lunch and that they should take care of themselves, it was an unwritten rule that most people did not. This was confirmed by several leaders who believed that physical fitness was not built into the culture. If you had time to work out or sit down and eat lunch, you had too much time on your hands and needed more work to do. To the surprise and dismay of several participants, none of the commands had mandatory physical training *"… here at the military base that I'm at now, we never PT, ever. I've never PT'd with my shift. You only PT on your own time* [EB20]. Participants and leaders noted that the lack of mandatory unit or command "*PT*" was not common among their fellow service members in the Army and Marine Corps. Sailors felt that having mandatory PT would build morale and encourage Sailors to eat healthy and be more fit, but thought it was difficult to do so because of work schedule and staffing shortages.

Leadership Engagement and Investment

Leaders set the tone by clarifying and executing the mission, creating barriers, or removing obstacles. The degree to which leaders engaged with and invested in their Sailors influenced Sailor's perceptions of themselves and motivation to be healthy and "ready." When asked about recommendations to make it easier and more desirable to eat

healthily, many participants suggested proactive engagement from their leaders. Some provided examples of leaders who were role models and encouraged them to eat healthily and exercise, but many believed their leadership did not care about what junior Sailors ate if they got the job done and stayed out of trouble: *They're [leadership] more worried about themselves and covering their own asses than the well-being and the healthiness and the readiness of their actual Sailors …. we are numbers to them and us as numbers directly reflect their evaluations. [EB30]*

Leadership engagement and connection with junior staff was a delicate balance. On one hand, junior Sailors wanted to know that their leaders cared about them and "*knew their name*s," but they did not want them hanging around too much.

> *It's a big separation [between junior Sailors and leaders]. But a lot of times we, or some people, don't want that connection because we're not gonna be as close and hearty with MA1 and Chief as we are with our other E4s and E5s … You're gonna change the way you talk, change the way you act, everything. So, it's weird. You just kind of tense up and you're hey MA1, yeah, I'll eat better … Thank you, and just leave. [EB29]*

There was a disconnect between participants' and leaders' perceptions of leadership's engagement with Sailors to eat healthily. Many of the leaders interviewed discussed how they cared about the junior Sailors, worked hard to make them "*good human beings*," and often encouraged them to eat better, *"work together and shop at places like Costco or Walmart, [and] cook and plan their meals together*" [Field 2]. Leaders talked about "*promoting fitness*" and educating junior Sailors, but few participants expressed the same sentiment. It was primarily only during recruit training

that participants believed their leaders actively engaged with them about their nutrition and well-being. They appreciated how the RDCs "*pushed them to maintain a healthy eating habit*," because it showed they cared—they did not feel talked down to or embarrassed. At their local commands, it was primarily the middle managers (E-5s), junior officers (O-3s), and CFLs that participants mentioned occasionally receiving guidance and support from. These leaders "*offered their knowledge*" and encouragement without making them "*feel attacked*."

Personal Responsibility

The Navy values and demands that Sailors maintain personal responsibility for their actions, health, and readiness. Sailors are encouraged to eat healthily and provided nutrition resources through MTFs and online platforms, but the responsibility to fuel for performance is the Sailors'. Beginning with a one-hour nutrition class in recruit training, Sailors are informed that they "*are responsible to maintain their weight within Navy standards*" and that if they "*want to be successful, use your time training to establish good habits that you can continue*." During this nutrition class, they are given basic information (e.g., choose vegetables and hydrate with water), and reminded that:

> *"once training is over, the easy choice will be to return to old habits or turn to other foods such as: (1) energy drinks, (2) frequent fast foods, and (3) high fat and sugar snacks that do not promote optimal performance*. [Personal Development Topic 2.15: Introduction to Nutrition, Recruit Training Command]

They are informed that there will be pressures and external challenges to eating unhealthfully, but their eating behaviors are their responsibility—no one will mandate what they eat or how they should eat: "*I can't order people not to chug Monsters and eat*

beef jerky…" [FN 31]. Leaders and participants frequently remarked that it is up to the Sailor to make good choices, even if it is hard to do so: *"I do see people being adults, and they have their own choices … but at the same time, if you're not providing healthy choices … it's definitely not helping the situation …"* [EB02].

Participants reported receiving little guidance and education in nutrition beyond recruit training. The perception was that if you wanted to know how to eat better to lose weight, maintain good health, or improve physical fitness, you had to "*figure it out yourself*." Other than mandatory physical training for Sailors on FEP, there were no requirements or trainings built into their work schedules (or career) to help Sailors establish healthy behaviors once they got to their commands. MAs were informed in "A" School that their schedules and job would make it hard to keep up their health and fitness, but they were not given tools to navigate these challenges. Many did not "*figure out*" how to make it work (i.e., nourish their bodies with nutritious foods), at least not consistently.

Misplaced Incentives

Other than making weight and passing the PRT, there was little incentive for participants to eat healthily and maintain fitness standards. From participants' perspective, they needed to do their job to meet the daily mission and take on collateral duties and extra trainings to improve their chances for advancement. Many junior Sailors believed the Navy rewarded doing a lot of collateral duties or things other than their job for advancement. From their perspective, they were incentivized to work hard at the expense of their health and wellness, and were frustrated when their hard work was not rewarded:

You gotta earn your stripes, but there's no reward once you earn your stripes … now I'm just working all the time and I'm tired all the time … There's no reason for me to keep burning myself out till I break. [EB15].

One leader suggested that we unintentionally "*incentivize being broken,"* because Sailors who are "broken" (i.e., cannot do their job because of an injury, etc.) get staff duty instead of working 14-hour shifts. The lack of cultural incentives to maintain health and fitness was expressed in a common narrative among leaders and participants that some Sailors "*do the minimum*": "*People don't wanna put in the extra work to work out on their own or, you know, maybe not eat 10 things of Ramen noodles a day" [EB13]; "There's a lot of people that would want to go all out and others that want to do the bare minimum"* [EB28].

Emphasis on Physical Fitness

"Physical" fitness was emphasized most often among participants and leaders, and in policies and messages when discussing health and readiness. Every base had one or more fully equipped fitness centers. When providing an overview of the base, one CO noted, "*we have a lot of fitness centers*." Sailors who failed any portion of the PRT were required to attend FEP, where the focus of remediation was on physical training, not nutrition, even for Sailors who passed the fitness portion but failed the body composition assessment. Participants and leaders frequently referred to the importance of physical fitness—not nutrition—for maintaining health and fitness standards. Relying on exercise to compensate for eating junk food or excess calories was common, and several participants talked about peers who were "*unhealthy but very fit*." For many, nutrition and health eating behaviors were less of a priority than physical fitness and aesthetics.

Table 6. Factors influencing eating behaviors: Themes, categories, and illustrative quotes

Theme	Category	Illustrative Quote
Intrapersonal (Individual)		
Knowledge and skills	Nutrition knowledge	*"You know, the lack of knowledge and information available to them is a big issue" [EB14]*
	Culinary literacy	*"…like some people really don't know how to cook. And it's just it's weird to me because I've been cooking since I was like super young." [EB13]*
Values, attitudes, and beliefs	Health and vitality	*"So, it's very important that I eat healthy and stay healthy." [EB22]*
	Body image and self-concept	*"Me personally, the fear of going back and looking like that again, I don't ever want to be that heavy unless it's just rock solid muscle." [EB14]*
	Military requirements	*"I don't wanna get overweight and not be able to be fit and ready for my PRT and to deploy if anything happens." [EB07]*
	Locus of control	*"So, by starting to meal prep and doing something about my nutrition I thought I could have some sort of control over my, you know my future or my situation." [EB28]*
Moods, feelings, and emotions		*"And that stress causes people, I feel, to overeat and say, why should I eat healthy? I've been having a bad mood. I want twenty-five wings, or I want a burger. I want something that's not good for me 'cause who cares?" [EB20]*
Food preferences	Taste, cravings, and enjoyment	*"…a lot of these kids are young and don't have a very good palate, like not good palate, not very experienced palate. So, they just eat things that are, they eat things that are delicious, like McDonald's and Burger King and pizza. Sometimes it's not the best" [EB11]*
	Familiarity and past eating habits	*"A lot of people don't like eating new things because they've never tried it and all that" [EB13]*
Resource management	Time management	*"I eat more when I'm not at work because I've got more time to prepare my food." [EB14]*
	Financial management	*"Wherever I wasn't down on money, I was definitely picking the better foods. But wherever I was low on money, it turned back to the cheaper, more plentiful*

Theme	Category	Illustrative Quote
		options where I get more out of it, than a more expensive but less produced options." [EB19]
Motivation and goals	Aesthetics	*"I think it's more of personal motivation and not so much to be like healthy eating wise, just to like look good and go to the gym and get like buff." [EB24]*
	Physical fitness	*"You know, if you work out and you don't eat right, the soreness is gonna be higher. Your recovery level is gonna be, you know, lower. So, it just comes down to that." [EB22]*
	Weight management	*"I try to skip dinner because…I'm trying to watch my weight." [EB16]*
Physical activity level		*"I think you can have kind of whatever diet you want, so long as you regularly work out." [EB22]*
Social Environment (Networks)		
Learning and training	Home education	*"I just go off of what I knew growing up. Um, like chicken is better than ground beef … and you want to eat more greens and …random stuff I picked up over 19 years." [EB32]*
	Formal military training and messages	*"In regard to the nutrition education that students receive it is not much…There is no nutrition education that I know of at ODS/OCS [Officer Development School/Candidate School] it is only in RTC [Recruit Training Command].* *[Field note 6: Email communication with Navy dietician]*
	Leaders	*"…the instructors [Recruit Division Commanders] always push for you to maintain a healthy eating habit because we ran, we ran twice a week." [EB14]* *"So, we had we had one Lieutenant, he just PCS'd, but he use to send out workouts and nutrition plans and what you should and shouldn't eat. And it was real helpful." [EB17]*
	Peers	*"I have friends…if they hear me talking, or certainly if they see me like, what I do and like how I meal prep, they'll like ask me questions about it." [EB25]*
	Social media	*"I would say social media is a huge way for them to get their nutritional information." [EB11]*

Theme	Category	Illustrative Quote
Peer pressure	Negative peer pressure	*"I'd say that I eat a lot more unhealthy things when I'm with other people just because it seems to be the trend with my group of friends, just like their priority isn't eating healthy as much as my priority is." [EB26]*
	Positive peer pressure	*"There is a bunch of peers around that were sort of getting on my case about it, so I decided to change it, change it up; instead, being healthier and more fit." [EB04]*
Role modeling	Leaders	*"he's one of the command fitness leaders, CFL…he's very, very healthy…So learning from him and talking to him about … healthy eating habits certainly has had an influence on my eating habits since I've been here. You know, as far as my nutrition goes, that's who I tend to look to." [EB14]*
	Peers	*"…she [roommate] always makes stuff like that all the time. She meal preps too. So, it's just like really cool. Like, she inspires me. She's awesome." [EB10]*
	Social media influencers	*"I've got a lot of my nutrition information from YouTube. So, I follow a few different nutrition people, physical trainers and different people that know about healthy things. And I just follow based on what they think and then what another one thinks and then I compare it." [EB05]*
Social norms	Eat out	*"…everyone just kind of gets together like, so guys, where we can go eat lunch today and then everyone kind of makes a collective decision." [EB03]*
	Order food (delivery services)	*"So, it's mostly, always order, order, order, order. Kind of sucks, but I have to eat. So that's that…If I'm at the weekends I'll have to order my food 'cause kitchens closed for sure." [EB27]*
	Eat on the run	*"I feel like you have to eat and just hurry up and eat, and then you're back on the lane." [EB27]*
	Do the minimum and complacency	*"I think most, a lot of us didn't care, 'cause they're like, as long as I stay within my weight class or my BMI class, I'm fine. That was most people's thing. And I mean, I can't blame them 'cause that's all most people focus on." [EB32]*

Theme	Category	Illustrative Quote
		"I don't think some people care personally, especially people that are like, oh, well, I'm gonna get out anyway. So why would I care about eating healthy now…if I haven't been doing it before." [EB13]
Social support	Family	*"She [participant's wife] made me more aware of like what I'm eating. She's good about that. And it's easier with her because she stays at home most of the time." [EB09]*
	Peers	*"So, we would cook dinner together 'cause …I'm her friend…I don't think I've seen her eat bad…If I didn't have her, then I would be eating like, you know, fast food all the time." [EB27]*
Physical Environment (Settings)		
Availability and accessibility of foods	Military training environments	*"No, in boot camp, there was no fast food line. There was just one simple line…I think one day out of a week or something where they would add on like some chicken wings, or like a burger or chicken, chicken burgers…We weren't allowed to eat any sweets in boot camp." [EB12]*
	On-base food environment	*"We don't really have the big commissary or anything. So, we do have what's in the hospital like in the galley downstairs when they're open or you do have maybe what's in 62 when they're open. But once they're closed, you don't have really many other options besides going out and getting fast food or restaurant around here." [EB17]*
	Off-base food environment	*"And when it comes to like the fast food and everything, in this area, this area is big on fast food." [EB29]*
Availability and accessibility of cooking and storing food	The barracks	*"We have a kitchen in the barracks, but there's like two stoves and most of the time they're being used by other people." [EB03]*
	Independent living	*"I live out in town, so I do have the opportunity of a kitchen. So that helps a lot. Like that's like a big thing." [EB29]*
	Borrowed spaces	*"I feel like a major contributor though is my brother is why I was successful, 'cause I have access to like family and like kitchen, which was all very lucky for me that I got stationed near family." [EB07]*

