



FACTORS IMPACTING SLEEP ACROSS DEPLOYMENT IN UNITED STATES NAVY AVIATION PERSONNEL

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Photo courtesy of Naval Health Research Center

Sleep Tactical Efficiency and Endurance Laboratory (STEEL)

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Funding Sponsor

Defense Health Agency
(Joint Program Committee-5)



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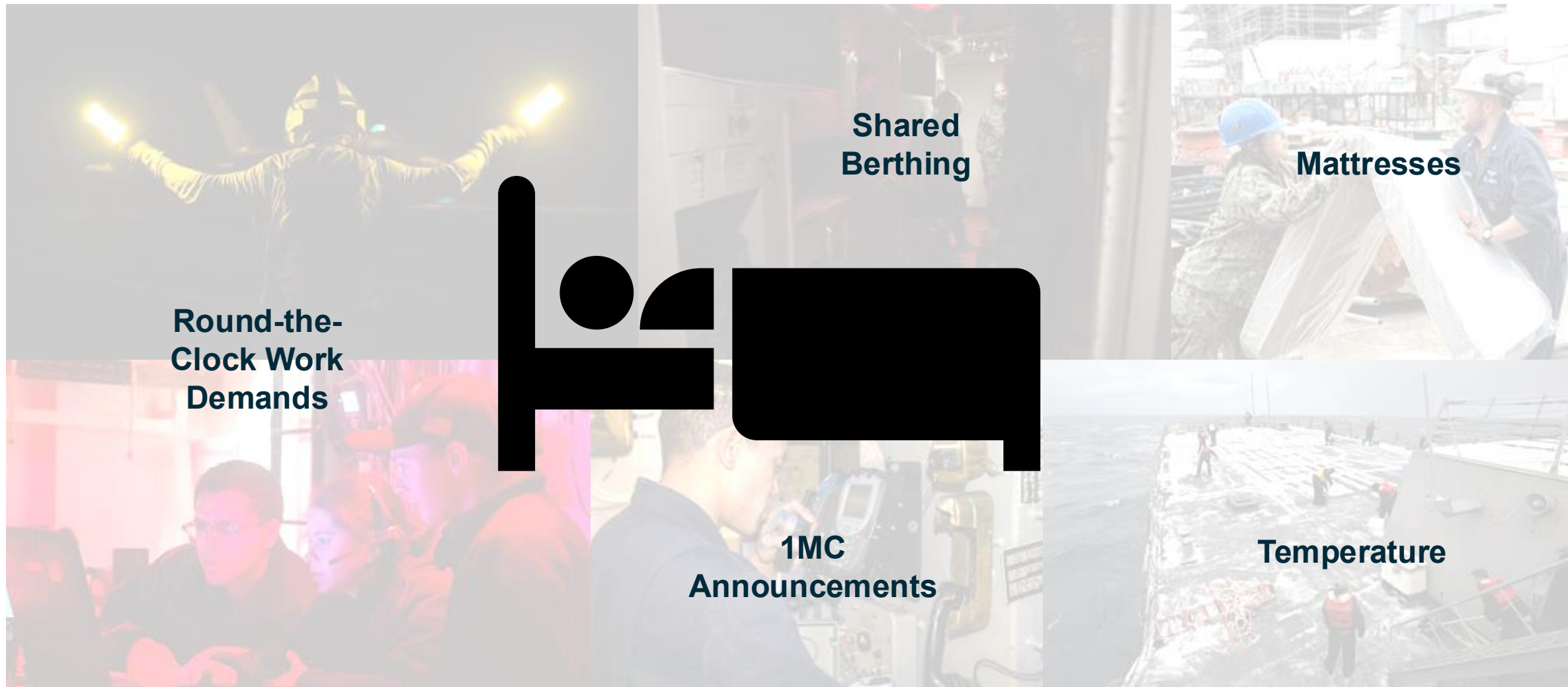
SLEEP IN MILITARY SETTINGS



