Afloat Surface Climate Assessment Survey FY22 Insights

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1.0	13 Oct 2022	Entire Document	A	First version of the summary report, documenting results from Year Two (FY22) of the ASCAS
2.0	14 Dec 2022	Entire Document	M	Second version of the summary report
2.0	15 Dec 2022	Analytical Section	M	Added executive summary

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1 INTRODUCTION

1.1 Executive Summary

The Afloat Surface Climate Assessment Survey (ASCAS) and the Operational Surface Risk Indicator (OSRI) programs provide strong evidence-based data to inform risk reduction and improve human performance outcomes. These combined efforts rely upon proven strategies for collecting and analyzing information that support data-driven strategic decision-making for leaders at all levels. For the ASCAS itself, monitoring, analyzing, and reducing risk of major mishaps is critical to fulfilling mission requirements and protecting the Navy's capital resources and, more importantly, Sailors. While there are many factors that influence operational safety and performance in complex systems, human factors considerations underpin all facets of success. However, human performance includes complex variables that cannot be directly observed, thus requiring innovative approaches to measure and capture their presence and effects. The ASCAS captures these crucial manifestations of otherwise unobservable factors and quantifies them for strategic leadership decisions.

The ASCAS has demonstrated that it can empower leadership with valuable data to evaluate key facets of a command's operational safety and crew endurance posture. The ASCAS includes several constructs connected to safety outcomes that collectively capture overall safety and help establish a meaningful unit safety profile. These components include measures of an organization's climate perception (e.g., Unit Cohesion, Leadership Assessment, Job Stress); safety-related measures (e.g., Error Management, Command Safety Practices, Satisfaction); crew endurance measures (e.g., Sleep Hours, Sleep Disturbance, General Health); leader perceptions of subordinates; and open-ended comments that provide opportunities for respondents to share their thoughts and concerns.

For this annual report, the respondents comprised 75 unique crews. Responses were aggregated with other TYCOM data and analyzed to provide additional insights. The analyses identified areas of praise and concern, as well as distinctions amongst the various demographics. In the aggregate, notable findings include:

- **Areas of praise**: Leader Perceptions of Subordinates, Unit Cohesion for both Watchteams and Work Centers, Supervisor Safety and Personal Responsibility for Workplace Safety.
- **Areas of concern**: Affective Commitment, Job Stress, Job Demands, and Team Processes.
- The differences between CNSP/L responses were negligible, thus implying there are no significant differences between the two.
- Sailors assigned to LCSs tended to respond more favorably to the state of the command than Sailors assigned to CRUDES or Amphibs.
- Enlisted Sailors, particularly Junior Sailors and Petty Officers, responded less favorably to nearly every construct when compared to Chiefs and Officers/CWOs.
- Uncomfortable mattresses and heavy workloads had the largest negative impact on Sailor sleep.
- Approximately 30% of Sailors knowingly allowed a safety issue to go unreported to their supervisors, with prior unit reporting frequency and non-compliance as the largest contributors.
- Key factors, such as gender and perceptions of leadership, strongly predicted the likelihood of reporting more frequent poor mental health days aboard ship.

2 BACKGROUND

2.1 Introduction

Following several major mishaps in 2017, the US Navy recognized the need to change not only its business practices, but also to conduct applied human factors research to help better understand the psychosocial components underlying mishaps and near-misses. Within the Surface Force, human factors research primarily focuses on the capabilities and limitations of human physical and cognitive abilities as well as sociotechnical systems (e.g., organizational structures) that cooperate via technology. This approach seeks to evaluate individual performance and enhancement opportunities. Still, the organizational and safety climate aboard a ship represents a more holistic and comprehensive assessment, one that informs how wider command practices might also influence behavioral outcomes. Given the multiple vulnerabilities in how humans process information and operate complicated technologies, human factors are an essential component in understanding and managing risk.

Identifying risk factors is a critical first step in the risk management process. However, an emerging consensus in the scientific field highlights the importance of developing effective risk management plans for latent error conditions (i.e., organizational factors that are not actively monitored and therefore go undetected), rather than focusing on error prevention per se. Among many other efforts aimed at addressing human factors issues across SURFOR, the ASCAS was established as a requirement within CNSP/CNSLINST 3502.7A. The ASCAS draws from published peer-reviewed scientific studies and is intended to capture the factors that can affect operational safety outcomes, such as latent mishap factors, including crew endurance issues.

2.2 What is Safety Climate?

Safety culture refers to the long-standing attitudes, beliefs, and values held within an organization at the enterprise-level, while safety climate reflects the shared individual perceptions of an organization, based on experience (this can extend from the Navy at large to the Watch Teams). Climate is associated with perceptions of day-to-day workplace realities. This safety climate focus on day-to-day realties is crucial for capturing the relationship, and possible dissociation, between what is espoused (e.g., safety culture policies, procedures, and practices) and what is actually practiced (e.g., local leadership values and behaviors, communication practices, training). These perceptions can directly translate into the implementation and upholding of local workplace safety procedures, or not. In other words, safety climate reflects and shapes the behaviors and experiences of organizational members and thus affects safety performance and outcomes. Safety climate indicators can predict potential incidents, and they are also associated with Sailors' motivation to engage in safety-related behaviors (e.g., intent to comply with rules, voice safety-related concerns). As such, enhancing understanding of a command's safety climate is a promising route for preventing accidents and other negative safety-related outcomes.

An organization's safety climate encompasses several factors, such as safety-oriented managerial values, communication, training, and system operation. Organizational safety climate assessments provide insight into general organizational behaviors, but more importantly, they help to uncover the workplace mindsets and organizational dynamics that influence safety-related behaviors. The annual ASCAS provides the data elements necessary for developing a comprehensive safety climate profile, which ultimately will help to identify priority targets (i.e., threats to operational safety) for intervention and mitigation.

2.3 What is Crew Endurance?

In its simplest form, crew endurance reflects the ability of personnel to maintain optimal performance (within an accepted target range) in the face of physiological, psychological, and environmental stressors. Not unlike astronauts, Sailors must operate within different kinds of environments: those that are *Isolated* (i.e., physically separated from civilization and subject to limited communications and social support), *Confined* (i.e., constrained physically, such as habitat-limited privacy, workspace, social interactions, and recreational activities), and *Extreme* (i.e., geophysical environment, shipboard industrial-like setting, and operational tempo). These Isolated, Confined, and Extreme (ICE) environments can compromise mission preparation and execution. They also increase the likelihood that problematic cognitive or behavioral issues will adversely affect crew endurance, performance, and both physical and mental health.

Effectively managing ICE environments requires vigilance: all personnel are responsible for protecting against insidious factors whose influence can accumulate and imperceptibly undermine crew endurance (e.g., sleep interruptions, lack of social engagement, lack of physical activity, task-induced fatigue). When mission requirements make it impossible to completely eliminate problematic physiological and psychological environmental stressors, leaders must be able to recognize this situation, and then implement effective and validated countermeasures to help protect mission readiness.

Regardless of the mission or operational realities, any number of causes, known and unknown, can reduce a Sailor's performance. Developing an effective mitigation system first requires detecting the presence of those primary factors that can be measured in principle. The factors undermining crew endurance are multifaceted, and their interplay is complex and dynamic. To counteract their influence, leadership must strive to ensure that each Sailor's needs are addressed in a comprehensive, rather than in a piecemeal, ineffective way (e.g., believing that drinking energy drinks are an effective long-term solution to counteract fatigue). Such efforts are critical for proactive maintenance of a ship's most important resource: the human system.

3 SURVEY INSTRUMENT

3.1 Overview

The ASCAS draws from multiple scientifically validated resources and was approved for use by the Institutional Review Board at Naval Medical Center Portsmouth, ensuring that the survey adheres to all DoD human subject protections. All participation in the effort was voluntary and responses were solicited anonymously. As presented in the tables, each hypothesized, unobservable, latent construct has been captured with some number of individual questions—the manifest observable variables. These individual items reflect the survey construct; for example, the *Unit Cohesion* construct comprises three separate question items, each reflecting a different facet of unit cohesion (i.e., Can the members of the unit depend on one another? Are they able to cooperate? Do they stand up for each other?). This multi-item approach to measurement enhances the reliability of the measures (i.e., the consistency of responses across different forms of the same construct) and their content validity (i.e., the extent to which the items faithfully capture the content of the latent construct). When reported, the individual items that constitute the representation of a latent construct are aggregated to produce a single score (the arithmetic mean).

3.2 Survey Measures

3.2.1 DEMOGRAPHICS

Demographic information gathered by the ASCAS included paygrade (Junior Sailors, Petty Officers, Chiefs, and Officers/CWOs), gender (Male and Female), age range (17-21, 22-25, 26-30, 31-35, 36-40, 41-45, 46-50, and 51-55), race (Non-white and White); years of service (numerical response), months onboard (numerical response), departmental assignment (Admin, AIMD, Air, Combat Systems, Deck, Engineering, Medical/Dental, Operations, Safety, Supply, Training/Plans & Tactics, and Weapons), and Ship-classes (LHD, LHA, LPD, LSD, LCC, CG, DDG, LCS Freedom, LCS Independence, and MCM). Note that more specific categories were not used as to help better ensure anonymity among small, unique groups (e.g., to protect the only female CWO in Engineering).

3.2.2 ORGANIZATIONAL CLIMATE PERCEPTION MEASURES

The primary measures have been validated in peer-reviewed scientific publications and relate directly to operational safety and human performance outcomes. These measures, and brief explanations for their use, include:

Unit Cohesion. Previous military studies have found that unit cohesion can impact the resilience and well-being of personnel. While the word “unit” implies a larger command structure in the military context, a unit in the truest sense reflects a composition of two or more people. Respondents are asked to rate their perceptions of their Watch Team, if applicable, and Work Center unit cohesion.

Leadership Assessment. Numerous studies have demonstrated that perceptions of unit leadership impact morale, performance, and health outcomes. Consistent with those studies, respondents are asked to rate their perceptions of unit leadership.

Job Stress. Chronic stress carries with it far-reaching interrelated negative consequences; for example, chronic stress reduces impairs slow-wave sleep (i.e., the only time when the blood-brain barrier increases in permeability and the brain glymphatic system removes metabolic waste products accumulated during normal activity). This in turn affects cognitive processes that undermine one's ability to make higher-level decisions (e.g., the capacity to make risk decisions) and negatively affects mood. Respondents are asked to rate their perceptions of job stress on an established Likert-like scale.

Affective Commitment. An employee's emotional attachment to, identification with, and involvement in an organization reflects their affective commitment to the organization, which in turn has implications for an organization's success.

Social Support. In general terms, social support reflects the degree to which one has people available whom they can rely upon to provide help or counsel. A lack of social support is associated with poor mental and physical health outcomes as well as decreased worker performance.

Team Process. An overall team process is defined as "…interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities directed toward organizing taskwork to achieve collective goals. Centrally, team process involves members interacting with other members and their task. They are the means by which members work interdependently to use various resources such as expertise, equipment, money, to yield meaningful outcomes (e.g., product development, rate of work, team commitment, and satisfaction)." The team process measure comprises *transition*, *action*, and *interpersonal* subprocesses. Transition processes occur prior to or between performance episodes and have a dual focus whereby members reflect on and interpret previous accomplishments as well as prepare for future actions. Action processes describe the behaviors that members engage in while working toward goal accomplishment. Interpersonal processes focus on the personal relationships between members.

Crew Resilience. Crew resilience reflects their ability to adapt to both incremental changes and sudden disruptions in order to satisfy operational demands. This ability is paramount for high-risk organizations. Respondents are asked to rate their perceptions of the crew's ability to bounce back and thrive in the face of adversity.

3.2.3 SAFETY-RELATED MEASURES

Error Management. The error management construct rests, in part, on the assumption that human errors can never be entirely prevented and therefore focuses on how to mitigate the consequences of errors that have occurred. Whereas error prevention seeks to avoid errors altogether, error management focuses on reducing negative error consequences and amplifying positive consequences (e.g., using the incident as a teaching moment). In sum, error management ensures that errors are quickly reported, negative error consequences are effectively minimized, and that organizational learning transpires.

No-blame Error Reporting. Known issues and mistakes often do not get reported for fear of reprisals. As such, minor issues requiring relatively simple fixes can manifest into major mishaps. A no-blame error reporting atmosphere mediates the relationship between safety climate and negative (e.g., unplanned maintenance) or positive (e.g., improved error detection through proactive crew involvement) outcomes.

Psychological Safety. The concept of psychological safety describes one's perception of the consequences associated with taking interpersonal risks (e.g., voicing a concern, sharing an opinion, submitting a recommendation, taking preemptive action). A large body of scientific research has demonstrated that increased psychological safety enhances a worker's willingness to communicate concerns, or promote organizational knowledge acquisition, employee well-being, and overall performance.

Caring. Research concerning organizational climate has repeatedly demonstrated that distinctive group-level climates emerge within organizations and locally influence performance outcomes (e.g., work quality, safety behaviors); for example, an officer who directs Sailors to disregard certain safety procedures whenever their department falls behind schedule creates a distinction between Navy procedures and subordinate group-level practices. This behavior creates the potential for distinctive climates in an organization. Additionally, workers tend to perform better and experience more positive mental and physical health outcomes when they feel that their organization cares about them. Within the military context, various organization levels can influence Sailor perceptions of care. Respondents thus are asked to rate the degree to which they perceived that the Navy, their command, their department, and their direct supervisor care about their health, safety, and well-being.

Command Safety Practices. Perceptions of a unit's safety practices play a key role in group members' behaviors and operational safety outcomes. For example, research in the commercial maritime sector found that worker's positive perceptions of management safety practices are associated with lower accident and crew fatality rates.

Noncompliance. Willful noncompliance with instructions or directions is a complex phenomenon that can lead to grave consequences. Assessing the frequency of noncompliance behaviors and attitudes in a unit is therefore critical to avoiding mishaps, as is examining precipitating or co-occurring circumstances.

Satisfaction. A worker's satisfaction with workplace safety practices/policies is positively associated with an organization's overall safety climate, which in turn increases commitment to organizational safety policies and reduces mishaps/accidents.

Personal Responsibility for Workplace Safety. When workers feel a lack of ownership in regard to their work environment, it can result in underappreciating the important role that they personally play in the organization's successes and failures.

Safety Communication. One of the most effective ways to promote a positive safety climate and mitigate negative outcomes is to ensure that safety-related communications across the entire organization are easily facilitated. Additionally, it is important to recognize that each Sailor has a different style of communication (e.g., passive, aggressive, passive-aggressive, assertive).

Job Demands. Workplace job demands present individuals with a number of potential stressors of varying severity. Excessive job demands can exhaust a Sailor's mental and physical resources, ultimately undermining their personal performance as well as that of the entire command.

Job Resources. Worker positive perceptions of available job resources help them properly conduct their duties as well as offset workplace pressures, both mentally and physically. Positive perceptions of job resources also promote active Sailor workplace engagement and general job satisfaction.

Safety Issue Under-Reporting. In both civilian and military sectors, potential safety issues and accidents are often not reported. To assess if potential safety issues are under-reported, respondents are asked to indicate the number of times (1) they reported a safety issue to their supervisor, (2) a safety issue went unreported to their supervisor, and (3) they experienced or witnessed a near-miss.

3.2.4 CREW ENDURANCE MEASURES

Sleep Hours. Problematic sleep impacts human performance by way of functional impairment and can lead to the onset of numerous mental and physical health issues. Respondents are asked to indicate the number of sleep hours available onboard, number of sleep hours required to feel well-rested, and the number of sleep hours generally obtained onboard and at home.

Naps. There is strong evidence in the scientific literature that naps, defined as a sleep episode less than 30 minutes in duration, promote human performance outcomes (e.g., alertness and cognitive processes). Respondents are asked to indicate how many days per week they take naps, the average duration of their naps, and how well-rested they feel following their naps both while onboard the ship and at home.

Sleep Disturbance. Although the amount of sleep obtained each day is important, so is the quality of the sleep. Generally speaking, good quality sleep means that one typically falls asleep within 30 minutes, sleeps soundly with minimal awakenings, and drifts back to sleep within a few minutes if awakened. Poor quality sleep entails having trouble falling asleep, trouble staying asleep, restlessness, and early terminal awakening (awakening before desired wake time).

Sleep Functional Impairment. Respondents are asked to rate how much sleepiness or fatigue affects their duties or ability to function, as well as falling asleep while on duty. The response format of each item comprised levels of agreement and ranged from 1 (never) to 5 (very often).

Sleep Factors. General shipboard environmental factors known to negatively impact sleep (i.e., Ambient Noise, 1MC Announcements, Crew Mate Noise, Uncomfortable Mattress, Temperature, Invasive Lighting, Workload, Meetings, Inspections, Drills, Rack Design) are assessed.

Daily Activities. To account for how personnel allocate their wake-time while onboard, respondents are asked to report how they spend their time per day across eight areas (Work Center Duties, Watch Team Duties, Completing Personnel Qualification Standards, Attending Meetings, Exercising Socializing, Personal Time, and Other).

General Health. Respondents are asked to rate their overall health on a Likert-like scale. Additionally, respondents are asked to indicate how many days their mental and physical health was not good in the past 30 days.

Physical Fitness Activity. Physical fitness activity provides a number of benefits beyond simply enhancing one's ability to pass a PFT. Physical activity affects brain plasticity and improves cognitive performance (e.g., visual pattern recognition), locomotion (e.g., balance), and functions as a mood enhancer. Conversely, a notable decrease in physical activity is a possible indicator of depression. To assess shipboard physical activity, respondents are asked to indicate how many days per week they got vigorous/high-intensity exercise (i.e., experience increased heart rate, breathing rate, sweating, and muscle fatigue) while underway and in-port. Respondents are asked to rate the adequacy of the shipboard fitness facilities/equipment and time allotted to exercise. Additionally, respondents indicate whether command PT is required as a means to gauge the command's commitment to physical fitness.

General Diet. Proper nutrition is a key component to maximize human performance, weight management (via energy balance), and improve overall health by reducing disease susceptibility. In relation to crew endurance, one's diet influences sleep quality, general energy levels, and human performance by way of macro and micro-nutrient composition. Respondents are asked to indicate the healthfulness (i.e., nutrition and proper serving sizes) of their overall diet while both at home and onboard the ship.

Sun Exposure. While excessive sunlight exposure can result in skin cancer, natural sunlight has important biological function for humans. Namely, sun exposure helps inform the biological circadian (near 24-hour) clock by which the timing of every physiological function in the body is regulated. Natural sunlight exposure also helps the body produce Vitamin D, which serves a key role in sleep processes, bone health, and combats negative health outcomes (e.g., inflammation, high blood pressure, muscle fatigue). Additionally, natural sunlight exposure elicits biological responses (e.g., serotonin production) that counter the onset of mental health issues (e.g., depression, seasonal affective disorder) while enhancing cognitive performance. Respondents are asked to indicate how many minutes of sun exposure they generally receive while underway.

Caffeine Use. While caffeine can enhance some aspects of human performance, it is a psychoactive drug that can negatively affect cognitive function and undermine performance. Excessive caffeine consumption has become an area of concern in both the general and military populations with the rapid expansion of energy drinks, supplements, and stimulants in the marketplace, to include ship stores. Generally speaking, consumption of approximately 400 milligrams of caffeine (about four 8-ounce cups of standard brewed coffee) per day appears to be safe for most healthy adults, while 250 milligrams of caffeine per day is considered moderate usage and 500 milligrams is considered excessive usage. Concerning ingredients and sugar content aside, the mass consumption of energy drinks/shots is presenting new concerns as the amount of caffeine per serving size ranges from 35 to >300 milligrams. Energy drink/shot consumption cannot only disrupt sleep, but also cause cardiovascular system, neurological, gastrointestinal, renal, and endocrine system problems. Caffeine can adversely impact general crew performance by disrupting their circadian cycle as it blocks sleep-inducing chemicals in the brain and increases adrenaline production. This, in turn, destabilizes cognitive, emotional, and behavioral processes. Respondents are asked how many times per day they consume various sources of caffeine.

Nicotine Usage. Nicotine is a stimulant that can disrupt circadian cycles. Additionally, most nicotine delivery systems, whether an e-cigarette or traditional cigarette, expose the user to harmful chemicals. Smoking is also associated with an increased prevalence of sleep-related respiratory disorders, which further undermines sleep quality and causes daytime sleepiness. Respondents are asked how many times per day they consume various sources of nicotine.

3.2.5 LEADER PERCEPTIONS OF SUBORDINATES

Procedural Compliance. Although COs are generally responsible for organizational outcomes, subordinates also carry a share of the responsibility. Unfortunately, DoD assessment tools such as the DEOCS, often solely focus on COs. To provide a new perspective, an established measure is used to assess leader perceptions of subordinates (i.e., those who supervise at least 2 Sailors) with respect to workplace compliance, risk management, and general safety behaviors.

3.2.6 OPEN-ENDED COMMENTS

Respondents were given the opportunity to share any thoughts that they might have concerning safety-related issues (e.g., methods to improve workplace safety or current safety-related issues), best and worst safety practices, and/or crew endurance issues (e.g., sleep, exercise, and nutrition).

4 RESULTS

4.1 Introduction

This report used advanced exploratory data analysis techniques to evaluate survey results. Descriptive statistics, including means and frequency tables, were also applied. Analysis of variance (ANOVA) techniques were used to compare mean differences in groups across continuous variables such as age. Categorical variables include paygrade, ship department, and ship type. Group means and differences in means are provided, along with standardized mean differences as a measure of the size of the effect of the variable (a difference in means rescaled by pooled variance; i.e., Cohen's *d*). While there is no definitive cutoff for interpreting Cohen's *d*, benchmarks often used include 0.2, 0.5, and 0.8 as small, medium, and large effects, respectively. Additionally, Natural Language Processing (NLP) techniques were applied to quantify, categorize, and derive insights into the open-ended questions. Large sample sizes, such as those herein, can produce statistically significant outcomes, even for trivial differences in size. Thus, any use of a *p*-value alone should be interpreted with caution and combined with measures of effect size such as Cohen's *d*.

4.2 SURFOR (Overall)

A total of 75 crews completed the ASCAS in FY22. Although the ASCAS is a mandatory crew requirement, completion of the survey by crewmembers is completely voluntary. Of 20,034 Sailors invited to complete the ASCAS, 8,670 opted to complete it, garnering a 43% completion rate. Of note, four additional crews assigned to ACU/BMU platforms completed the ASCAS; these platforms are notably different than the others surveyed and were subsequently removed from the overall analysis to avoid skewing and misinterpretation of results.

4.2.1 DEMOGRAPHICS

Demographics of the sample are provided in Table 1, which includes counts of participants based on gender, race, age, paygrade, department, and ship-class to which they are assigned.

Table 1. Demographics of the ASCAS Respondents (SURFOR)

	CNSF	%	CNSP	%	CNSL	%
Gender						
Female	1767	20.58%	1,242	20.39%	525	21.03%
Male	6821	79.42%	4,849	79.61%	1,972	78.97%
Age						
17-21	1274	14.87%	938	15.44%	336	13.46%
22-25	2341	27.30%	1,671	27.48%	670	26.84%
26-30	1759	20.51%	1,225	20.15%	534	21.39%
31-35	1513	17.64%	1,073	17.65%	440	17.63%
36-40	1052	12.27%	732	12.04%	320	12.82%
41-45	471	5.49%	323	5.31%	148	5.93%
46-50	125	1.46%	87	1.43%	38	1.52%
51-55	34	0.40%	27	0.44%	7	0.28%
56-60>	6	0.01%	3	0.05%	3	0.12%
Race						
Non-white	3967	46.85%	2,904	48.34%	1,063	43.23%
White	4500	53.15%	3,104	51.66%	1,396	56.77%
Paygrade						
Junior Sailors (E1-E3)	1310	15.21%	955	15.63%	355	14.17%
Petty Officers (E4-E6)	4871	56.55%	3,480	56.97%	1,391	55.53%
Chiefs (E7-E9)	1044	12.12%	715	11.70%	329	13.13%
Officer/CWO	1389	16.12%	959	15.70%	430	17.17%
Ship Department						
Admin	620	7.26%	437	7.22%	183	7.35%
AIMD	232	2.71%	173	2.86%	59	2.37%
Air	434	5.10%	286	4.72%	148	5.94%
Combat Systems	1557	18.22%	1,088	17.97%	469	18.84%
Deck	455	5.32%	317	5.24%	138	5.54%
Engineering	1746	20.43%	1,236	20.42%	510	20.48%
Medical/Dental	220	2.57%	141	2.33%	79	3.17%
Operations	1346	15.75%	975	16.11%	371	14.90%
Safety	8	0.32%	17	0.28%	11	0.44%
Supply	834	9.76%	600	9.91%	234	9.40%
Training / Plans & Tactics	125	1.46%	86	1.42%	38	1.53%
Weapons	948	11.09%	698	11.53%	250	10.04%
Ship-class						
Amphib (LHD, LHA, LPD, LSD, LCC)	3338	38.50%	2,292	37.30%	1,046	41.41%
CRUDES (DDG, CG)	4601	53.01%	3,391	55.19%	1,210	47.90%
LCS (Free, Ind)	674	7.78%	404	6.58%	270	10.69%
MCM	57	0.66%	57	0.93%	0	0.00%

Most respondents were male (79.42%), and the majority (80.32%) were younger than age 35. In terms of racial makeup, 53.15% of the respondents self-reported as White, with the remainder being categorized as Non-White. The most frequent rank was Petty Officer (56.55%). The most prevalent departments represented in survey responses are Engineering (20.43%), Combat Systems (18.22%) and Operations (15.75%). In terms of ship cases, the majority of responses were from Sailors aboard CRUDES (53.01%). The demographics of the respondents are reflective of the overall SURFOR demographics.

4.2.2 AREAS OF PRAISE AND CONCERN

Across all FY22 SURFOR ASCAS responses, which survey constructs scored highly and which scored poorly? Respondents were asked to rate their perceptions on a 5-point Likert-scale, with 1 being an unfavorable response and 5 being a favorable response. *However, in some instances, questions were reverse encoded so that 1 indicated a favorable response. Those constructs are denoted with an asterisk (*) in subsequent tables.* Areas of praise include constructs that reflect overall favorable responses. Areas of concern indicate negative overall responses. Table 2 identifies high and low scoring constructs for all survey respondents.

Table 2. Areas of Praise and Concern (SURFOR)

Item	Mean (Likert: 1-5)
Leader Perception of Subordinates (Subset 3)	3.94
Leadership Perception of Subordinates (Subset 2)	3.74
Unit Cohesion (Watch Team)	3.65
Leadership Perception of Subordinates (Subset 1)	3.55
Unit Cohesion (Work Center)	3.54
Supervisor Safety	3.53
Personal Responsibility for Workplace Safety	3.53
Command Safety Practices	3.44
Job Resources (Equipment)	3.39
Sleep Factors *	2.49
Job Stress *	3.63
Sleep Disturbances *	3.39
Affective Commitment	2.62
No-Blame Error Reporting	2.78
Job Demands *	3.18
Team Process (Interpersonal Processes)	2.86
Psychological Safety	2.87
Team Process (Action Processes)	2.92
Team Processes (Overall)	2.93

Notes:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. * *For these questions lower scores represent a more favorable response, with a mean of 3 being neutral*. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.

Overall, Sailors responded more favorably towards questions referring to Leader Perception of Subordinates, Unit Cohesion, Supervisor Safety, Personal Responsibility for Workplace Safety, Command Safety Practices, Job Resources (Equipment), and Sleep Factors. Survey constructs that scored unfavorably included Affective Commitment, No-Blame Error Reporting, Team Processes, Psychological Safety, Job Stress, Sleep Disturbances, and Job Demands.

4.2.3 COMPARATIVE ANALYSIS BY DEMOGRAPHICS

While the section above details high and low scoring constructs, the heatmaps below detail average scores across all of the constructs. Each row represents a survey construct. Each column represents a different subgroup. Here, each column reflects mean responses for the various age groups. Due to differences in survey metrics (some questions are reverse encoded, some are days rather than Likert-scale), four heatmaps are included. For all figures, less favorable responses are colored orange and more favorable responses are colored blue. For additional information on how to read a heatmap visualization and a dictionary to understand the shorthand metrics, see Appendix C.

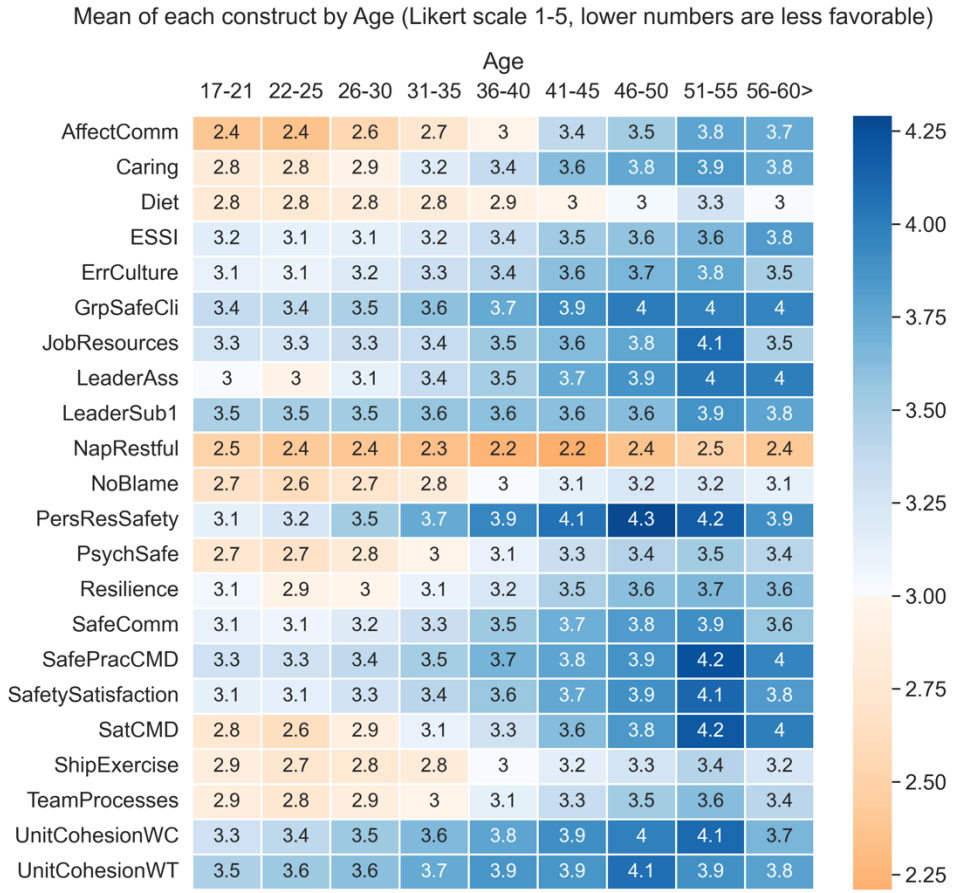

Figure 1. Mean Constructs of Interest by Age on Likert Scale Questions

Of note, younger Sailors tended to respond less favorably than older Sailors. This is particularly evident within the Affect Commitment (AffectComm), Caring, and Satisfaction with Command (SatCMD) constructs.