Theme	Category	Illustrative Quote
Cost and convenience		*"It's [fast food] quicker. It's cheaper. It's easier to get a hold of. I mean, regardless of the healthiness of it, we are more focused on getting something in our stomach so that we can continue to operate." [EB30]*
Workplace structure and systems	Shift work	*"The greatest group at risk is security. Their circadian rhythm is off, they have poor habits, and it shows in their labs and weight. They drink a lot of energy drinks and sit for hours at a time. They have really poor eating habits. They feel like their supervisors don't care; the Navy doesn't care." [Field note 24: Telephone conversation with installation dietician]*
	Work tempo	*"So, it's kind of like we have to eat in between cars or whenever you get a chance. So, you don't ever really know when you're going to eat, you just eat when you're hungry and as quickly as you can." [EB20]*
	Fundraisers	*"I don't remember what the group exactly is called, but they're in charge of getting our Corpsman Balls and stuff together. So, they do fundraising. We have Taco Tuesdays, obviously…they sell Chick-fil-A and stuff. It's more expensive than what you would go and purchase it for." [EB03]*
	Potlucks and social gatherings	*"So, there is quite a bit of potluck. Usually that's when someone leaves. Typically, either when they're separating or they're PCSing to some other command, that's typically when we have the potlucks." [EB05]*
Macro-level Environment (Sectors)		
Military structure	Social class/position	*"They don't allow us to eat in King Hall. Which I think is pretty insane considering we work here and take care of the kids. But from some higher ups—can't remember the names or positions—but we're just the help." [EB08]*
	Resource allocation (subsistence and housing allowance)	*"I know whenever we get an additional BAS [basic allowance for subsistence] for the food allowance because we don't have a galley, some people prefer to have that extra money than to eat in a group. But what's been an issue is…I haven't been, my second BAS doesn't always kick in." [EB19]*

Theme	Category	Illustrative Quote
Policies and regulations	Housing policies	*"'Cause like there's a lot of people in the barracks and there's one kitchen. And honestly, if they would just let people have that, like have the things that aren't authorized, it would help a lot." [EB10]* *"For the safety and protection of other UH [unaccompanied housing] residents and the facilities, cooking in UH buildings is only permitted in unit or room kitchenettes or kitchens and common kitchens. Installations will provide a list of authorized small appliances." [CNIC Manual 11103.2 – Unaccompanied Housing Manual – Chapter 6-9]*
	Nutrition policies	*"The program [Go for Green] is not an instruction however, so it is not mandatory but 'highly encouraged.'Most facilities often use it but are they using it properly is another question." [Field note 6: Email communication with Navy dietician]* *"The Surgeons General of the Army, Navy, and Air Force will…Develop and implement programs in accordance with the current U.S. Dietary Guidelines for Americans, and in support of HPO [Human Performance Optimization], that will…(a) Influence food choices to ensure mission is met without sacrificing morale. [OPNAVINST 10110.1: Nutrition and Menu Standards for Human Performance Optimization p. 1]*
	Physical fitness and body composition testing	*"Everyone, I mean everyone switches up, we all get healthy real quick. But it's a lot of intermittent fasting you'll see around PRT season. So, people trying to make tape, trying to make weight really fast." [EB15]* *"Any attempt by a member to alter their BCA [body composition assessment] measurements by using body wraps, starvation diets, and sauna suits is prohibited." [OPNAVINST 6110.1 J: Physical Readiness Program, p.8]*

Theme	Category	Illustrative Quote
Socio-cultural norms and values	Social media	*"You almost like you tend to surround yourself with people who are like you, that's even for social media." [EB06]*
	Dieting	*They are following the social norms. They'll say, "I'm trying to cut out the carbs…I don't eat fruit because it has sugar." [Field note 24: Conversation with installation dietician]*
Cultural Environment		
Mission first	Suck it up	*"Sometime if we see like, oh, so and so haven't eaten yet, and I don't have clinical in the afternoon, but I know they do have clinical in the afternoon, let me be a good shipmate and cover so they can go eat. But if we're all busy, we're all busy. You just have to kind of suck it up." [EB06]*
	Health behaviors on your own time	*Junior Sailors have a lot on their plate from their job to Sailor 360. There is so much that they have to do so you have to "get better on your own time." [Field note 34: MA leader]*
Leadership engagement and investment		*"Like when I tell you, the RDC [Recruit division commander] they care. They care about what you eat. They literally tell you, hey, have a bowl of cereal. No bacon today. How about you get a banana." [EB27]* *"So, they're [leadership] more worried about themselves and covering their own asses than the well-being and the healthiness and the readiness of their actual Sailors." [EB30]*
Personal responsibility	Highly encouraged	*"The Navy encourages us to keep our standards and healthy standards. But that's as far as it goes, really." [EB29]*
	Figure it out yourself	*"It's a lot of trial and error. It's a lot of figure it out yourself…I think it would be nice if there was some sort of educational material for all of us. Just something to help us out." [EB28]*
Misplaced incentives		*"…the Army and Marine Corps incentivize being fit, and in the Navy, you aim for the minimum… In other Services, you're incentivized to do your job and 'stay in your lane,' but in the Navy we incentivize you doing other duties." [Field note 31: Conversation with MA leaders]*

Theme	Category	Illustrative Quote
Emphasis on physical fitness		*"…I've always tried to eat healthy throughout my life, but it's never been like a top, top priority. Like my more my physical shape, just like my physical fitness and everything's been more my top priority." [EB23]*

Table 7. Instruction and policy documents reviewed as artifacts

Topic Area	Document	Purpose, Key Message, or Implications
Unaccompanied Housing (i.e., barracks)	Commander Navy Installations Command [CNIC] Manual 11103.2: Unaccompanied Housing (UH) Operations Management (January 23, 2019)	• Establishes policy on kitchen use in UH • Prohibits use of certain appliances in UH units to ensure safety (i.e., hot plates). • Establishes policy on cooking in unit: Cooking is only permitted in unit or room kitchenettes or kitchens, and common kitchens. Installations will provide a list of authorized small appliances …Installations may provide a list of allowable resident-owned authorized small appliances.
	Naval Support Activity Annapolis Instruction 11103.3: Naval Support Activity Annapolis, Unaccompanied Housing (UH) Regulations (November 8, 2018)	• Instructs E1-E4 UH residents to coordinate with their respective commands to request entitled BAS and BAS II because NSA Annapolis has no galley facility • Prohibits cooking in individual rooms: The use of hot plates, camp stoves, electric skillets/frying pans, and broiler/toaster type ovens are a fire safety hazard without proper ventilation and are not authorized in the rooms. The only exceptions are air popcorn poppers, coffee pots, blenders, and microwave ovens (not to exceed 600 watts).

Topic Area	Document	Purpose, Key Message, or Implications
Nutrition, Food Service, and Health Promotion	*Chairman of the Joint Chiefs of Staff Instruction [CJCSI 34045.01]: Chairman's Total Force Fitness Framework (September 23, 2013)	• Establishes the Total Force Fitness (TFF) framework as a key (a) readiness component and (b) component to the DoD's Force Health Protection Program and the Chairman's Health of the Force priorities • Defines and outlines goals for nutritional fitness
	*DoD Directive 1010.10: Health Promotion and Disease/Injury Prevention (August 22, 2003)	• Establishes the DoD requirement to implement health promotion to improve and sustain military readiness and the health, fitness, and quality of life of military personnel • Acknowledges individual health status is greatly dependent upon family and community health and community health is intensely affected by the collective behaviors, attitudes, knowledge, and beliefs of community members
	DoD Manual 1338.10: DoD Food Service Program (August 26, 2019)	• Implements policy, assigns responsibilities, and provides guidance for DoD Food Service Program • Requires DoD to provide high quality and cost-effective food service to authorized military and civilian personnel • Requires DoD Component heads to operate appropriated military personnel feeding and dining facilities • Requires all food service personnel to receive training on nutrition, food science, and healthy cooking techniques • Requires DoD Components to use food management teams to improve quality of food service, provide food that maximized health and

Topic Area	Document	Purpose, Key Message, or Implications
		promotes optimal physical and cognitive performance of the warfighter
	Army Regulation 40-25/OPNAVINST 1011.1/MCO 10110.49/ AFI 44-141: Nutrition and Menu Standards for Human Performance Optimization [HPO] (January 3, 2017) *In Revision	• Establishes nutritional standards, termed military dietary reference intakes (MDIs) for meals served to military personnel to support HPO • Outlines responsibilities to educate commanders, service members, families, and food service personnel about requirements and strategies to ensure eating habits promote HPO • Outlines responsibilities to (a) ensure healthy foods are incorporated into menu planning, appealing, and convenient; and (b) facilitate access to healthy foods at a reasonable price when possible • Encourages leaders to lead by example in terms of eating a healthy diet • Requires all Services to provide fundamental nutrition knowledge to service members during initial military training
	DoD Instruction: 1015.10: Military Morale, Welfare, and Recreation (MWR) Programs (May 6, 2011)	• Establishes and implements policy, assigns responsibilities, and prescribes procedures for operating and managing programs for military MWR programs • Requires Military Service Chiefs to ensure installations operate customer-driven MWR programs that are determined locally by marker analysis for the benefit of authorized patrons.

Topic Area	Document	Purpose, Key Message, or Implications
	DoD Instruction 1330.09: Armed Services Exchange Policy (December 7, 2005)	• Established policy and assigns responsibilities for operating Armed Services exchanges (e.g., Navy Exchange Service [NEX]) • Provides guidelines on purchase restrictions of name-brand fast-food operations—primary consideration shall be given to the overall quality of life and welfare of the active duty community • Provides definitions for appropriated funds (APF), MWR Programs, and Non-appropriated Funds (NAF) • APF: Funds appropriated by Congress • MWR Programs: Military programs that provide for the mission sustainment, community support, and revenue-generating programs for authorized personnel • NAF: Monies derived from sources other than congressional appropriations and commissary surcharge funds, primarily for the sale of goods and services to DoD military and civilian personnel and their family members, use DoD support or provide MWR programs
	DoD Instruction 1330.21: Armed Services Exchange Regulations (July 2005)	• Implements reference, prescribes procedures, and assigns responsibilities for operating Armed Services Exchanges • Authorizes Exchanges to operate name brand fast food outlets (restaurants, cafeterias, and snack bars), vending machines, and exchange marts (e.g., convenience stores)

Topic Area	Document	Purpose, Key Message, or Implications
Physical Fitness and Body Composition	*DoD Instruction 1308.3: DoD Physical Fitness and Body Fat Programs Procedures (November 5, 2002) *In Revision	• Provides policy, responsibility, and procedures for governing physical fitness and weight/body fat standards in the Armed Force
	OPNAV Instruction 6110.1J (July 2011)	• Establishes policy and requirements for Sailors to maintain a level of physical fitness required to support overall mission readiness • Requires members to meet minimum PFA standards for continued naval service • Requires commands to provide 10-week notice of scheduled PFA • Establishes BCA failure as an overall PFA failure • Specifies that alteration of BCA (e.g., starvation diets) are prohibited • Mandates FEP for Sailors who fail any portion of PFA
	NAVADMIN 203/11: 6110.1J Physical Readiness Program Policy Changes	• Prohibited members who fail BCA from taking PRT • Announced that members are not exempt from PFA if 10-week notice was not provided
	NAVADMIN 178/15: Physical Readiness Program Policy Changes (August 2015)	• Required members who fail BCA to take PRT • Required members who fail BCA to enroll in FEP and nutritional counseling • Announced COs will conduct PFA spot checks • Introduced changes to BCA and body fat standards beginning with first cycle in 2016: (1) Changed body fat standards, graduated by age (e.g., Males 40+ years increased from 23% to 26%); (2) Changed BCA Methodology (e.g., member will

Topic Area	Document	Purpose, Key Message, or Implications
		pass BCA if waist circumference is ≤ 39 inches for males and ≤ 35.5 inches for female) • Instituted administrative separation for members who incurred 2 PFA failures in most recent 3 PFAs • Announced "Future planned changes: Develop Navy-wide Registered Dietitian (RD) utilization plan…. Establish Go for Green healthy-eating ashore and at sea"
	NAVADMIN 061/16: Implementation of Physical Readiness Program Policy Changes Update #2 (March 2016)	• Reiterated changes to BCA beginning with the first PFA cycle in 2016: 1) Changed body fat standards, graduated by age (e.g., Males 40+ years increased from 23% to 26%); (2) Changed BCA Methodology (e.g., member will pass BCA if waist circumference is ≤ 39 inches for males and ≤ 35.5 inches for female) • Required members who fail BCA to enroll in weight management OR receive nutrition counseling
	NAVADMIN 141/17: Physical Readiness Program Policy Changes (September 2017)	• Exempted members who pass BCA and score excellent or better from the following PRT (BCA still required)
	NAVADMIN 304/17: Physical Readiness Program Policy Change (December 2017)	• Discontinued processing separations for PFA failures • Changed policies related to PFA failures to improve retention (e.g., ≥ 2 failure not separated, but ineligible for advancement)

Topic Area	Document	Purpose, Key Message, or Implications
	NAVADMIN 071/20: Physical Readiness Policy Update (March 2020)	• Suspended 2020 semi-annual PFA due to COVID-19 prevention efforts • Suspended organized or group PT (exceptions for accession missions such as recruit training)
	NAVADMIN 193/20: Physical Readiness Program Policy Update for Physical Fitness Assessment Cycle Two 2020 Due to COVID 19 Mitigation (July 2020)	• Suspended Cycle 2, 2020 PFA to minimize COVID-19 risk • Continued suspension of organized or group PT • Provided guidelines to resume mock PFA for Cycle 2, 2020 when COVID-19 conditions permit • Reminded members to "make good choices for a healthy diet" • Recommended participation in 5-week conditioning program through Navy Operational Fitness and Fueling System (NOFFS) • Announced changes to PRT (i.e., curl-ups replaced with plank, and rower added as alternative cardio option) for Cycle 1, 2021 PFA
	NAVADMIN 304/20: Physical Readiness Program Policy Changes CY2021 Cycle, Plank and Rower Modalities (November 2020)	• Announced one PFA Cycle in 2021 (March 15, 2021-September 15, 2021) • Provided Echelon II Commanders permission to waive 2021 PFA cycle requirements (encouraged to conduct BCA) • Provided Echelon II Commanders permission to authorize group PT • Introduced new Physical Readiness Program Guide 15 and provided instructions and rationale for forearm plan (replaced curl-up) and 2000-meter rows