Photos courtesy of DVIDS



SLEEP IN MILITARY SETTINGS



Photos courtesy of DVIDS



SLEEP IN MILITARY SETTINGS

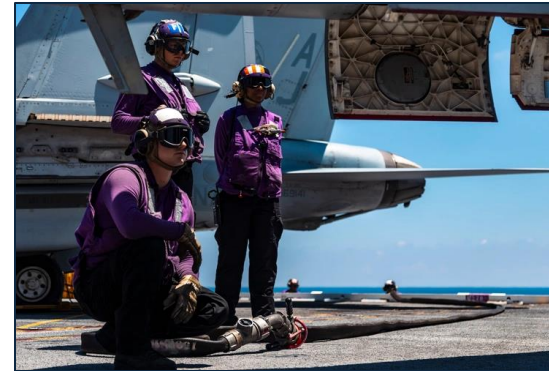


Sufficient sleep is critical for maintaining and optimizing health, performance, and combat readiness

Photos courtesy of DVIDS



UNITED STATES NAVAL AIR FORCES



Photos courtesy of DVIDS



PURPOSE



Photo courtesy of DVIDS

To characterize sleep in a sample of United States Navy aviation personnel

To examine differences in sleep across operational conditions and roles

To characterize factors disrupting sleep in underway settings



SAMPLE AND OPERATIONAL CONTEXT



Carrier 1:
Air Dept.



Carrier 2:
Reactor Dept.



Carrier 3:
Air, Engineering, Navigation,
Supply, Reactor Dept.



Squadron 1:
Command & Control
E-2 Hawkeye



Squadron 2:
Strike Fighter Squadron
F/A-18F Super Hornet

N = 88

30 days

162 days

N = 74

43 days

87 days

N = 266

69 days

196 days

Photos courtesy of DVIDS



SAMPLE AND OPERATIONAL CONTEXT



Carrier 1:
Air Dept.



Carrier 2:
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Carrier 3:
Air, Engineering, Navigation,
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Squadron 1:
Command & Control
E-2 Hawkeye



Squadron 2:
Strike Fighter Squadron
F/A-18F Super Hornet

 N = 28	30 days	162 days
	43–266 Sailors	
 N = 43	43 days	87 days
	10–69 days in port	
 N = 43	10 days	162 days
	40–196 days of deployment	

Photos courtesy of DVIDS



PROJECT PROCEDURES

Enrollment

Pre-Deployment Survey

Oura Ring Setup on Personal Phone with Project Account

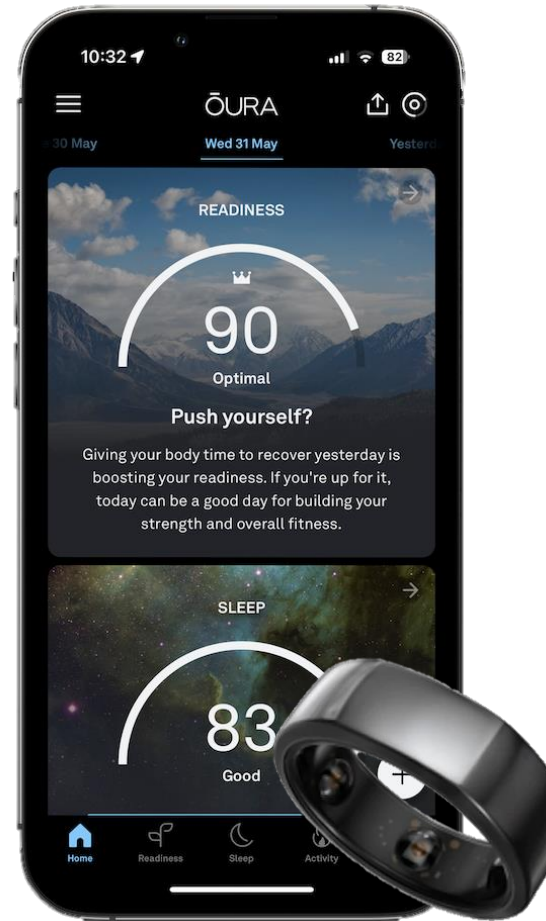
Deployment

Continuously Wear Oura Ring

Upload Oura Ring Data to Cloud Database

Mid- and End-of-Deployment Surveys

Oura Ring



Photos courtesy of Oura

Sleep Disturbances

	☒	☐
	☐	☒
	☐	☒
	☒	☐



DATA ANALYSIS

- Linear mixed models to examine differences in sleep based on operational context and role
 - Officer vs. Enlisted status
 - In-port workup vs. during deployment
 - Mean total sleep time as primary sleep outcome
 - Random effect of participant included
- Descriptive summary of factors disturbing sleep