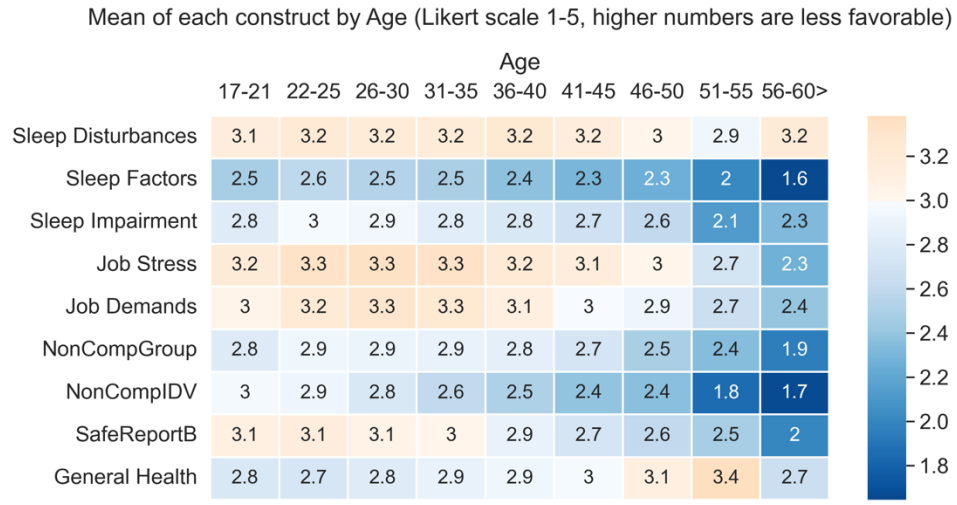

Figure 2. Mean Constructs of Interest by Age (Reverse Encoded)

The same trend (i.e., older Sailors responding more favorably) is evident with reverse encoded constructs. Of note, Sailors aged 46-55 reported less favorably on questions related to their general health.

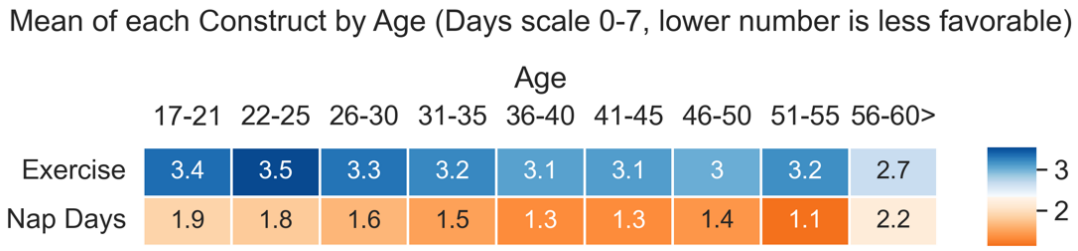

Figure 3. Mean Constructs of Interest by Age (Days Scale)

Figure 3 showcases mean responses by age for questions related to Naps and Exercise days. Specifically, they were asked how many days on average per week they engage in exercise and naps. Younger Sailors (17-35) tend to exercise more frequently than older Sailors. The number of days that Sailors nap tends to decrease as Sailor's age and increases for the 56-60+ age group.

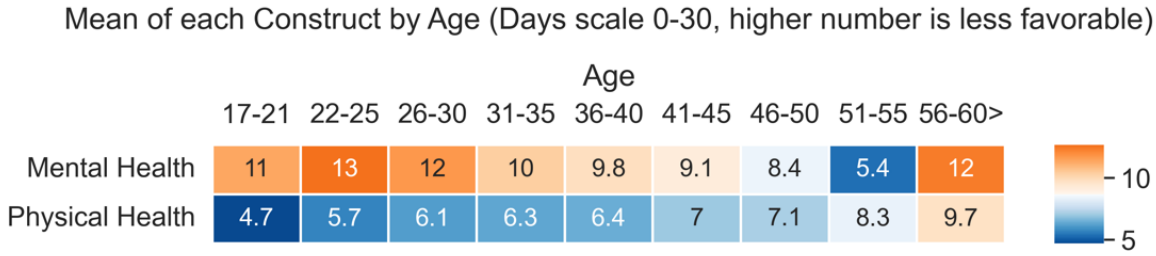

Figure 4. Mean Constructs of Interest by Age (Days Scale, Reverse Encoded)

These survey questions examine how many days in the past 30 days Sailors' mental and physical health were not good. A higher number denotes a less favorable response. Younger Sailors tend to report more days of poor mental health, though the 56-60+ age group reverses the downward trend. Younger Sailors tend to report fewer days of poor physical health; this mean gradually increases, with Sailors 56-60+ age group reporting the most (9.7) days of poor physical health.

4.2.4 ACTIVITY ANALYSIS

A portion of the ASCAS focuses on how Sailors spend their time on a daily basis. Figure 5 shows the average lengths of time individuals report working in the following areas: Work center duties, Watch Team duties, completing personnel qualification standards, and attending meetings. Please note this analysis does not include time dedicated to sleeping, but it does, by extension, drive the amount of time left each day for sleeping.

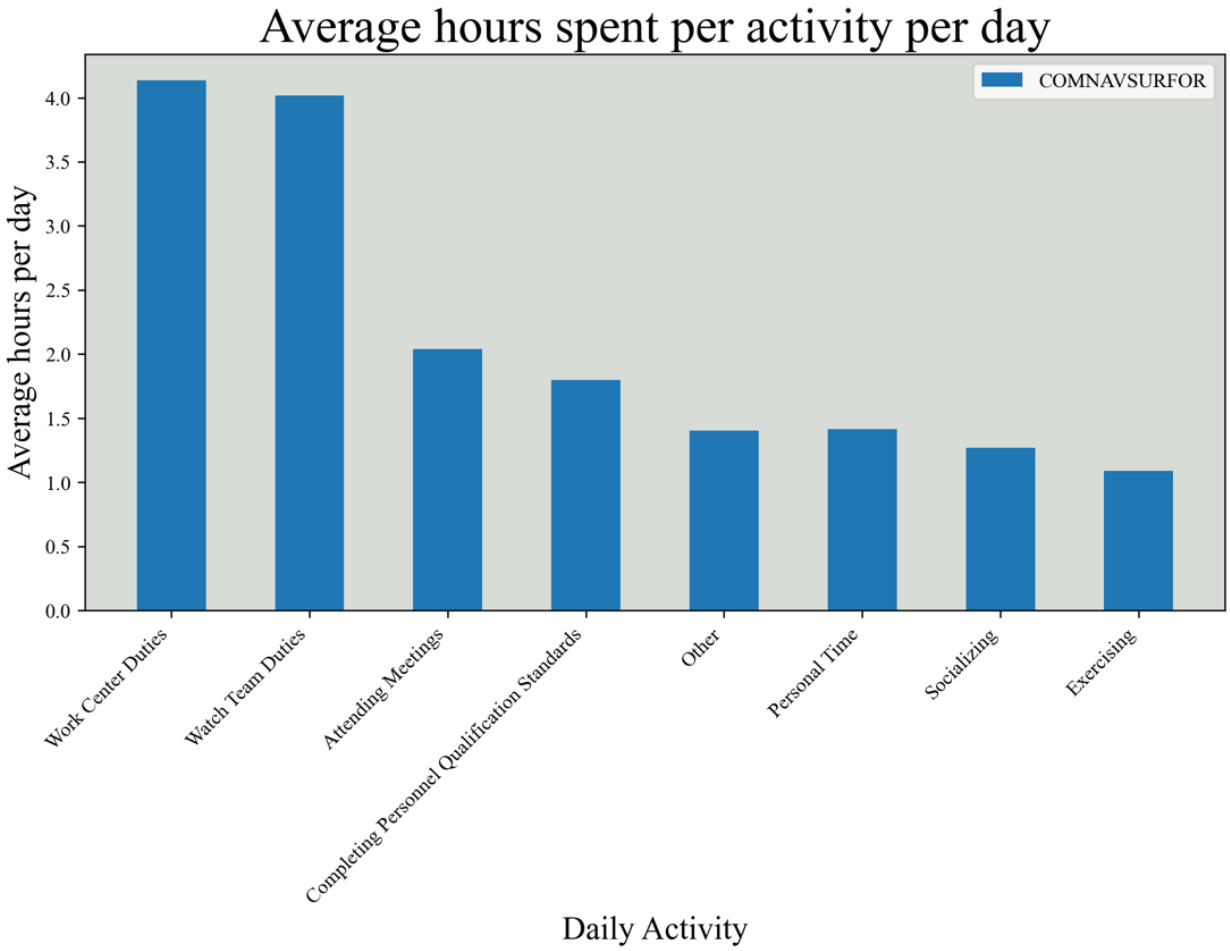

Figure 5. Average Hours Spent Per Activity Per Day (SURFOR)

As indicated in Figure 5, respondents spend most of their time (4 hours and 8 minutes) completing Work Center Duties, followed by Watch Team Duties (4 hours and 1 minute) and Attending Meetings (2 hours and 2 minutes). On average, respondents reported spending (11 hours and 59 minutes) hours on work-related duties and (3 hours and 46 minutes) hours on personal activities. Work related duties include Work Center Duties, Watch Team Duties, Attending Meeting and Completing Personnel Qualification Standards. Personal activities include Personal Time, Socializing and Exercising. The “Other” category is excluded as it cannot be defined as work or personal activities.

4.3 CNSP/CNSL Analysis

This section explores notable differences between the CNSP and CNSL respondents. In the second year of the new ASCAS, 52 crews (6,144 respondents) were assigned to CNSP platforms, and 23 crews (2,526 respondents) were assigned to CNSL platforms. While Section 4.3 details CNSP/L analyses conducted, differences between these two groups were small and bear little practical significance.

4.3.1 AREAS OF PRAISE AND CONCERN

Similar to Section 4.2.2, analysis was performed to identify areas of praise and concern. Table 3 highlights these areas for both CNSP and CNSL.

Table 3. CNSP/L Areas of Praise and Concern

Item	CNSP Mean (Likert: 1-5)	CNSL Mean (Likert: 1-5)
Leader Perception of Subordinates (Subset 3)	3.93	3.94
Leadership Perception of Subordinates (Subset 2)	3.73	3.76
Unit Cohesion (Watch Team)	3.65	3.63
Leadership Perception of Subordinates (Subset 1)	3.55	3.54
Unit Cohesion (Work Center)	3.55	3.52
Supervisor Safety	3.52	3.53
Personal Responsibility for Workplace Safety	3.51	3.50
Command Safety Practices	3.44	3.42
Job Resources (Equipment)	3.39	3.39
Sleep Factors *	2.50	2.49
Job Stress *	3.64	3.65
Sleep Disturbances *	3.40	3.37
Affective Commitment	2.61	2.64
No-Blame Error Reporting	2.77	2.80
Job Demands *	3.17	3.22
Psychological Safety	2.86	2.90
Team Process (Interpersonal Processes)	2.86	2.84
Team Process (Action Processes)	2.92	2.90
Team Process (Overall)	2.93	2.86

Note:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. *For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

CNSP and CNSL respondents tended to response similarly, with the areas of praise and concern being similar to those of CNSF overall.

4.3.2 CONSTRUCTS WITH NOTABLE DIFFERENCES IN MEANS

Mean differences were analyzed between the CNSP and CNSL. Table 4 provides the survey constructs with the largest differences in means. CNSP and CNSL responses tended to be very similar, with construct means nearly identical. Note, in general, most differences are small to negligible.

Table 4. Constructs with Notable Differences in Means

	CNSP		CNSL		T-test		
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**P-Value**	**Effect Size**
Occupational Challenges *	2.75	0.99	2.68	0.99	0.07	0.002	0.07
Crew Resilience	3.06	0.94	3.11	0.93	0.05	0.043	-0.05
Job Demands *	3.17	0.90	3.22	0.90	0.05	0.026	-0.06
Sleep Impairment	2.88	0.93	2.83	0.93	0.05	0.045	0.05

** For these items lower scores represent a more favorable response, with a mean of 3 being neutral.*

The constructs above are those that exhibited the largest differences in their means. Most differences were statistically significant, though the effect sizes were negligible (<.10). CNSP expressed slightly more favorable responses towards Sleep Impairment and Job Demands. CNSL expressed slightly more favorable views toward Occupational Challenges and Crew Resilience.

4.3.3 ACTIVITY ANALYSIS

Similar to Section 4.2.4, analysis was performed to identify differences in how much respondents spend on various activities. Figure 6 shows the average lengths of time individuals report allotted to various activities for CNSP and CNSL.

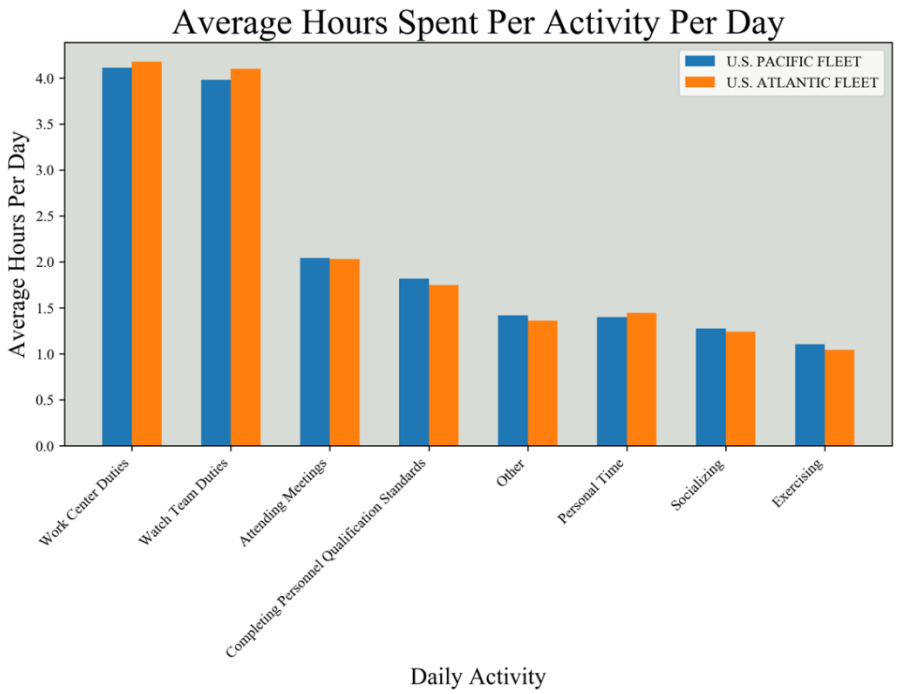

Figure 6. Average Hours Spent Per Activity Per Day (CNSP/L)

CNSP and CNSL Sailors tended to respond similarly. CNSL reported slightly higher time devoted to Watch Center Duties and Watch Team Duties whereas CNSP Sailors spend more time Attending Meetings and Completed Personnel Qualification Standards. CNSP Sailors reported spending an average of 11 hours and 57 minutes on work-related activities and 3 hours and 47 minutes on non-work-related activities. While CNSL Sailors reported spending 12 hours and 4 minutes on work-related activities and 3 hours and 44 minutes on non-work-related activities.

4.4 Ship-class Analysis

Results include responses from four main ship-classes: Amphib Ships (LHD, LHA, LPD, LCC, LSD), CRUDES (CG, DDG), Littoral Combat Ships (LCS), and Mine Countermeasure (MCM). Table 5, below, details the number of crews and respondents assigned to each ship-class. Note that, because only one MCM took the ASCAS in the last year, it was excluded from later comparative analysis.

Table 5. Number of Ships and Surveyed Sailors by Ship-class

Ship-class	# of Ships	# Surveyed
Amphib (LHD, LHA, LPD, LCC, LSD)	18	3338
CRUDES (CG, DDG)	39	4601
LCS	17	674
MCM	1	57

4.4.1 AREAS OF PRAISE AND CONCERN

Areas of praise and concern are the constructs with the highest and lowest means for that category, respectively. Table 6 presents areas of praise and concern for each Ship-class.

Table 6. Ship-class Areas of Praise and Concern

Item	CRUDES Mean (Likert: 1-5)	Amphib Mean (Likert: 1-5)	Littoral Combat Ship Mean (Likert: 1-5)
Leader Perception of Subordinates (Subset 3)	3.95	3.86	4.21
Leadership Perception of Subordinates (Subset 2)	3.74	3.68	3.99
Unit Cohesion (Watch Team)	3.68	3.51	4.00
Unit Cohesion (Work Center)	3.57	3.44	3.82
Leadership Perception of Subordinates (Subset 1)	3.57	3.48	3.74
Personal Responsibility for Workplace Safety	3.54	3.44	3.88
Supervisor Safety	3.52	3.48	3.83
Command Safety Practices	3.43	3.40	3.69
Job Resources (Equipment)	3.40	3.35	3.54
Sleep Factors *	2.94	2.53	2.27
Safety Satisfaction	3.33	3.25	3.62
Job Stress *	3.69	3.56	3.73
Sleep Disturbances *	3.38	3.41	3.35
Affective Commitment	2.64	2.51	3.10
No-Blame Error Reporting	2.76	2.74	3.10
Job Demands *	3.21	3.11	3.35
Team Process (Interpersonal Processes)	2.85	2.82	3.14
Psychological Safety	2.87	2.81	3.21
Team Process (Action Processes)	2.91	2.88	3.16
Team Processes (Overall)	2.93	2.88	3.17
Satisfaction of Command	2.97	2.89	3.22

Note:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. *For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Areas of praise were consistent across the various ship-classes. Notably, respondents assigned to LCSs tended to respond more favorably than their CRUDES or Amphib counterparts, *except with respect to job demands*. This may be reflective of their small crew size.

4.4.2 COMPARATIVE ANALYSIS OF SHIP-CLASSES

Beyond areas of praise and concern, analyses were performed to identify and understand differences across our ship-classes. Results are detailed in the heatmaps below.

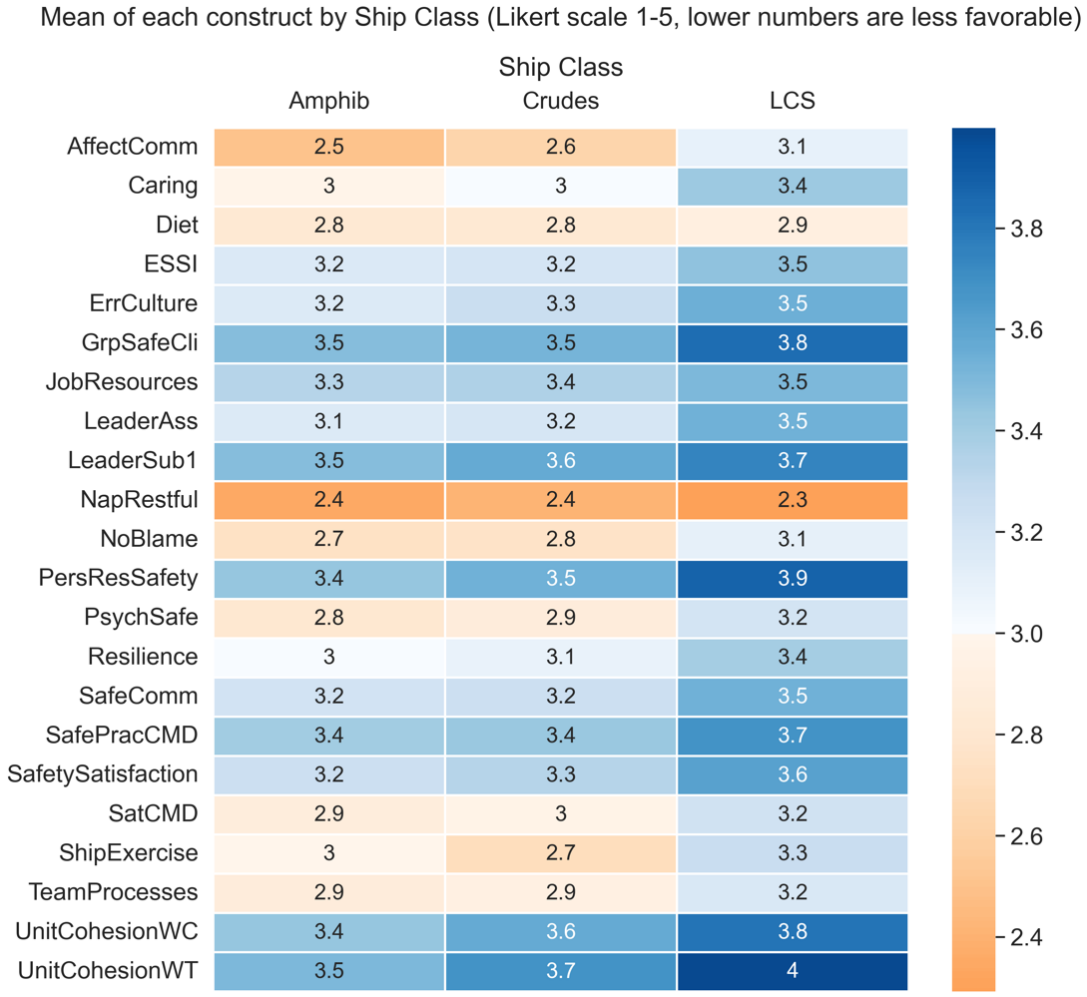

Figure 7. Mean Constructs of Interest by Ship-class

As identified in Section 4.4.1, LCS respondents tended to respond more favorably than CRUDES and Amphib Sailors. Consistent with CNSF results, responses related to Naps and Diet were unfavorable for all ship-classes.

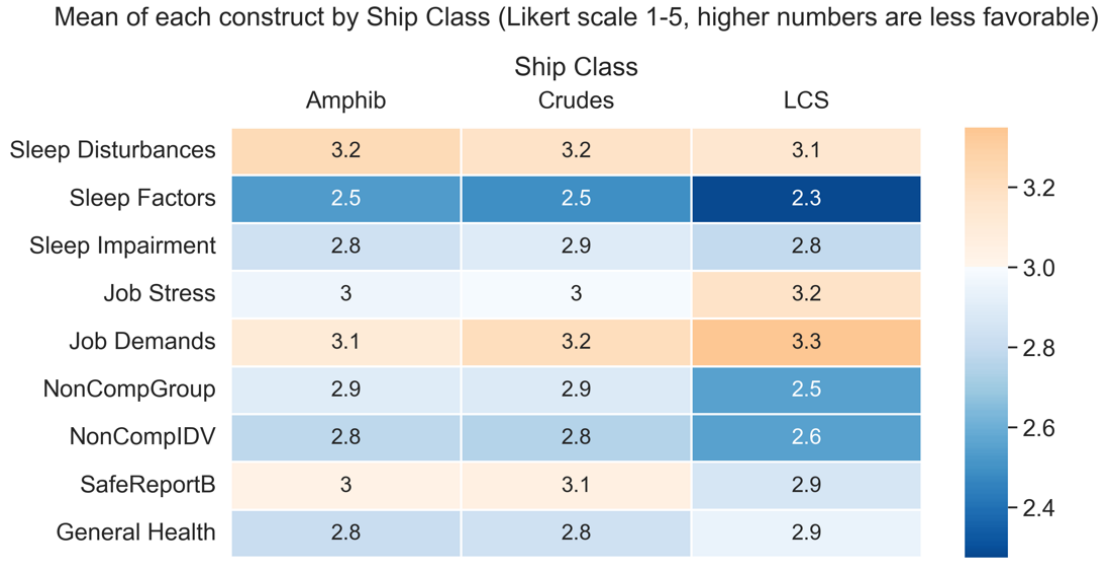

Figure 8. Mean Constructs of Interest by Ship-class (Reverse Encoded)

While LCS Sailors tend to respond more favorably to some constructs, they scored more negatively towards Job Demands and Job Stress.

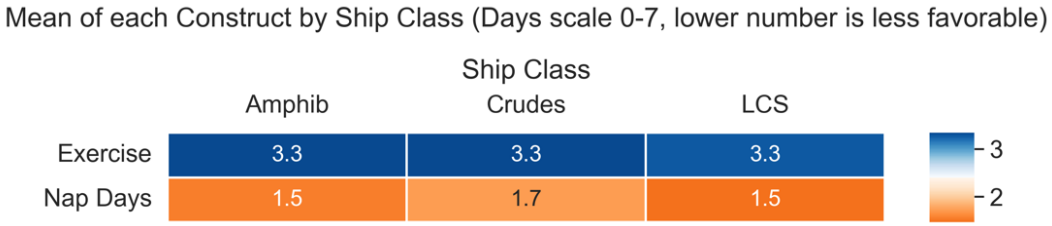

Figure 9. Mean Constructs of Interest by Ship-class (Days Scale)

Ship-class had little bearing on questions related to exercise and nap days. On average, regardless of ship-class, sailors reported 3.3 days of exercise per week. Sailors reported 1.5 naps/week for Amphibs and LCSs, and 1.7 naps per week for CRUDES.

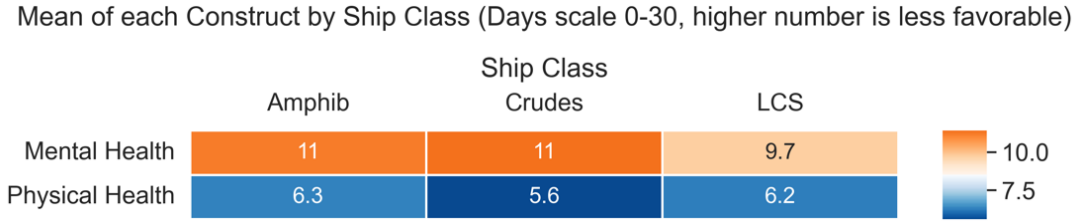

Figure 10. Mean Constructs of Interest by Ship-class (Days Scale, Reversed Encoded)

With regard to mental health, Sailors on Amphibs and CRUDES reported an average of 11 days of poor mental health (in the last 30 days). LCS respondents reported 9.7 days of poor mental health. Sailors reported more days of poor mental as compared to poor physical health. Specifically, Sailors on Amphibs reported an average of 6.3 days of poor physical health, those assigned to LCSs reported 6.2 days, and CRUDES reported a slightly lower average of 5.6 poor physical health days.

4.4.3 BREAKDOWN OF SLEEP FACTORS

The Sleep Factors construct is composed of 15 questions in the survey. This section examines the difference in sleep factors between ship-classes. The factors with the largest negative impact for any individual group are shown to provide a better understanding of reasons for poor sleep. The Sleep Impairment and Sleep Disturbance Constructs are also shown for reference.

4.4.3.1 SLEEP FACTORS OF HIGHEST CONCERN

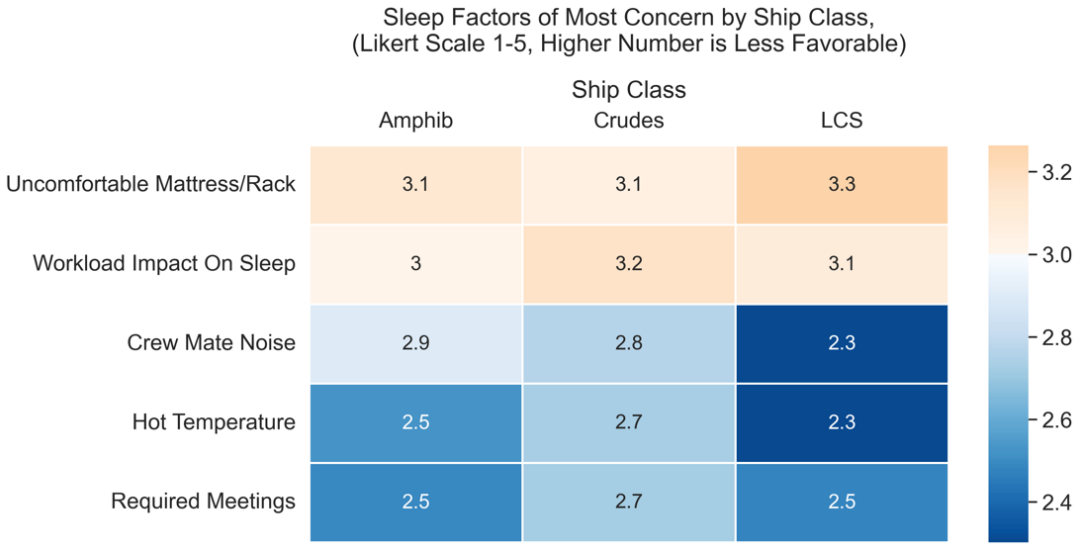

Figure 11. Heatmap of Sleep Factors by Ship-class

Uncomfortable Mattress/Rack on LCSs were the most negative factor for any group. It was also the factor Amphib respondents reportedly most negatively. Workload Impact on Sleep was the most negative factor reported by CRUDES, and the second worst factor reported by Amphib and LCS Sailors.

4.4.3.2 SLEEP IMPAIRMENT AND SLEEP DISTURBANCES

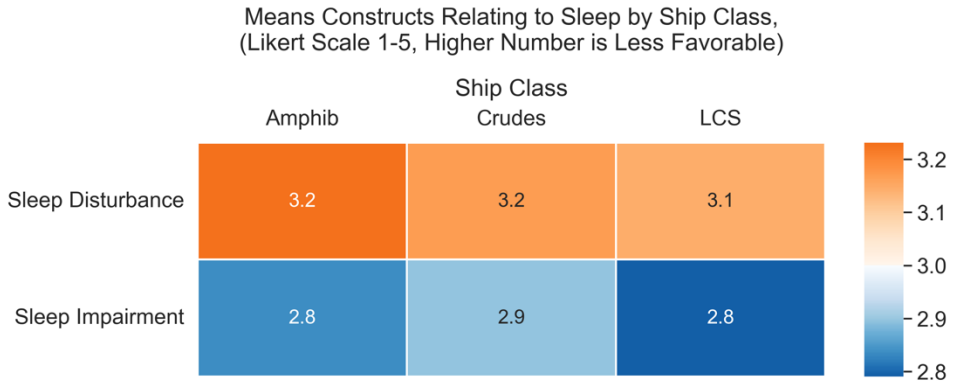

Figure 12. Heatmap of Sleep Constructs by Ship-class

Despite some pronounced differences in individual sleep factors, the Sleep Disturbance and Sleep Impairment constructs were relatively consistent across ship-classes.

4.4.1 ACTIVITY ANALYSIS

Figure 13 depicts the average lengths of time individuals reported spending on various activities, across ship-classes.