Topic Area	Document	Purpose, Key Message, or Implications
	NAVADMIN 024/21: Physical Readiness Program Policy Changes CY2021 Cycle, Plank and Rower Modalities (January 2021)	• Delayed 2021 PFA to July 2021-December 31, 2021 (after primary influenza season and time for COVID-19 vaccine distribution) • Announced expectation to resume twice annual testing in 2022

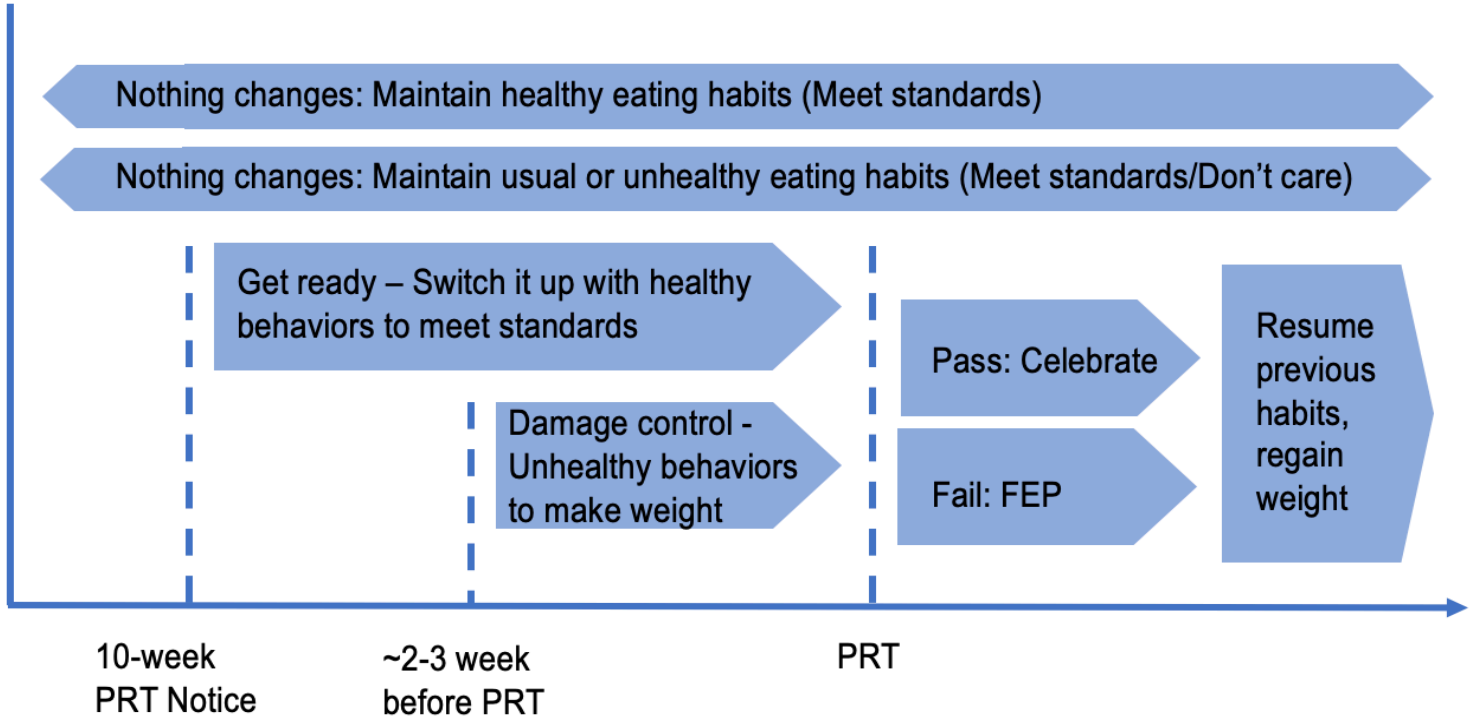
Note: (*) Policy/Document is in revision and/or approval process

1. BAS: Basic Allowance for Subsistence
2. BCA: Body Composition Assessment
3. CO: Commanding Officer
4. DoD: Department of Defense
5. FEP: Fitness Enhancement Program
6. HPO: Human Performance Optimization
7. PFA: Physical Fitness Assessment (Includes BCA and PRT)
8. PRT (Physical Readiness Test)
9. PT: Physical Training

SPECIFIC AIM 2: INVESTIGATE THE INFLUENCE OF CYCLIC PHYSICAL READINESS TESTING (PRT) ON EATING BEHAVIORS AMONG JUNIOR ENLISTED SAILORS IN NON-DEPLOYED SETTINGS OR "WE TEND TO CHANGE IT UP TO HEALTHIER EATING"

Eating behaviors among junior enlisted Sailors shifted toward healthier dietary patterns during PRT season: *"Everyone, I mean everyone switches up, we all get healthy real quick"* [EB15]. In contrast to the Physical Readiness Program policy goals (see Table 7), participants and leaders described a culture of "getting ready" versus "staying ready," where leaders or purveyors of nutrition information "*teach to the test"* and Sailors *"study for the test."* In the weeks leading up to the PRT, "*everyone starts to take their diet and nutrition seriously … a lot more people encourage healthy eating, but it's not consistent, almost like the day after the PRT or when they stop doing PRT make-ups*" [EB05] things go back to normal.

Including the dominant cultural shift to healthier eating, five patterns of eating behaviors during PRT season emerged: (a) maintain usual eating habits, (b) get ready—switch it up, (c) make weight—damage control, (d) go back to normal—PRT is over, and (e) eat whatever—PRT is cancelled. These patterns of eating behaviors corresponded with the timing of the test (e.g., 10 weeks out from testing) and Sailors' perceived ability to meet standards (see Figure 29). Changes to eating behaviors during PRT season suggested an overarching goal of many Sailors to get to a number (e.g., body weight or run time) versus maintain overall health and physical performance: "*Many think 'if I can just make this number, all of my problems will go away'… they need to know eating well is about your health and readiness"* [FN24]. The five patterns of eating behaviors during PRT season are discussed in detail below and presented in Table 8 with categories and illustrative quotes.



Note: The Navy's Physical Fitness Assessment (PFA) includes the body composition assessment (BCA) and the physical readiness test (PRT). Within the culture, "PRT" is used interchangeably with "PFA" as indicated in the figure.
FEP = Fitness Enhancement Program (Remediation)

Figure 29. Influence of PRT on eating behaviors

Maintain Usual Eating Habits

For some Sailors, nothing changes; they maintain their usual eating habits—healthy or unhealthy: "*it depends on how close you are to being where you want to be*" [EB25]. Sailors who maintain healthier eating habits during the year had no reason to change their habits if they could pass the fitness test and "make weight." Those who continued unhealthy eating habits like eating fast food or junk food during PRT season "*didn't care*" to eat a more nutritious diet because they "*could pass the weigh-in*," "*run without even worrying about what they eat,*" or planned to "*get out* [of the Navy] *anyway*."

Get Ready—Switch it up

Participants described a cultural norm of switching to healthier eating habits following the 10-week notice to "*get into PRT shape*" [EB03]. Weight loss, not physical performance, seemed to be the major driver for improving eating behaviors: "*People who change their diets are kind of on the higher end of the scale"* [EB26]; "*When it's announced that we're coming up on our PRT soon, everyone tries to eat healthier so they [can] drop those few extra pounds*" [EB02]. Although some service members started eating healthier to improve their physical fitness and aimed for good scores during the PRT, participants and leaders agreed that most Sailors did not care about their PRT score, "*they care that they're not on FEP… it's about the bare minimum*" [FN 31]. They also agreed that "*you can't cheat on the cardio*" portion of the test, "*it's easy to pass*." When asked about the preparation and difficulty of the PRT, one leader replied, "*I'm a master at how to get an excellent on the PRT, and I'm fat*." [FN 31]

Changes to make eating habits healthier included eating more vegetables and home-prepared foods, less fast food and junk food, and less food in general: "*PRT season [is] the only time that people want to stick to eating salads and not eating the burgers and going out as much*" [EB17]. In addition to eating more salads, participants reported that there is "*more meal prepping*" [EB05], "*making their own stuff" [EB10]*, and "*bringing in their own food that's more healthy*" [EB02]. Sailors may also "*shy away from the desserts*" and not "*drink as much Monster*" [EB05]. One participant reported a different aspect of energy drink consumption during PRT:

> *You'll see people substitute food with energy drinks 'cause it gives 'em the same kind of full energy feeling that a good meal would. So, like Monsters and Rock Stars, you'll see those in anybody's hands, really … nobody will be walking around with a full plate of food at that point … it's gonna be small portions of something, but it's gonna be healthy*. [EB15]

Participants also reported an increase in physical activity during PRT season, especially in the weeks leading up to the test: "*…the moment PRT comes around, it's like oh my goodness, everyone's going to the gym, everyone's running outside"* [EB28]. One participant described changes to eating healthier and increasing physical activity as a "*temporary fix*," and stated that Sailors may say things like, "*I'm gonna eat a little better or just eat less, period. Not even better, just less, and try to work out*." [EB29]

None of the participants reported receiving formal nutrition guidance during PRT season, but some stated that they did get reminders from leaders to be prepared like, *"PRTs coming around, make sure your stuff is squared away, and people do or not*" [EB29]. One of the CFLs interviewed reported that, "*he usually puts out messages in the*

CFL's Corner of the Plan of the Week and encourages Sailors not to wait until the last minute to prepare for the PRT [FN 14]. According to one of the installation dieticians, Sailors who actively seek nutrition information or dietary intervention only come "*as a last resort*" or if "*they have been mandated to come*." She also stated that many of the active duty patients she sees are *"young males who want to lose a significant amount of weight in a short time. I'm the last resort, at the last minute*" [FN 24].

Make Weight—Damage Control

Sailors who are at risk for failing the body composition assessment—not *"making weight"* or not *"making tape*"—made significant changes to their eating behaviors, such as going on fad or extreme diets, severely restricting calories, and purging: "*…where most people fail is the tape*" [EB22]. Popular diets during PRT season included liquid or juicing diets, Keto, Paleo, and intermittent fasting. A participant working in one of the healthcare settings described an extreme diet called the snake diet:

> *You constantly drink this water that has electrolytes in it to give your body the nutrients it needs, but you eat one meal. You eat really good for one day. Then you fast 48 hours so you don't eat anything. And then one day you may eat one meal, and then you fast for another 72 hours. And then you may eat a meal and then you're supposed to fast for another 72. It's an outrageous diet … You just drink a certain amount of water a day and you put like potassium in it and everything else, so you don't catch the cramps and you put sodium and stuff like that just to give your body nutrients. But I've seen quite a few people do that here, actually. I don't think it's too healthy, but they do it.*

Participants also reported that people will fast for a few days to a week or hit "*the gym constantly*" to lose weight for the PRT. Some reported that they know people who engage in purging behaviors, including wrapping their stomachs in Saran Wrap and sweating or taking laxatives: "*…there's some clear substance that they drink that makes them a little detox, bit it's like everything just comes out the back end*" [EB20].

Participants acknowledged that extreme weight loss behaviors to pass the PRT are unhealthy and unsustainable; "*it's like damage control, they try to fix everything at once, like right before they do it [take the PRT]*" [EB25]. They noted that unhealthy weight loss practices were not what Sailors should be doing and that it was unrealistic for people to think they were losing actual weight in such a short time: "*That's not how your body works. You just don't wrap yourself like a tortilla and you lose weight*" [EB29]. However, people who engaged in "*making weight"* or *"damage control"* seemed to do so repeatedly: "*a lot of people think they can do it [lose weight]. Especially the people who have done it before, they'll always think they could do it later on"* [EB05]. Leaders and participants noted that these behaviors could have negative consequences on the job—like being "*super dizzy"* during work while carrying a weapon.

Go Back to Normal—PRT is Over

Once Sailors passed the weigh-in or physical fitness portion of the PRT, they went back to eating their usual diet until the next PRT cycle: "*Once they get that pass or fail, they get the pass, then they're immediately back to not eating healthy"* [EB22]. When Sailors finish the PRT, there is a sense of relief and cause for celebration. For some, this meant celebrating with junk food or foods they restricted to lose weight. Sailors started "*eating out"* again and "*relaxing*" their healthier eating habits. Few people

side-step the cultural norm of reverting back to their usual eating habits after the PRT and stuck with eating healthily: "*Some stay healthy, stay working out, eating better, eating healthy. A lot fall off and will go back to old habits until the next cycle starts up*" [EB08].

Eat Whatever—PRT is Cancelled

The Navy suspended the first and second cycle PRT in 2020 due to COVID-19 prevention efforts (see Table 7). Physical fitness centers were also closed at various intervals during this time and organized physical training, including mandatory workouts for Sailors in FEP, was canceled. Without formal body composition and physical fitness testing and mandatory training to keep Sailors "*in check*," many Sailors chose to "*eat whatever*" they wanted, which often meant more junk food and fast food and less healthier options: "*And now that they're [PRTs] canceled, [it's] even worse. Like who cares? You know, let's eat whatever, let's do whatever"* [EB29]; "*The second one [PRT] got canceled, so people are like, Cheetos and Doritos, anything you can find"* [EB21].

Sailors who consistently ate healthily and maintained body composition standards were less likely to be impacted by the PRT suspension. Sailors who tended to switch it up twice a year to pass the test were more likely to continue to eat less healthily and possibly even worse than before the pandemic. One leader's assessment of the impact of COVID-19 and PRT cancellations was that *"it's hurting the people who were on the edge and were somewhat working out and fit"* [FN 31:]. Participants and leaders reported that many Sailors gained weight during the pandemic—"*the COVID 20*"—likely due to a lack of formal assessments, gym closures, and the overall negative social and emotional impact of COVID-19.