PARTICIPANTS AND CONTEXT



N = 576 Sailors

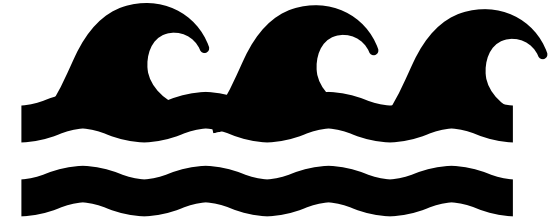
Age: 29 ± 7 years

83% Male; 17% Female

16% Officers; 84% Enlisted



**26,704
person-days of
in-port data**

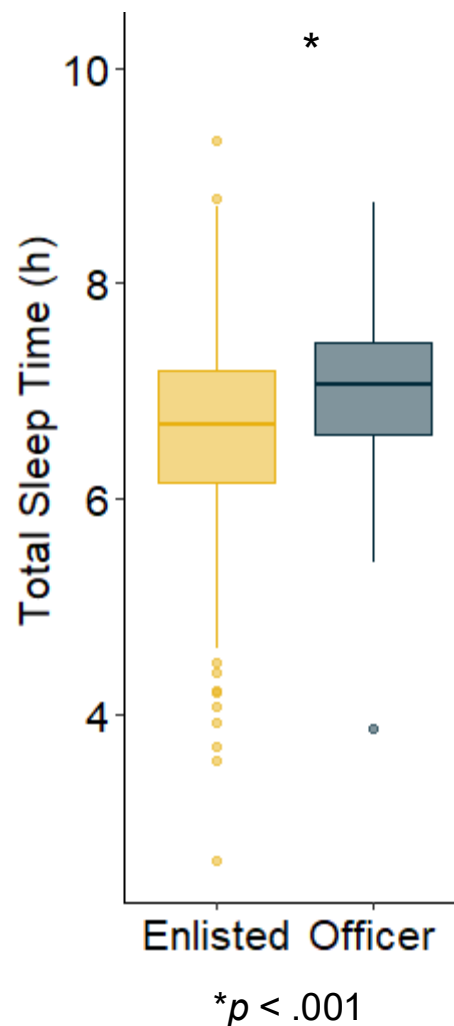


**49,015
person-days of
deployment
data**



SLEEP DIFFERENCES: OFFICERS AND ENLISTED

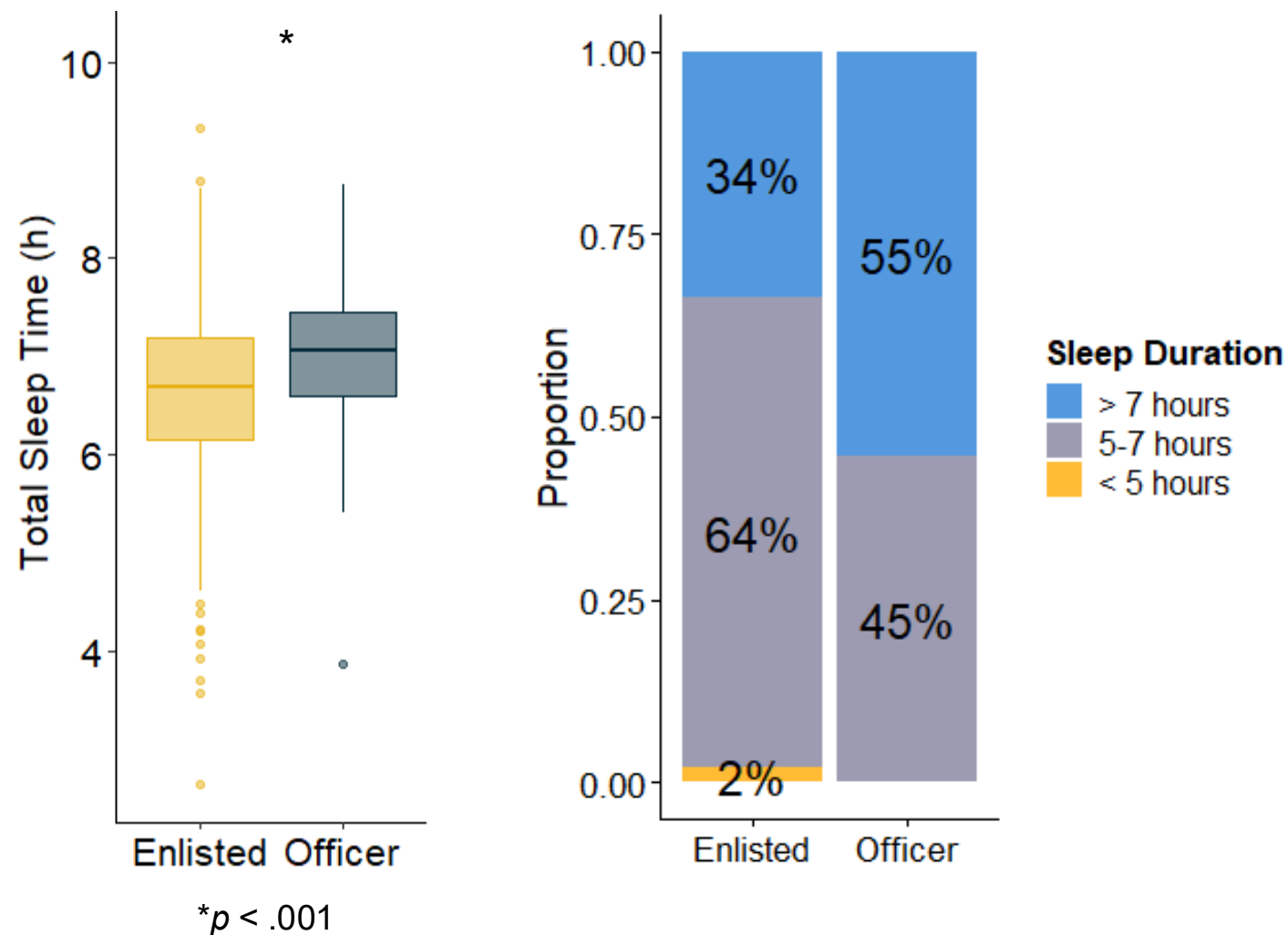
- Average sleep duration was **shorter among Enlisted** personnel than Officers