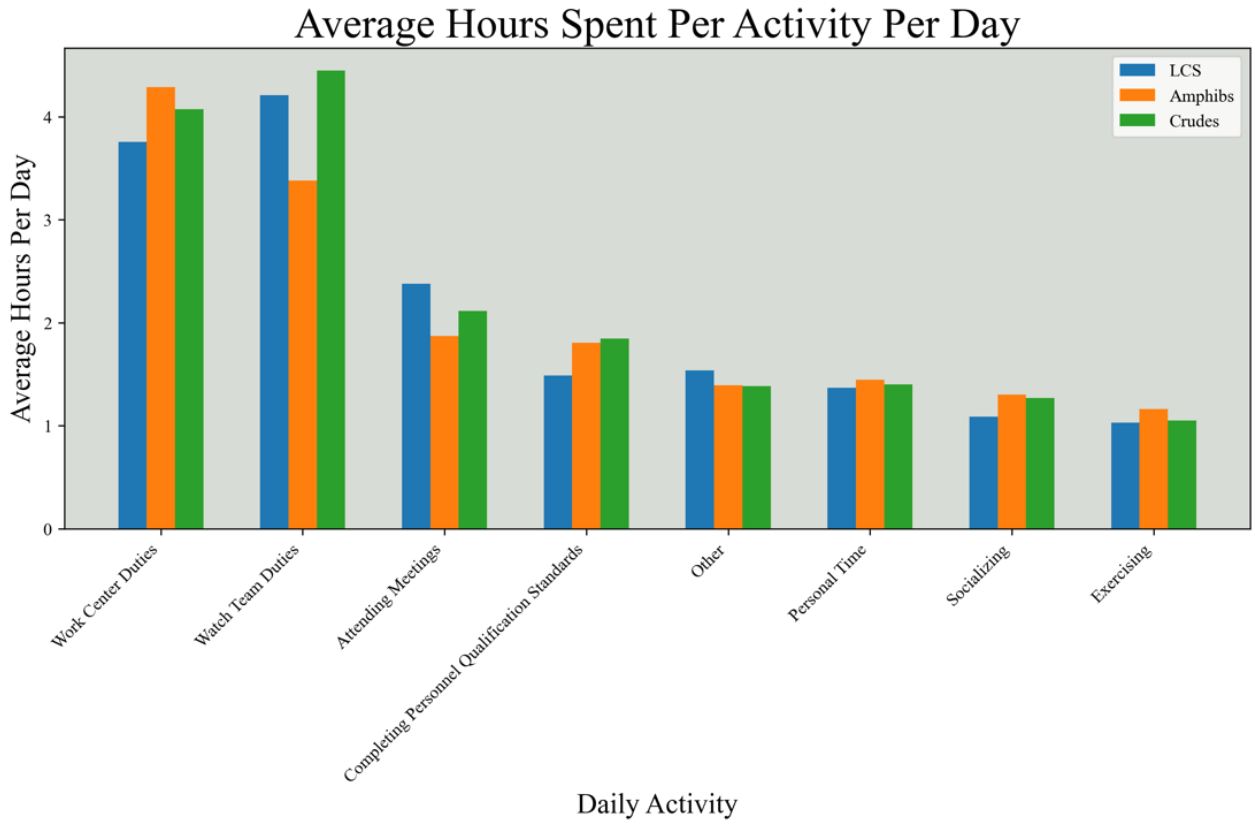

Figure 13. Average Hours Spent Per Activity Per Day (Ship-class)

Of note, respondents assigned to LCS platforms tended to spend less time on Work Center duties than their Amphib and CRUDES counterparts. This is likely due to the LCS contracted maintenance construct. CRUDES and LCSs reported spending less time on Watch Team duties and attending meetings than Amphib respondents.

Table 7. Average Time Spent on Work and Personal Duties by Ship-class

Ship-class	Average Time Spent on Work Duties	Average Time Spent on Personal Duties
Amphib (LHD, LHA, LPD, LCC, LSD)	11 hours 21 minutes	3 hours 54 minutes
CRUDES (CG, DDG)	12 hours 28 minutes	3 hours 43 minutes
LCS	11 hour 50 minutes	3 hours 29 minutes

An average, Sailors assigned to CRUDES reported the most time spent on work duties (12 hours and 28 minutes) and Amphibs reported the least (11 hours and 21 minutes).

4.5 Paygrade Analysis

The following section examines the key constructs relative to rank. Analyses was performed on four Paygrade ranges (Junior Sailors E1-E3, Petty Officers E4-E6, Chiefs E7-E9, and Officers/Chief Warrant Officers), and further reduced to two groups (Enlisted and Officers) where applicable. Details regarding the number of respondents for the distinct subgroups are included below.

Table 8. Number of Respondents by Paygrade

Paygrade	Number of Respondents
Junior Sailors (E1-E3)	1310
Petty Officers (E4-E6)	4871
Chiefs (E7-E9)	1044
Officers (including CWOs)	1389

Most respondents who provided their paygrade were Petty Officers (56.5%), followed by Officers (16.1%), Junior Sailors (15.2%) and Chiefs (12.1%).

Table 9. Number of Respondents by Aggregated Paygrade

Paygrade	Number of Respondents
Enlisted (E1-E9)	7225
Officers (CWOs)	1389

Aggregating into Enlisted and Officer categories, 83.9% of responses came from Enlisted Sailors, whereas 16.1% were Officers.

4.5.1 AREAS OF PRAISE AND CONCERN

Survey constructs that scored favorably and unfavorably tended to align with those of SURFOR overall. Table 10 details those constructs and the mean scores for the Officer and Enlisted subgroups.

Table 10. Constructs of Praise and Concern by Paygrade (Officer vs Enlisted)

Item	Officer Mean	Enlisted Mean
Leader Perception of Subordinates (Subset 3)	4.11	3.89
Personal Responsibility for Workplace Safety	4.02	3.43
Unit Cohesion (Watch Team)	3.93	3.59
Unit Cohesion (Work Center)	3.90	3.47
Sleep Factors *	2.10	2.57
Supervisor Safety	3.79	3.48
Leadership Perception of Subordinates (Subset 2)	3.78	3.73
Command Safety Practices	3.76	3.38
Job Resources (Equipment)	3.71	3.33
Safety Satisfaction	3.70	3.27
Leadership Perception of Subordinates (Subset 1)	3.64	3.53
Job Stress *	3.66	3.64
Job Demands *	3.13	3.19
Sleep Disturbances *	3.02	3.46
Team Processes (Overall)	3.25	2.86
Team Process (Action Processes)	3.23	2.86
Satisfaction of Command	3.58	2.84
Psychological Safety	3.29	2.79
Team Process (Interpersonal Processes)	3.22	2.79
No-Blame Error Reporting	3.03	2.73
Affective Commitment	3.19	2.51

Note:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. **For these questions lower scores represent a more favorable response, with a mean of 3 being neutral*. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.

4.5.2 CONSTRUCTS WITH NOTABLE DIFFERENCES IN MEANS

The means between the Officers and Enlisted differed for most constructs. A test of statistical significance is given in Table 11 as well and all are significant with small to moderate effect sizes.

Table 11. Constructs with Significant Differences in Means Based on Officer vs Enlisted

	Officer		Enlisted			T-test	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**P-Value**	**Effect Size**
Satisfaction with Command	3.58	1.12	2.84	1.16	0.74	<0.001***	0.64
Affective Commitment	3.19	1.14	2.51	1.1	0.68	<0.001***	0.61
Personal Responsibility for Workplace Safety	4.02	0.78	3.43	0.89	0.59	<0.001***	0.68
Psychological Safety	3.29	0.82	2.79	0.87	0.5	<0.001***	0.58
Error Management	3.65	0.84	3.16	0.96	0.49	<0.001***	0.52
Leader Assessment	3.59	0.85	3.12	0.86	0.47	<0.001***	0.55
Safety Satisfaction	3.7	0.8	3.25	0.89	0.45	<0.001***	0.51
General Health	3.21	0.98	2.76	0.93	0.45	<0.001***	0.52
Sleep Disturbance*	3.02	1.01	3.46	0.94	0.44	<0.001***	-0.46
Unit Cohesion (Work Center)	3.9	0.78	3.47	1.03	0.43	<0.001***	0.43
Safety Communication	3.62	0.8	3.19	0.9	0.43	<0.001***	0.49
Team Process	3.25	0.76	2.86	0.82	0.39	<0.001***	0.48
Command Safety Practices	3.76	0.73	3.38	0.84	0.38	<0.001***	0.47
Individual Noncompliance*	2.44	0.93	2.81	0.93	0.37	<0.001***	-0.40
Crew Resilience	3.37	0.89	3.02	0.94	0.35	<0.001***	0.38
Unit Cohesion (Watch Team)	3.93	0.84	3.59	0.98	0.34	<0.001***	0.35
Supervisor Safety Climate	3.79	0.86	3.48	0.94	0.31	<0.001***	0.33
No-Blame Error Reporting	3.03	0.77	2.73	0.78	0.3	<0.001***	0.39
Job Resources (Overall)	3.61	0.67	3.31	0.76	0.3	<0.001***	0.40
Social Support	3.45	1.02	3.16	1.04	0.29	<0.001***	0.28
Occupational Challenges*	2.52	0.98	2.77	0.99	0.25	<0.001***	-0.25
Days which mental health was judged 'not good'*	8.2	9.58	11.78	10.83	3.58	<0.001***	0.35
Days which physical health was judged 'not good'*	4.85	7.66	6.15	8.4	1.3	<0.001***	0.16

** For these items lower scores represent a more favorable response*

The means above highlight the constructs with the most considerable mean differences between Officer and Enlisted. The constructs were all statistically significant between the groups and were of medium effect size. Officers had more favorable responses towards every item, with Satisfaction with Command and Affective Commitment having the largest differences.

4.5.3 COMPARATIVE ANALYSIS OF PAYGRADES

Upon discovering such notable differences between the Officer and Enlisted subgroups, additional analyses were performed to explore responses of the four Paygrades included in the ASCAS.

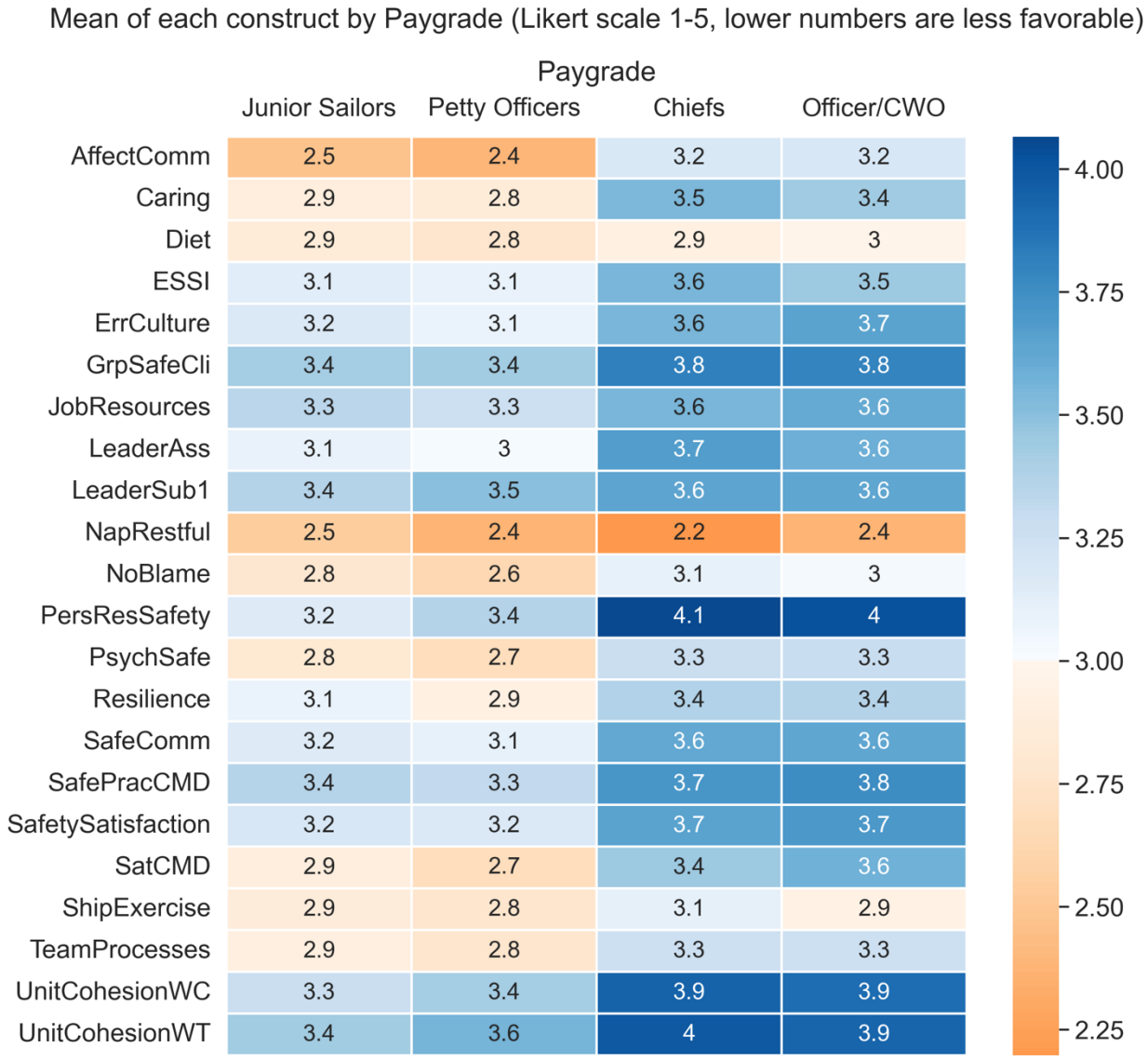

Figure 14. Heatmap of Constructs by Paygrade

Figure 14 shows the mean responses to Likert scale questions, where higher numbers represent more favorable responses. Of note, Junior Sailors and Petty Officers (E1-E6), tended to respond less favorably to nearly all constructs. Chiefs (E7-E9) responses were more similar to those of Officers/CWOs than Junior Sailors and Petty Officers.

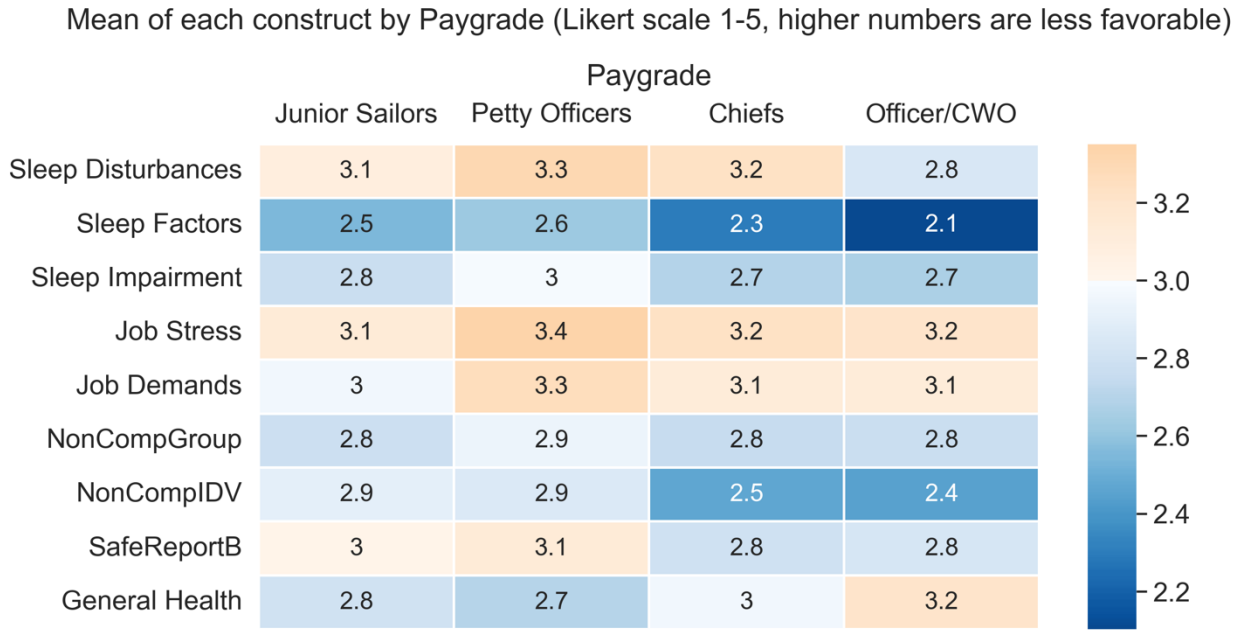

Figure 15. Mean Constructs of Interest by Paygrade

In Figure 15, it is evident that reverse encoded constructs (where lower scores are more favorable) follow a similar trend, with Chiefs and Officers/CWO generally responding more favorably.

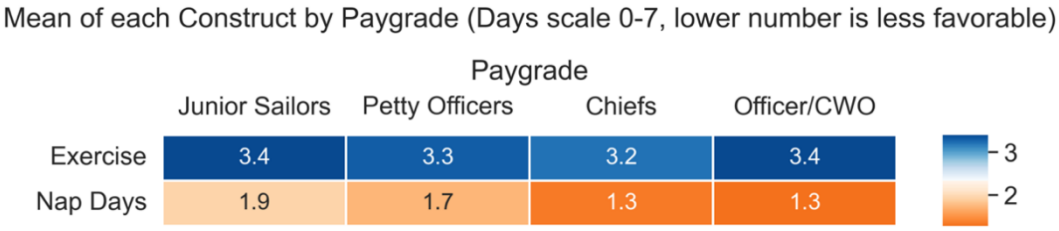

Figure 16. Mean Constructs of Interest by Paygrade (Days Scale)

All groups reported similar numbers of exercise days, with Junior Sailors and Officer/CWOs responding slightly higher. In terms of Nap Days, Junior Sailors and Petty Officers reported napping more frequently than Chiefs and Officer/CWOs.

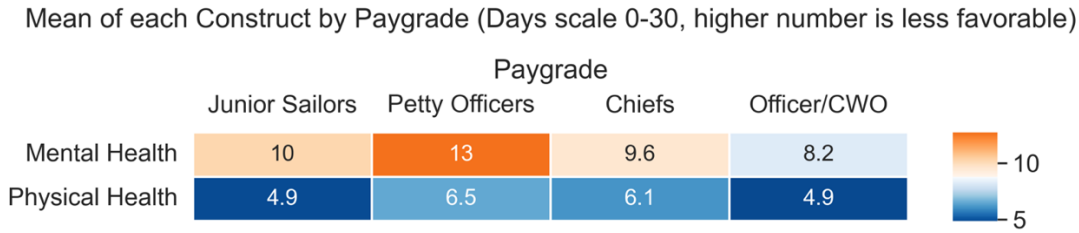

Figure 17. Mean Constructs of Interest by Paygrade (Days Scale, Reverse Encoded)

Petty Officers (E4-E6) reported the most days of better mental health (13 days/month), followed by Junior Sailors (10), Chiefs (9.6) and Officers/CWOs (8.2). Petty Officers also reported the most days of poor physical health (6.5 days/month), followed by Chiefs (6.1). Junior Sailors and Officer/CWOs both reported the few days of poor physical health (4.9) of the Paygrades surveyed.

4.5.4 BREAKDOWN OF SLEEP FACTORS

The Sleep Factors construct is composed of 15 questions in the survey. This section examines the difference in sleep factors between the Enlisted and Officer groups, as well as across the four Paygrade categories. The factors with the largest negative impact for either group are shown to provide a better understanding of reasons for poor sleep. The Sleep Impairment and Sleep Disturbance Constructs are also shown for reference.

4.5.4.1 SLEEP FACTORS OF HIGHEST CONCERN

	Paygrade		
Construct	Enlisted (E1-E9)	Officer/CWO	Sleep Factors of Most Concern by Paygrade, (Likert Scale 1-5, Higher Number is Less Favorable)
Uncomfortable Mattress/Rack	3.20	2.57	
Workload Impact On Sleep	3.11	3.06	
Crew Mate Noise	2.92	2.03	
Required Meetings	2.58	2.79	
Drills	2.74	2.10	

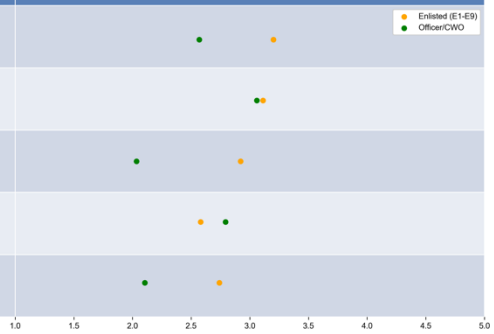

Figure 18. DNA Chart of Sleep Factors by Paygrade

Uncomfortable Mattress/Rack was the largest negative factor for Enlisted crewmembers and showed a pronounced difference between the Enlisted and Officer groups. Workload was a large negative factor but showed a negligible difference between groups. Crew Mate Noise and Drills showed a large difference between groups, but these factors were less negative.

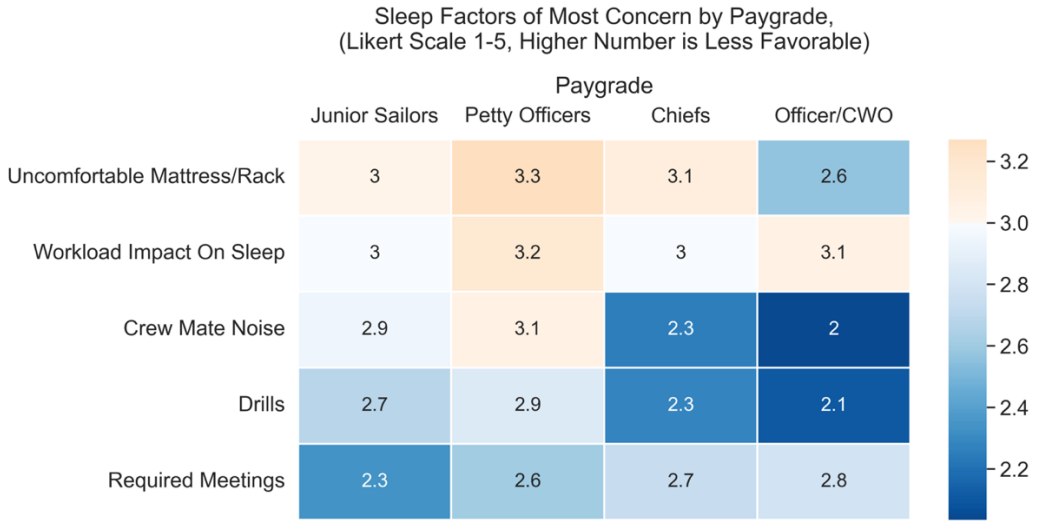

Figure 19. Heatmap of Sleep Factors by Paygrade

Reviewing means across the four paygrades once again reveals Uncomfortable Mattress/Rack and Workload to be the largest negative factors impacting sleep, though Officer/CWOs were less impacted by mattress. Petty Officers tended to respond more unfavorably towards Crew Mate Noise compared to the other groups.

4.5.4.2 SLEEP CONSTRUCTS OF HIGHEST CONCERN

Construct	Paygrade: Enlisted (E1-E9)	Paygrade: Officer/CWO	Means Constructs Relating to Sleep by Paygrade, (Likert Scale 1-5, Higher Number is Less Favorable)
Sleep Disturbance	3.26	2.84	
Sleep Impairment	2.90	2.67	

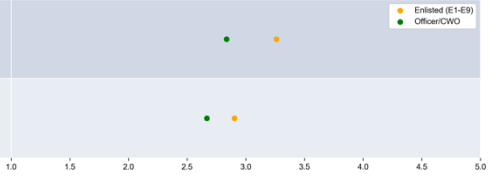

Figure 20. DNA Chart of Sleep Constructs by Paygrade

Consistent with the highlighted sleep factors, the Sleep Disturbance and Sleep Impairment constructs showed differences between groups, with the Enlisted group reporting less favorable results than the Officer group.

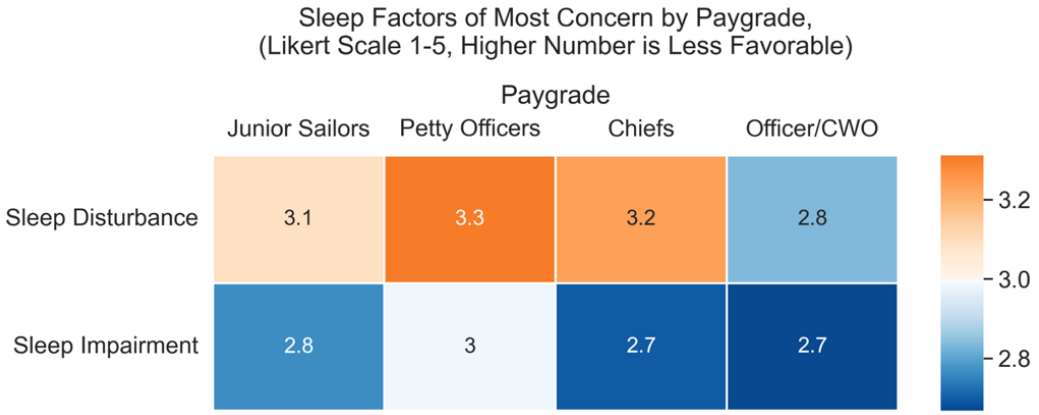

Figure 21. Sleep Factors by Paygrade

Of all the Enlisted groups, Petty Officers tended to respond less favorably to both the Sleep Disturbance and Sleep Impairment constructs.

4.5.5 ACTIVITY ANALYSIS

Analysis was performed to identify differences in how much respondents spend on various activities. Figure 22 shows the average lengths of time individuals report allotted to various activities for Enlisted Sailors and Officers.

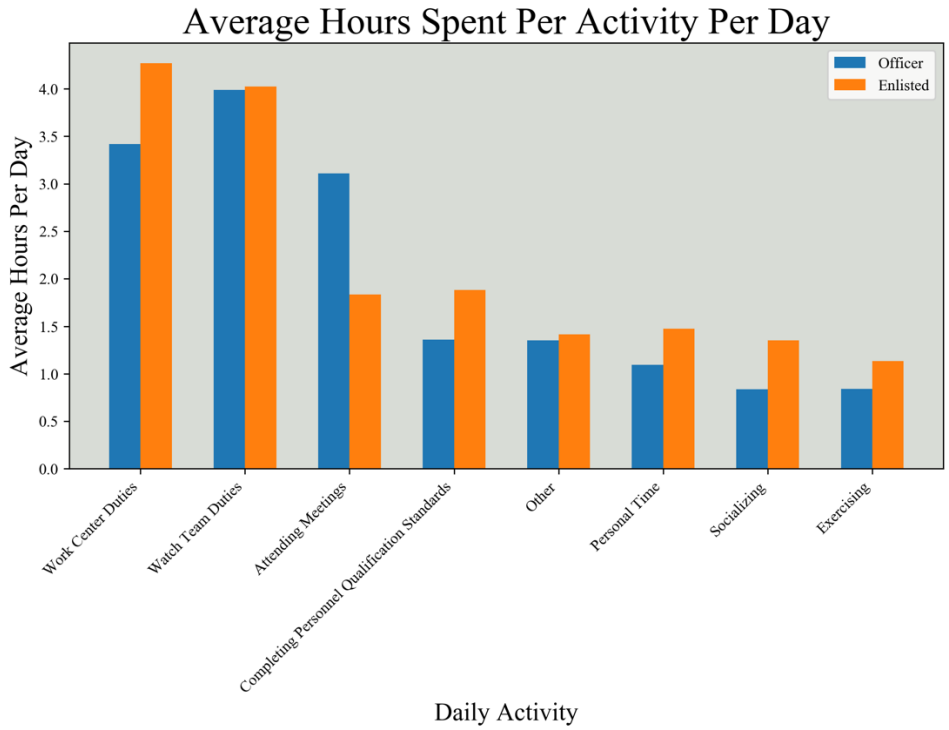

Figure 22. Average Hours Spent Per Activity Per Day (Paygrade)

Officers/CWOs reported more time Attending Meetings than their Enlisted counterparts. Enlisted Sailors reported significantly more time devoted to their Work Center Duties and Completing Personnel Qualifications Standards. The Officers and Enlisted groups reported similar time spent per day on Watch Team Duties.

Officers/CWOs reported spending an average of 11 hours and 52 minutes on work-related activities and 2 hours and 46 minutes on non-work-related activities. Enlisted Sailors reported spending 12 hours and 00 minutes on work-related activities and 3 hours and 58 minutes on non-work-related activities.

4.6 Department Analysis

This section investigates differences across departments. All results include responses from 12 departments (Engineering, Operations, Combat Systems, Supply, Admin, Deck, Weapons, Medical/Dental, Training / Plans & Tactics, Air, AIMD, and Safety). Analysis was completed both by department (12 groups) and in comparison to the Engineering department as a reference group. The FY21 ASCAS Report showed significant differences between Engineering and non-Engineering responses; analysis was repeated to identify whether or not the same trend was evident. Additionally, many of the departments had too few responses to allow for a robust comparative analysis.

Table 12. Number of Respondents by Department

Department	Number of Respondents
Admin	620
AIMD	232
Air	434
Combat Systems	1557
Deck	455
Engineering	1746
Medical/Dental	220
Operations	1346
Safety	28
Supply	834
Training / Plans & Tactics	125
Weapons	948

Most respondents were assigned to the Engineering department (1746), followed by Combat Systems (1557), Operations (1346) and Weapons (948). The smallest group of respondents came from the Safety Department (28), consistent with the sizes of the departments within ship organization manuals.

Table 13. Number of Respondents by Engineering vs Non-Engineering

Department	Number of Respondents
Engineering	1746
Non-Engineering	6799

Splitting the data into two distinct groups, Engineering comprises 20.43% of the total responses, and non-Engineering include the remaining 79.57%

4.6.1 AREAS OF PRAISE AND CONCERN BY DEPARTMENT

Survey constructs that scored favorably and unfavorably tended to align those of SURFOR overall. Table 14 details those constructs and the mean scores for the Engineering and non-Engineering subgroups.

Table 14. Areas of Praise and Concern by Engineering vs Non-Engineering Department

Item	Engineering Mean	Non-Engineering Mean
Leader Perception of Subordinates (Subset 3)	3.80	3.97
Leadership Perception of Subordinates (Subset 2)	3.66	3.76
Unit Cohesion (Watch Team)	3.64	3.65
Unit Cohesion (Work Center)	3.53	3.54
Personal Responsibility for Workplace Safety	3.52	3.53
Leadership Perception of Subordinates (Subset 1)	3.48	3.57
Sleep Factors *	2.52	2.48
Supervisor Safety	3.41	3.56
Command Safety Practices	3.33	3.47
Job Resources (Equipment)	3.29	3.42
Job Stress *	3.78	3.61
Affective Commitment	2.54	2.64
Sleep Disturbances *	3.43	3.38
Job Demands *	3.37	3.14
No-Blame Error Reporting	2.74	2.79
Team Process (Interpersonal Processes)	2.77	2.88
Psychological Safety	2.81	2.89
Team Process (Action Processes)	2.82	2.94
Team Processes (Overall)	2.83	2.95
Satisfaction of Command	2.86	2.98

Note:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. *For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

4.6.2 CONSTRUCTS WITH NOTICEABLE DIFFERENCES IN MEANS

Compared across different constructs, notable differences were less pronounced between Engineering and Non-Engineering departments. Engineering reported slightly worse physical and mental health days than Non-Engineering departments.

Table 15. Major Mean Differences by Engineering and Non-Engineering Departments

	Engineering		Non-Engineering		T-test		
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**P-Value**	**Effect Size**
Job Demands *	3.37	0.92	3.14	0.89	0.23	<0.001***	0.26
Occupational Challenges *	2.9	0.99	2.69	0.99	0.21	<0.001***	0.21
Individual Noncompliance *	2.89	0.96	2.71	0.93	0.18	<0.001***	0.19
Job Stress *	3.78	0.92	3.61	0.92	0.17	<0.001***	0.18
Sleep Impairment *	3	0.94	2.83	0.92	0.17	<0.001***	0.18
Supervisor Safety Climate	3.41	0.95	3.56	0.93	0.15	<0.001***	-0.16
Safety Satisfaction	3.2	0.89	3.35	0.88	0.15	<0.001***	-0.17
General Health	2.71	0.96	2.86	0.95	0.15	<0.001***	0.16
Days which mental health was judged ‘not good’ *	11.8	10.87	11.06	10.68	0.74	0.059	0.07
Days which physical health was judged ‘not good’ *	6.51	8.76	5.79	8.18	0.72	0.062	0.08

**For these items lower scores represent a more favorable response*

The above table reports the constructs with the most considerable mean differences between the Engineering and other departments. The constructs were all statistically significant between the groups but had a small effect size. The non-Engineering department had favorable responses towards every item.