So, this year it's just kind of more relaxed 'cause people aren't worried about the PRT. And ever since a lot of the gyms has been closed, people lost their mojo … I used to be a regular at the gym, and then I gained about 20 pounds [EB31].

Closures of fitness centers and COVID-19 restrictions altered many Sailor's fitness routines, which contributed to changes in eating behaviors: "*So once the gyms closed, … they didn't know of other ways to work out. I think that's the biggest thing, people haven't been working out"* [EB22]. Sailors who relied on gyms for workouts found it challenging to come up with exercise routines and lost motivation. Participants who followed diet plans like "*counting macros*" to support their physical performance and improve their body composition were less likely to adhere to their diets if they could not go to the gym and work out as they usually would: "*We meal prep the whole week and we go to the gym, but with the gyms being closed, we're kind of like, you know what, let's just take a break, eat things we enjoy, have fun while we can"* [EB11]. Participants also reported eating out more or ordering take-out because of the COVID-19 restrictions: *"Since COVID, there's only one person that's allowed in the kitchen at once. It's really hard to cook when you want to. So, I've been just relying on takeout, which kinda affects my money"* [EB16].

Overall, participants and leaders felt that PRT cancellations and COVID-19 had a negative impact on Sailors' eating behaviors and fitness. As one leader summarized, *"people are not working out and they are eating more. It's going to take a long time to get people back in shape"* [FN15]

Table 8. Influence of PRT on eating behaviors: Themes, categories, and illustrative quotes

Theme	Category	Illustrative Quote
Maintain usual eating habits	Maintain healthy eating habits	*"…for some of the people like the role models, they eat pretty much the same, like I've noticed like the entire time." [EB07]*
	Maintain usual or unhealthy eating habits	*"I don't think some people care personally, especially people that are like, oh well, I'm gonna get out anyway so why would I care about eating healthy now … if I haven't been doing it before." [EB13]*
Get ready—Switch it up	Eat healthier	*"I think we tend to change it up to a more healthy, healthier eating habit so that we can like get in shape, eat right, last, endurance, have endurance. I think we eat healthier honestly." [EB01]*
	Eat less/Eat less junk foods and fast food	*"They tend to get that 10-week notice and they say, oh, I should probably stay away from this and I should probably stop eating that. And I'm like yeah, you probably should. I think that's mostly they tend to reel in on the fast food … most of them tend to cut back on the on the Monster Energy drinks and whatnot." [EB22]*
	Get advice from leaders	*"I guess a lot more people encourage healthy eating during that time, but it's not consistent; almost like the day after the PRT or when they stop doing PRT make- ups." [EB05]*
	Increase physical activity	*"I do notice that that they start working out a lot more. Um, usually at least like a month or two before the PRT begins, they start working out lot." [EB28]*
Make weight—damage Control	Start a diet	*"Everyone, I mean everyone switches up, we all get healthy real quick. But it's a lot of intermittent fasting you'll see around PRT season. So, people trying to make tape, trying to make weight really fast." [EB15]*

Theme	Category	Illustrative Quote
	Fast or severely restrict calories	*"… so, a lot of people can't pass weight, they'll fast for like a week." [EB20]*
	Purge	*"I actually have a few co-workers who would always the week before their weigh-in take MiraLAX, that laxatives. They would take it almost every day to clear out their system and would barely eat anything for a few days in order to get the lowest the weight possible. In order to pass their weigh-in." [EB28]*
	Exercise excessively	*"Just hitting the gym constantly and not eating. Actually, there was a co-worker of mine that did that because he felt like he needed to lose weight and he was only eating so many amount of calories a day. And he said it was making him feel sick when he went to the gym."] EB03]*
Go back to normal—PRT is over	Celebrate with junk food or unhealthy eating habits	*"then after the PRT, everyone celebrates with, like I know one, I'm not gone say his name, but I know one guy I work with, he says that he eats a pound of bacon after every PRT and then like 12 pack of beer." [EB20]*
	Go back to old eating habits	*"… right after the weigh in, they go right back to eating whatever they want. …They're just concerned about how it looks on paper, I guess." [EB26]*
Eat whatever—PRT is cancelled		*"I became too comfortable with no PRTs … I started eating and then didn't work out. So, I started packing weight, weight, weight." [EB31]*

SPECIFIC AIM 3: IDENTIFY PERCEIVED BARRIERS AND FACILITATORS TO HEALTHY EATING BEHAVIORS AMONG JUNIOR ENLISTED SAILORS IN NON-DEPLOYED SETTINGS OR "WE MAKE IT HARD FOR THEM TO BE SUCCESSFUL"

Healthy eating behaviors were "*highly encouraged*" within the culture, but junior enlisted Sailors often had to overcome numerous environmental and cultural barriers to eat healthily. In many instances, participants had to "*go out of their way*" to find or prepare nutritious foods. As one Navy dietician described it, "*We make it hard for them to be successful*." The following findings address the three research questions for the third specific aim which asked: (a) How do junior enlisted Sailors define healthy eating behaviors?; (b) What individual characteristics hinder or facilitate healthy eating behaviors among junior enlisted Sailors?; and (c) What aspects of the social, physical, macro-level, and cultural environment hinder or facilitate healthy eating behaviors among junior enlisted Sailors? A list of facilitators and barriers are provided in Table 9.

Findings for Research Question 3A: Junior Enlisted Sailors' Definition of Healthy Eating Behaviors

In response to being asked what healthy eating habits meant to them, participants defined healthy eating behaviors according to food groups, quantity of food intake, dietary patterns, and the impact of foods on their health and well-being. Terms used to describe healthy eating behaviors included phrases like "*making healthy choices*," "*eat[ing] right*," "*eat[ing] better*," "*doing really good*," and "*eating as clean and as fresh as possible*."

Healthy eating behaviors meant "*cutting out a lot of the junk food and focusing more on substantial calories*" [EB 04]. Minimizing junk food and snacking was an essential part of healthy eating behaviors. Vegetables and proteins (usually animal sources) were often described as healthy food options: "…*healthy eating to me is like*

protein and greens right off the bat … [by] green I mean like vegetables, and protein, meat, so, any type of meat I guess" [EB07]. Fruit was included as healthy food options but was mentioned less often than vegetables. Participants frequently referred to protein as the "go to" macronutrient and were less likely to endorse eating carbohydrates. A dietician confirmed this dietary pattern within the culture, by stating it was a "*common misconception that protein is good, and carbs are bad. I have to tell them that you can overeat protein*" [FN 24].

Having healthy eating behaviors meant eating balanced portions, eating unhealthy foods in moderation, and "*listening to your body*." Participants felt that it was important to eat food they enjoyed in moderation and avoid being restrictive:

> *A lot of foods are healthy if you eat them in moderation. Just watch your portion and you can eat as many, not as many snacks, but you can eat snacks and you can eat something unhealthy every once in a while, but you can't overindulge*. [EB11]

Eating a balanced diet in moderation meant that foods that you enjoyed could be eaten without compromising your health and well-being: "*Having, like one cheat meal instead of a cheat day"* [EB20]. Intuitive eating and "*being conscious of what you're taking into your body*" were important aspects of healthy eating behaviors because they ensured junior Sailors were aware of what they were eating and how the foods they were eating affected their body, long-term health, and wellbeing: *"Healthy eating habits to me means to fuel my body the best possible way that I can … taking care of myself for the long run and being as healthy as I can for my future"* [EB28]. Having healthy eating behaviors meant eating foods that "*satisfied you*," made you "*feel good,*" and did not "*give you that groggy feeling afterwards*."

Healthy eating behaviors were not one size fits all: "*I think the biggest thing that people don't realize is that everybody's different, and even down to like a genetic level, everybody's different"* [EB22]. Participants believed that some people may need to eat less or more than others, or that even certain foods that may be considered unhealthy for one person, may be healthy for another depending on that person's goals, physical activity level, or overall diet plan: "*I would consider a burger healthy to someone if they're about to go out and do weightlifting, considering it's a high source of protein and carbohydrates for their workout … healthy foods depends on the person"* [EB04].

Findings for Research Question 3B: Intrapersonal Facilitators and Barriers to Healthy Eating Behaviors

Intrapersonal Facilitators

Intrapersonal facilitators to healthy eating behaviors centered around having an internal locus of control, adequate nutrition knowledge and culinary literacy, health-oriented goals and autonomous motivation, and prudent management of time and money. Participants described a lack of autonomy and agency in various aspects of their professional life and social situations that made it difficult, but not impossible, for them to eat healthily. Most participants stated that eating healthily was an important priority, but those who believed they had control over their eating behaviors seemed to be more successful in their attempts to eat a balanced and nutritious diet. They identified ways to navigate challenges through planning and preparation and were not as easily swayed to routinely eat junk food and fast food like their peers.

What I can control on my every day is what I eat. Just 'cause I can't go to the gym doesn't mean I'm gonna shoot myself in the foot … I cook in my room. I try to meal prep … it can save me time during the week and stuff. [EB25]

Table 9. Summary of the main facilitators and barriers to healthy eating among junior enlisted Sailors

FACILITATORS	BARRIERS
Intrapersonal Health-oriented goals and motivation Internal locus of control Prudent management of resources: Time and money Nutrition and culinary literacy Meal planning and meal prepping Physical activity/Active lifestyle	**Intrapersonal** Lack of nutrition and culinary literacy External locus of control Resource constraints: Time, money, and transportation Fatigue, boredom, depressed mood, and stress
Social Environment Positive peer pressure Family support Leadership support and engagement Parental training and influence	**Social Environment** Negative peer pressure Unhealthy foods in the workplace (i.e., fundraisers, social gatherings, free food brought in by coworkers)
Physical Environment Access to cooking and food storage Access to and availability of healthy foods Food choice architecture and nutrition messages	**Physical Environment** Barracks life—limited access to cooking/food storage Availability and convenience of fast food and junk food (e.g., sugary snacks) No galley—lack of access to affordable healthy foods Shift work
Macro-level Environment Social media influencers and "how-to videos"	**Macro-level Environment** Popular dieting culture Restrictions/regulations in the barracks
Cultural Environment Boot camp—Promotion and support for healthy eating	**Cultural Environment** Mission requirements Cultural norms (e.g., eating fast food/eating on the go)

Participants who were motivated to eat healthily for the sake of their overall health and well-being took pleasure in having healthy eating behaviors and enjoyed the taste of nutritious foods. Eating healthily was not a chore, but a welcomed part of their lifestyle. For some, this motivation stemmed from wanting to avoid the chronic health conditions of their family members, and for others it was a result of improvements in their physical and mental health after changing their diet.

> *When I lived with like my parents, … I didn't really eat the healthiest … But now that I can eat healthy, I've noticed a lot of improvement in my, how do I say it? Improvement in my behavior, I guess you would say. I feel a lot more calm, I feel a little bit more, I feel healthy. I feel healthy compared to what I felt kind of crappy after eating bad things. It helps with my energy. My energy output to working out has increased a lot more than it used to. I could do a lot more things. I felt more energetic to do things. So, it's pretty important for me, especially 'cause I feel better, and I do things better. [EB05]*

Exercising and maintaining a physically activity lifestyle often paralleled with eating healthily. Participants who reported eating healthily most of the time engaged in regular physical activity. Although not everyone who worked out regularly ate healthily, exercising seemed to put people in a mindset to choose foods that were more nutritious and would support their efforts in the gym. If people stopped exercising, their eating behaviors tended to trend away from eating nutritious foods to eating more junk and fast foods.

Knowing why certain foods should be eaten or avoided, how to eat healthily on a budget, and how to prepare good-tasting nutritious foods with limited equipment made it easier for participants to eat healthily. Eating healthily was easier for participants who planned their meals and budgeted their money and time accordingly. They planned according to their lifestyle and focused on keeping it simple.

> *I usually start planning the beginning of the week what we would do for dinner every evening and then write out what we need to go grocery shopping … because I do pack my lunch, so does my husband … We plan everything out*. [EB11]

One participant described meal prepping hot and cold meals, because having simple cold meals saved her time and money. Planning prevented skipping meals or spending extra money on ordering out.

Intrapersonal Barriers

Intrapersonal barriers to healthy eating behaviors included nutrition and culinary knowledge deficits, external locus of control, resource constraints, stress, fatigue, and low moods. Confusion about what constituted a healthy diet (beyond eat more fruits and vegetables and eat less junk food) made it challenging for some same Sailors to consistently eat a nutritious and balanced diet. Many participants were curious about fad diets and eating plans. Those focused on losing weight or improving their physical appearance were even more likely to have a "trial and error" approach with their eating behaviors—seeking information without discretion. Not knowing how to cook and prepare foods, especially for those living in the barracks, encouraged participants to choose less nutritious options: "… *some people really don't know how to cook. It's weird*

to me because I've been cooking since I was super young. They only know how to cook cereal or something like that, Ramen noodles. [EB13]

Participants who perceived their eating behaviors as out of their control were less intentional about what they ate during the workday and spent less time planning and preparing. These participants seemed to accept whatever the social or work situation threw at them, which often resulted in skipping meals, snacking on junk foods, drinking energy drinks, and eating whatever was cheap, quick, and easy. Several junior Sailors did not own a car and had to rely on friends to get food off-base or even on-base if the commissary was not in walking distance to the barracks. The lack of personal transportation was often a barrier to eating healthily, especially if peers did not want to stop at restaurants that served nutritious foods, or if on-base dining options and delivery services were limited: *"I don't have a car, so I'm limited to what people can, you know, hey let's go to the grocery store … lunch can be anything like any fast food chain because it's whatever out there limits me to"* [EB21]. Poor time management and money management created a negative cycle of eating out and spending too much money for the sake of convenience. Some participants felt that they could not afford to eat healthily because they did not have the time or financial resources, but some of their peers with the same job and income made time and budgeted their money to buy healthy foods.