SLEEP DIFFERENCES: OFFICERS AND ENLISTED

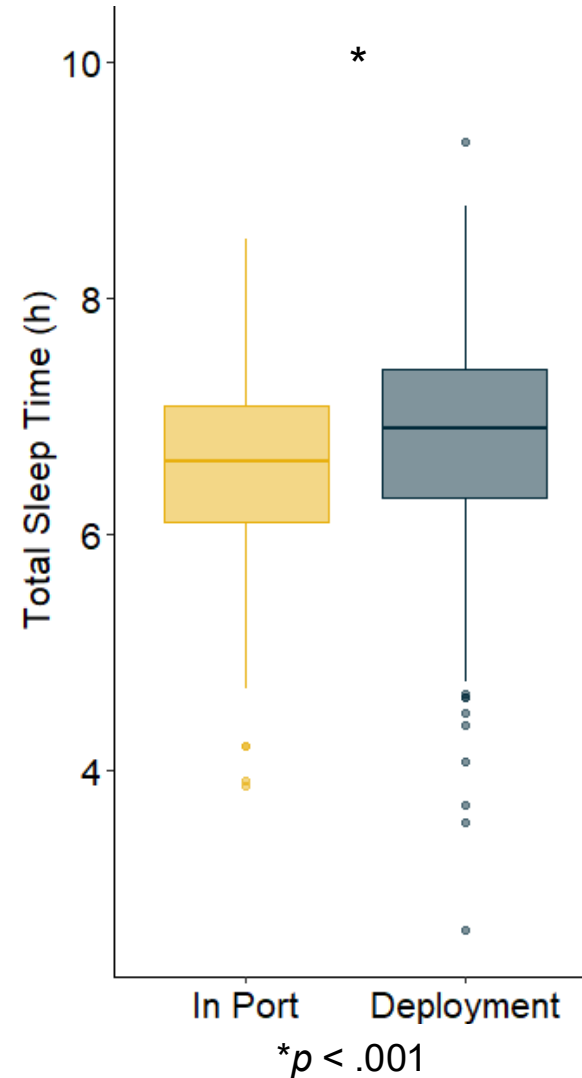
- Average sleep duration was **shorter among Enlisted** personnel than Officers
- Fewer Enlisted personnel obtained at least 7 hours of sleep on average than Officers