4.6.3 COMPARATIVE ANALYSIS BY DEPARTMENT

Additional analysis was performed to explore responses of the twelve department groups included in the ASCAS. Note that all groups are groups are different sizes, with the Safety Department having only 28 respondents. As such, additional data is required to make some findings statistically significant or generalizable.

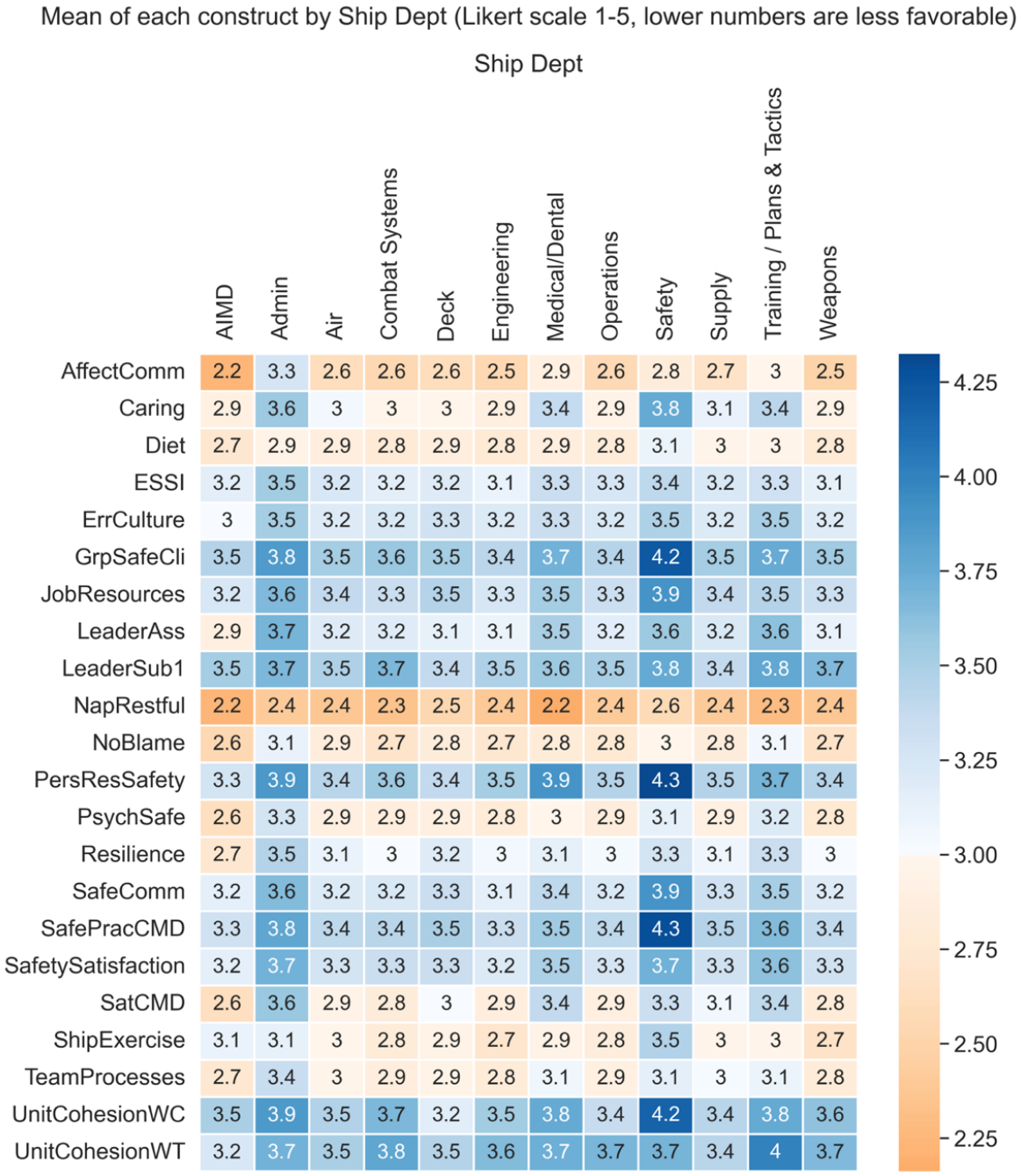

Figure 23. Mean Constructs of Interest by Ship Department

Of note, Sailors assigned to the Safety and Admin departments tended to respond more favorably than the other groups. AIMD Sailors (on larger amphibious ships) tended to respond more negatively than other departments.

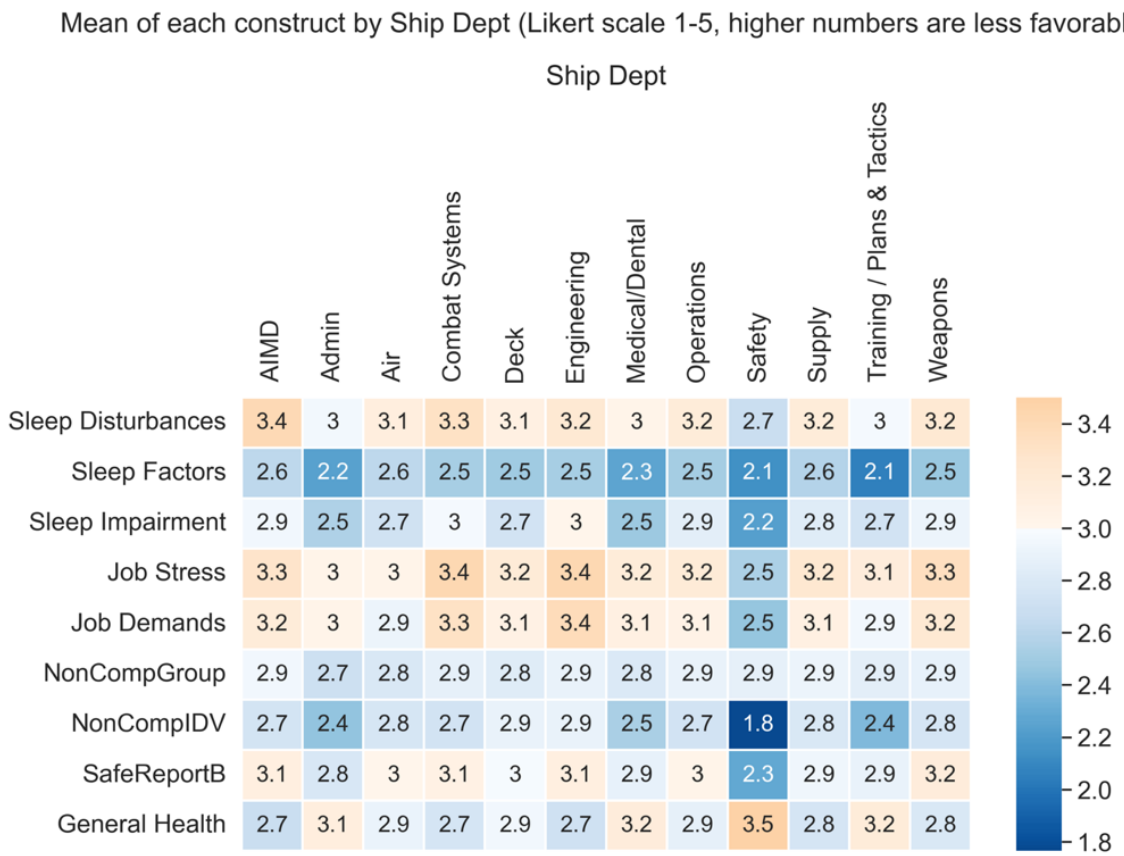

Figure 24. Mean Constructs of Interest by Ship Department

For reverse encoded constructs, the Safety and Admin departments tended to respond more favorably than the other department. The Job Stress, Job Demands and Sleep Disturbances tended to receive the most unfavorable responses by all groups (excluding Admin and Safety).

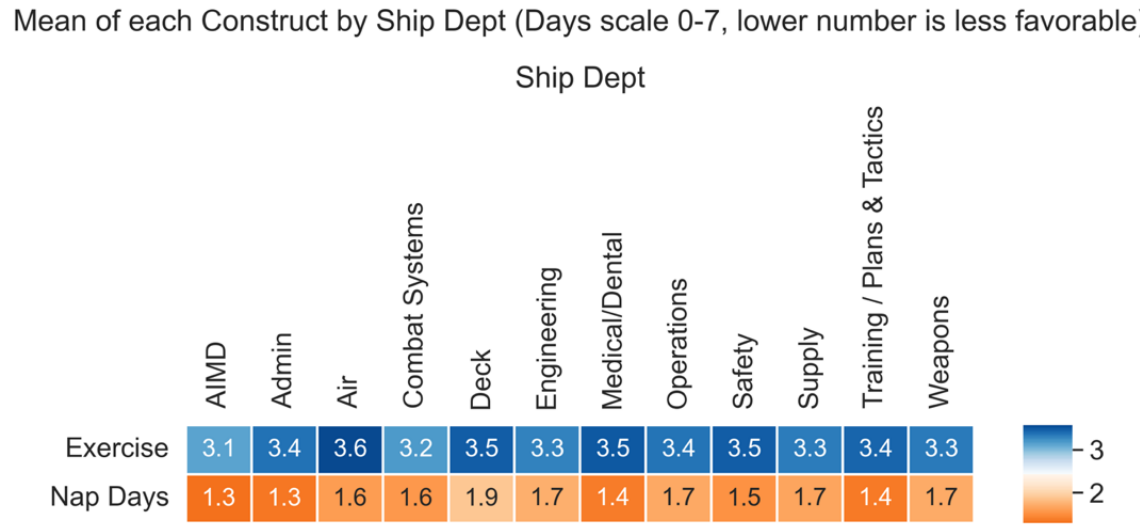

Figure 25. Mean Constructs of Interest by Ship Department (Days Scale)

Nap and Exercise days were generally consistent across the departments.

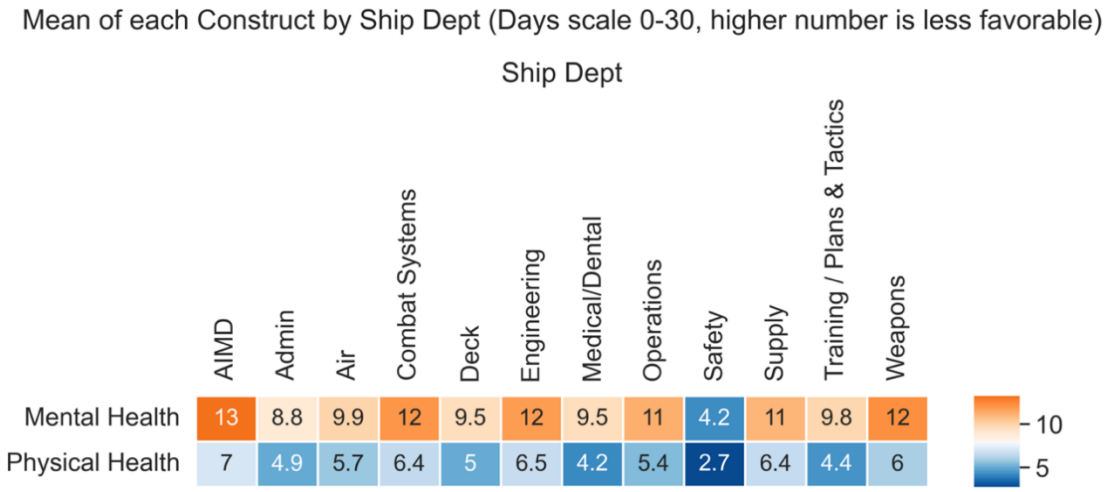

Figure 26. Mean Constructs of Interest by Ship Department (Days Scale, Reverse Encoded)

Days of poor mental health and poor physical health were notably distinct across the various departments. Safety reported the few days of poor mental health (4.2 /month), whereas AIMD reported the most (13 days/month). Safety also reported the fewest days of poor physical health (2.7), and again AIMD reported the most (7).

4.6.4 BREAKDOWN OF SLEEP FACTORS

This section examines the difference in sleep factors between Engineering and Non-Engineering departments, as well as across the twelve ship departments. The factors with the largest negative impact for either group are shown to provide a better understanding of reasons for poor sleep. The Sleep Impairment and Sleep Disturbance Constructs are also shown for reference.

4.6.4.1 SLEEP FACTORS OF HIGHEST CONCERN

	Ship Dept		
Construct	Engineering	Non-Engineering	Sleep Factors of Most Concern by Ship Dept, (Likert Scale 1-5, Higher Number is Less Favorable)
Workload Impact On Sleep	3.40	3.03	
Uncomfortable Mattress/Rack	3.04	3.11	
Crew Mate Noise	2.83	2.77	
Required Meetings	2.67	2.60	
Drills	2.66	2.63	

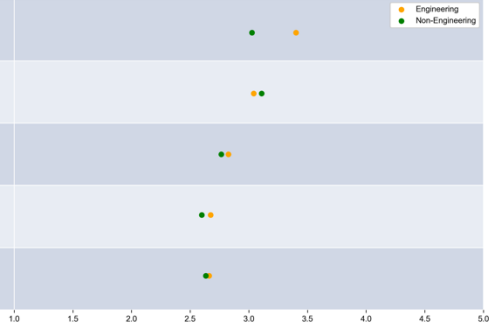

Figure 27. Sleep Factors by Ship Department

Workload Impact on Sleep was the largest negative factor for the Engineering Department and showed a pronounced difference between the Engineering and Non-Engineering departments. Uncomfortable Mattress/Rack, was an additional factor impacting sleep, but differences between groups were less pronounced. Drills, Crew Mate Noise, and Required Meetings were also factors of concern, but average responses were more positive (with neutral being 3).

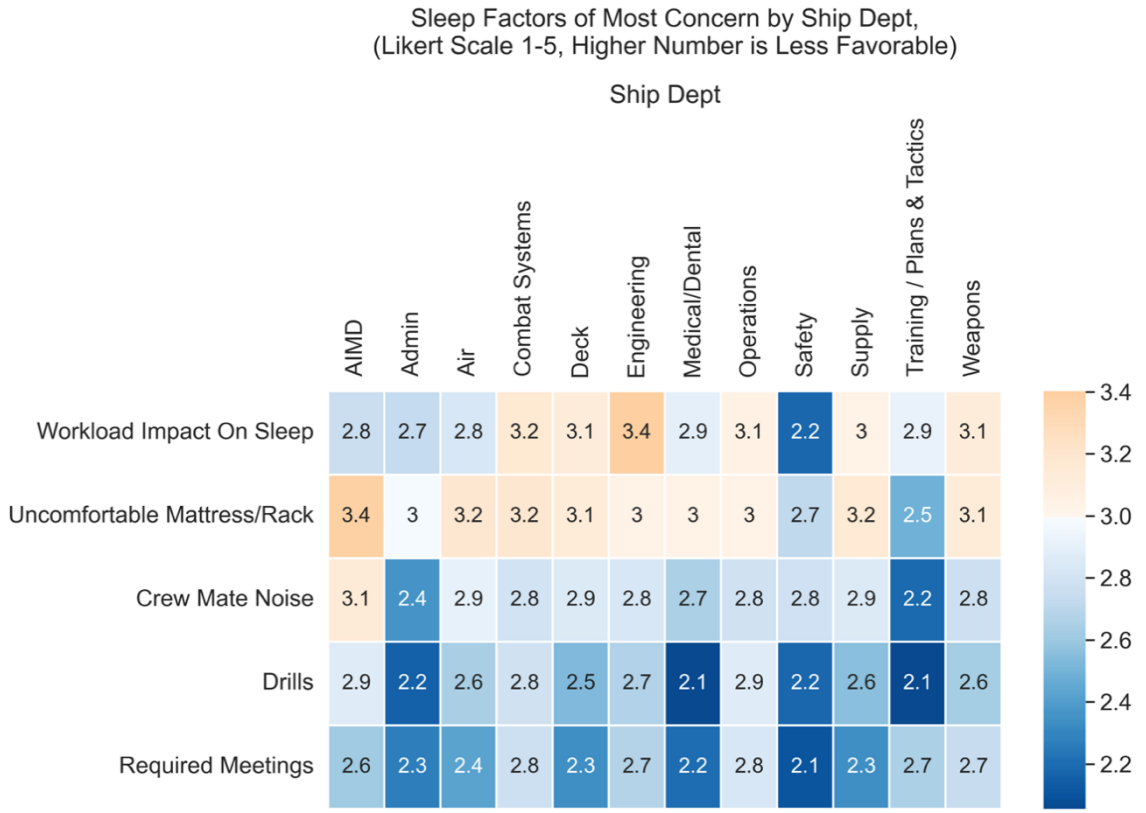

Figure 28. Mean Constructs of Interest by Ship Department

Examining Sleep Factors by department, Workload and Uncomfortable Mattress/Rack remain the most negative factors affecting sleep. However, Combat Systems, Deck, Engineering, Operations, Supply Weapons also negatively cited Workload, while other departments did not. The same trend is noted with Uncomfortable Mattress/Rack, with AIMD, Air, Combat Systems, Deck, Supply and Weapons responding unfavorably.

4.6.4.2 SLEEP DISTURBANCES AND SLEEP IMPAIRMENTS

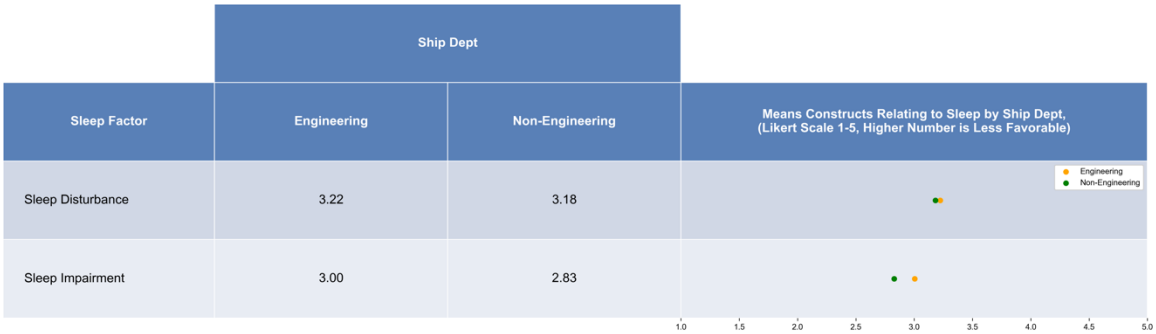

Figure 29. Sleep Constructs by Ship Department

The Sleep Impairment construct showed a difference between groups, with the Engineering department reporting less favorable results than the Non-Engineering departments. The Sleep Disturbance construct showed a negligible difference between groups.

4.6.5 ACTIVITY ANALYSIS

Analysis was performed to identify differences in how much respondents spend on various daily activities. Figure 30 shows the average lengths of time individuals report allotted to various activities for Engineering and Non-Engineering respondents.

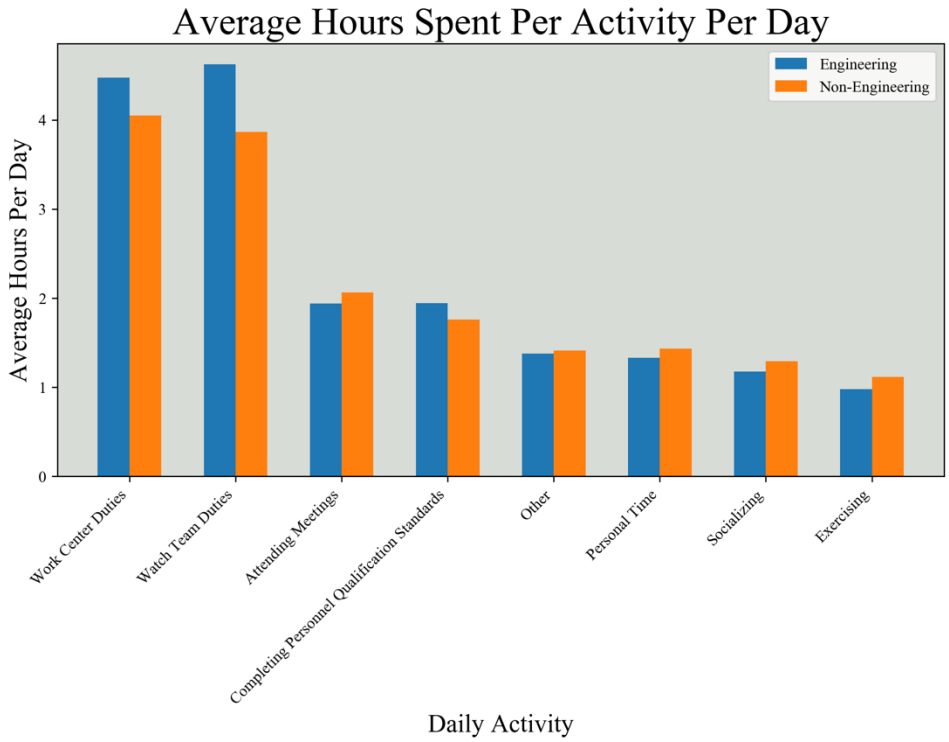

Figure 30. Average Hours Spent Per Activity Per Day (Department)

Those in Engineering departments reported spending an average 12 hours and 59 minutes on work-related activities and 3 hours and 29 minutes on non-work-related activities. All other departments reported spending 11 hours and 44 minutes on work-related activities and 3 hours and 50 minutes on non-work-related activities. Engineering department personnel reported more time being focused on work center and Watch Team duties and less time attending meetings; as well as less time per day devoted to recuperative activities (e.g., personal time, socializing and exercising).

4.7 FDNF Analysis

Analysis was performed to compare responses from Forward Deployed Naval Forces (FDNF) platforms to their non-FDNF counterparts. Three platforms (LHA, DDG, and an LPD) were forward deployed at the time that they completed the ASCAS.

Table 16. Number of Ship and Responses by FDNF

FDNF Status	Number of Ships	Number of Responses
FDNF	3	537
Non-FDNF	72	8133

4.7.1 AREAS OF PRAISE AND CONCERN BY FDNF

Survey constructs that scored favorably and unfavorably tended to align those of SURFOR overall. Table 17 details those constructs and the mean scores for the Engineering and non-Engineering subgroups.

Table 17. Areas of Praise and Concern by FDNF vs Non-FDNF

Item	FDNF Mean	Non-FDNF Mean
Leader Perception of Subordinates (Subset 3)	3.83	3.94
Leadership Perception of Subordinates (Subset 2)	3.63	3.75
Supervisor Safety	3.55	3.53
Unit Cohesion (Watch Team)	3.54	3.65
Unit Cohesion (Work Center)	3.51	3.54
Command Safety Practices	3.49	3.43
Leadership Perception of Subordinates (Subset 1)	3.47	3.56
Sleep Factors *	2.55	2.49
Personal Responsibility for Workplace Safety	3.44	3.53
Job Resources (Equipment)	3.41	3.39
Job Stress *	3.64	3.65
Affective Commitment	2.46	2.63
Sleep Disturbances *	3.43	3.39
Job Demands *	3.14	3.19
No-Blame Error Reporting	2.68	2.79
Psychological Safety	2.77	2.88
Team Process (Interpersonal Processes)	2.85	2.86
Team Process (Action Processes)	2.88	2.92
Team Processes (Overall)	2.91	2.93

Note:
1. For the table above, higher scores represent a more favorable response, with a mean of 3 being neutral. Favorable scores are colored green, and unfavorable scores are shaded red. Scores within 0.05 of neutral (3) are shaded white.
2. *For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Areas of praise and concern were similar to those seen for SURFOR overall (Table 2). FDNF responded less slightly favorably than non-FDNF respondents in high scoring and low scoring constructs, except Supervisor Safety, Command Safety Practices and Job Resources (Equipment), though the differences were small.

4.7.2 CONSTRUCTS WITH NOTICEABLE DIFFERENCES IN MEANS

Compared across different constructs, no notable differences were observed between Sailors assigned to FDNF platforms and the rest of the respondents. Table 18 reports the constructs with the most considerable mean differences between the two groups. Note that the mean difference used to identify constructs was 0.10. Though most results are statistically significant due to large sample sizes, the differences are small and bear little practical significance.

Table 18. Major Mean Differences between FDNF and Non-FDNF Platform

	FDNF		Non-FDNF		T-test		
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**P-Value**	**Effect Size**
Affective Commitment	**2.46**	**1.12**	**2.63**	**1.13**	**0.17**	**0.001****	**-0.15**
Social Support	**3.07**	**1.05**	**3.22**	**1.04**	**0.15**	**0.004***	**-0.12**
Satisfaction with Command	**2.84**	**1.22**	**2.96**	**1.18**	**0.12**	**0.029.**	**-0.10**
No-Blame Error Reporting	**2.68**	**0.79**	**2.79**	**0.78**	**0.11**	**0.008***	**-0.14**
Unit Cohesion (Watch Team)	**3.54**	**0.97**	**3.65**	**0.99**	**0.11**	**0.005***	**-0.11**
Psychological Safety	**2.77**	**0.88**	**2.88**	**0.88**	**0.11**	**0.005***	**-0.12**
Days which physical health was judged 'not good' *	**6.81**	**8.48**	**5.88**	**8.29**	**0.93**	**0.001****	**0.11**

** For these items lower scores represent a more favorable response*

Most constructs were statistically significant between the groups but differences were small, as measured by the effect sizes. The non-FDNF respondents had favorable responses towards every item.

4.7.3 COMPARATIVE ANALYSIS

Beyond areas of praise and concern, analysis was conducted to assess how FDNF survey respondents compared to the rest of the fleet. Figures 31–34 showcase mean responses.

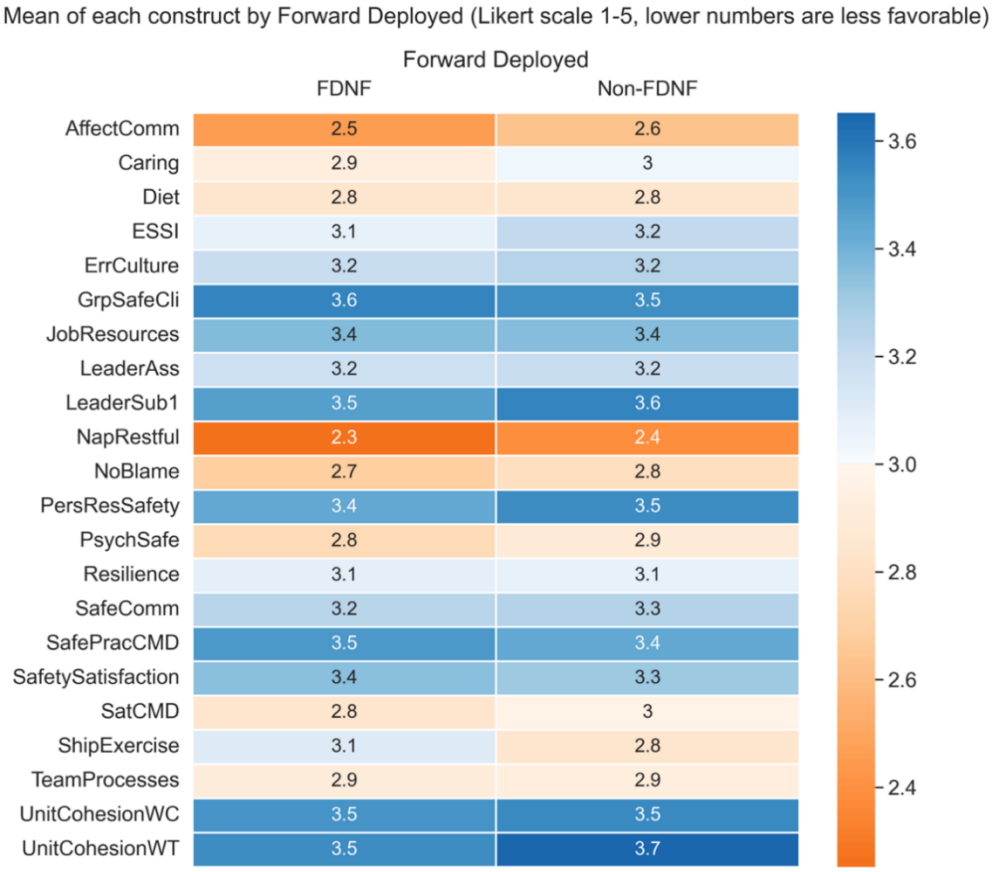

Figure 31. Mean Constructs of Interest by FDNF vs Non-FDNF

Differences between FDNF and non-FDNF Sailors were minor. FDNF respondents responded slightly less favorably on all constructs except Group Safety Climate (GrpSafeCli), Command Safety Practices (SafePracCMD) and Safety Satisfaction, and Ship Exercise Facilities (ShipExercise).

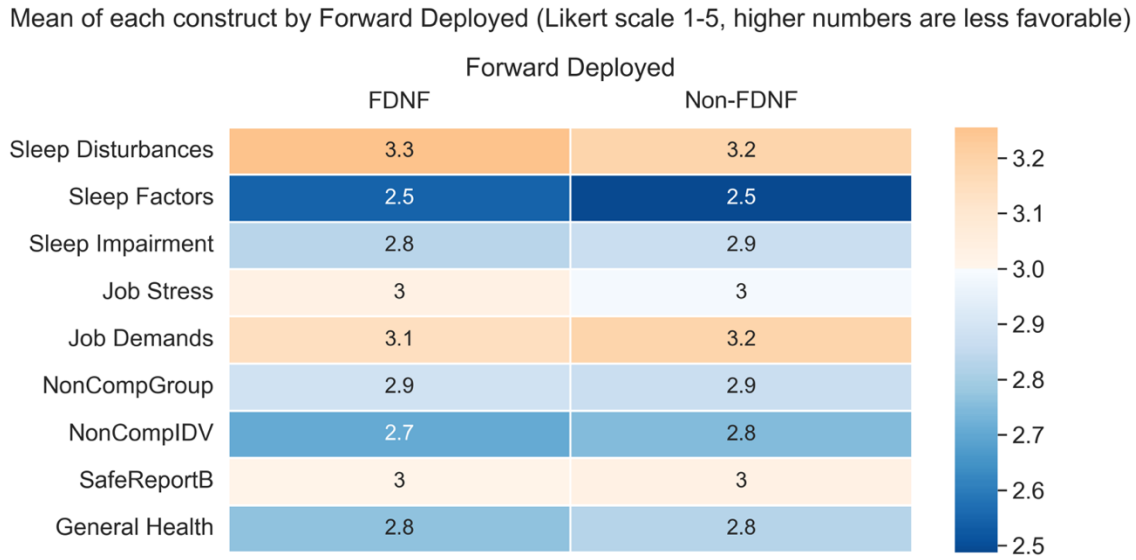

Figure 32. Mean Constructs of Interest by FDNF vs Non-FDNF

Reverse encoded constructs also showed minimal differences between FDNF and non-FDNF respondents. Sailors on FDNF platforms responded slightly less favorably to the Sleep Disturbances construct.