Stress, fatigue, burnout, and depressed moods from demanding work schedules, mission requirements, and being in a new environment encouraged emotional eating with unhealthy foods. Emotional eating or eating to cope with stress and boredom was easy because junk food and fast foods were widely available and easily accessible. Making time to prepare a meal after a long and stressful day was unappealing.

You're mentally exhausted. So, like the thought of washing dishes and prepping the food and then you have to wait for it to cook like you just, you burn out and then you just don't have the mental energy it takes to cook. [EB15]:

Findings for Research Question 3C: Environmental Barriers and Facilitators to Healthy Eating Behaviors

Environmental Facilitators

Environmental facilitators to healthy eating behaviors among junior enlisted Sailors included: (a) social networks that encouraged and role modeled healthy eating habits; (b) convenient access to healthy foods that were affordable, visually appealing, and palatable; (c) nudges within the food environment that encouraged eating nutritious foods or where healthy options were the default and less nutritious options were the exception; and (d) convenient access to a kitchen or space to prepare at any time. Early exposure to healthy eating and nutritious whole foods encouraged participants to continue to eat healthily once they joined the Navy, even if their peers did not. Some participants discussed growing up near farms, having gardens, or having parents who rarely bought junk foods. These Sailors often sought out ways to maintain their healthy eating habits even though they were not always successful.

My parents are very active … my mom's always cooked her whole life. She cooks every meal. We never went out … I'm from a really rural town in Pennsylvania. Most people live on farms, they just cook, and like they have their chickens and their own beef and their own pigs and stuff. So, you just, you cook a lot of meals and I don't know, we've always just been like really healthy about things like that. [EB11]

It was easier for participants to make healthy choices when their peers, coworkers, and family members did as well—positive peer pressure was welcomed. Participants appreciated support from leaders who expressed genuine concern for their health and well-being. Receiving information from leaders they trusted and believed valued them as a person encouraged junior Sailors to make healthier choices, especially if leaders understood their work and social challenges.

Having access to delicious and nutritious foods made it easier for participants to eat healthily. During a workday, this required most participants to prepare and bring food with them. Almost every participant had access to food within their work environment, but it was primarily in recruit training where everyone had convenient access to healthier options and fewer calorie-dense options. Color coding of foods in the galley encouraged healthier choices (e.g., green for foods to eat liberally and red for foods to eat sparingly). Participants reported that labeling seemed to be more accurate at the galleys in recruit training where there were also fewer red items. The color coding, nutrition information, and plentiful nutritious options made it easier for some to eat healthy in recruit training, particularly those who were actively trying to do so.

> *I definitely think some people did [make food choices based on signs]. Especially people that were not as good at the physical stuff … I knew some friends of mine that would not get any red or anything like that because they were worried about not being able to pass their PRT or the PFA or whatever they call it*. [EB13]

For some, moving out of the barracks and having access to their own kitchen encouraged cooking and meal prepping. Not having to wait in line for the stove, haul appliances up flights of stairs, or cook while their peers watched made it easier to prepare

a quick meal or even a few extra for the week. Learning how to navigate logistical challenges with cooking in the barracks and finding recipes and ideas from similar others (e.g., college students on social media) was also helpful.

> *"I decided to look at a lot of college students … and I found really great recipes that were really quick, really easy. A lot of microwave meals … I didn't know you can microwave eggs and have scrambled eggs from the microwave. Like, I didn't know that was a thing until I YouTubed some college students who do that all the time*. [EB25]

Environmental Barriers

Environmental barriers to healthy eating behaviors among junior enlisted Sailors included: (a) a preponderance of junk food and fast food in work settings and on-base; (b) social norms and peer pressure to eat unhealthily; (c) limited access to cooking and food storage; and (d) work schedule and cultural norms that encouraged being busy and putting your health on hold. Factors within the social, physical, and cultural environment made unhealthy eating behaviors the default.

Junk food and fast foods were the most widely available food options for Sailors, and in some instances, the only option. Participants did not have to look far or go out of their way to find calorie-dense, cheap, quick, and easy options, but extra effort was required to find healthier options that were appetizing.

> *Before the Navy it was a lot better. I did a lot more cooking and I was eating a lot healthier 'cause I had that option. I had a garden in my backyard, so I ate like a lot of fruits and vegetables. And I just had more healthier options*. [EB23]

Junior enlisted Sailors had to "*try to avoid*" the less healthy options daily. Eating healthily was even more difficult for participants who were surrounded by peers, coworkers, and leaders who did not eat healthily, brought in free food (e.g., donuts), or frequently suggested going out to eat or ordering junk food. Many people connected and socialized around food, and this made it difficult for Sailors to eat differently from those around them: *"…it's a lot harder just because of accessibility to a kitchen and just like the influence of everyone around you eating like so unhealthy*" [EB26].

Living in the barracks made it hard for junior enlisted Sailors to eat healthily because they did not have easy access to cook and store their foods. Cooking in the barracks was a major inconvenience. It was easier to order food or eat cheap unhealthy foods.

> *It's pretty difficult [to eat healthily] 'cause there's a lot of people in the barracks and there's one kitchen. And honestly, if they would just let people have the things that aren't authorized, it would help a lot. I think it'll help people stop spending money and going out all the time to get food and they'll be able to actually make stuff because there's a lot of people that are like, oh, I don't really want to go all the way downstairs. Bringing all this crap down, cook, bring everything back up, when I can just like heat something up in the microwave, or just order, go get food. So, it's not as easy as it should be, I think*. [EB10]

The culture and participant's work and living environments supported unhealthy eating behaviors. To eat healthily, junior Sailors had to "opt out" of cultural norms like snacking on unhealthy foods, eating on the go, and relying on fast food for sustenance.

SUMMARY

The eating behaviors of junior enlisted Sailors were influenced by many modifiable intrapersonal and environmental factors. Participants desired to eat healthy and nutritious foods, but often found it hard to do. The proximity to and density of unhealthy foods, insufficient access to cooking and food storage, and time pressures associated with "mission first" workplace structures and systems contributed to a cultural norm of skipping meals, snacking, and grabbing calorie-dense convenience food for quick consumption. Only 30% and 43% of participants reported eating the daily recommended amounts of fruits and vegetables, respectively. Access to healthy, convenient, and low-cost foods; meal planning; resource management; peer support and leadership engagement; and an internal locus of control contributed to healthy eating behaviors among junior Sailors. During PRT season, most junior Sailors shifted toward eating healthily to pass the test, which highlights a culture of "getting ready" versus "staying ready." The Navy encouraged junior Sailors to maintain healthy eating behaviors by providing nutrition instruction in recruit training, nutritious foods at low-cost in galleys and commissaries, and education and messages for improving intake of dietary quality, but these efforts were inadequate to overcome the default culture of unhealthy eating behaviors.

CHAPTER 5: Discussion

This focused ethnography explored factors influencing the eating behaviors of junior enlisted Sailors working in non-deployed settings to understand how military service and Navy culture impact service members' food choices and dietary habits. Findings suggest that unhealthy eating behaviors are a cultural norm, and intrapersonal, socio-environmental, and cultural factors encourage junior Sailors to eat non-nutritious foods that are cheap, quick, and easy. To eat healthily, junior Sailors had to go out of their way to find and prepare nutritious foods, reject negative peer pressure, and opt out of social norms. Policies, healthy eating initiatives, and leaders encouraged nutritional fitness, but cultural contradictions and environmental barriers undermined Sailors' motivation to eat healthily. Challenges to eat healthily increased once junior Sailors graduated from recruit training and left a tightly controlled environment that had sufficient access to nutritious foods and limited access to junk food. Cultural expectations of *mission first* and *personal responsibility* without organizational support, access to healthy food environments, and leadership engagement made it difficult for junior Sailors to eating healthily and achieve nutritional fitness.

Military culture—from recruit training onwards—influenced the eating behaviors of junior enlisted Sailors. Eating during recruit training was limited to three meals served daily in the galley. Unrestricted access to food during regimented mealtimes prompted some Sailors to eat more than usual for fear of hunger during training. Reports of overeating during recruit training are consistent with recent research showing a shift toward decreased reliance on internal satiety cues for eating completion among Army, Air Force, and Marine recruits in initial military training (52). Unlike previous studies

that reported recruits were pressured to eat quickly or did not have enough time to eat during training (21; 52; 55), participants in this study noted that they had adequate time to eat their meals, and some reported eating second servings while waiting to be dismissed from dining. Differences in findings may reflect changes in dining and eating procedures in recruit training and/or Service-specific culture. Having sufficient time to sit and eat can support healthy eating habits and allow for proper digestion of food, but fear of hunger coupled with time-sensitive and unfettered access to food can promote unhealthy eating behaviors. Having time and plenty of food may explain how some participants gained excess weight during recruit training.

A *mission first* ethos unwittingly contributed to unhealthy eating behaviors. Conditions related to work schedules and leadership expectations were frequently cited reasons for skipping meals, ordering fast food, eating junk food, eating quickly, and drinking energy drinks. These eating behaviors were socially acceptable and modeled by leaders. In contrast to recruit training, mealtimes and proper nourishment were not as valued or respected. Some participants chose to work without taking a break to eat, and some believed they were expected to *suck it up* and forgo breaks to eat and hydrate. Recent research investigating the influence of military culture on service members' eating behaviors primarily reported eating quickly during recruit training (52) and deployments (21). However, findings from this study suggest that grabbing food and eating quickly are prominent behaviors in nondeployed settings too. These behaviors may also reflect societal norms as skipping meals and "eating on the run" because perceived time constraints have been reported among civilian emerging adults (121). Consistent with previous research reporting high energy drink use among service members (112;

188), this study found that drinking energy drinks was a cultural norm. Energy drinks represented one of the many cultural contradictions related to nutritional fitness. Junior Sailors received education on the risks associated with energy drinks from instructors in recruit training and from healthcare providers at their commands, but they were widely available and easily accessible at every base—including in the hospital and clinics—as observed in this study. Many participants religiously drank energy drinks throughout the workday to give them energy, keep them awake, or keep them full. Junior Sailors rarely mentioned drinking energy drinks on the days they did not work, which suggests that energy drink consumption may be associated with the military work environment. If the Navy wants Sailors to limit energy drink consumption, they should strongly consider making it less available in work settings and on base. Policies that restrict the sale of energy drinks in work settings and/or limit the sale of energy drinks on base could be considered. Healthy eating behaviors and nutritional fitness were not manifested as mission essential within the culture. What junior Sailors ate seemed to be of little consequence as long as they met the day-to-day mission, could do their job, and were within standards.

Changes to eating behaviors during PRT evolutions highlighted a culture of "getting ready" versus "staying ready." This study found that many Sailors modified their usual eating behaviors to pass the test. Diet modification ranged from adopting healthy eating habits to engaging in disordered eating and compensatory behaviors. Sailors almost always changed their eating behaviors to make weight, not to pass the physical fitness portion of the test. Dangerous fad diets and compensatory behaviors (e.g., inappropriate use of laxatives) noted in this study support previous research on making

weight behaviors (21; 24; 55; 104). This study provided new knowledge about the cultural shift toward eating more healthy and nutritious foods during PRT season. Sailors who need to lose a only small amount of weight or body fat to pass the test may be more likely to adopt healthier eating habits during PRT season as opposed to taking extreme measures previously reported. Culture change initiatives should focus on helping Sailors adopt and sustain healthy eating habits year-round. Unhealthy behaviors to make weight may be more prevalent among older service members with more time in service than younger service members, because weight gain and central adiposity may increase with age. Also, failing the PRT may have greater professional consequences for senior than junior Sailors. Research is needed to investigate the aforementioned assumptions and longitudinal trends of eating behaviors during PRT season among Sailors of all ranks and ages.

Making weight and dieting were common among junior Sailors but were not associated with maintaining military appearance. Maintenance of military appearance has been reported as a reason service members strive to manage their weight and body composition (59; 124). In fact, Navy and DoD fitness and body composition instructions note military appearance and "appropriate" appearance as rationale for standards (41; 127). To the dismay of some senior leaders interviewed, present day junior enlisted Sailors seemed less concerned about military appearance and uniform fit than previous eras. This finding may reflect changes within the broader society. In 2017-2018, the prevalence of obesity among adults 20 to 39 years old in the United States was 40% (69), and current messages and marketing encourage "body positivity" and "healthy at every size." A lack of emphasis on military appearance may also be reflective of Service or

unit-specific values. This analysis suggested that junior (and some senior) Sailors did not believe a physically fit, trim, or neat appearance was important for job performance or promotion. This belief contrasts that of the U.S. Marine Corps (USMC). Military appearance is highly valued within USMC culture and stressed in their policies—"Simply put, Marines who do not present a suitable military appearance fail to possess the qualities necessary to effectively lead Marines" (p. 1-1) (46). Researchers report weight standards and military appearance as reasons service members engage in unhealthy weight control practices (17; 163). Findings from this study suggest that among junior enlisted Sailors, making weight during cyclical testing, not maintaining military appearance, may be the primary reason for unhealthy weight control practices in the Navy. More research is needed to understand the influence of Navy policies and culture on junior Sailors' attitudes and beliefs about weight, body composition, and military appearance to address problematic eating behaviors.

Leadership support and engagement positively influenced junior Sailors' eating behaviors. Beginning in recruit training, junior Sailors received personal advice on their nutrition and dietary habits from RDCs. Participants believed their RDCs' direct communication about choosing healthy foods and avoiding unhealthy foods was well-intended and not demeaning—they believed their leaders in recruit training cared about their success. Jackson et al. (2013) reported similar findings of Army soldiers in basic training; participants reported their drill sergeants in Basic Combat Training (BCT) helped them choose healthy and performance-enhancing foods and had a positive attitude towards healthy eating (79). In the same study, participants believed their leaders in Advanced Individual Training (AIT) were less helpful in guiding them to make healthy

choices and perceived eating for performance as less important as BCT drill sergeants. This same phenomenon was noted in this study. Participants reported that leaders in "A" School and in their current units were less proactive about helping them have healthy eating behaviors, and these leaders seemed to place less value on their own nutrition than RDCs. Difference between RDCs and other leaders may be attributed to different missions. RDCs are responsible for "making Sailors" and ensuring recruits graduate and immediately advance to "A" School—nutritional fitness is inextricably linked to their mission. Training and unit leaders are responsible for ensuring junior Sailors acquire job-specific knowledge, skills and abilities to meet the day-to-day mission—nutritional fitness is a less apparent priority. Senior leaders must set the tone for nutritional fitness and middle managers—those closest to junior Sailors. They must role model and proactively support healthy eating behaviors to positively change the culture. Junior Sailors must perceive that their leaders care and are supportive. This study supports the culture of health framework (157) and research on cultures of health within the workplace: people perceive greater employee/organizational support for their health when their leaders are supportive and engaged (137).