SLEEP CHANGES WITH OPERATIONAL CONDITION

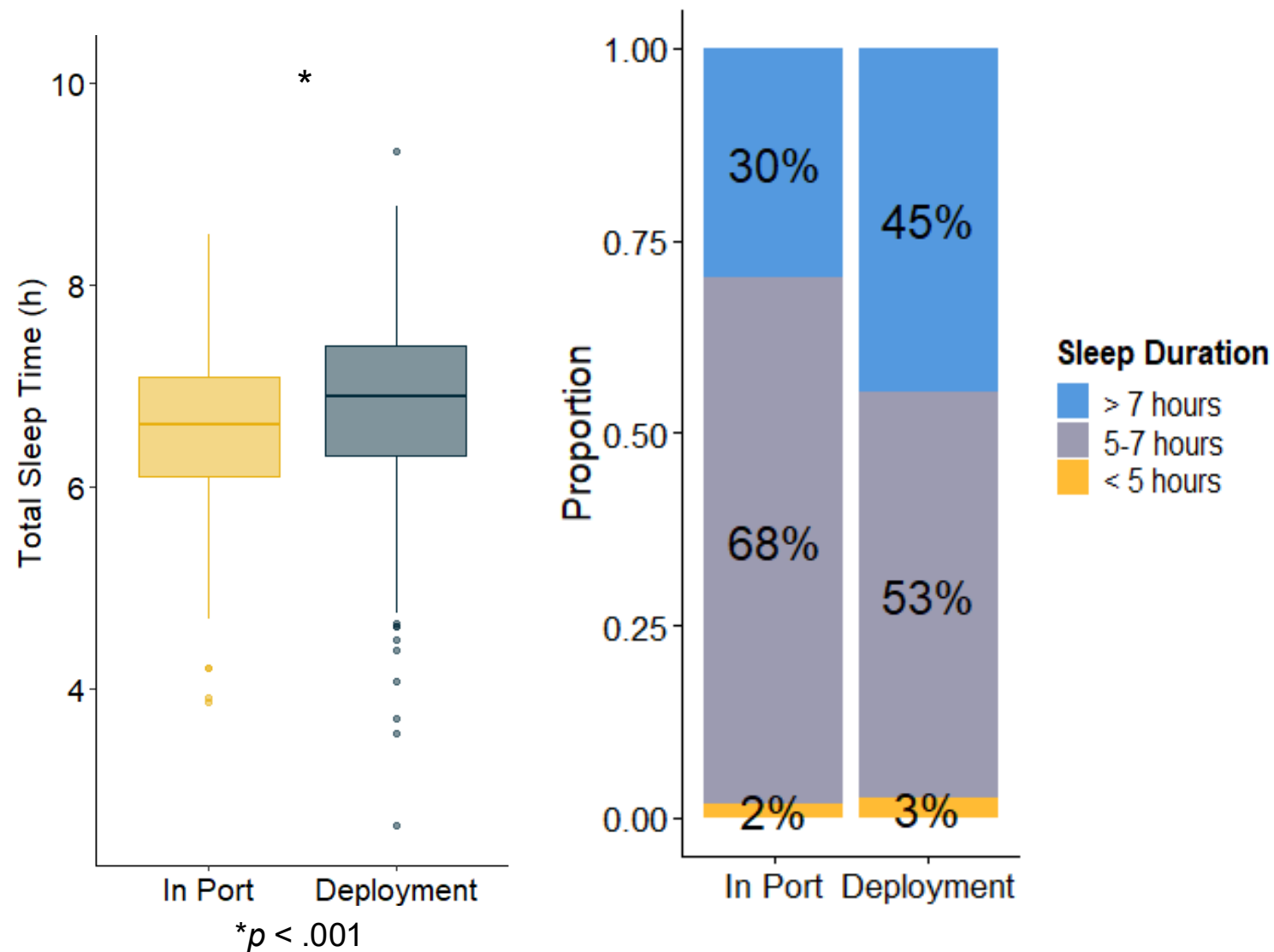
- Average sleep duration was **shorter in port** than during deployment