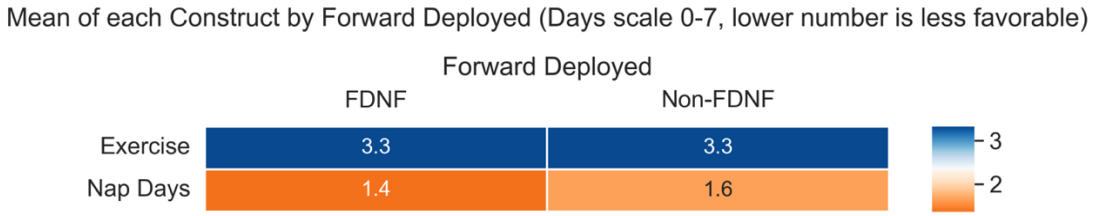

Figure 33. Mean Constructs of Interest by FDNF vs Non-FDNF (Days Scale)

FDNF respondents reported the same days of exercise as their non-FDNF counterparts, and slightly fewer naps per week.

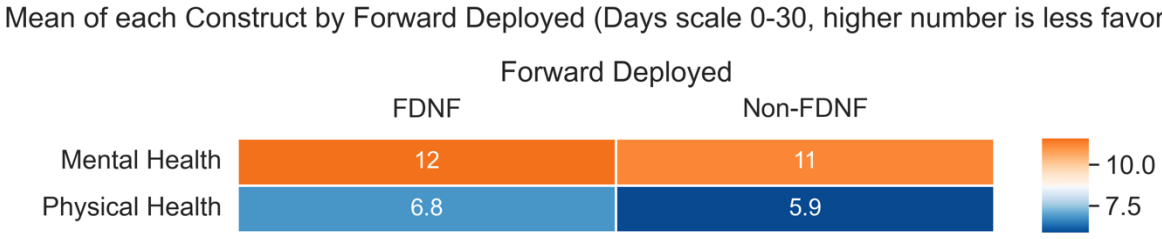

Figure 34. Mean Constructs of Interest by FDNF vs Non-FDNF (Days Scale, Reverse Encoded)

FDNF respondents reported an average of 12 days in the last 30 days of poor mental health, compared to 11 days for non-FDNF respondents. Additionally, FDNF respondents reported an average of 6.8 days in the last 30 days of poor physical health, compared to non-FDNF's 5.9 average.

4.7.4 BREAKDOWN OF SLEEP FACTORS

This section examines the difference in sleep factors between FDNF and Non-FDNF respondents. The factors with the largest negative impact for either group are shown to provide a better understanding of reasons for poor sleep. The Sleep Impairment and Sleep Disturbance Constructs are also shown for reference.

4.7.4.1 SLEEP FACTORS OF HIGHEST CONCERN

	Forward Deployed		
Construct	FDNF	Non-FDNF	Sleep Factors of Most Concern by Forward Deployed, (Likert Scale 1-5, Higher Number is Less Favorable)
Uncomfortable Mattress/Rack	3.12	3.10	
Workload Impact On Sleep	3.05	3.11	
Crew Mate Noise	2.95	2.77	
Drills	2.74	2.63	
Hot Temperature	2.18	2.65	

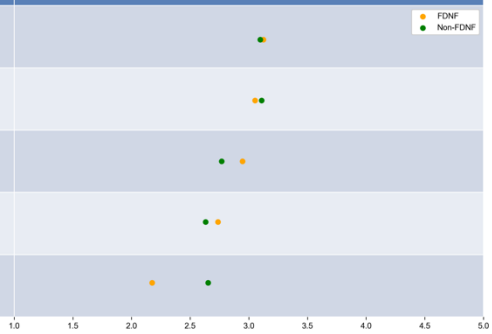

Figure 35. Sleep Factors by FDNF vs Non-FDNF

Uncomfortable Mattress/Rack and Workload Impact on Sleep were the largest negative factors for the FDNF and non-FDNF groups, but the differences between groups were minor. Crew Mate Noise, Drills, and Hot Temperature showed more pronounced differences between the groups, but these factors were less negatively reported.

4.7.4.2 SLEEP DISTURBANCE AND SLEEP IMPAIRMENTS

	Forward Deployed		
Sleep Factor	FDNF	Non-FDNF	Means Constructs Relating to Sleep by Forward Deployed, (Likert Scale 1-5, Higher Number is Less Favorable)
Sleep Disturbance	3.25	3.19	
Sleep Impairment	2.83	2.87	

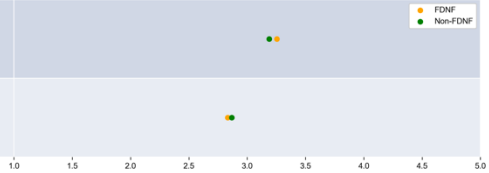

Figure 36. Sleep Constructs by FDNF vs Non-FDNF

The Sleep Disturbance and Sleep Impairment constructs showed negligible differences between groups.

4.7.5 ACTIVITY ANALYSIS

Analysis was performed to identify differences in how much time respondents spend on various daily activities. Figure 37 shows the average lengths of time individuals report allotted to various activities for FDNF and Non-FDNF respondents.

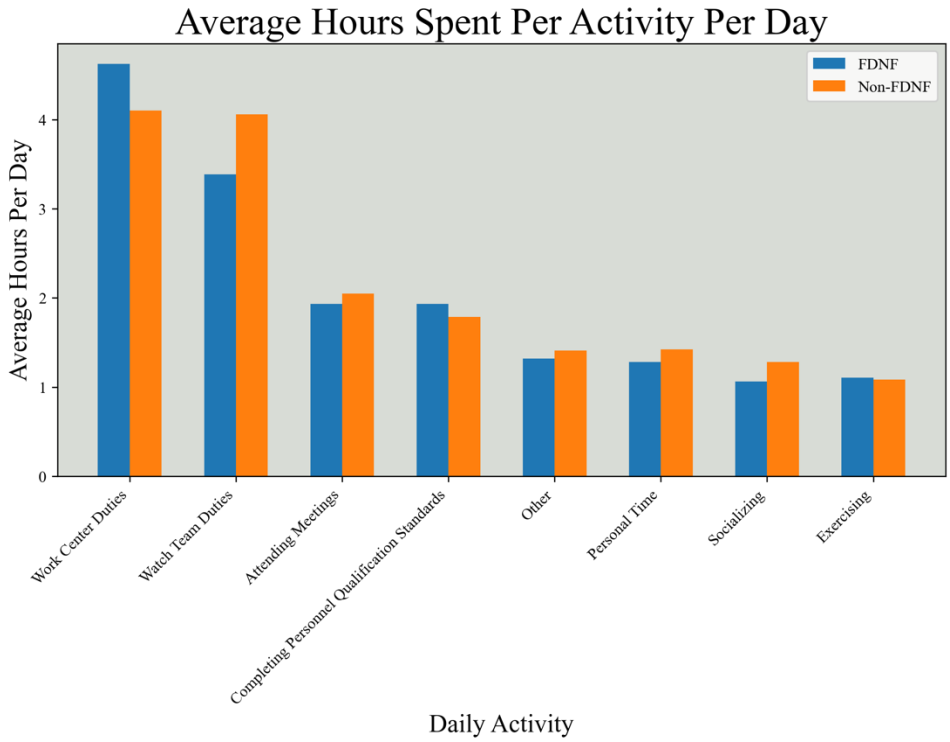

Figure 37. Average Hours Spent Per Activity Per Day (Forward Deployed)

Those assigned to FDNF platforms tended to report more time spent on Work Center Duties and Completing PQSs. Non-FDNF Sailors reported more than spent on Watch Team duties and attending meetings and non-work-related activities. On average, FDNF Sailors reported 11 hours and 53 minutes on work related activities, and 3 hours and 27 minutes on non-work-related activities. Sailors whose platforms were not FDNF at the time of the ASCAS reported 12 hours and 0 minutes on work activities and 3 hours and 47 minutes on non-work activities.

4.8 Fit/Fill Analysis

4.8.1 SUMMARY

Responses were compared to Fit/Fill metrics recorded for these platforms at the time the survey was administered. Means and analysis below show the percentage of billets filled and the number of people trained in those billets on each ship (Fit) vs filled by any individual (Fill). The threshold of fill above 95% and fit above 92% was used to dichotomize the fit and fill measure to determine if these manning metrics are associated with safety climate and responses to the ASCAS. Analysis was performed to identify areas of praise and concern for ships below and above the Navy mandated Fill thresholds. Findings were analogous to the overall SURFOR findings (See Table 19).

Table 19. Number of Ships and Responses by Fill Status

Fill Status	Number of Crews	Number of Responses
Below Fill (<.95)	35	4503
Above Fill (>=0.95)	38	3931

Table 20. Number of Ships and Responses by Fit Status

Fit Status	Number of Crews	Number of Responses
Below Fit (<.92)	38	5034
Above Fit (>=0.92)	36	3410

4.8.2 CONSTRUCTS WITH NOTABLE DIFFERENCES IN MEANS

The means between the ships above and below Fit/Fill were generally similar. The constructs below are those with the greatest differences between the mean scores. A test of statistical significance is given in Table 21 as well and all are significant with small effect sizes.

Table 21. Mean Differences between Below Fill and Above Fill Platforms

	Fill < 0.95		Fill >= 0.95		T-test		
Item	Mean	SD	Mean	SD	Mean Difference	P-Value	Effect Size
Crew Resilience	3.02	0.94	3.14	0.92	0.12	<0.001***	-0.13
Satisfaction with Command	2.91	1.18	3.01	1.19	0.1	<0.001***	-0.08
Affective Commitment	2.59	1.13	2.68	1.14	0.09	<0.001***	-0.08
Team Process (Overall)	2.89	0.82	2.98	0.82	0.09	<0.001***	-0.11
Job Demands *	3.22	0.89	3.13	0.91	0.09	<0.001***	0.1
Leader Assessment	3.17	0.87	3.24	0.89	0.07	<0.001***	-0.08
Safety Satisfaction	3.29	0.89	3.36	0.88	0.07	0.001**	-0.08
Sleep Impairment *	2.9	0.94	2.83	0.92	0.07	0.001**	0.08
Days which mental health was judged 'not good'*	11.59	10.8	10.78	10.6	0.81	0.001**	0.08
Days which physical health was judged 'not good'*	6.15	8.56	5.78	8.05	0.37	0.421	0.04

** For these items lower scores represent a more favorable response*

The means above highlight the constructs with the largest mean differences between ships that were above and below 95% fill at the time the ASCAS was administered. Most notably, Sailors on platforms above the 95% threshold reported 10.78 days of poor mental health, compared to 11.59 days of poor mental health on platforms below 95% fill. However, most constructs, though statistically significant, had negligible mean differences and hence little practical significance. Additionally, it is notable that Physical Health differences between the two groups were not statistically significant.

Table 22. Mean Differences between Below Fit and Above Fit Platforms

	Fit < 0.92		Fit >= 0.92		T-test		
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**P-Value**	**Effect Size**
Occupational Challenges *	2.70	0.99	2.78	0.99	0.08	0.001**	-0.08
Job Demands *	3.15	0.89	3.23	0.90	0.08	<0.001***	-0.09
Satisfaction with Command	2.99	1.17	2.92	1.21	0.07	0.012	0.06

** For these items lower scores represent a more favorable response*

There were few differences in responses from Sailors above and below the 92% fit threshold. Table 22 shows the constructs of notable differences, though differences were minor and effect sizes were small.

4.8.3 COMPARATIVE ANALYSIS

Beyond areas of praise and concern, analysis was conducted to assess how responses of Sailors above and below fit and fill thresholds differed. Figures 38–41 showcase mean responses. Additional analysis was completed for fit/fill groups by ship-class. Minimal differences were observed both at an aggregate level and for each ship-class. Fit/fill by ship-class results are included in Appendix A.

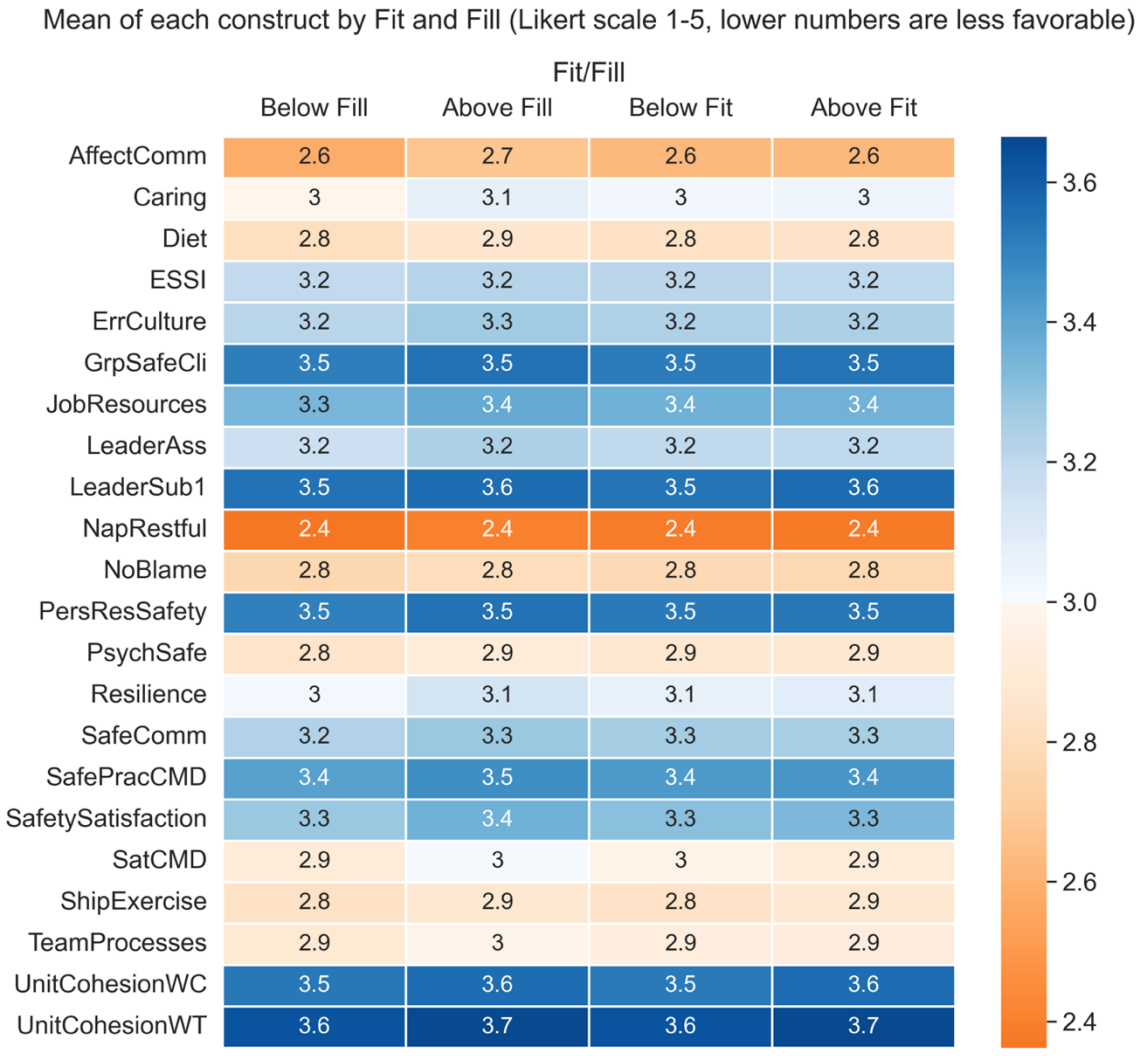

Figure 38. Mean Constructs of Interest by Fit/Fill

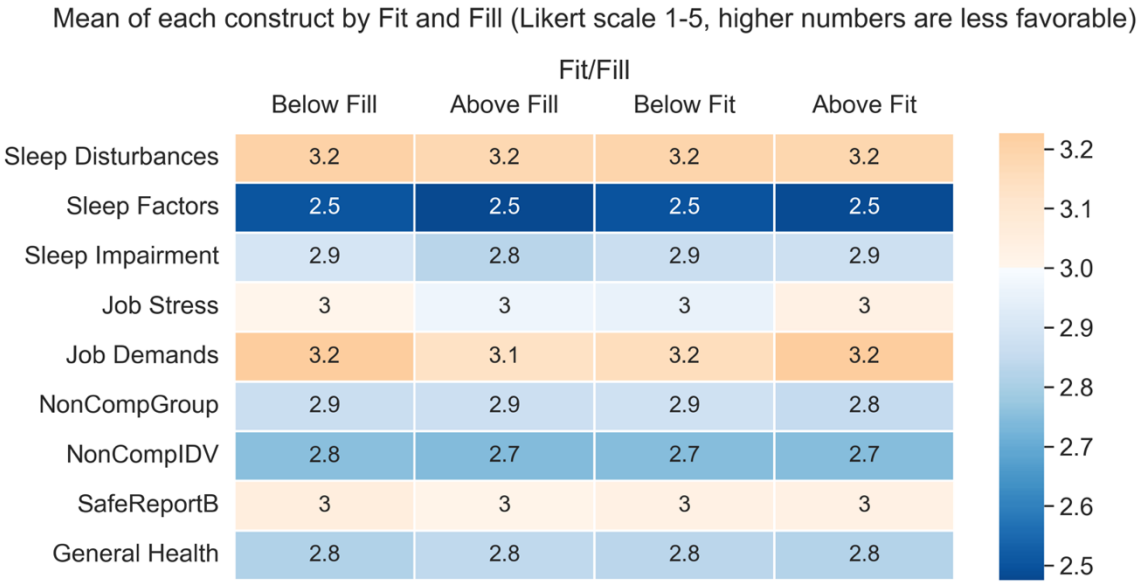

Figure 39. Mean Constructs of Interest by Fit/Fill

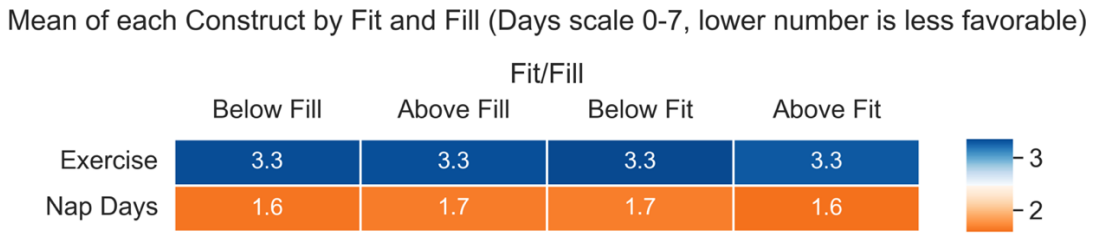

Figure 40. Mean Constructs of Interest by Fit/Fill (Days Scale)

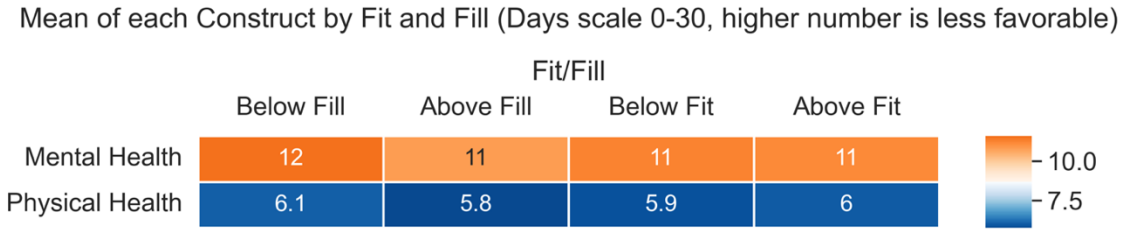

Figure 41. Mean Constructs of Interest by Fit/Fill (Days Scale, Reverse Encoded)

4.8.4 BREAKDOWN OF SLEEP FACTORS

The Sleep Factors construct is composed of 15 questions in the survey. This section examines the difference in sleep factors between respondents above and below the fit and fill thresholds. The factors with the largest negative impact for either group are shown to provide a better understanding of reasons for poor sleep. The Sleep Impairment and Sleep Disturbance Constructs are also shown for reference.

4.8.4.1 SLEEP FACTORS OF HIGHEST CONCERN

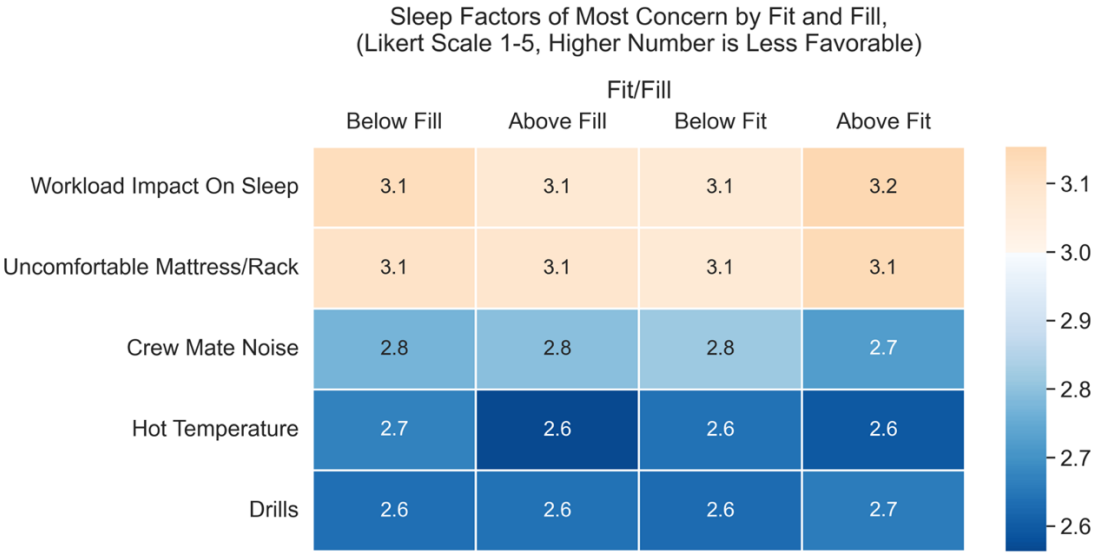

Figure 42. Sleep Factors by Fit/Fill

Uncomfortable Mattress/Rack and Workload Impact on Sleep were the largest negative factors for the fit/fill groups, but the differences between groups were minor. Crew Mate Noise, Hot Temperature, and Drills were less negatively reported and the difference between the groups was negligible.

4.8.4.2 SLEEP DISTURBANCE AND SLEEP IMPAIRMENT

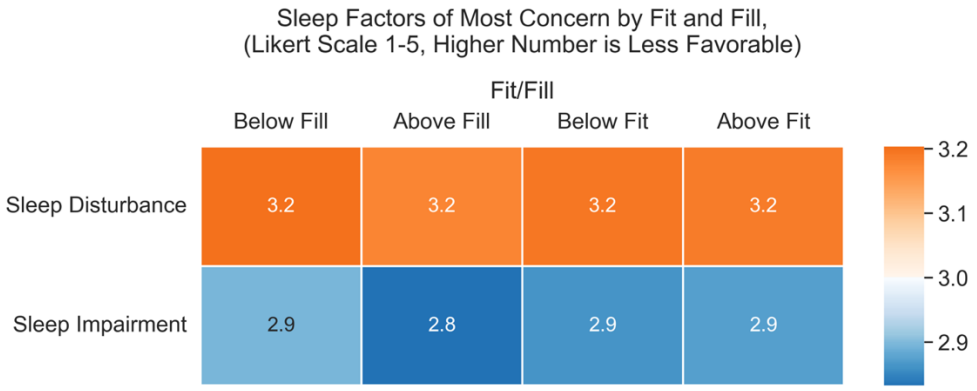

Figure 43. Sleep Factors by Fit/Fill

Consistent with the highlighted sleep factors, the Sleep Disturbance and Sleep Impairment constructs showed negligible differences between groups.

4.8.5 ACTIVITY ANALYSIS

Analysis was performed to identify differences in how much respondents spend on various daily activities. Figure 44 shows the average lengths of time individuals report allotted to various activities for below 92% Fit and above 92% Fit respondents. Activity analysis by fill status was nearly identical to that of fit.

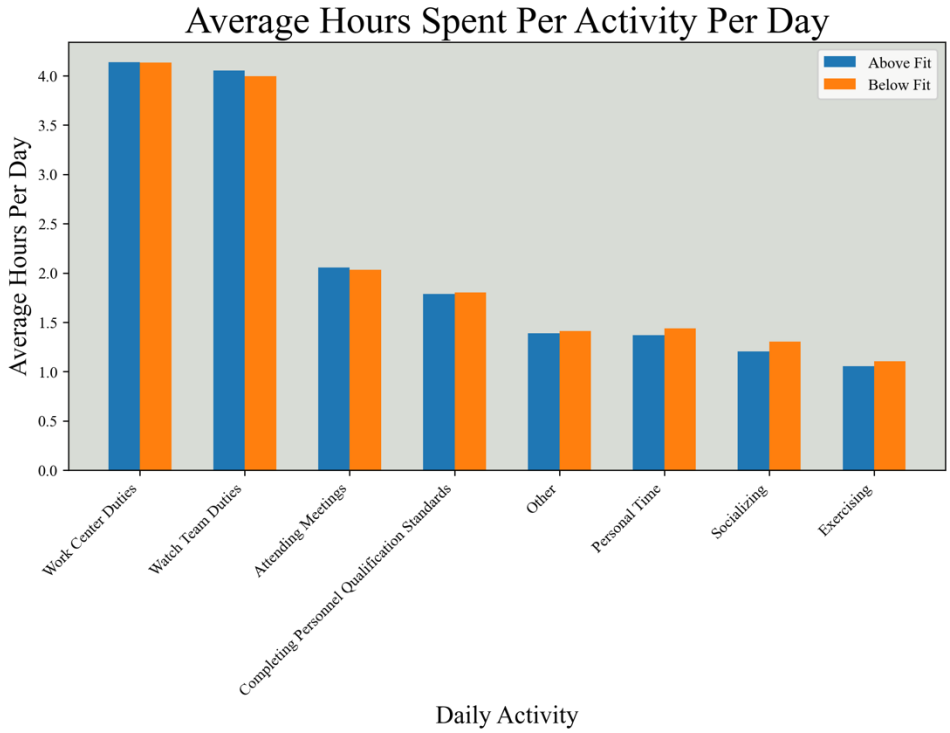

Figure 44. Average Hours Spent per Activity per Day (Fit)

Sailors on platforms that were below 0.92 Fit reported spending an average of 12 hours and 0 minutes on work-related activities and 3 hours and 50 minutes on non-work-related activities. Sailors on platforms above 92% Fit reported spending 11 hours and 58 minutes on work-related activities and 3 hours and 38 minutes on non-work-related activities.

4.9 OFRP Analysis

The ASCAS instructions require commands to complete the survey during READ-E1 (Basic) and READ-E5 (Sustainment) phases of the OFRP. Analysis was performed to assess whether phase correlated with aggregate responses of the constructs of interest amongst 44 Basic-phase and 27 Sustainment-phase crews.

Table 23. Number of Ships and Responses by OFRP Phase

OFRP Phase	Number of Ships	Number of Responses
READ-E1	44	5118
READ-E5	27	3296

4.9.1 CONSTRUCTS WITH NOTABLE DIFFERENCES IN MEANS

Table 24 shows the differences between these means and their tests of significance and effect size.

Table 24. Constructs with Significant Differences in Means Based on OFRP Phase (Greater than 0.15)

	READ-E1		READ-E5		T-test		
Item	Mean	SD	Mean	SD	Mean Difference	P-Value	Effect Size
Crew Resilience	**3.19**	**0.93**	**2.91**	**0.92**	**0.28**	**<0.001*** **	**0.30**
Occupational Challenges *	**2.64**	**0.98**	**2.86**	**1.01**	**0.22**	**<0.001*** **	**-0.22**
Job Demands *	**3.09**	**0.88**	**3.30**	**0.91**	**0.21**	**<0.001*** **	**-0.24**
Sleep Impairment *	**2.80**	**0.91**	**2.96**	**0.95**	**0.16**	**<0.001*** **	**-0.17**
Job Stress *	**3.58**	**0.92**	**3.73**	**0.92**	**0.15**	**<0.001*** **	**-0.16**
Days which mental health was judged 'not good' *	**10.92**	**10.55**	**11.48**	**10.97**	**0.56**	**<0.001*** **	**0.05**
Days which physical health was judged 'not good' *	**4.85**	**7.66**	**6.15**	**8.40**	**1.30**	**<0.001*** **	**0.16**

** For these items lower scores represent a more favorable response*

The table above details the constructs with the most considerable mean differences between READ-E1 and READ-E5. Those in RE1 had significantly better scores on Crew Resilience and Sleep Impairment than READ-E5, but significantly poorer scores on Job Stress, Occupational Challenges, Job Demands. Additionally, Sailors in READ-E5 reported more days of poor mental and physical health compared to those in READ-E1. All constructs were statistically significant between the groups and were of small to medium effect sizes.

4.10 CO Demographics Analysis

During the administering of ASCAS, CO gender and race information is captured to explore whether or not differences are observed based on the gender or race of a CO. This analysis is exploratory, and the conclusions—while they may appear compelling—are very much provisional and subject to change as more data is collected. These conclusions should be tempered by the fact that sample sizes are small and confounding variables not captured in these data are present.

4.10.1 CO GENDER

Of the 75 ships surveyed in FY22, only 7 had female COs. The number of responses analyzed from those 7 platforms is detailed in Table 25.

Table 25. Number of Crews and Responses by CO Gender

CO Gender	Number of Crews	Number of Responses
Male	68	7430
Female	7	1240

The means between the male and female CO were similar for most constructs. Table 26 details constructs of differing means and tests of significance.

Table 26. Constructs with Significant Differences in Means Based on CO Gender

	Male		Female			T-test	
Item	Mean	SD	Mean	SD	Mean Difference	P-Value	Effect Size
Affective Commitment *	**2.65**	**1.14**	**2.47**	**1.10**	**0.18**	**<0.001*** **	**0.16**
Crew Resilience	**3.10**	**0.94**	**2.94**	**0.90**	**0.16**	**<0.001*** **	**0.17**
Unit Cohesion (WT)	**3.66**	**0.96**	**3.53**	**0.98**	**0.13**	**0.001** **	**0.14**
Unit Cohesion (WC)	**3.56**	**1.01**	**3.44**	**1.03**	**0.12**	**0.001** **	**0.12**
Days which mental health was judged 'not good' *	**11.12**	**10.66**	**11.79**	**10.83**	**0.62**	**0.136**	**0.06**
Days which physical health was judged 'not good' *	**5.88**	**8.24**	**6.24**	**8.66**	**0.36**	**0.58**	**0.04**

** For these items lower scores represent a more favorable response*

The means above highlight the constructs with the most considerable mean differences between groups with male and female COs. Even here, differences were minor, effect sizes were weak, and not all results were statistically significant. Reviewing all Likert scale constructs, minor differences are visualized in Figure 45.