Workplace structures and systems undermined and supported healthy eating behaviors. Work environments that provided time and space for Sailors to eat and store food (e.g., refrigerators) made it easier for junior Sailors to eat healthily, whereas work environments that kept Sailors on the go contributed to snacking, ordering fast food, and eating quickly. Results of this study suggest junior Sailors need practical tools for preparing meals and scheduling eating times that support proper fueling when they have demanding schedules, work shifts, or do not have access to proper food storage and

preparation (e.g., working the night shift or on patrol). Work groups socialized and celebrated events by eating: food brought people together and was often used to boost morale or fundraise. Participants' attempts to maintain healthy eating habits in the workplace were challenged because the majority of foods in these instances were unhealthy. Junior Sailors who wanted to limit sugar and processed foods had to employ willpower regularly to avoid highly palatable junk food (e.g., donuts and candy) offered by their leaders and coworkers. To create a culture of healthy eating within the workplace, leaders and employees (Sailors and civilians) will need to realign formal and informal systems to create new and healthy norms (157).

Military food environments observed in this study can be characterized as "food deserts" and "food swamps." Food deserts are communities (usually low-income and racial/ethnic minority neighborhoods) with limited access to nutritious foods and supermarkets and have been associated with poor dietary intake and increased risk of obesity (196; 198). Food swamps, defined as communities where high volumes of energy-dense fast foods and junk foods inundate healthy and nutritious options (152), have been shown to be a better predictor of obesity rates than food deserts (33). Researchers investigated the association of food deserts and food swamps and dietary behaviors among adolescent girls living in an urban environment and found that living in food swamps was significantly associated with eating more snacks and desserts daily ($p = 0.007$) (68). When available, the commissary and military dining facility were typically the only food outlets providing a high density of nutritious food relative to unhealthy options. Findings from this study support previous research with active duty Army soldiers who perceived that "nutrition was out of [their] control" because of the unhealthy

food environments on base and in their work settings (28). It is unrealistic, and arguably unfair, to expect young, junior enlisted Sailors—especially those required to live on base—to maintain nutritional fitness in an environment overrun with unhealthy foods.

Availability of and accessibility to cooking and food storage influenced junior Sailors' eating behaviors. Junior Sailors who regularly cooked and meal prepped reported eating a more nutritious diet and saving money. Most junior enlisted Sailors living in the barracks found it challenging to cook and prepare meals, which contributed to self-reported unhealthy eating behaviors. Similarly, college students living in dormitories have reported challenges to eating healthily because of poor access to cooking (87). Military barracks that provide increased access to cooking and food storage may help junior Sailors eat more healthily. Future research studies should examine cooking behaviors and dietary intake among Sailors with and without convenient access to cooking and food storage.

Consistent with the literature (36; 75; 172; 202), this study found that the eating behaviors of junior Sailors were influenced by social norms and their valued reference group of peers. Junior Sailors often ate what their friends and coworkers ate—healthy or unhealthy. It was difficult for Sailors to maintain healthy eating habits when their peers did not. Good intentions and willpower were no match for peer pressure to order out and eat fast food. Eating out at fast food restaurants is a common and enjoyable way to socialize with friends, and people are more likely to choose unhealthy options as a treat or reward when dining out (2; 13). When considering social context, it is easy to understand how difficult it can be for a junior Sailor to opt out of social norms and eat nutritious foods, which are perceived as less appealing when socializing with peers.

Sailors who tended to eat healthier surrounded themselves with those who perceived their nutrition as integral to their health and fitness. Findings from this study support previous research showing that social norms predict eating behaviors and are independent of social support (10). Initiatives to improve the eating behaviors of junior enlisted Sailors for the long-term will need to address descriptive norms (what people do) and injunctive norms (what people think you *should* do) (36; 116). Social support, in addition to positive social norms, is an important facilitator of healthy eating behaviors (77). Strong social support from family members, peers, coworkers, and leaders made it easier for junior enlisted Sailors to eat healthily in unhealthy food environments. This research supports current efforts targeting healthy eating behaviors among military families and communities.

Intrapersonal factors identified in this study were consistent with findings from previous research of emerging adults. Participants' nutrition knowledge and culinary literacy influenced their food choices and cooking habits. An important finding from this study was how participants received nutrition information and whom they considered a trusted source. Many participants sought out information from their peers who had little to no formal education on nutrition or from social media influencers. Rarely did participants actively seek out information from credentialed professionals. The credibility and utility of information received were mixed; some followed questionable dieting advice and others found ways to cook nutritious foods with limited resources. Educators and health professionals should consider nutrition and education initiatives that are proactive and culturally relevant to improve junior Sailors' nutrition and culinary literacy. Similar to previous research of emerging adults (40), physical activity was associated with eating behaviors. Some junior Sailors who regularly exercised were more motived to

eat healthily, and others used exercise to compensate for excessive caloric intake. Junior Sailors might benefit from targeted education about performance nutrition and energy balance.

Time and convenience strongly influenced junior Sailors' eating behaviors. Whether choosing healthy or unhealthy foods, participants chose what was quick and easy. It is widely accepted that people often take the path of least resistance and make food choices based on convenience (40; 63; 76; 87). Unfortunately, it is more convenient for junior Sailors to get unhealthy foods versus healthy foods on base. Military food environments in this study provided easy access to low-cost, palatable, and calorie-dense foods, which allowed Sailors to *grab and eat something quickly*. The commissaries observed provided healthy *grab-and-go* options, but participants in this study did not seem to take advantage of them. Because perceived time constraints also influence eating behaviors (13; 138), efforts are needed to make healthy food options accessible and teach junior Sailors how to conveniently prepare nutritious snacks and meals.

It is common for people to experience gaps between their ideals and actual behaviors (16), and this was true for participants in this study. The majority of participants stated that it was important for them to eat healthily, but less than half met U.S. Dietary Guideline recommendations for fruit and vegetable intake. They were aware of the risks associated with eating and drinking unhealthy foods and beverages and the benefits of consuming a balanced and nutritious diet, but all too often they chose foods and drinks that undermined their health and fitness. Intrapersonal factors that facilitated healthy eating behaviors centered around having an internal locus of control, health-oriented goals, autonomous motivation, adequate nutrition knowledge and culinary

literacy, and prudent management of time and money. Previous research supports these findings (1; 82; 88), and efforts that target individual behavior change among junior Sailors should focus on developing and sustaining these facilitators. However, as this study shows, and the social ecological model postulates (105), individual behavior change efforts without social, environmental, and cultural support are less likely to be effective for the long-term. This study demonstrates that junior Sailors' eating behaviors are interconnected with their environments, and efforts to create a culture of healthy eating in the Navy must consider the myriad of internal and external influences.

The social ecological model of eating behaviors (180) provided a useful framework to explore contextual influences of eating behaviors among junior enlisted Sailors. This conceptual framework was useful because it provided flexibility to deductively organize data analyses and findings congruent with the literature (40; 77; 172) and inductively collect and analyze data in a meaningful and culturally relevant manner, consistent with qualitative research (113).

The social ecological model for eating behaviors is not without limitations. It identifies multiple levels of influences of individual behavior, but lacks detail on how factors interact across levels. The operational modeling of relationships within and between levels and factors needed to test hypotheses, drive work, or guide interventions is missing in the layers of concentric circles that characterize the majority of social ecological models. Lastly, the influence of culture and subcultures is not explicitly depicted, potentially missing the most powerful influences on individuals' attitudes, values, and beliefs.

ISSUES OF TRUSTWORTHINESS

Establishing trustworthiness—the quality or goodness of qualitative research—is important for ensuring credibility, plausibility, and integrity of research findings (155). In contrast to quantitative research that aims to produce objective and measurable evidence for causal relationships, associations, and characterizations, the aim of qualitative research is to examine processes and meaning to understand human experiences. Because of these differences in perspectives and purposes of quantitative and qualitative research, there are alternative criteria for validating and evaluating the methodology and findings of qualitative research (34; 113; 155). Evaluation of the validity and reliability of quantitative research is to ensure generalizability and reproducibility of results, whereas evaluation of the rigor of qualitative research is to establish evidence for robust and plausible research findings (155). Various criteria have been put forward for evaluating the rigor and trustworthiness of qualitative research (34; 113; 121), but the most frequently used are credibility, dependability, transferability, and confirmability (100). Methods used by the researcher to assure trustworthiness based on the aforementioned criteria are discussed below.

Credibility

Credibility refers to faithful interpretation of participants' views (155) and requires the researcher to report data that clearly and accurately reflect the informants' perspectives. Credibility involves assuring the findings are a true and authentic portrait, make sense, and are credible to the participants and readers (113). To ensure credibility of findings, the researcher engaged with the data extensively by reading and rereading transcripts, field notes, and artifacts to ensure an intimate understanding of the data and by staying close to the data with descriptions and interpretations. The researcher provided

context-rich and meaningful descriptions of the findings related to the specific aims. Triangulation among methods and data sources repeatedly produced confirming conclusions, and the research findings linked to the initial conceptual framework and other social and behavioral theories. Finally, the researcher journaled, memoed, and discussed with the mentor and members of the dissertation committee her perceptions, thoughts, and biases related to the study.

Dependability

Dependability addresses the issues of quality and integrity and refers to factual reporting and auditability of the research process and findings (113). The research aims and questions were congruent with the study design and methodology, and the researcher's role was explicitly described. The recursive and iterative processes of parallel data collection and data analysis allowed for constant evaluation and comparison of emerging findings. To ensure readers can follow the research process and investigator's reasoning, the researcher maintained an audit trail of all forms of data collected, analytical reflections of the data and the analysis process (e.g., creation of codes, domains, and themes), notes from meetings with the mentor and other members of the dissertation committee, and rationale for conclusions. A detailed description of codes, their definitions, and illustrative quotes was maintained in a comprehensive codebook, and a list of domains and various matrixes were created and are maintained as part of the audit trail in NVivo (145). Data were collected across a full range of sources, allowing for confirming or disconfirming assumptions and propositions to draw dependable conclusions.

Transferability

Rigorous and meaningful qualitative research can generate findings that move people, communities, political groups, and social groups to action (78). Transferability, rather than generalizability, is a goal of qualitative research. Transferability refers to the fit of findings to other similar contexts and larger import (113). The researcher thoroughly described the setting, participants, and process to permit readers to make comparisons with other samples. The findings include rich descriptions for readers to examine similarities and differences within their own settings. Throughout the research process, a range of readers (e.g., researchers and Navy, Army, and Air Force service members) commented on the consistency of findings with their own experiences with junior enlisted Sailors as well as soldiers and airmen.

Confirmability

Confirmability establishes that the conclusions and interpretations reached are coherent and supported by the data (113; 155). The researcher's role and inevitable biases should be explicitly stated, but findings should be relatively neutral and free of unacknowledged biases (113). Confirmability is achieved when the other three aforementioned criteria are met or through publication and dissemination of results that have implications beyond the study and provide recommendations (121; 155). The study's methods and procedures and the researcher's role were described in detail, and an audit trail of the researcher's reflections and conversations with the mentor were maintained. Alternate explanations and rival conclusions were examined and discussed with the mentor and members of the dissertation committee. Interested participants and persons who were informally interviewed were invited to read drafts and the final chapters and provide feedback. Finally, the researcher will disseminate findings from this

study in peer-reviewed journals, conferences, briefings with leaders of the research sites and other military decision makers, and various communication venues accessible to the general military and civilian population.

STRENGTHS

Major strengths of this study were its use of a focused ethnographic research design and a social ecological model to gain a holistic perspective of eating behaviors and influences of those behaviors within the context of an understudied social group. Results of this study identified unexplored interrelationships among Sailors, their environment, and military systems. The research design and framework helped identify culturally relevant facilitators and barriers to healthy eating among junior enlisted Sailors that healthcare providers and military decision makers can use immediately to inform interventions, initiatives, and policies targeting nutritional fitness. Multiple methods and sources of data were used to triangulate findings and provided credibility and rich descriptions for a deeper understanding of a complex phenomenon. With the exception of sex, demographic characteristics of the sample were closely representative of the junior enlisted population in the Navy. Considering that approximately 11% of enlisted personnel in the Navy are female (165) and may be underrepresented in military research, this study included a greater percentage of female (53%) participants, which potentially provides equitable input from women in the military.

To the researcher's knowledge, this is the first study to explore eating behaviors among emerging adults currently serving in the military. Recent studies that have explored the influence of military service on eating behaviors primarily consisted of Veterans, many of which were out of the service decades or more at the time of data

collection (21; 55; 170), or focused primarily on pathological eating behaviors and "making weight" (21; 55; 104). This study builds on previous research of eating behaviors among service members by identifying a spectrum of prominent eating behaviors in a young, active-duty population during the introductory years of military service (i.e., recruit training, "A" school, and first and second duty station). Further, it describes perceived barriers and facilitators to healthy eating, providing an opportunity to learn from people and processes that are successful.