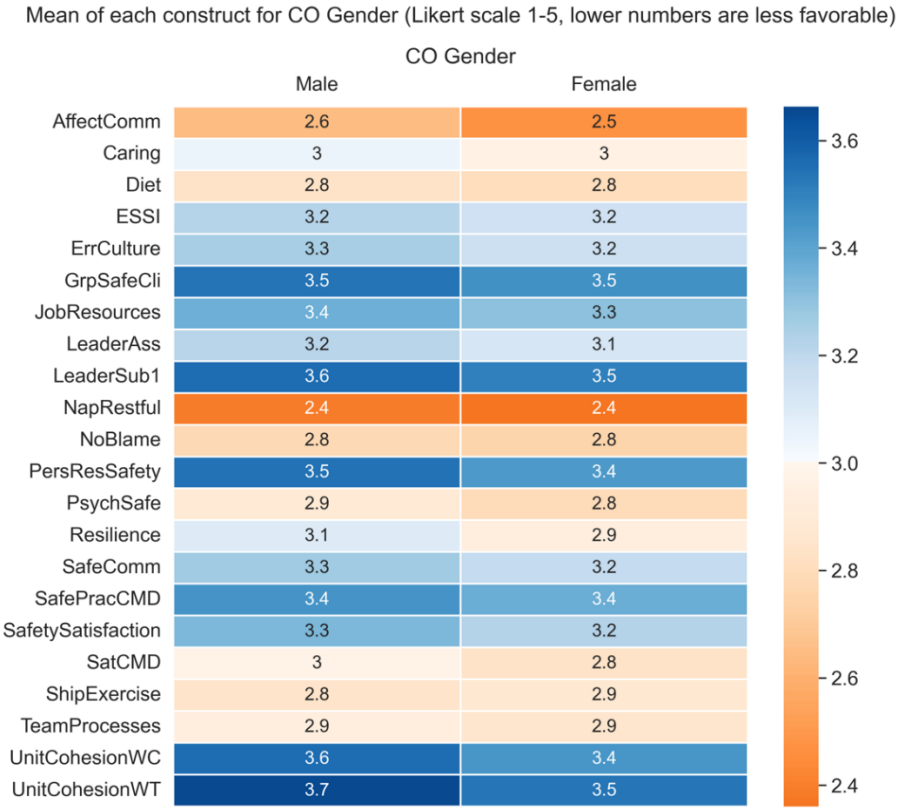

Figure 45. Mean Constructs of Interest by CO Gender

As denoted above, mean differences were minor between male and female COs.

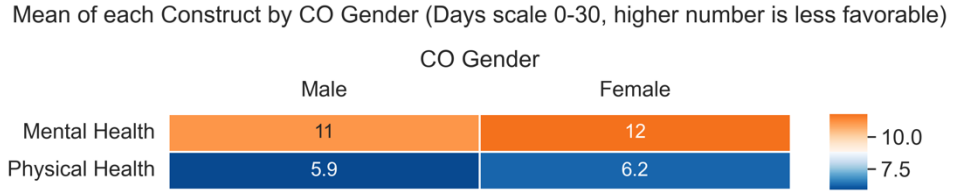

Figure 46. Mean Constructs of Interest by CO Gender (Days Scale, Reverse Encoded)

Results were not statistically significant – additional data is required for robust statistical testing. Additional analyses are included in Appendix B.

4.10.2 CO RACE

Analysis was completed to identify differences between respondents based on CO race. Due to low numbers of minority COs, initial analysis was completed on White and Non-white subgroups.

Table 27. Number of Crews and Responses by CO Race

CO Race	Number of Crews	Number of Responses
White	59	7180
Non-White	16	1490

Differences between white and non-white COs were minimal. Figure 47 depicts means for Likert constructs.

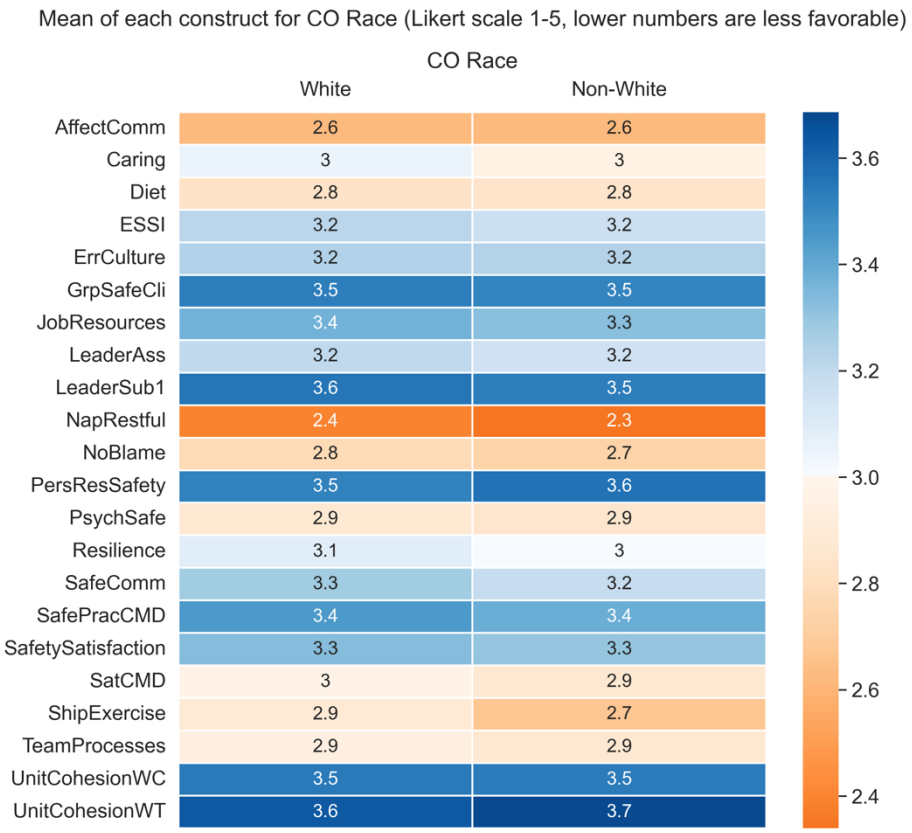

Figure 47. Mean Constructs of Interest by CO Race

Due to minimal differences observed between responses, analysis was also conducted on the four CO subgroups in the datasets. Breakouts of respondents and number of Sailors reporting to COs is detailed in Table 27.

Table 28. Number of Crews and Responses by CO Race

CO Race	Number of Crews	Number of Responses
White	59	7180
Black	14	1283
Asian	1	161
Hispanic	1	46

Note that the dataset contains only 1 Asian and 1 Hispanic CO. As such, findings are not statistically significant nor generalizable. Mean differences shown in Figure 48, though interesting, should be interpreted with extreme caution.

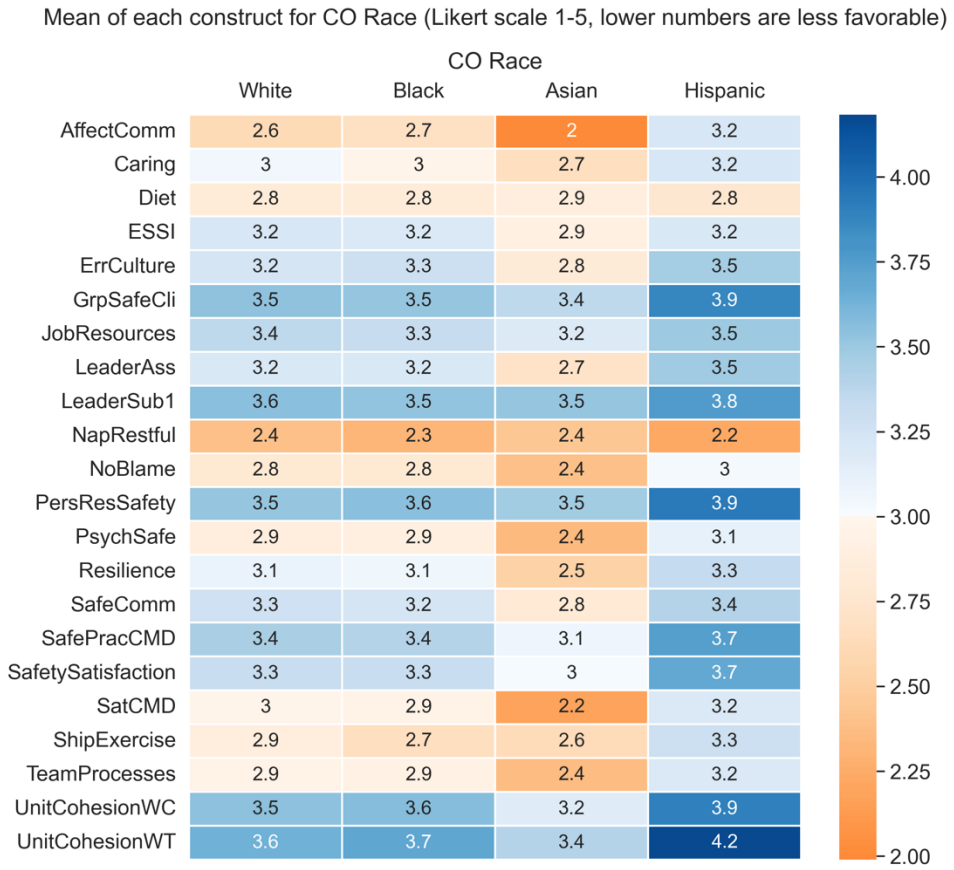

Figure 48. Mean Constructs of Interest by CO Race

Respondents on platforms with Hispanic COs reported more favorably than the other groups. However, as mentioned previously, our sample sizes are small and do not allow for statistically significant results. Further analysis with additional data should be conducted when it becomes available. Additional analyses are included in Appendix B.

4.11 Natural Language Processing (NLP) Analysis on Open-Ended Comments

4.11.1 SENTIMENT ANALYSIS

To better understand the open-ended comments, we performed a sentiment analysis of the free response field. Sentiment Analysis is a Natural Language Processing (NLP) technique that can determine whether text is positive, negative, or neutral in connotation. Since the text has many Navy-specific terms and phrases that might not be accurately assessed by any single sentiment analysis method, an ensemble of three different methods of varying complexity was developed and used. The overall sentiment score reported here is an average of the three methods: TextBlob, vaderSentiment, and Flair. The score is scaled to be between 0 and 1, with 0 corresponding to negative sentiment. Of the 8,670 Sailors who opted-in to the survey, 2,689 provided open-ended responses. The distribution of the sentiment scores is presented by paygrade, department, and ship-class.

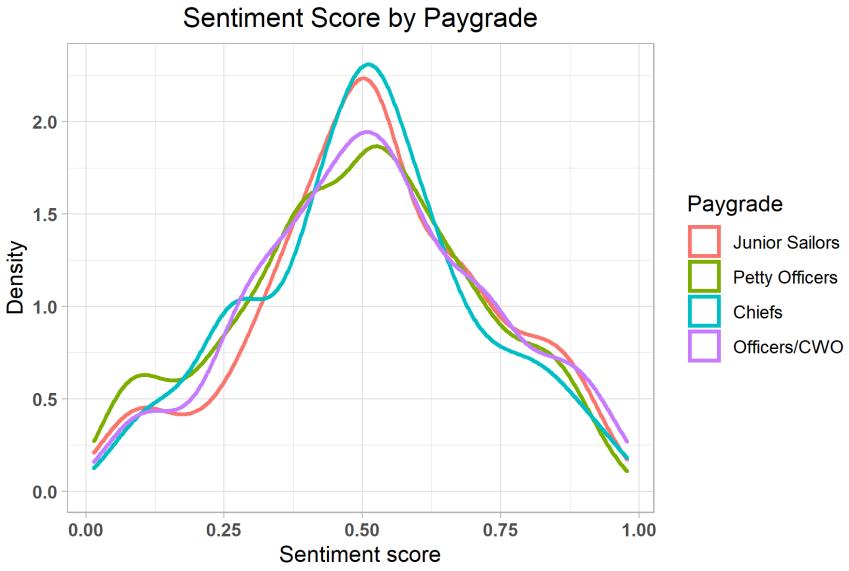

Figure 49. Density Plot of Sentiment Score by Paygrade

The above figure depicts the density plots of the sentiment score for four different paygrades. Since the score is an average of three different methods, two of which, TextBlob and vaderSentiment, rate most text as fairly neutral, the overall effect is that the density plot are roughly shaped like bell curves with truncated ends. The main areas to note in the plots are near the ends at 0 (very negative) and 1 (very positive). A trend in the figure above is that there are more negative comments from Petty Officers than other paygrades.

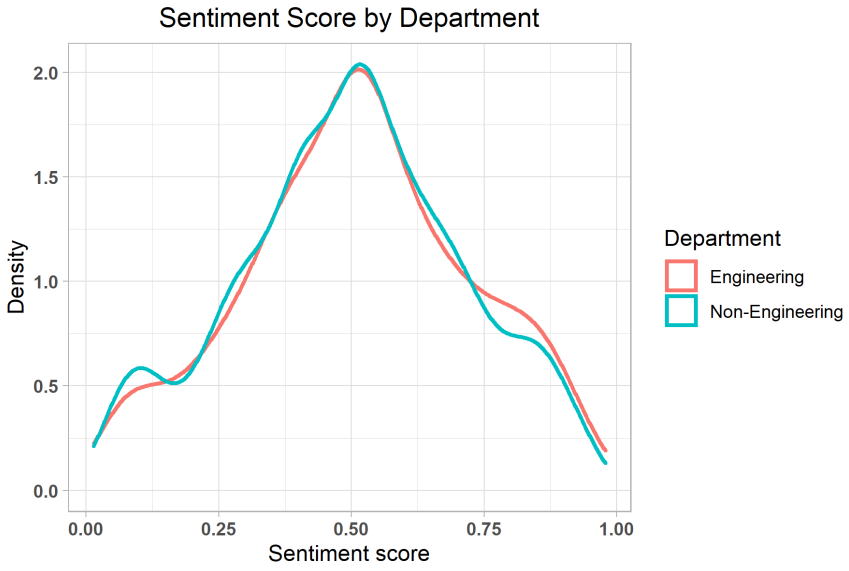

Figure 50. Density Plot of Sentiment Score by Department

Based on the quantitative survey data, it was hypothesized that those in the Engineering department would have a greater percentage of negative comments than those in other departments. When the sentiment score is broken down by department in Figure 50, the distributions are shown to be nearly identical. It should be noted, in contrast to the hypothesis, that slightly more negative comments and slightly fewer positive comments were obtained from Non-Engineering departments.

Figure 51. Density Plot of Sentiment Score by Ship-class

Figure 51 shows minimal difference based on ship-class, although the Sailors on Amphibs trend more neutral.

Another hypothesis was that command satisfaction, measured by a pair of questions, should be correlated with the average sentiment across ships.

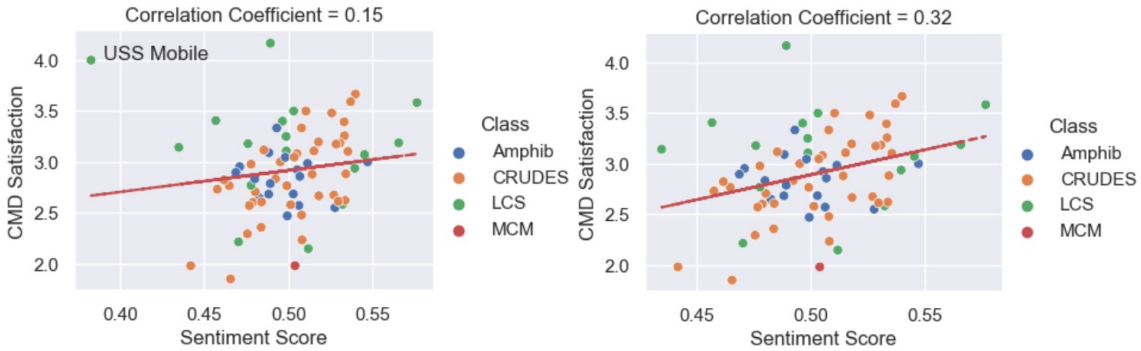

Figure 52. Command Satisfaction vs Sentiment Score by Ship

The above figure depicts plots of command satisfaction (averaged over both questions for all sailors on each ship) versus sentiment score. In the left plot, all 75 ships are included, but notice that one LCS is an outlier that brings the correlation down significantly. In the plot to the right, that LCS was removed and the correlation coefficient more than doubled to 0.32. The individual questions most positively correlated with sentiment score are:

- UnitCohesionWC[SQ001]: The members of my work center know that they can depend on each other.
- SatCMD[SQ001]: Overall, I am satisfied with the safety practices of this command.
- ErrCulture[EMC02]: Our errors point us at what we can improve.
- Caring[SQ001]: The Navy cares about my overall health, safety, and well-being

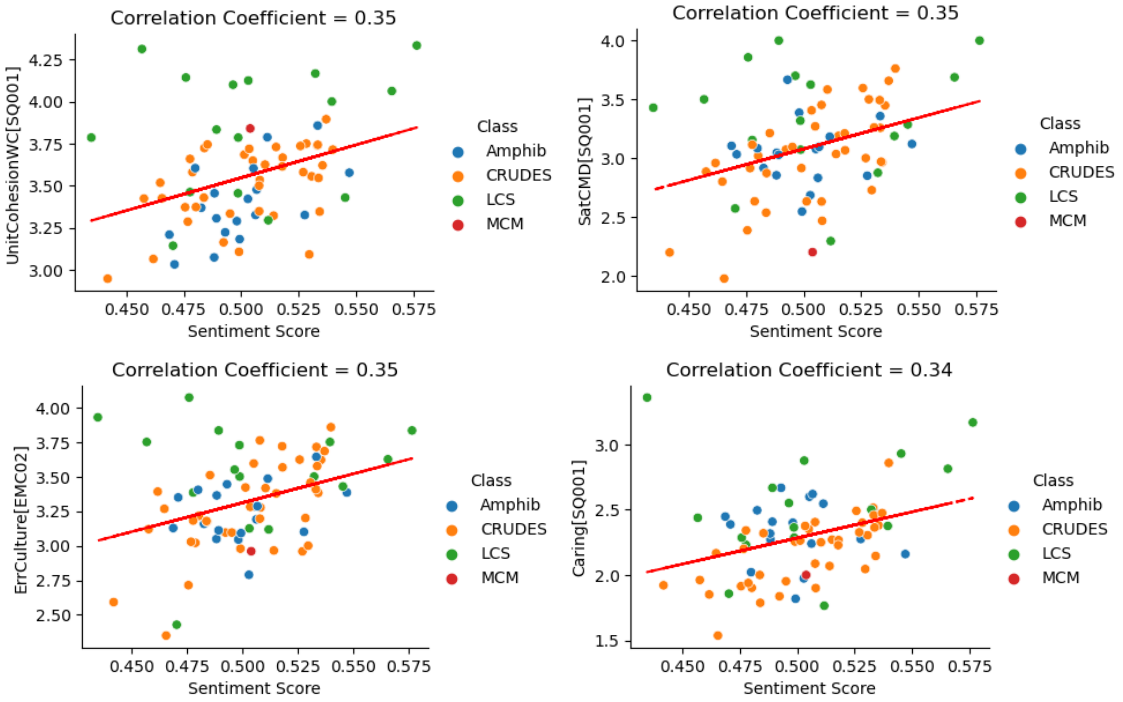

Figure 53. Top 4 Questions Most Positively Correlated with Sentiment Score

The questions most negatively correlated with sentiment score are:

- SleepImpair[4]: Fatigue impacts my ability to effectively communicate with others.
- MentHealth[SQ001]: Thinking about your mental health, which includes stress, depression and problems with emotions, how many days during the past 30 days was your mental health not good?
- JobDemands[SQ004]: We have to work overtime (beyond regular duty hours) to get our work done
- Caffeine[SQ004]: On an average day onboard your current ship, please indicate how many times per day you consume: caffeine pill or energy pill (e.g., NoDoz, Energize, or Zoom).

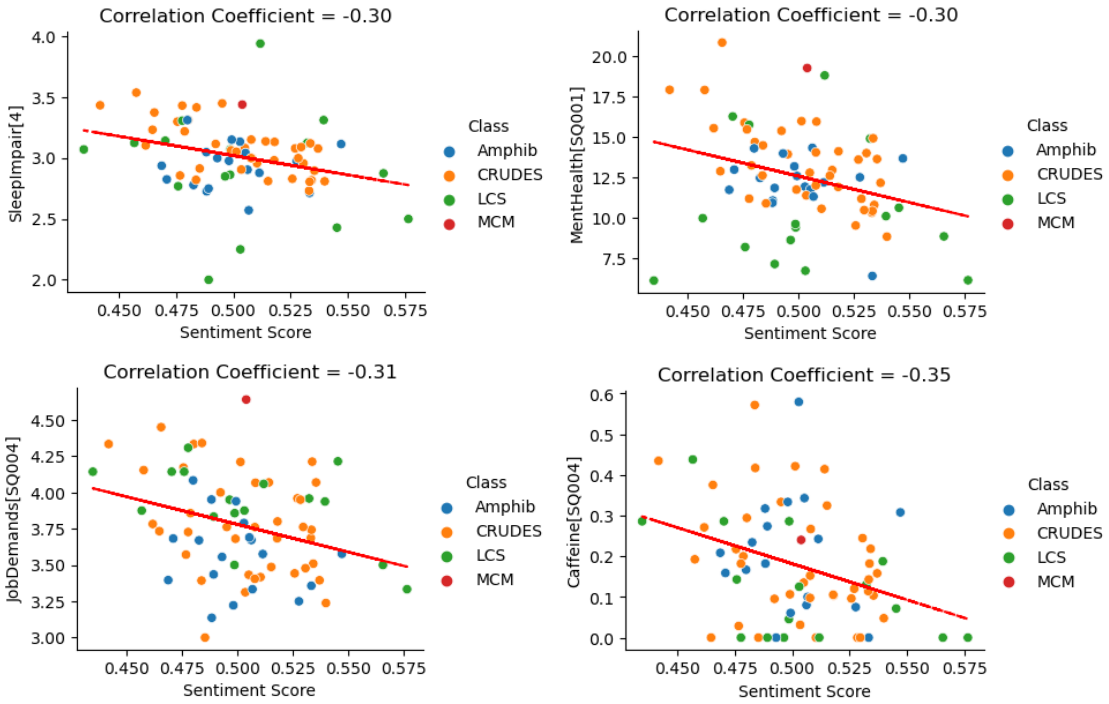

Figure 54. Top 4 Questions Most Negatively Correlated with Sentiment Score

5 SUMMARY OF ADVANCED ANALYTICS

5.1 Overview

Descriptive statistics can inform command practices by providing the senior leadership with a snapshot of organizational climate and safety climate at a given point in time. While these metrics are informed by the best available scientific findings from the academic literature, there are unique factors in a military operating environment that may not be addressed by other sources. The ASCAS data provide an opportunity to gain deeper insight from the data by using advanced analytical techniques. For example, descriptive statistics might provide information about the number of safety incidents Sailors did not report, but logistic regression techniques can weigh the relative contribution of different factors that might lead a Sailor to not report safety issues. This information can then inform potential interventions and next steps that ultimately enhance safety culture rather than provide descriptive information about its current status.

The FY22 ASCAS report contains four analytical priorities with topics that include: safety reporting, sleep disruptions, changing safety attitudes, and mental health. Brief overviews of findings are in the following sections.

5.2 Factors Related to Unreported Safety Issues in High-risk Workplaces

Nearly 3 in 10 Sailors did not report safety issues to their chain of command even though they knew a problem existed. Using an analysis known as Logistic Regression, responses to several ASCAS questions were found to increase the likelihood of not reporting safety issues, including prior safety reporting behaviors, individual non-compliance attitudes, and crew non-compliance attitudes.

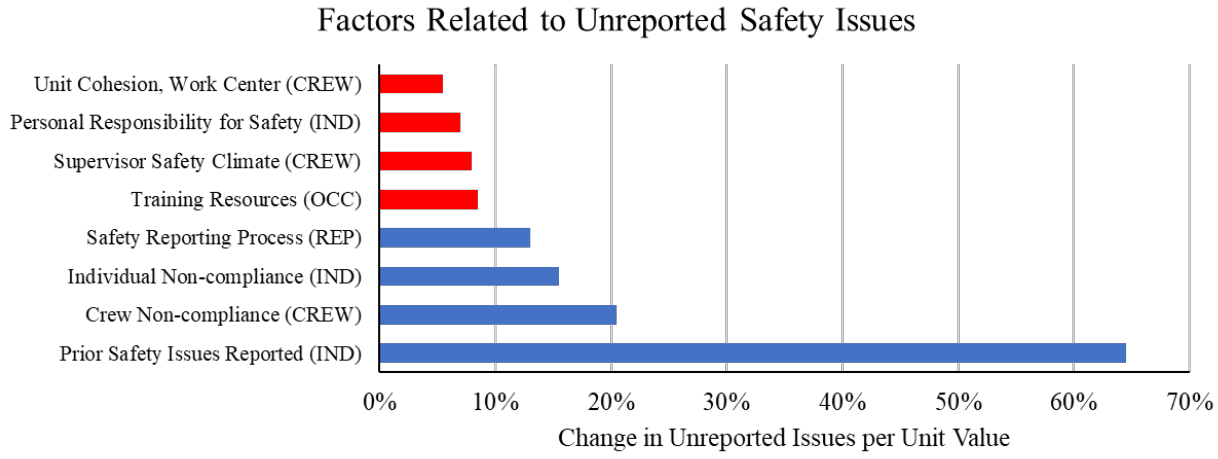

Figure 55. Factors Related to Unreported Safety Issues

Figure 55. Change in the likelihood of safety underreporting by predictor. Blue bars indicate a positive relationship, where increasing the value in the variables in the left column led to a corresponding increase in the likelihood of safety reporting. Red bars indicate a negative relationship, where increasing the value in the variables produces a decrease in the likelihood of safety reporting.

5.3 Sleep Disruptions during Naval Operations as a Function of Occupational Factors

Sleep disruptions persist across ship type, departmental assignment, and paygrade. No occupational assignment approached the recommended 7 hours of sleep per night, and the sleep deficiencies pervaded all assignments. Using a statistical method called Multivariate Analysis of Covariance, differences between ships and departments were found to account for only a small portion of the variance observed, although engineering personnel did have more sleep disruptions than other assignments.

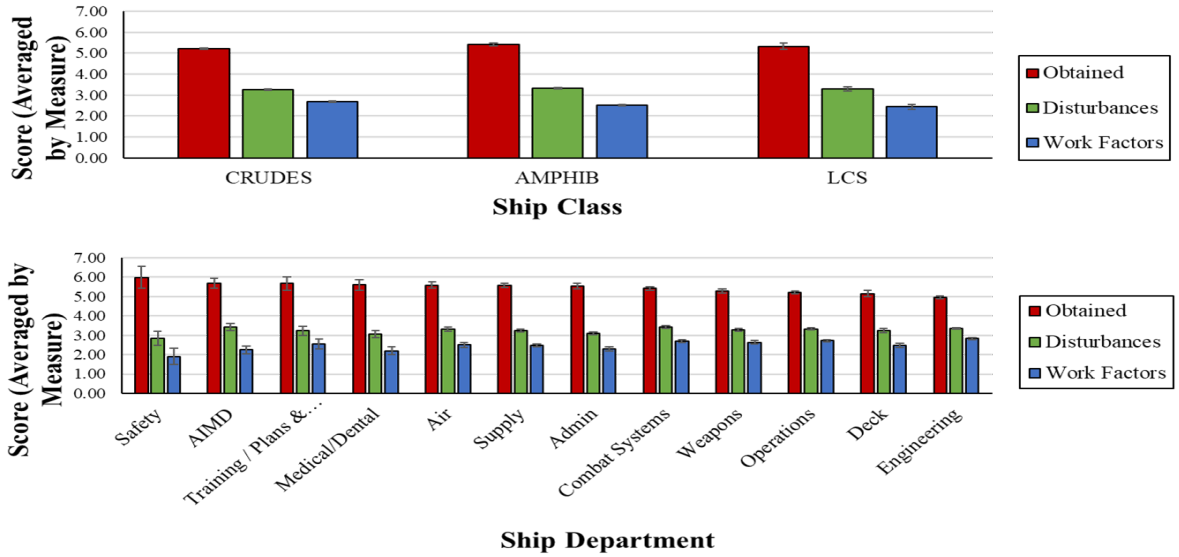

Figure 56. Average Scores for the Three Dependent Sleep Measures

Figure 56. Average scores for the three dependent sleep measures (hours sleep obtained per night aboard ship in red, average sleep disturbances experienced in green, and average intrusion of occupational factors in blue). Sleep obtained per night was measured in average hours per night. Both sleep disturbances and work factors represent averages of several survey questions measured on a 1-to-5 Likert-type scale. Top third of the figure is separated by ship type. Middle third of the figure is separated by paygrade. Bottom third of the figure is separated by occupational assignment.

5.4 Changing Safety Attitudes Across a Career of Naval Service

Safety attitudes change throughout a naval career with more experienced personnel adopting greater personal responsibility for safety climate aboard ship. Based on a statistical procedure known as Linear Regression, this change could not be attributed to changing affective commitment, which was measured alongside personal responsibility. However, although non-compliance attitudes changed over a career, the change was marginal compared to personal responsibility for safety. These findings indicate that experienced Sailors may take greater responsibility onto their shoulders to preserve safe operating conditions aboard ship, *but their compliance to "work as espoused" guidelines may not change* (no increased compliance to the prescribed safety guidelines).

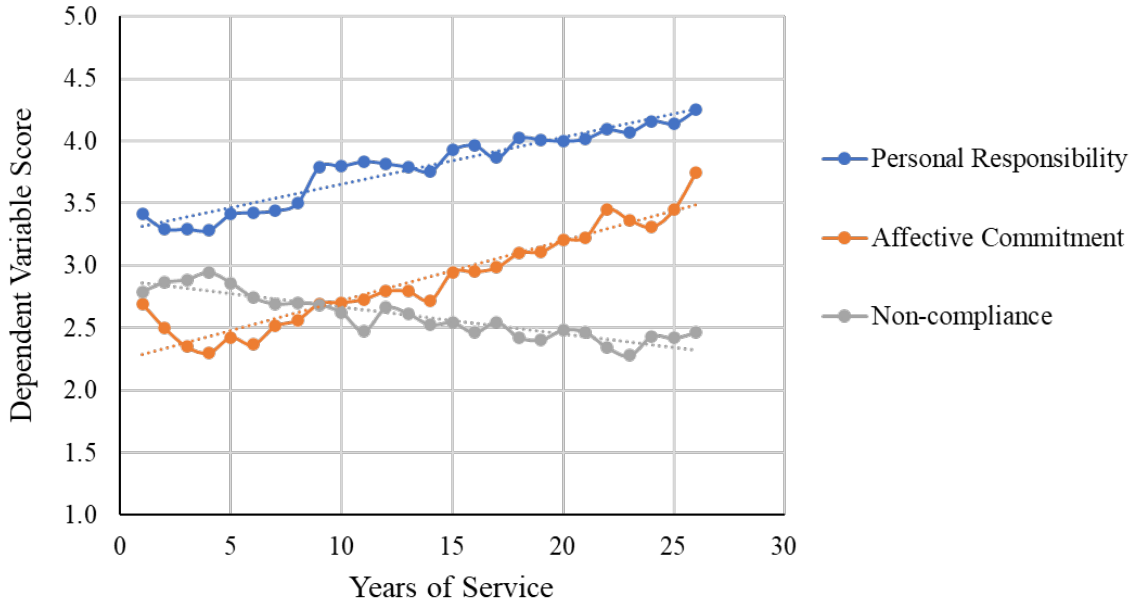

Figure 57. Key Variable by Years of Service

Overview of key variables included in this study (personal responsibility for safety in blue, affective commitment in orange, and attitudes toward non-compliance in grey) separated by years of service on the x-axis. Key variables were measured on Likert-type scales from 1 to 5, and values represent the average score across the questions asked. Dotted lines represent a linear trend fit to the data.

5.5 Sunlight Exposure Can Positively Impact Mental Health During Naval Deployments

Sunlight exposure can disrupt circadian rhythm for those on non-day shifts, but when properly controlled, sunlight exposure can also have positive mental health benefits. Increasing sunlight exposure positively impacted the number of good mental health days experienced both directly and indirectly through morale. Using a process called Mediation Analysis, it was shown that providing more opportunity for Sailors to get topside while underway could significantly improve mental health.

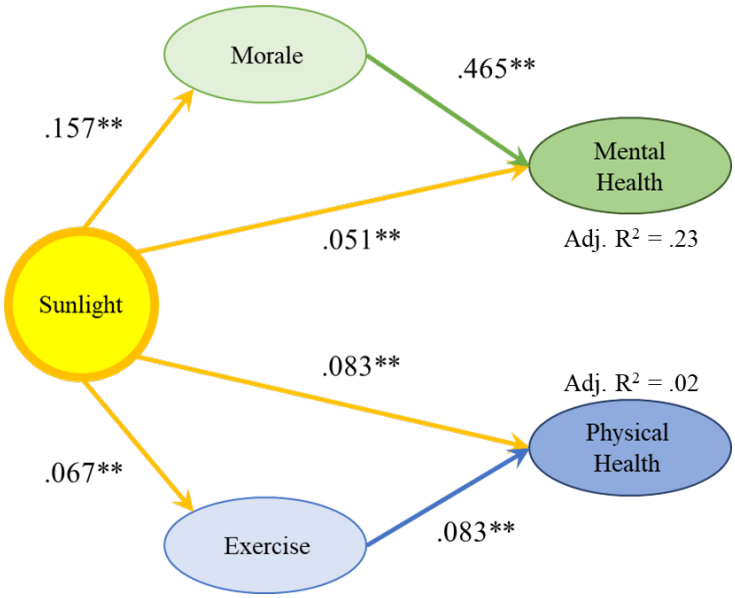

Figure 58. Relationship between Sunlight and Mental Health

Mediation analyses on the relationship between sunlight and mental health as mediated by morale (top half) and the relationship between sunlight and physical health as mediated by exercise (bottom half). **indicates $p < .001$.

6 CONCLUSION

6.1 Summary

The ASCAS is an insightful resource to capture a comprehensive operational safety profile within SURFOR. More broadly, the ASCAS can be viewed as part of a larger effort that seeks to: 1) identify crew problems; and 2) provide robust data that can later be incorporated into analyses that attempt to identify the underlying causes of those problems (e.g., using structural equation modeling or Bayesian network construction, both of which can support "What if?" tests of the possible outcomes from implementing different courses of action). Both components are essential for successfully monitoring operational safety.

The conclusions drawn in this report are provisional and may change as more ASCAS data are collected. Of particular importance, with a larger sample size, the OSRI team will be in a better position to generate norms for judging when a problem is present or absent in a given command. As it stands now, in defining an "area of praise or concern," preliminary thresholds of .05 above and below the "neutral" option served to identify problematic or praiseworthy circumstances. However, this choice of criterion is limited as it does not consider the individual variation that might hold across constructs. With that caveat in mind, overall, SURFOR's areas of praise included Leader Perception of Subordinates, Unit Cohesion (Work Center and Watch Team), Supervisor Safety Climate, Personal Responsibility for Workplace Safety, Command Safety Practices, Sleep Factors and Job Resources (namely Equipment). Areas of concern included Affective Commitment, No-Blame Error Reporting, Satisfaction of Command, Job Stress, Job Demands, Team Processes, Psychological Safety and Sleep Disturbances. Mean differences between demographic groups in the sample were typically negligible, though women and older respondents reported fewer days of poor mental health.

On the whole, when comparing CNSP and CNSL data, there are no significant differences between the two groups. However, CNSP expressed slightly more favorable responses towards Crew Resilience, and Occupational Challenges; while CNSL expressed slightly more favorable responses towards Job Demands, and Sleep Impairment.

Of greater note are the differences observed in by paygrades. These analyses identified differences in nearly every survey construct, with Enlisted Sailors responding more unfavorably than Officers/CWOs. Constructs manifesting the largest differences included Satisfaction with Command, Affective Commitment, Personal Responsibility for Workplace Safety, Psychological Safety, Error Management, Leader Assessment, Safety Satisfaction, General Health, Days which mental health was judged "not good," and Days which physical health was judged "not good."

Similar to paygrade outcomes, the analyses highlighted notable differences in Sailors assigned to various departments, which is in keeping with previous findings. Most notably, Sailors assigned to the Safety and Admin departments tended to respond more favorably than the other groups, while AIMD Sailors tended to respond more negatively than other departments. Comparing the Engineering Department to all other ship departments, Sailors assigned to Engineering Departments reported more unfavorable responses across the constructs of Job Demands, Occupational Challenges, Individual Noncompliance, Job Stress and Sleep Impairment.

The FY22 ASCAS dataset was joined to several other metrics to better understand how these factors affect safety climate. Specifically, FDNF status, FIT/FILL metrics, and OFRP phase data were assessed. Major findings are as follows:

- FDNF Sailors tended to respond less favorably towards Affective Commitment, Social Support, and Days which physical health was judged "not good."
- Commands with below standard FIT (< 92%) did not reveal any practically significant differences compared to those where FIT > 92%. However, platforms with low FILL (<95%) reflected notably less favorable responses in the following areas: Crew Resilience, Satisfaction with Command, and Days of poor mental health.
- OFRP analyses indicated that Sailors in the Basic phase (READ-E1) responded more favorably to questions around Crew Resilience, Occupational Challenges, Job Demands, Sleep Impairment, Job Stress, Days which physical health was judged "not good" and Days which mental health was judged "not good," than those in Sustainment phase (READ-E5)
- CO gender and race analysis, while potentially interesting, are not significant, provisional and subject to change as additional data is collected.

To cultivate an understanding of those opinions solicited from the open-ended responses, NLP techniques were applied to quantify sentiment. Negative comments more frequently came from Petty Officers than other paygrades. Positive sentiments were correlated with favorable scores with regard to Unit Cohesion (Work Center), Command Satisfaction, Error Culture and Caring. Negative sentiments were correlated with questions related to Sleep Impairment, Mental Health, and Job Demands.

These findings serve to help SURFOR identify and mitigate operational safety and crew endurance concerns. The ASCAS lays the foundation that will ultimately help promote a deeper and richer understanding of the complex multifaceted interplay of factors that contribute to overall safety culture with a high-risk organization. The Navy is poised to leverage robust analytic techniques for use on the ASCAS data, which will produce a tool that will complement ongoing strategic lines of effort, ultimately enabling better decision making and more effective implementation of countermeasures designed to promote safety.

6.2 Next Steps

Leveraging scientific literature and factor analysis, the FY23 ASCAS has had some new constructs added to allow for additional insights. The updated version of the survey will be merged with historic data, and further analyses performed. The ASCAS data is being incorporated into the Operational Safety Risk Indicator (OSRI) machine learning model within the Jupiter platform. Specifically, ASCAS data will be joined to disparate data sources, including as personnel systems (e.g., COGNOS, NSIPS, MNA, and DMDC), training (e.g., STRMS and TORIS), health-related records (e.g., NMCPHC and ADMITS), safety-related data (e.g., RMI and SURFOR Critiques and Lessons Learned), and other data sources (e.g., 90-day SURFOR CO reports) to better understand relationships and causal factors. Access to the ASCAS's interactive dashboards and additional products can be requested via the DoN's enterprise data environment, Jupiter (https://jupiter.data.mil).

7 APPENDICES:

7.1 Appendix A: Fit/Fill Analysis by Ship-class

As minimal differences were observed in survey responses for Sailors on crews above or below Fit/Fill thresholds (seen in Section 4.8), additional analysis was performed at a ship-class level. Data was split in three groups (Amphibs, LCSs, and CRUDES) and analysis repeated. For each of the three groups, minimal differences were observed. Heatmaps detailing findings are included below.

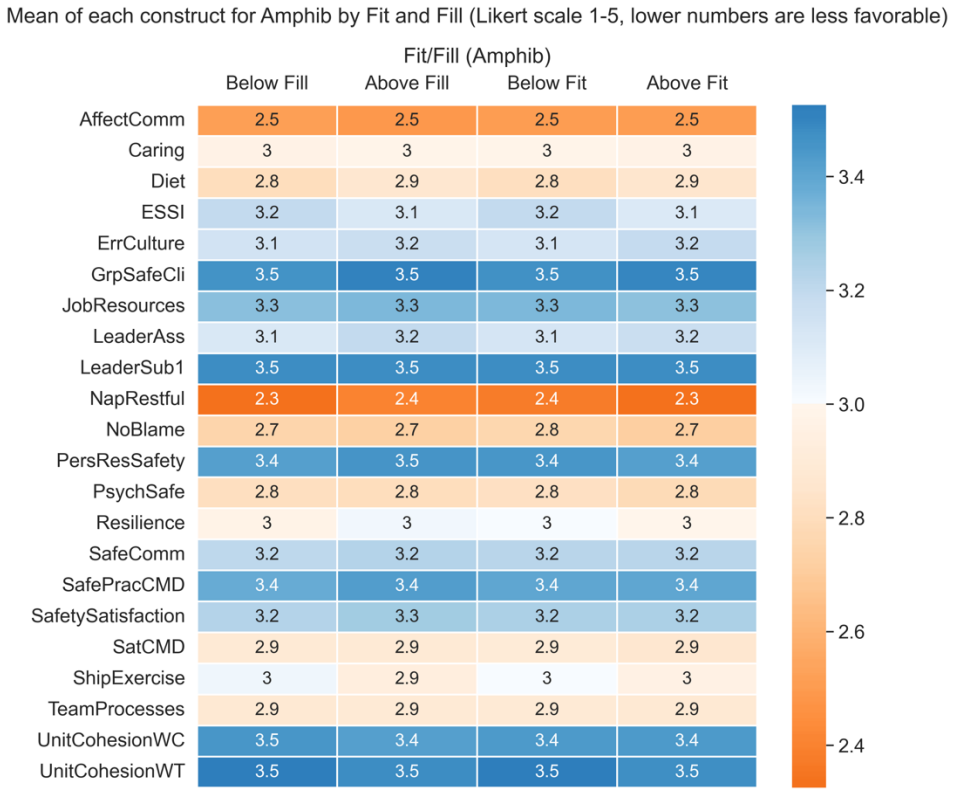

Figure 59. Construct of Means of Interest for Amphib by Fit/Fill

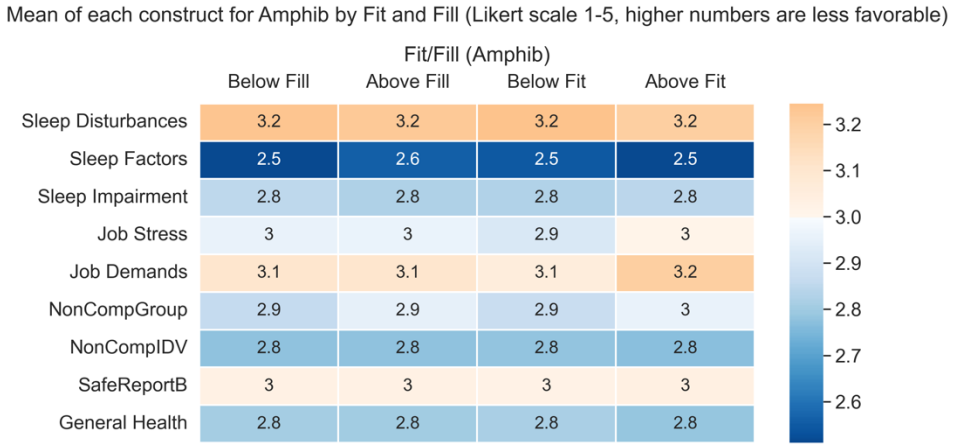

Figure 60. Construct of Means of Interest for Amphib by Fit/Fill

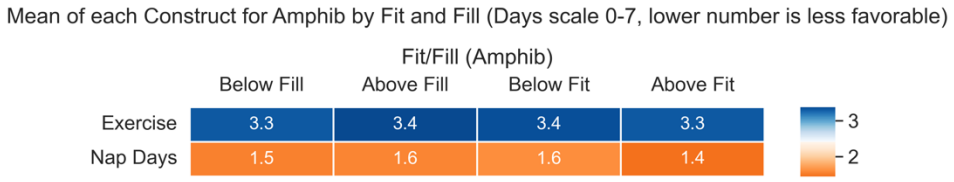

Figure 61. Construct of Means for Amphib by Fit/Fill (Days Scale)

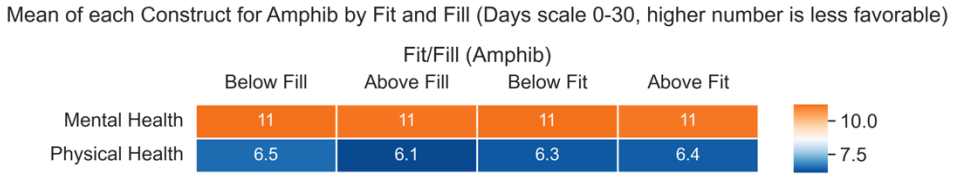

Figure 62. Construct of Means for Amphib by Fit/Fill (Days Scale, Reverse Encoded)

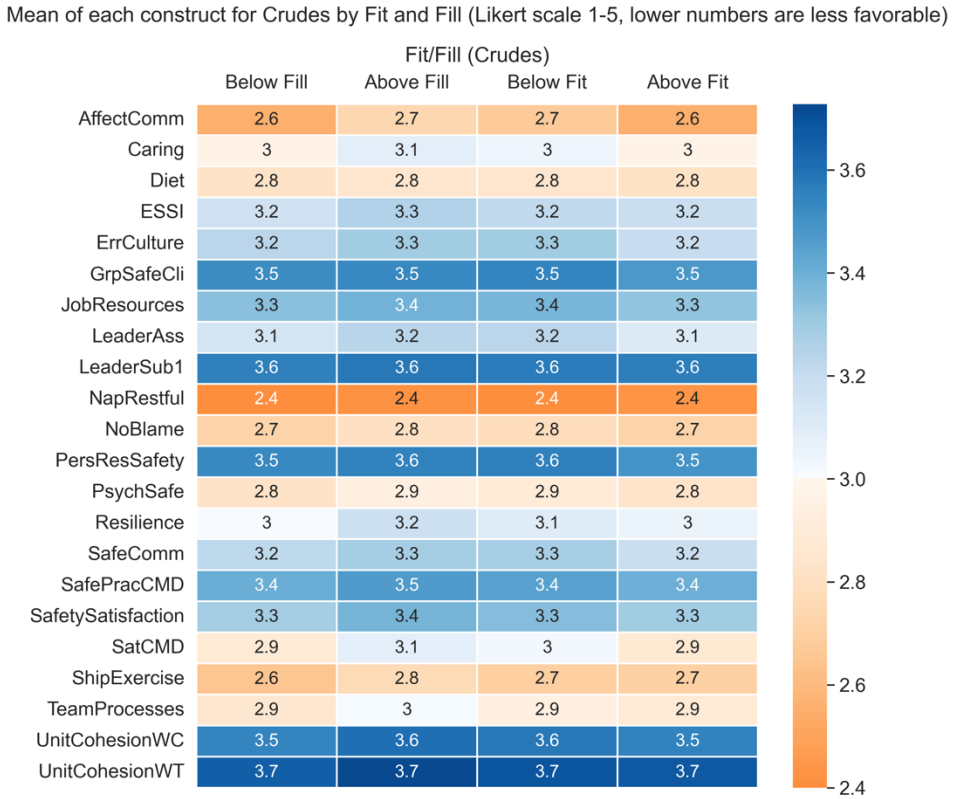

Figure 63. Construct of Means of Interest for CRUDES by Fit/Fill

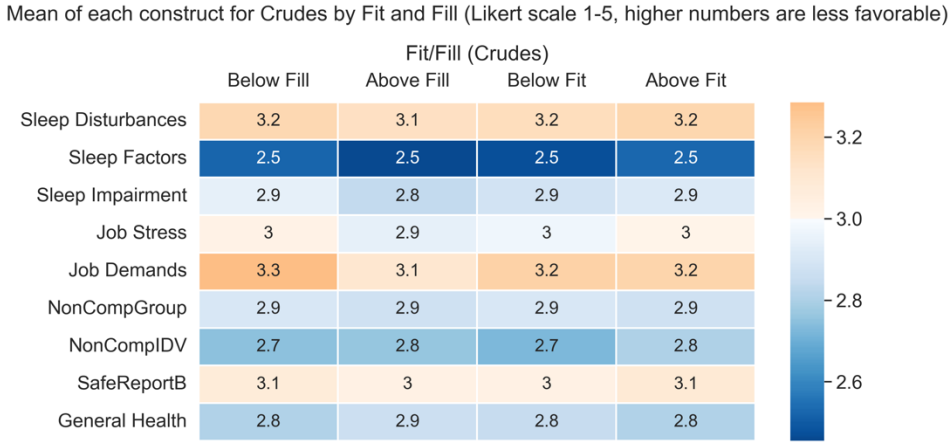

Figure 64. Construct of Means of Interest for CRUDES by Fit/Fill

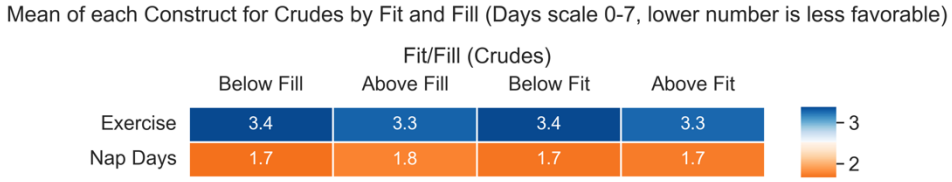

Figure 65. Construct of Means for CRUDES by Fit/Fill (Days Scale)

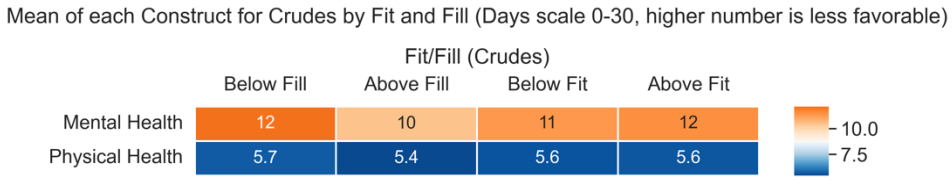

Figure 66. Construct of Means for CRUDES by Fit/Fill (Days Scale, Reverse Encoded)

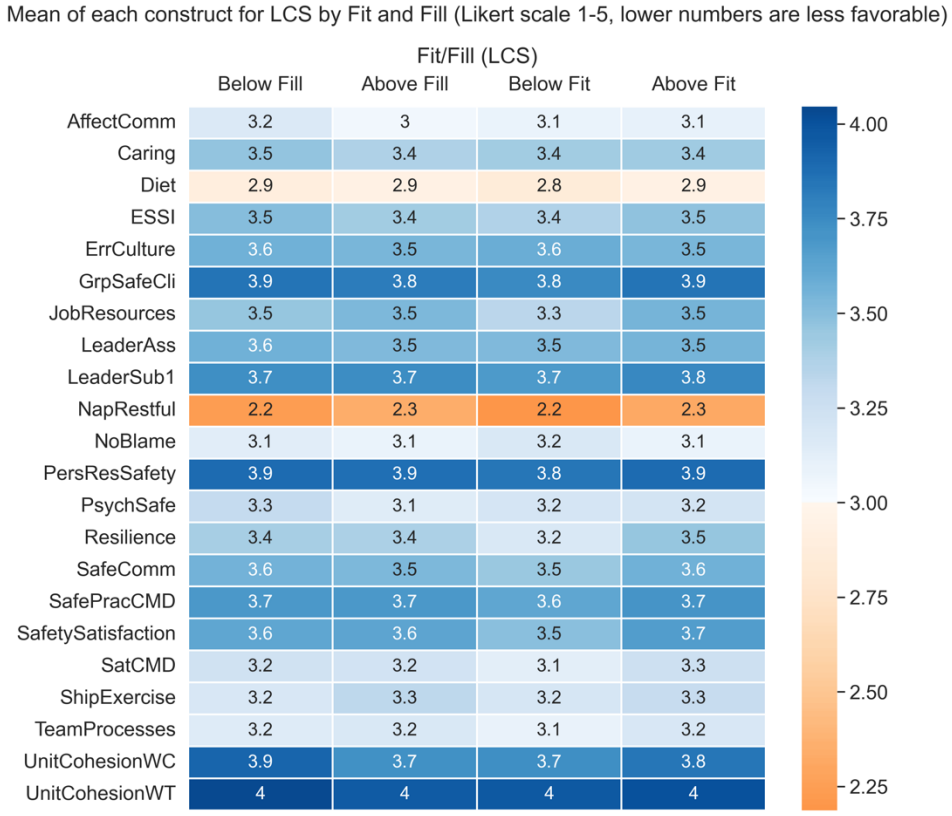

Figure 67. Construct of Means of Interest for LCS by Fit/Fill

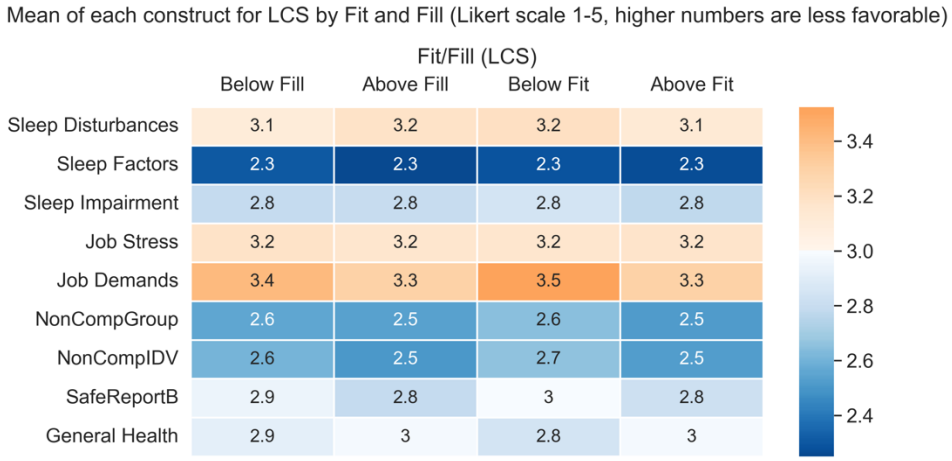

Figure 68. Construct of Means of Interest for LCS by Fit/Fill

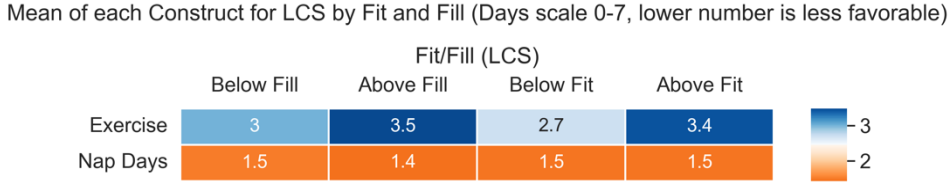

Figure 69. Construct of Means of Interest for LCS by Fit/Fill (Days Scale)

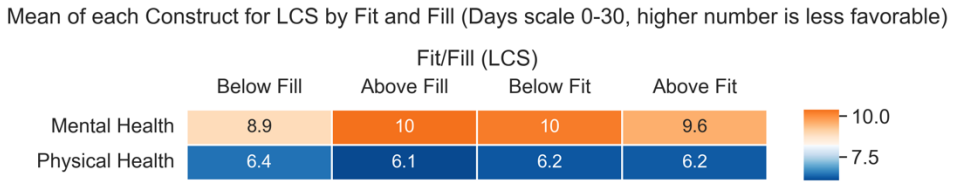

Figure 70. Construct of Means for LCS by Fit/Fill (Days Scale, Reverse Encoded)

7.2 Appendix B: CO Demographics Analysis

Analysis was performed to identify notable differences with regard to CO gender and race. Findings are included below.

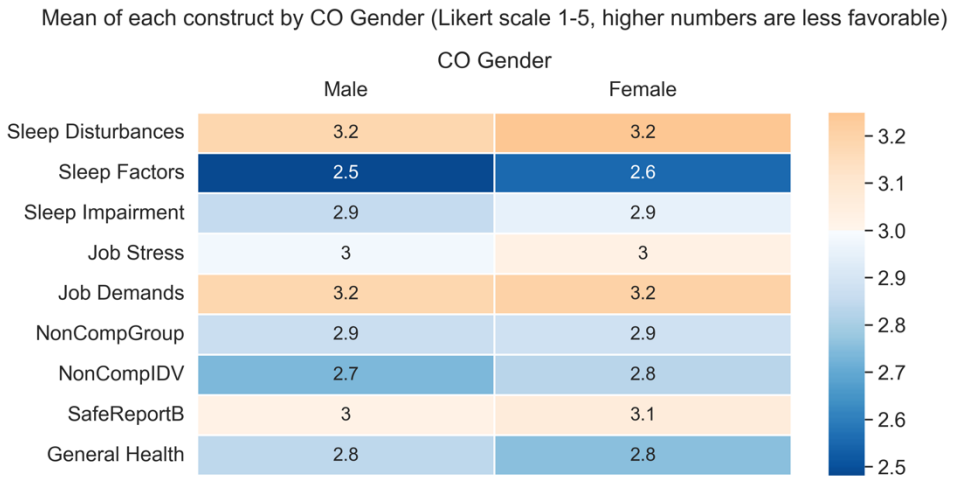

Figure 71. Construct of Means of Interest by CO Gender

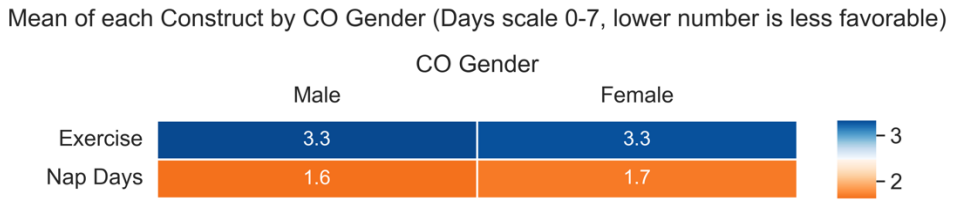

Figure 72. Construct of Means by CO Gender (Days Scale)

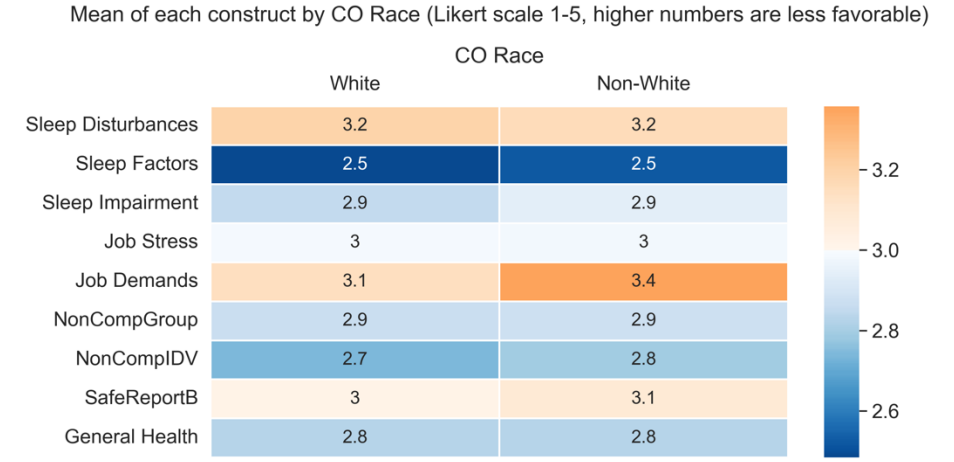

Figure 73. Construct of Means of Interest by CO Race

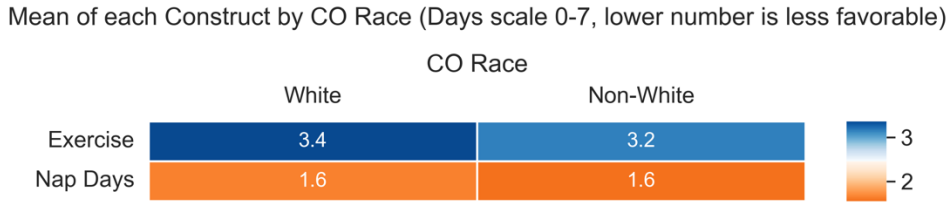

Figure 74. Construct of Means by CO Race (Days Scale)

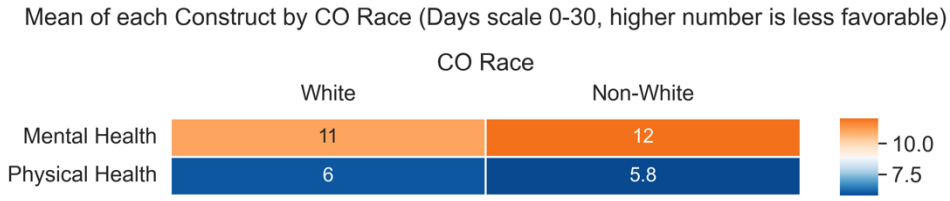

Figure 75. Construct of Means by CO Race (Days Scale, Reverse Encoded)

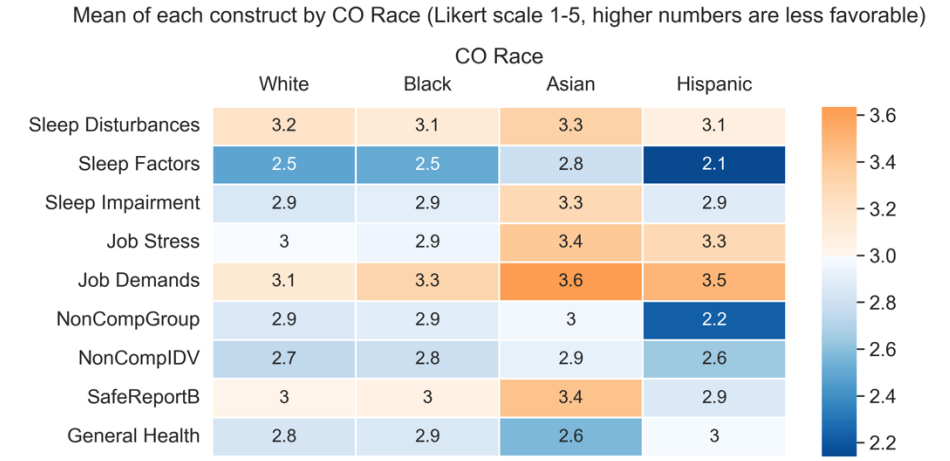

Figure 76. Construct of Means of Interest by CO Race

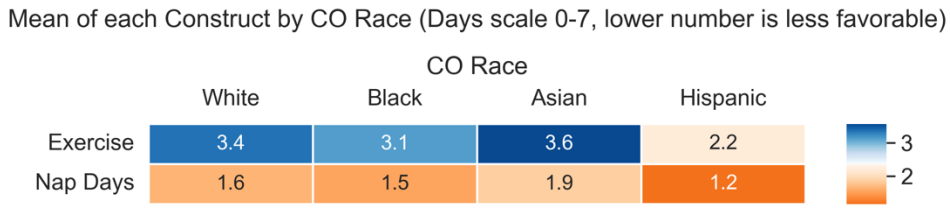

Figure 77. Construct of Means by CO Race (Days Scale)

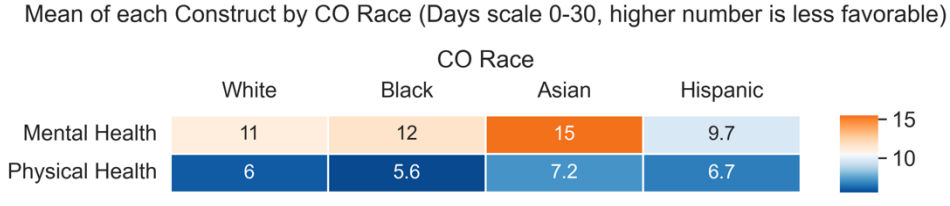

Figure 78. Construct of Means by CO Race (Days Scale, Reverse Encoded)

7.3 Appendix C: Tools for Understanding Heatmap Visualizations

Below are tools for understand the visualizations leveraged in the report.