LIMITATIONS

This study has limitations. Researcher subjectivity posed a risk for potential bias in data collection, data analysis, and interpretation of results; however, researcher bias in qualitative research is debated and opinions vary based on perspectives (e.g., interpretive or positivist) (29). This research study was situated in an interpretive paradigm that assumes reality is constructed intersubjectively and findings emerge through ongoing dialogue between the researcher and community to understand meaning (29). The researcher employed several strategies (e.g., reflexive journaling and discussions with a mentor) as listed previously, to ensure trustworthiness by using criteria accepted within healthcare research. Findings from this investigation are limited to the context and setting of this study, and as such, results are not generalizable. Thus, caution must be applied when applying results to junior enlisted Sailors serving in different environments or other military populations. However, findings presented from this study may transfer to other groups and encourage targeted inquiries of similar issues.

All participants volunteered for this study, which raised issues of self-selection or participation bias. It is possible that Sailors, and even leaders and personnel informally

interviewed, participated for reasons related to their values and beliefs about service members' eating habits or policies and procedures related to the food environment, or simply to voice frustrations on the topic. Additionally, the researcher's comparative rank may have influenced participants to temper their behavior and answer questions in ways they assumed would please the researcher. The researcher took measures to mitigate the impact of these limitations and employed several recruitment strategies and engagement efforts to obtain a demographically heterogeneous sample. Because data collection and data analyses occurred in parallel, the researcher actively worked to recruit participants with different views, perceptions, and conditions, including outliers and negative cases. The researcher cast a wide net for informal interviews, including individuals at multiple levels of leadership, years of service, and professional engagement. Participants were asked to describe their own behaviors and experiences or their peers' when discussing topics that may have been perceived as embarrassing or private (e.g., making weight for the PRT). The researcher primarily wore civilian clothes to reduce the influence of rank and kept the interviews and interactions relaxed and informal.

Restrictions on social interactions with participants because of military culture and regulations (e.g., fraternization) and COVID-19-related restrictions imposed limitations to conducting observations in settings where eating behaviors could be observed. The researcher could not observe Sailors eating in the barracks or eating in social settings during their off time. Many eateries and military dining facilities changed their usual methods for meal service or closed temporarily, altering typical eating behavior patterns and limiting the researcher's observations of these patterns. The researcher asked participants and other individuals questions to elicit responses about

eating behavior that could not be observed. Lastly, photo elicitation was used to gather visual data for context and deeper understanding.

IMPLICATIONS FOR MILITARY READINESS

A healthy and ready force is critical to meeting the Navy's mission to "recruit, train, equip, and organize to deliver combat ready Naval forces to win conflicts and wars while maintaining security and deterrence through sustained forward presence" (194). Mission success depends on the health and nutritional fitness of every Sailor. Findings from this study suggest that junior enlisted Sailors working in non-deployed settings may have eating behaviors that contribute to unhealthy weight gain, diet-related diseases and injuries, and poor cognitive and physical performance, which negatively impact overall military readiness. Obesity, musculoskeletal injuries, and other preventable illness resulting from poor nutrition can lead to unplanned losses, manning issues, poor retention, non-deployability, and decreased unit effectiveness. If Sailors are not properly fueled and equipped while working in non-deployed settings, it is unrealistic to assume they will be optimally prepared to meet the demands of the mission in a deployed environment.

This study supports the strategic and operational priorities of the Chairman of the Joint Chief's TFF Framework, the Chief of Naval Operations Culture of Excellence initiative, and the Navy Surgeon General's priorities of People, Platforms, Performance, and Power. A common goal of each of these priorities is human performance optimization (HPO) to sustain Sailors' health and well-being, enhance lethality, and increase survivability of our fighting force. HPO is defined as "the process of applying knowledge, skills, and emerging technologies to improve and preserve the capabilities of

military members, and organizations to execute essential tasks" (p. S53) (49). TFF and HPO advocate for disease and injury prevention and promotion of whole health, including nutritional fitness. Results of this study suggest that the nutritional fitness of junior enlisted Sailors is inadequate and the focus on prevention is insufficient. The status quo must change if the Navy desires to achieve HPO and TFF of the force.

Leaders have a critical role in supporting Sailors' health, well-being, and performance (49). Several leaders in these studies noted high-operational tempos as a stressor for junior Sailors, and stress can contribute to unhealthy eating behaviors. Leaders are responsible for mission success, which includes ensuring the health and welfare of their subordinates. This study described leaders' influence on junior Sailors' eating behaviors and the importance of proactive engagement. Leaders at every level should inspire Sailors to be at their best, especially in their health. Senior leaders should be mindful that they set the tone and can create or remove barriers to healthy eating. Mid-level leaders may be the most trusted source of information and may be the leaders with the most influence on junior Sailors' eating behaviors. Thus, the Navy should consider equipping and training mid-level leaders to be role models and change agents of healthy eating behaviors.

IMPLICATIONS FOR POLICY

Findings from this study demonstrate an urgent need to radically improve the military nutrition environment. To achieve nutritional fitness, the DoD and the Navy must create and implement policies that increase the availability of and access to affordable, healthy, and nutritious options, and significantly decrease the availability and density of fast foods and junk foods on military bases. The 2021 National Defense

Authorization Act (NDAA) mandates that the Secretary of Defense submit a report on the diet and nutrition of service members and "the plan of the Secretary to improve health, performance, and combat effectiveness by modifying the food and beverages in dining halls" (25). It will take a collaborative effort among military decision makers and APF and NAF entities to do what is in the best interest of service members and the Services, while balancing issues related to funding and profit. Policy makers and leaders will need to evaluate the role food serves in morale, recreation, and revenue for the Services and create policies that support nutritional fitness without incurring negative unintended consequences.

Lasting change is possible. Dr. Judy Logeman, a retired Navy Nurse and former Executive Officer of Naval Hospital Great Lakes was concerned about the incidents of fractures and obesity among recruits in training. She worked with leaders, "the Fleet," dieticians, and other stakeholders to improve what was offered in recruit galleys. One notable change that contributed to decreased rates of fractures included replacing soda with milk at lunch and breakfast (J. Logeman, personal communication, May 18, 2021). According to participants in this study, sodas, energy drinks, and desserts are still not provided in the recruit galley. To create policies that promote healthy eating in the Navy, Dr. Logeman stressed the need to partner with "the line" and communicate costs and benefits that are meaningful to stakeholders.

Policies and initiatives to improve nutritional fitness must be multifaceted and targeted. In addition to addressing the military nutrition environment, policies must target nutrition education for junior and senior Sailors. Nutrition education should be provided during training evolutions (e.g., "A" School" and Officer Candidate School) and

delivered cyclically throughout a Sailor's career. Mandatory cooking and nutrition education should be provided to Sailors living in the barracks as part of their orientation. Sailors are generally counseled on what not to do, but may lack guidance on things that they can do to improve their health and well-being when living in a controlled environment.

Findings from this study suggest limitations and unintended consequences to the Navy's Physical Readiness Program policies. Navy leaders should consider the effectiveness of cyclical readiness testing as this study supports previous research that the PRT may not adequately assess the maintenance of physical fitness and body composition standards, but rather prompts many Sailors to engage in just-in-time training or unhealthy compensatory behaviors to meet the standard. Policies are needed to address Sailors at risk for PRT failures due to poor nutrition or other lifestyle factors. The current policies are reactive and potentially miss helping Sailors who have diet-related issues (e.g., obesity) but pass the test because they take drastic measures. Similarly, remediation and support for Sailors who fail the PRT are inadequate. FEP is viewed as a punishment to be avoided at all costs and mainly focuses on physical conditioning. Robust nutrition counseling and supportive long-term weight management initiatives are needed as research shows that maintenance of weight loss is extremely difficult (187).

IMPLICATIONS FOR NURSING PRACTICE AND NURSING SCIENCE

Nurses are among the most trusted members of the healthcare team (156) and well-positioned to positively influence eating behaviors of junior enlisted Sailors at multiple levels. As healthcare providers, nurses can use information from this study to inform the assessment, education, and treatment of eating behaviors and diet-related

conditions with patients. Nurses can work collaboratively with other disciplines to help service members adopt and sustain healthy eating behaviors by being a trusted source for information. Military nurses are leaders, and one of the primary responsibilities of Navy nurses is to train and equip HMs to care for those in harm's way. Navy nurses can leverage their clinical expertise and leadership to educate HMs on nutritional fitness and set a standard of eating behaviors worth emulating.

The Future of Nursing 2020-2030 Consensus Study Report emphasized the role of nurses in addressing health equity and social determinants of health—conditions and environments that significantly impact health and well-being (197). Food insecurity is an emerging problem in the military (142), and results of this study suggest that junior enlisted Sailors may lack nutrition security, which has been defined as "having consistent access, availability, and affordability of foods and beverages that promote well-being and prevent (and if needed, treat) disease" (p. 1) (119). Access to nutritious foods is a social determinant of health, and findings from this study demonstrate a need for nurses to leverage their skills in healthcare, research, policy, and advocacy to ensure equitable food availability and accessibility of emerging adults in the military.

IMPLICATIONS FOR RESEARCH

This study describes the complexities of eating behaviors and the importance of employing a holistic approach that considers contextual factors. Future research could integrate sophisticated quantitative and qualitative methods to examine interactions among genetics, environments, social networks, and behaviors to better understand determinants of eating behaviors and diet-related outcomes of active duty service members. Such research requires transdisciplinary collaboration and innovative thinking.

As demonstrated in this study, it is important to consider the influence of multiple factors, especially the influence of culture and subcultures, when investigating eating behaviors because of the interconnectedness among individuals and their sociocultural environments. Research that addresses the impact of only one factor (e.g., culinary literacy) may have limitations when applied to real-world situations.

Factors identified in this study can be assessed and measured in future research and population-based surveys (e.g., the DoD's Health Related Behaviors Survey) to provide granularity for leaders to make informed and meaningful decisions. Findings from this study provide researchers with new knowledge to consider when developing surveys and instruments that assess food choice behaviors, dietary intake (quality and quantity), meal patterns, and dieting behaviors. For example, researchers and participants may have different definitions of eating a "meal" and snacking. As shown in this study, several participants discussed skipping breakfast, which might lead investigators to erroneously assume that all participants who skip meals are not eating anything and thus collect data that underestimate energy intake.

RECOMMENDATIONS AND FUTURE DIRECTION

Findings from this study highlight a critical need for action. This study identified potential areas for intervention and investigation that will require action and community-based participatory research, transdisciplinary collaboration, strategic planning, transformative policies, and leadership engagement at every level of the organization. Change will take time, but military decision makers, leaders, healthcare providers, and researchers can take immediate steps to collectively target nutritional fitness and create a

culture of healthy eating behaviors in the Navy. The following recommendations address gaps identified in this study and provide suggestions for positive change.

A culture change process is needed to address the sociocultural norms of unhealthy eating behaviors in the Navy. Action research that addresses how to successfully empower Sailors to systematically change the cultural environment so that it supports healthy eating is needed. Researchers and leaders with expertise in culture change, organizational systems, and health policy are most likely required to lead this monumental effort in concert with a multidisciplinary team of health and social science experts. Researchers can build on findings from this study by further examining the following questions:

1. Is there a sufficient sense of community, shared vision, and positive outlook needed to bring about sustained individual and collective change?
2. What skills will leaders need to be successful in spearheading a culture change initiative?
3. How can leaders dismantle negative social climate factors and strengthen positive social influences?
4. How are current social norms established and which ones will be critical to the success of a culture change project?
5. How can peer support (family, friends, Sailors, and coworkers) be leveraged to assist in achieving nutritional fitness?
6. Who are the key stakeholders (individuals and organizations) influencing the eating behaviors of Sailors and what incentives will be needed for stakeholders to align their practices in support of healthy eating behaviors?

Investigators examining a culture change process within the Navy can consider the following cultural touch points that shape norms and values (see Table 10) (J. Allen, personal communication, February 24, 2021). This study identified numerous factors related to these touch points, all of which provide foundational evidence for future exploration.

Table 10. Cultural touch points

1. Resource commitment	8. Push-back
2. Built environment	9. Onboarding
3. Communication and information	10. Traditions and symbols
4. Rewards and recognition	11. Story and narrative
5. Relationship development [make it social]	12. Roles and responsibilities
6. Learning and training	13. Goal setting and planning
7. Modeling	14. Laws and policies

Researchers and decision makers will need to consider where to begin the culture change initiative—local command or Department of the Navy. There are pros and cons to starting at different levels for change. A macro-level approach may target aspects of the Navy's overarching culture, whereas a more proximal approach to the individual may also consider immediate subcultures. Regardless of whether the culture change process begins at the highest or lowest level, support and buy-in are required from the Chief of Naval Operations, Chief of Naval Personnel, and the Surgeon General and Chief of Bureau of Medicine and Surgery to achieve success.

Several findings from this study are worthy of empirical examination. Research is needed to objectively measure the healthfulness of the military nutrition environment. The majority of research investigating military nutrition environments is isolated to military dining facilities, which neglect the potentially significant impact of on-base NAF services (i.e., convenience stores and fast food) and the surrounding community on

service members' eating behaviors. Current tools such as mNEAT can be used immediately to quantifiably examine the availability and accessibility of nutritious foods on military bases, and this information can be disseminated to decision makers for action. Researchers can also use valid and reliable measures and rigorous analytical approaches used in studies of civilian environments to examine the healthfulness of military nutrition environments and relationships among these environments and operationally relevant outcomes. Lastly, more research is needed to examine the impact of junior enlisted Sailors' dietary intake (quality and quantity) on critical health (e.g., body composition and cardiometabolic risk) and performance (e.g., physical fitness and concentration) outcomes.

The Navy needs to address problems related to dieting and weight management. This study described a culture in which Sailors engaged in extreme or fad diets that could be detrimental to their health and readiness. The diet industry is "big business" for profit and relies on the principle that people will continue their services. The volume of dieting information from uncredentialed sources is staggering, and junior Sailors may be negatively influenced by the latest trends and social media. Researchers and healthcare providers must present credible information about nutrition and dieting in a manner that is convincing and easy for junior Sailors to understand. This information must also align with marketing of supplements and weight loss advertisements on military installations, because mixed messages among military leaders, healthcare providers, and on-base retailers (e.g., GNC) can be confounding.