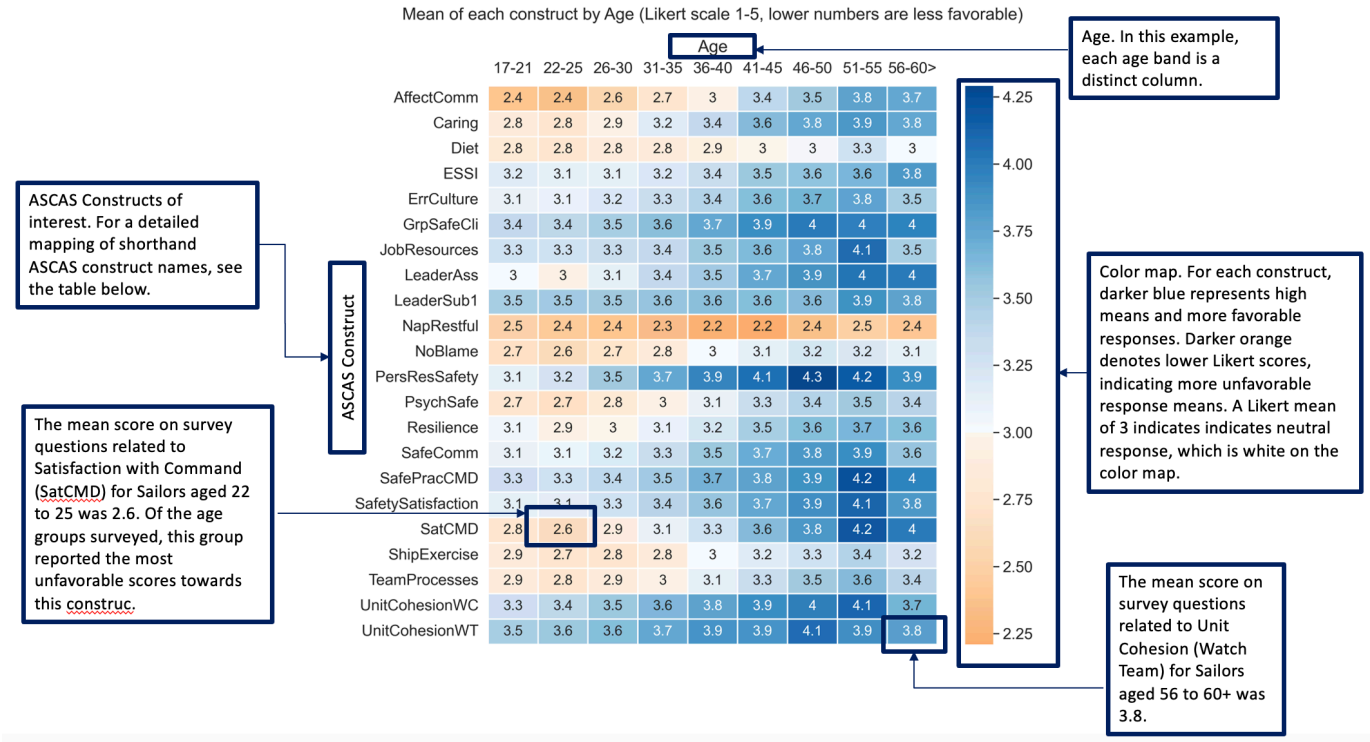

Figure 79. Sample Heatmap

Table 29. Mapping of Shorthand to Longform ASCAS Constructs

Shorthand ASCAS Construct Names	Long Form ASCAS Construct Names	Unit of Measurement
AffectComm	Affective Commitment	Likert scale
Caring	Caring	Likert scale
Diet	Healthful Diet	Likert scale
ESSI	Social Support	Likert scale
ErrCulture	Error Culture	Likert scale
GrpSafeCli	Supervisor Safety Climate	Likert scale
JobResources	Job Resources	Likert scale
LeaderAss	Leadership Assessment	Likert scale
LeaderSub1	Leader Perceptions of Subordinates	Likert scale
NapRestful	Nap Restful	Likert scale
NoBlame	No Blame Error Reporting	Likert scale
PersResSafety	Personal Responsibility for Workplace Safety	Likert scale
PyschSafe	Psychological Safety	Likert scale
Resilience	Brief Resilience Scale	Likert scale
SafeComm	Safety Communication	Likert scale
SafePracCMD	Command Safety Practices	Likert scale
SafetySatisfaction	Safety Satisfaction	Likert scale
SatCMD	Satisfaction with the Command	Likert scale
ShipExercise	Physical Fitness Activity (resources)	Likert scale
TeamProcesses	Team Processes	Likert scale
UnitCohesionWC	Unit Cohesion (Work Center)	Likert scale
UnitCohesionWT	Unit Cohesion (Watch Team)	Likert scale
Sleep Disturbances	Sleep Disturbances	Likert scale (Reversed)
Sleep Factors	Factors Impacting Sleep	Likert scale (Reversed)
Sleep Impairment	Sleep Functional Impairment	Likert scale (Reversed)
Job Stress	Job Stress	Likert scale (Reversed)
Job Demands	Job Demands	Likert scale (Reversed)
NonCompGroup	Command-Noncompliance	Likert scale (Reversed)
NonCompIDV	Individual-Noncompliance	Likert scale (Reversed)
SafeReportB	Safety Reporting Behaviors	Likert scale (Reversed)
General Health	General Health	Likert scale (Reversed)
Exercise	Physical Fitness Activity (general)	Days
Nap Days	Nap Time	Days
Mental Health	Mental Health	Days (Reversed)
Physical Health	Physical Health	Days (Reversed)

In the table above, the (reversed) denotation indicates that these measures are reverse encoded, with high scores corresponding to more unfavorable responses. For additional detail on these constructs, refer to Section 3.2.

7.4 Appendix D: CNSF and CNSP/L Response Means

See below for a comprehensive summary of FY2022 survey results, including CNSF, CNSP and CNSL means and standard deviations.

Note: For the tables below, under column 'P-Value' the statistical significance symbol mapping is: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' '

Table 30. Unit Cohesion (Work Center)

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.55**	**1.01**	**3.52**	**1.00**	**3.54**	**1.01**
The members of my work team know that they can depend on each other.	3.51	1.10	3.48	1.09	3.50	1.10
The members of my work team cooperate with each other.	3.58	1.05	3.55	1.04	3.57	1.05
The members of my work team stand-up for each other.	3.55	1.12	3.53	1.11	3.55	1.11

Table 31. Unit Cohesion (Watch Team)

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.65**	**0.97**	**3.63**	**0.96**	**3.65**	**0.96**
The members of my work team know that they can depend on each other.	3.64	1.02	3.62	1.02	3.64	1.02
The members of my work team cooperate with each other.	3.71	0.98	3.68	0.98	3.70	0.98
The members of my work team stand-up for each other.	3.59	1.04	3.58	1.04	3.59	1.04

Table 32. Leader Assessment

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.20**	**0.87**	**3.19**	**0.89**	**3.20**	**0.88**
Tells Servicemembers when they have done a good job.	3.28	1.07	3.26	1.07	3.28	1.07
Embarrasses Servicemembers in front of other Servicemembers. *	3.52	1.22	3.47	1.24	3.51	1.23
Tries to look good to higher-ups by assigning extra missions or details to Servicemembers. *	2.80	1.29	2.85	1.30	2.82	1.29
Exhibits clear thinking and reasonable action under stress.	3.19	1.03	3.16	1.04	3.18	1.03

** These questions are reverse encoded so that higher scores represent a more favorable response, with a mean of 3 being neutral.*

Table 33. Job Stress

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.64**	**0.93**	**3.65**	**0.92**	**3.65**	**0.92**
A lot of the time my job makes me very frustrated or angry.	3.60	1.14	3.63	1.13	3.61	1.14
I am usually under a lot of pressure when I am at work.	3.56	1.05	3.54	1.04	3.55	1.04
My job is stressful.	3.78	1.02	3.78	1.03	3.78	1.02

Note: For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Table 34. Occupational Changes

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.75**	**0.99**	**2.68**	**0.99**	**2.73**	**0.99**
The challenges of my job exceed what I have been trained to do.	2.99	1.16	2.93	1.15	2.98	1.16
The challenges of my job exceed my inherent personal capabilities.	2.51	1.08	2.43	1.07	2.49	1.08

Table 35. Affective Commitment

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.61**	**1.14**	**2.64**	**1.13**	**2.62**	**1.13**
I feel like “part of the family” at my command.	2.73	1.23	2.76	1.22	2.74	1.23
I feel “emotionally attached” to this command.	2.39	1.24	2.41	1.25	2.40	1.25
I feel a strong sense of belonging to my command.	2.71	1.22	2.76	1.21	2.73	1.22

Table 36. Social Support

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.20**	**1.05**	**3.22**	**1.01**	**3.21**	**1.04**
There is someone available to whom you can count on to listen to you when you need to talk.	3.24	1.22	3.29	1.18	3.26	1.21
There is someone available to you to give you good advice about a problem.	3.28	1.15	3.31	1.12	3.29	1.14
There is someone available to help with daily duties.	3.15	1.09	3.17	1.05	3.16	1.08
There is someone you can count on to provide you with emotional support (e.g., talking over problems or helping you make a difficult decision).	3.13	1.25	3.12	1.23	3.13	1.24

Table 37. Team Process

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.93**	**0.83**	**2.91**	**0.80**	**2.93**	**0.82**
Transition Processes:	**3.01**	**0.90**	**3.00**	**0.87**	**3.01**	**0.89**
Identify the key challenges that we expect to face.	3.08	0.99	3.10	0.96	3.09	0.98
Ensure that everyone on our team clearly understands our goals.	3.05	1.03	3.03	0.99	3.05	1.02
Develop an overall strategy to guide our team activities.	2.90	0.99	2.87	0.97	2.89	0.99
Action Processes:	**2.92**	**0.84**	**2.90**	**0.81**	**2.92**	**0.83**
Regularly monitor how well we are meeting our team goals.	3.04	1.00	3.05	1.00	3.05	1.00
Monitor important aspects of our work environment (e.g., inventories, equipment and process operations, information flows).	3.06	0.98	3.03	0.96	3.05	0.97
Assist each other when help is needed.	3.02	0.98	3.02	0.95	3.02	0.97
Coordinate our activities with one another.	2.78	1.00	2.73	0.97	2.77	0.99
Communicate well with each other.	2.71	1.01	2.67	1.00	2.70	1.00
Interpersonal Processes:	**2.86**	**0.91**	**2.84**	**0.89**	**2.86**	**0.90**
Deal with personal conflicts in fair and equitable ways.	2.82	1.02	2.80	1.02	2.81	1.02
Encourage each other to perform our very best.	3.17	1.04	3.14	1.01	3.16	1.03
Keep a good emotional balance in the team.	2.60	1.05	2.58	1.03	2.60	1.04

Table 38. Crew Resilience

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.06**	**0.94**	**3.11**	**0.93**	**3.07**	**0.94**
Our crew tends to bounce back quickly after hard times.	3.11	1.04	3.18	1.03	3.13	1.04
It does not take our crew long to recover from a stressful event.	3.00	1.03	3.03	1.03	3.00	1.03
Our crew usually come through difficult times with little trouble.	3.08	1.03	3.10	1.03	3.09	1.03

Table 39. Error Management

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.23**	**0.97**	**3.27**	**0.93**	**3.24**	**0.96**
After an error has occurred, it is analyzed thoroughly.	3.15	1.08	3.20	1.06	3.17	1.08
Our errors point us at what we can improve.	3.30	1.04	3.34	1.00	3.31	1.03

Table 40. No-Blame Error Reporting

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mea**	**SD**
Overall Measure Construct	**2.77**	**0.78**	**2.80**	**0.78**	**2.78**	**0.78**
An effective anonymous reporting system exists at this command.	2.99	1.10	3.00	1.10	2.99	1.10
This command has a “no-blame culture”.	2.45	1.03	2.47	1.03	2.46	1.03
Mistakes are corrected without punishment and treated as a learning opportunity on this ship.	2.68	1.08	2.77	1.09	2.71	1.08
Crew members are reluctant to report a coworker’s failure.	2.94	1.00	2.96	0.99	2.95	1.00

Table 41. Psychological Safety

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.86**	**0.88**	**2.90**	**0.88**	**2.87**	**0.88**
Members of this crew are able to bring up problems and tough issues.	2.99	1.07	3.04	1.07	3.01	1.07
It is safe to take a risk on this crew.	2.79	1.04	2.85	1.05	2.81	1.04
No one on this team crew would deliberately act in a way that anyone's efforts.	2.74	1.08	2.74	1.08	2.74	1.08
On this crew everyone's unique skills and talents are valued and utilized.	2.93	1.08	2.95	1.07	2.94	1.08

Table 42. Caring

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
The NAVY cares about my overall health, safety, and well-being.	2.41	1.16	2.37	1.15	2.40	1.16
My COMMAND cares about my overall health, safety, and well-being.	2.88	1.21	2.91	1.20	2.89	1.20
My DEPARTMENT cares about my overall health, safety, and well-being.	3.24	1.22	3.27	1.20	3.25	1.21
My DIRECT SUPERVISOR cares about my overall health, safety, and well-being.	3.56	1.19	3.60	1.16	3.58	1.18

Table 43. Supervisor Safety Climate

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mea**	**SD**
Overall Measure Construct	**3.52**	**0.93**	**3.53**	**0.93**	**3.53**	**0.93**
Uses explanations (not just compliance) to get us to act safely.	3.48	1.07	3.50	1.06	3.49	1.06
Makes sure we follow all the safety rules (not just the most important ones).	3.64	0.99	3.64	0.99	3.65	0.99
Is strict about working safely when we are tired or stressed.	3.44	1.07	3.44	1.08	3.45	1.07
Frequently checks to see if we are all obeying the safety rules.	3.54	1.00	3.54	1.00	3.55	1.00

Table 44. Command Safety Practices

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.44**	**0.84**	**3.42**	**0.81**	**3.44**	**0.83**
This command responds quickly to safety concerns.	3.40	0.94	3.38	0.93	3.40	0.94
This command provides safety information.	3.56	0.89	3.55	0.86	3.56	0.88
This command investigates safety problems quickly.	3.37	0.94	3.35	0.94	3.37	0.94
This command conducts frequent safety inspections.	3.44	0.94	3.39	0.94	3.42	0.94

Table 45. Command Noncompliance

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.86**	**0.98**	**2.89**	**0.98**	**2.87**	**0.98**
Other crew members sometimes turn a blind eye when rules are bent.	3.01	1.09	3.05	1.10	3.02	1.09
Other crew members use undocumented and/or unauthorized workarounds.	2.73	1.03	2.78	1.03	2.74	1.03
Other crew members have intentionally not complied with an approved procedure or process.	2.84	1.06	2.86	1.05	2.84	1.06

Note: For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Table 46. Individual Noncompliance

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mea**	**SD**
Overall Measure Construct	**2.75**	**0.94**	**2.75**	**0.94**	**2.75**	**0.94**
It is sometimes necessary to take risks beyond those inherent in my job, in order to get a task done.	2.86	1.06	2.86	1.07	2.86	1.06
It is sometimes necessary to overlook some rules in order to get the job done more quickly.	2.61	1.07	2.62	1.07	2.61	1.07
It is sometimes necessary to undertake a task a different way if I consider the approved procedure or process to be overly cautious or inefficient.	2.78	1.05	2.76	1.04	2.77	1.05

Table 47. Safety Satisfaction

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.31**	**0.89**	**3.34**	**0.87**	**3.32**	**0.89**
Overall, I am satisfied with the safety practices of this command.	3.30	0.95	3.31	0.93	3.31	0.94
Overall, I am satisfied with the amount of control and involvement I have in relation to safety issues.	3.31	0.94	3.37	0.90	3.33	0.93

Table 48. Personal Responsibility for Workplace Safety

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mea**	**SD**
Overall Measure Construct	**3.51**	**0.91**	**3.55**	**0.89**	**3.53**	**0.90**
My work performance directly impacts the command's overall operations.	3.59	1.07	3.63	1.07	3.61	1.07
Before making a work-related decision, I consider how it will affect the entire command.	3.53	1.02	3.60	0.99	3.56	1.01
I feel directly responsible for the conduct of safe operations on the ship.	3.42	1.07	3.46	1.05	3.44	1.07
I play a key role in ensuring overall safety at the command.	3.49	1.06	3.50	1.07	3.50	1.06

Table 49. Safety Communication

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mea**	**SD**
Overall Measure Construct	**3.26**	**0.90**	**3.25**	**0.89**	**3.26**	**0.90**
There is sufficient opportunity to discuss and deal with safety issues.	3.30	0.97	3.30	0.95	3.30	0.96
There is open communication about safety issues at this command.	3.32	0.98	3.32	0.96	3.33	0.97
Crew members are regularly consulted about workplace health and safety issues.	3.15	1.00	3.14	0.98	3.15	1.00

Table 50. Safety Reporting Behavior

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.04**	**0.86**	**3.02**	**0.86**	**3.03**	**0.86**
The reporting process is more complicated than it needs to be.	3.06	0.96	3.03	0.96	3.05	0.96
The reporting process is too time consuming.	3.03	0.93	2.99	0.93	3.01	0.94
Reporting safety concerns is unlikely to lead to changes.	3.03	1.04	3.03	1.06	3.03	1.04

Table 51. Job Demands

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.17**	**0.90**	**3.22**	**0.90**	**3.18**	**0.90**
We do not have enough time to carry out tasks properly.	3.16	1.13	3.20	1.14	3.17	1.13
We do not have the equipment that we need to do our job properly.	3.08	1.11	3.15	1.13	3.11	1.12
We do not have sufficient manning to achieve allocated tasks on time.	3.49	1.21	3.55	1.21	3.51	1.21
We have to work beyond regular duty hours to get our work done.	3.48	1.11	3.55	1.10	3.50	1.11
There is pressure from leadership to maintain performance standards at the cost of safety.	2.64	1.21	2.63	1.21	2.63	1.21

Note: For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Table 52. Job Resources

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.36**	**0.76**	**3.36**	**0.75**	**3.36**	**0.76**
Training:	**3.32**	**0.80**	**3.33**	**0.79**	**3.33**	**0.80**
Our training has prepared us well for the duties of our current jobs.	3.21	0.97	3.24	0.96	3.22	0.97
Our safety training goes above and beyond minimum requirements.	3.17	0.92	3.17	0.92	3.17	0.92
Safety is consistently emphasized during our training.	3.59	0.89	3.57	0.90	3.59	0.89
Equipment and Facilities:	**3.39**	**0.81**	**3.39**	**0.81**	**3.39**	**0.81**
Our workplace facilities are adequate for the safe performance of our duties.	3.36	0.89	3.37	0.89	3.36	0.89
There is sufficient protective clothing and equipment available for tasks to be carried out safely.	3.43	0.94	3.40	0.94	3.42	0.94
Necessary safety equipment is always accessible.	3.39	0.91	3.40	0.91	3.39	0.91

Table 53. Safety Issue Reporting

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
You reported a safety issue to your supervisor.	1.96	2.66	2.04	2.73	1.98	2.67
A safety issue went unreported to your supervisor.	1.29	2.48	1.29	2.55	1.29	2.49
Experienced or witnessed a near-miss (i.e., something that could have caused an injury but did not).	2.10	2.77	2.08	2.77	2.09	2.76

Table 54. Satisfaction with Command

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.94**	**1.19**	**2.98**	**1.17**	**2.96**	**1.19**
I am motivated to perform my best for this command.	3.11	1.27	3.15	1.25	3.12	1.26
I am happy to be assigned to this command.	2.78	1.27	2.81	1.26	2.79	1.27

Table 55. Sleep Hours

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
On an average day, how many hours are **available** for you to sleep when onboard your current ship?	6.16	1.99	6.37	1.94	6.22	1.97
On an average day, how many hours of regular sleep (i.e., excluding naps) do you get when sleeping **at home**?	6.74	1.68	6.84	1.61	6.76	1.66
On an average day, how many hours of regular sleep (i.e., excluding naps) do you get when sleeping onboard your **current ship**?	5.19	1.43	5.31	1.39	5.23	1.42
How many hours of sleep per day do you **require** to feel well-rested?	7.02	1.36	7.00	1.38	7.01	1.36

Table 56. Nap Time

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
On average, how many days per week do you take at least one nap while onboard your current ship?	1.52	2.02	1.52	2.00	1.51	2.01
On average, how many days per week do you take at least one nap while at home?	1.76	1.93	1.69	1.90	1.73	1.92
What is the average duration (in minutes) of your naps when onboard your current ship?	2.43	1.52	2.47	1.52	2.43	1.52
What is the average duration (in minutes) of your naps when at home?	3.38	1.88	3.31	1.89	3.36	1.88
How well-rested do you generally feel following your naps while onboard your current ship?	1.90	1.03	1.86	1.02	1.88	1.03
How well-rested do you generally feel following your naps while at home?	2.89	1.37	2.86	1.39	2.88	1.38

Table 57. Sleep Disturbance

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Overall Measure Construct	**3.40**	**0.96**	**3.37**	**0.97**	**3.39**	**0.97**
My sleep is refreshing. *	3.46	1.07	3.45	1.06	3.45	1.07
I have problems with my sleep.	3.50	1.18	3.47	1.20	3.49	1.19
I have difficulty falling asleep.	3.28	1.24	3.24	1.27	3.27	1.25
I have trouble staying asleep.	3.37	1.24	3.34	1.26	3.36	1.25
I use a prescription medication and/or a supplement (e.g., melatonin or herbs) to help me sleep.	2.41	1.39	2.36	1.39	2.39	1.39

** These questions are reverse encoded so that lower scores represent a more favorable response, with a mean of 3 being neutral.*

Table 58. Sleep Impairment

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mea**	**SD**	**Mean**	**SD**
Overall Measure Construct	**2.88**	**0.93**	**2.83**	**0.93**	**2.86**	**0.93**
Fatigue impacts or distracts me from my duties.	2.96	1.05	2.93	1.06	2.94	1.05
I am completely exhausted and unable to function effectively.	2.61	1.06	2.54	1.06	2.58	1.06
I am extremely sleepy or fighting sleep while on duty.	3.05	1.10	3.02	1.11	3.03	1.11
Fatigue impacts my ability to effectively communicate with others.	2.89	1.08	2.85	1.09	2.87	1.09

Note: For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Table 59. Sleep Factors

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Ambient Noise (e.g., air system, miscellaneous equipment)	2.38	1.31	2.35	1.32	2.37	1.31
1MC Announcements	2.34	1.26	2.38	1.30	2.35	1.27
Crew Mate Noise (e.g., open/closing rack, chatting, etc.)	2.78	1.38	2.81	1.41	2.78	1.39
Uncomfortable Mattress	3.09	1.44	3.15	1.44	3.10	1.44
Invasive Lighting	2.38	1.31	2.35	1.35	2.37	1.32
Workload	3.11	1.29	3.08	1.31	3.11	1.30
Required Meetings	2.64	1.34	2.56	1.34	2.62	1.34
Required Inspections	2.39	1.37	2.29	1.37	2.36	1.37
Drills (e.g., General Quarters)	2.65	1.34	2.60	1.36	2.64	1.35
Hot	1.94	1.20	2.12	1.32	1.99	1.24
Cold	2.66	1.40	2.57	1.36	2.62	1.38
Bad Dreams/Nightmares	2.09	1.30	2.06	1.31	2.08	1.30
Rack Width	2.46	1.39	2.45	1.41	2.45	1.40
Rack Length	2.08	1.32	2.06	1.33	2.07	1.32
Rack Height	2.46	1.46	2.43	1.48	2.45	1.47

Note: For these questions lower scores represent a more favorable response, with a mean of 3 being neutral.

Table 60. Daily Activities

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Work Center Duties	4.11	1.91	4.18	1.90	4.13	1.91
Watch Team Duties	3.98	2.22	4.10	2.19	4.02	2.21
Completing Personnel Qualification Standards	1.82	1.47	1.76	1.47	1.80	1.47
Attending Meetings	2.04	1.50	2.01	1.47	2.04	1.49
Exercising	1.11	1.13	1.06	1.07	1.09	1.11
Socializing (e.g., playing video games, chatting, etc.)	1.28	1.23	1.26	1.21	1.27	1.22
Personal Time (e.g., reading, sending emails home, etc.)	1.40	1.22	1.46	1.22	1.41	1.22
Other	1.42	1.75	1.36	1.70	1.40	1.74
Collateral Duties	2.13	1.66	2.09	1.65	2.12	1.66

Scale: Number of Hours

Table 61. General Health

	CNSL		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
In general, how would you rate your **overall health**?	2.82	0.96	2.86	0.94	2.83	0.96
Thinking about your mental health, which includes stress, depression and problems with emotions, how many days during the past 30 days was your **mental health** not good?	11.24	10.79	11.13	10.56	11.21	10.72
Thinking about your physical health, which includes physical illness and injury, how many days during the past 30 days was your **physical health** not good?	5.97	8.29	5.72	8.16	5.93	8.30

Table 62. Physical Fitness Activity

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
How many days per week do you engage in vigorous/high-intensity exercise (i.e., experience increased heart rate, breathing rate, sweating, and muscle fatigue) while underway?	2.99	2.27	3.01	2.22	2.99	2.25
How many days per week do you engage in vigorous/high-intensity exercise (i.e., experience increased heart rate, breathing rate, sweating, and muscle fatigue) while in-port?	3.70	1.91	3.60	1.92	3.66	1.92
Please rate how adequate the following items are onboard your current ship in order for you to maintain physical fitness: Shipboard exercise facilities (i.e., fitness equipment and space).	3.07	1.17	3.17	1.14	3.10	1.16
Please rate how adequate the following items are onboard your current ship in order for you to maintain physical fitness: Time provided to exercise.	2.59	1.22	2.64	1.25	2.60	1.23
Are you required to regularly participate in group physical fitness training sessions (i.e., PT at least three times per week)?	0.09	0.28	0.08	0.28	0.09	0.28

Table 63. Healthful Diet

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Please rate how healthful (i.e., nutritious and comprised of proper serving sizes) your overall diet is while onboard your current ship.	2.15	0.93	2.10	0.93	2.14	0.93
Please rate how healthful (i.e., nutritious and comprised of proper serving sizes) your overall diet is while at home.	3.51	1.02	3.60	0.96	3.54	1.00

Table 64. Sun Exposure (Daily)

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
On average, how many minutes of sunlight exposure do you get per day when underway on your current ship?	16-30 min	1.65	16-30 min	1.64	16-30 min	1.65

Table 65. Caffeine Usage

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
An energy drink/shot (e.g., Red Bull, Rockstar, Five Hour Energy, Monster).	1.03	1.53	0.95	1.49	1.00	1.52
A caffeinated drink such as coffee, tea, or soda.	1.92	1.87	1.88	1.84	1.91	1.86
Caffeinated gum.	0.16	0.91	0.14	0.90	0.15	0.91
A caffeine pill or energy pill (e.g., NoDoz, Energize, or Zoom).	0.19	0.92	0.19	0.99	0.19	0.94
Other concentrated caffeine sources.	0.39	1.22	0.36	1.26	0.38	1.23

Table 66. Nicotine Usage (Daily)

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
E-cigarette, vape pen, or e-pipe.	0.37	1.69	0.42	1.81	0.38	1.72
Cigarettes.	0.95	2.42	0.92	2.37	0.94	2.40
Cigars, cigarillos or little cigars.	0.13	0.84	0.17	1.01	0.14	0.89
Tobacco pipe.	0.07	0.63	0.08	0.74	0.08	0.67
Chewing tobacco, snuff or dip.	0.45	1.60	0.54	1.78	0.47	1.66
Nicotine patch.	0.11	0.84	0.12	0.86	0.11	0.84
Other nicotine sources (e.g., lozenges).	0.27	1.29	0.34	1.48	0.29	1.34

Table 67. Leader Perception of Subordinates

	CNSP		CNSL		CNSF	
Item	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Please indicate how often your subordinates do the following when completing a task that requires a work procedure be followed:	**3.55**	**0.59**	**3.54**	**0.56**	**3.55**	**0.58**
They try their best to apply the procedure correctly to the task.	4.03	0.92	4.03	0.89	4.03	0.91
They do what the procedure says without thinking too much about it. *	2.70	0.96	2.66	0.95	2.69	0.96
They skip parts of the procedure to save time. *	3.93	0.99	3.93	0.98	3.93	0.99
Please indicate how often your subordinates do the following when they believe that a work procedure is not appropriate:	**3.73**	**0.89**	**3.76**	**0.86**	**3.74**	**0.88**
They think about the risks/hazards and assess whether the standard procedure will work.	3.69	0.94	3.70	0.91	3.69	0.93
They discuss these issues with me before taking action.	3.78	0.98	3.81	0.95	3.79	0.97
Please indicate how often your subordinates do the following:	**3.93**	**0.85**	**3.94**	**0.82**	**3.94**	**0.84**
They use all of the necessary safety equipment to do their job.	3.94	0.92	3.94	0.88	3.94	0.91
They use the correct safety procedures for carrying out their job.	3.99	0.87	3.99	0.83	3.99	0.86
They pay a lot of attention to the rules and procedures necessary to do their work safely.	3.86	0.92	3.89	0.90	3.87	0.91

** These questions are reverse encoded so that higher scores represent a more favorable response, with a mean of 3 being neutral.*