The Navy should consider focusing on weight gain prevention and weight loss maintenance, in addition to healthy weight loss. It is well known that the majority of

people who lose weight will regain the weight lost (and sometimes more) within six months to a year (70; 204).Weight maintenance is hard and requires a lifelong commitment to a healthy lifestyle supporting ideal energy balance. Sailors who lose weight to join the Navy or start their career with a body composition near the standards may struggle more than their lean peers to stay within standards. They also may be at increased risk for excess weight gain during their first tour due to physiological responses following weight loss. Between January 2013 and June 2017, 4,862 Sailors were separated from active duty for body composition assessment (BCA) failures (195). Policy changes (not separating for BCA) may have curtailed the number of unplanned losses in recent years, but it is unlikely that the prevalence of overweight and obesity in the Navy has decreased. Consistent with previous research, findings from this study show that many Sailors lose weight to meet standards. It is therefore likely that many Sailors' weight cycle—repeat patterns of weight loss and weight regain—throughout their career, even though weight cycling may lower muscle mass and strength (153) and lead to increased risk of cardiometabolic disease (39; 118). To the researcher's knowledge, no published studies on the incidence and prevalence of weight cycling among active duty Sailors are available nor is there published research on the long-term consequences of weight cycling in a military population. Such research could be invaluable, especially when considering the prevalence of obesity and associated comorbidities among U.S. Veterans (15).

Eating behaviors are complex and may be best understood in context. Future research investigating eating behaviors among service members should consider potential influences related to military service and culture. Researchers should consider a holistic

or systems approach when examining dietary patterns to gain a better understanding of the population of interest and identify potential mediators and moderators of behaviors and outcomes. Military leaders are often rewarded for making quick decisions or taking immediate action on a problem. However, when addressing nutrition and eating behaviors of junior Sailors, a quick-fix approach could be unidimensional and ineffective. Military decision makers, healthcare providers, and educators must work collaboratively on multiple levels, to identify Sailors' concerns and determine incentives for Sailors, food retailers, and the organization to achieve nutritional fitness in the Navy.

CONCLUSION

The eating behaviors of junior enlisted Sailors are influenced by many modifiable factors. Sailors are encouraged to eat a healthy and nutritious diet but must overcome numerous barriers to do so. Results of this study suggest unhealthy eating behaviors are the default among junior enlisted Sailors due in part to socio-cultural norms, barracks-life, and food environments that influence them to choose foods that are cheap, quick, and easy. Junior Sailors who consistently eat healthily must opt out of social norms and have a strong internal locus of control, autonomous motivation for eating healthily, nutrition and culinary literacy, and prudent resource management to maintain these healthy behaviors.

Current efforts to improve Sailors' eating behaviors primarily target individual behavior and insufficiently address environmental factors and socio-cultural norms. Because biology can push people to eat more—especially when nutrient-dense and highly palatable food are conveniently available—efforts to improve Sailors' nutrition and dietary intakes without changing the environment and culture will be unsuccessful or

short-lived. It will take a multi-pronged approach and shared responsibility between Sailors and the organization to improve nutritional fitness and create a fighting force that "stays ready."

More research is needed to empirically examine the influence of factors identified in this study on Sailors' eating behaviors, the healthfulness of military food environments, and the impact of cultural and environmental factors on diet-related disease and human performance. Targeted education, leadership engagement, and the ability to cook in unaccompanied military housing (e.g., barracks) are actionable strategies that can be promptly implemented to move the Navy toward a culture of healthy eating. Importantly, leadership with a clear and operational strategy that prioritizes and promotes healthy behaviors and policies to increase the availability of and access to healthy and nutritious options is needed as soon as possible.

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Appendix A: Proposed Targeted Enrollment

TARGETED ENROLLMENT: NUMBER OF PARTICIPANTS

Rate Category	**Sex**		
	Female	**Male**	**Total**
Hospital Corpsman (HM)	10	20	30
Master-At-Arms (MA)	6	24	30
Rate: Total of participants	16	44	60
Ethnic Category			
Hispanic	3	7	10
Non-Hispanic	13	37	50
Ethnicity: Total of participants	16	44	60
Racial Category			
African American or Black	4	7	11
American Indian or Alaskan Native	1	1	2
Asian American or Pacific Islander	2	5	7
Biracial or Multiracial	2	3	5
White	7	28	35
Racial: Total of participants	16	44	60

Proposed targeted enrollment is based on having an even distribution of HMs and MAs, and a sample with demographics consistent with the U.S. Navy population (based on the FY19 Total Force Demographic Report: https://www.navy.mil/strategic/Navy_Demographics_Report.pdf)

Appendix B: Semi-Structured Interview Guide

WELCOME

Thank you so much for participating in this interview, I know your time is valuable and I appreciate you spending it with me and look forward to learning from you.

PURPOSE

The purpose of our discussion is to learn from your experiences as a Sailor, particularly as an emerging adult (the transition from being a teenager to an adult) in the Navy and working on this base. Your feedback will help me understand important factors that influence the eating behaviors of Sailors and provide information that may be used to inform future policies and initiatives related to nutrition and health in a military environment. Eating behaviors includes many factors related to eating such as the types of food you eat, how much you eat, when and where you eat, who you eat with, and your food preferences.

GROUND RULES

Here are some things to keep in mind for our conversation today.

- Information from this project will be used to inform my dissertation and papers for publication.
- I will be recording our session so I can accurately transcribe your thoughts and opinions.
- I will not include any personal identifiers such as your name.
- I will only share the recording or transcript with members of my research team.
- Audio recordings will be stored in a password protected and secure computer drive.
- There are no right or wrong answers to any of the questions.
- This a "rank-free zone"
- If at any time during the interview, you want to tell me something "off the record", please let me know and I will stop recording.

NOTE: Please don't share information that is a violation of the Uniformed Code of Military Justice (UCMJ), such as drug or excessive alcohol use, with me because I am obligated to report UCMJ violations.

Do you have any questions before we begin? With your permission, I will begin recording now.

INTRODUCTION/ICE BREAKER

"This is participant_____.

1. How long have you worked here at the command?
2. What's one of your favorite foods?

INTERVIEW QUESTIONS

Topic: Social, Environmental, Military Service/Navy Culture Influences on Eating Behaviors

1. Can you describe what you typically eat and drink during the day, from when you wake up to when you go to sleep, on the days you work?
    a. Probe: (If they don't mention): What about snacks?

2. Can you describe what you typically eat and drink the days that you don't work?
3. Can you tell me how your job and work schedule influence what you eat and when you eat?
    a. Probe: How does your eating differ between the days you work and don't work?

4. Where do you buy the foods you eat, to include meals, snacks, and groceries?
    a. Probe: What restaurants, fast food places, or eateries do you go to or purchase your meals?

5. Can you describe your eating habits when you are with other people?
    a. Probe: What types of food do you eat with your peers or coworkers?
    b. Probe: What might observe when you are eating with other people that's different when you are eating alone?

6. Can you tell me about events or traditions at the command that involve food or eating?
    a. Probe: Can you tell me about events such as picnics, potlucks, or celebrations?
    b. Probe: Do you ever observe food related fundraisers?

7. Who would you identify within the command as role models for healthy eating?
    a. Probe: Does anyone in your leadership chain influence your choice of foods?

Topic: PRT Influence on Eating Behaviors

8. Can you tell me about your peers eating behaviors during PRT season?
    a. Probe: (If they don't mention): What type of changes, or actions, do people make to lose weight during this time?
    b. Probe: If there are changes during PRT season, how long do the changes in eating behaviors last?

Topic: Perceived Barriers and Facilitators to Healthy Eating

9. Can you tell me what healthy eating habits mean to you?
    a. Probe: What types of foods and drinks do you consider healthy?

10. In the past year, did you attempt to eat healthy?
    a. Probe: (If yes): How successful were you?
    b. Probe: (If no): How important is it to you to eat healthy?
    c. Probe: Tell me more about that?

11. How easy do you think it is for someone with your job and living situation to eat healthy?

12. Can you describe practices or activities that may make it difficult for Sailors to eat healthy?

13. Imagine that you are in charge, what would you do to have a culture in which Sailors ate healthy most of the time?

Topic: Photographs – Social and Environmental Influences/Facilitator and Barriers

14. Tell me about the photos that you sent (brought)?
    a. Probe: What prompted you to take a photo of this?
    b. Probe: What does this mean for you?
    c. Probe: How do you perceive *this* (the element captured in the photo) to be a barrier or benefit to healthy eating behaviors?

15. (Optional question with time) How would you compare your current eating habits to your eating behaviors before you joined the Navy?

16. Is there anything else you would like to share or that you think I should know?

Thank you again for your time.

Potential additional questions.
What are your intentions or goals for your eating habits over the next year?
Have you helped anyone else with their eating habits?

Appendix C: Demographic Questionnaire

Eating Behaviors: Demographic Questionnaire

Directions: Please fill in the blank or check the appropriate answer.
Participant ID:_____
Today's date (Month/Day/Year):_____

1. What is your age in years? _____

2. What is your sex?
   - ○ Female
   - ○ Male

3. What is your ethnic background?
   - ○ Hispanic or Latino
   - ○ Not Hispanic or Latino

4. What is your racial background?
   - ○ African American/Black
   - ○ American Indian/Alaskan Native
   - ○ Asian American/Pacific Islander
   - ○ Bi-racial/Multiracial
   - ○ Caucasian/White
   - ○ Other (Please Specify):_____
   - ○ Decline to state

5. What is your pay grade?
   - ○ E-1
   - ○ E-2
   - ○ E-3
   - ○ E-4

6. What is your rate?
   - ○ Hospital Corpsman
   - ○ Master-At-Arms

7. How many years have you been on active duty? _____

8. Where do you live?
   - ○ Barracks (On-base)

- ○ Base housing (On-base)
- ○ Off-base

9. How many adults are in your household (live with you)? ____

10. How many children are in your household (live with you)? ____

12. What is your height in inches? _____

13. What is your weight in pounds? _____

Appendix D: Health Eating Score-7 (HES-7) Questionnaire

*Scores shown in parentheses were not included in the questionnaire provided to participants.

Think about the <u>past 30 days</u> when responding to the questions below about your <u>dietary intake and fueling</u>: (Note: Only a few examples of each are listed below to remind you of the types of food in each category – many more are possible)

1. How often did you consume any **FRUIT** – *Examples: fresh, frozen, canned, or dried, or 100% fruit juices. A serving is 1 cup of fruit or ½ cup of fruit juice.*
    - ○ 3 or more times per day (5)
    - ○ Twice per day (4)
    - ○ Once per day (3)
    - ○ Approximately every other day (2)
    - ○ Less than every other day (1)
2. How often did you consume any **VEGETABLES –** *Examples: fresh, frozen, canned, cooked, or raw: dark green vegetables (broccoli, spinach, most greens), orange vegetables (carrots, sweet potatoes, winter squash, pumpkin), legumes (dry beans, chickpeas, tofu), starchy vegetables (corn, white potatoes, green peas), and other (tomatoes, cabbage, celery, cucumber, lettuce, onions, peppers, green beans, cauliflower, mushrooms, summer squash, etc.). A serving is 1 cup of raw vegetables, or ½ cup of cooked vegetables.*
    - ○ 3 or more times per day (5)
    - ○ Twice per day (4)
    - ○ Once per day (3)
    - ○ Approximately every other day (2)
    - ○ Less than every other day (1)
3. How often did you consume any **WHOLE GRAINS** – *Examples: rye, whole wheat, or heavily seeded bread, brown or wild rice, whole wheat pasta or crackers, oatmeal, or corn tacos. A serving is 1 slice of bread or ½ cup of grains.*
    - ○ 3 or more times per day (5)
    - ○ Twice per day (4)
    - ○ Once per day (3)
    - ○ Approximately every other day (2)
    - ○ Less than every other day (1)

4. How often did you consume any **DAIRY** – *Examples: regular/whole-fat milk, low or reduced fat milk (2%, 1%, ½%, or skim), yogurt, cottage cheese, low-fat cheese, frozen low-fat yogurt, soy milk, or other calcium fortified foods (orange juice, soy/rice milk, breakfast cereals, etc.). A serving is 8oz of liquid or 1 oz. of cheese.*

    - ○ 3 or more times per day (5)
    - ○ Twice per day (4)
    - ○ Once per day (3)
    - ○ Approximately every other day (2)
    - ○ Less than every other day (1)

5. How often did you consume any **FISH –** *Examples: tuna, salmon, or other <u>non-fried</u> fish.*

    - ○ 4 or more times per week (5)
    - ○ 2 to 3 times per week (5)
    - ○ 1 time per week (3)
    - ○ 2 times per month (3)
    - ○ 1 time per month (1)
    - ○ Rarely or never (1)

6. **Recovery Fueling** – Do you typically consume a healthy snack <u>within 60 minutes</u> after a strenuous exercise session? *Examples: 1 piece of fruit, a handful of nuts, 1 small yogurt container, 1 cup of milk, 1 granola bar, or 1 sports bar.*

    - ○ Most of the time (5)
    - ○ Often (4)
    - ○ Sometimes (3)
    - ○ Rarely (2)
    - ○ Never (1)
    - ○ Not applicable (do not participate in strenuous exercise sessions) (0)

7. How often do you consume **SUGAR-SWEETENED BEVERAGES**? *Examples: Hi-C, Cranberry juice cocktail, Hawaiian Punch, Tang, Sweetened iced tea, lemonade, sports drinks like Gatorade, fruit-flavored drinks, or any kind of soft drink (like cola, Sprite, orange soda, regular or diet. 1 serving is 1 glass or 8 ounces).*

    - ○ 3 or more times per day (1)
    - ○ Twice per day (2)
    - ○ Once per day (3)
    - ○ Approximately every other day (4)
    - ○ Less than every other day (5)