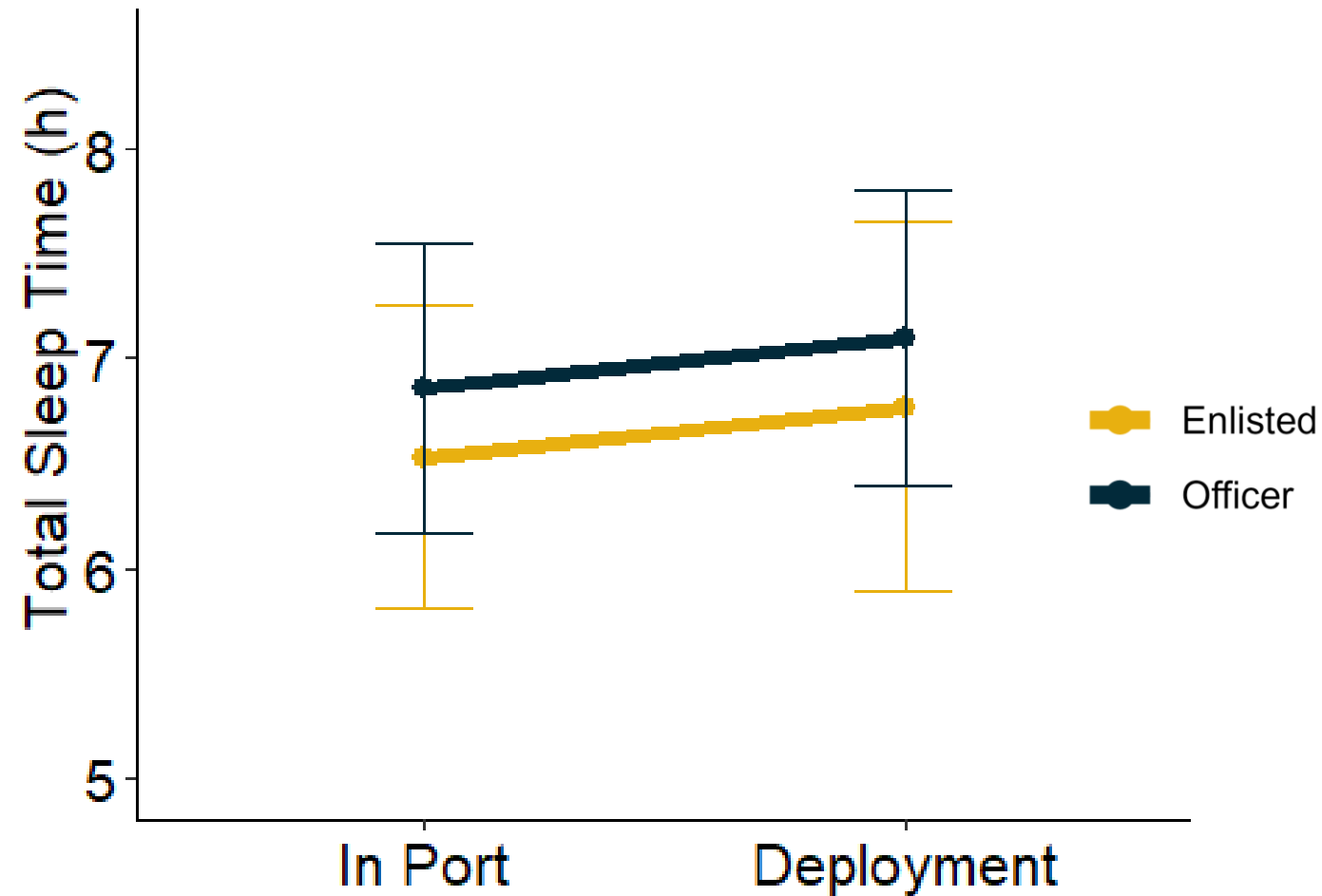
SLEEP CHANGES WITH OPERATIONAL CONDITION

- Average sleep duration was **shorter in port** than during deployment
- Fewer Sailors obtained the recommended 7 hours of daily sleep during the in-port period before deployment





CONDITION-RELATED CHANGES IN SLEEP WERE CONSISTENT BETWEEN OFFICERS AND ENLISTED PERSONNEL





FACTORS DISTURBING SLEEP

Sailors reported on the extent to which different factors disturbed their sleep. The most common factors disturbing Sailor sleep extremely/quite a bit include:



U.S. Navy photo by PO2 Jayme Pastoric from navy.mil/Released

Mattress: 33%
Rack Size: 23%



Photos courtesy of DVIDS

Watch: 26%
Drills: 25%



Photo courtesy of DVIDS

Crew Noise: 25%



Stress: 25%



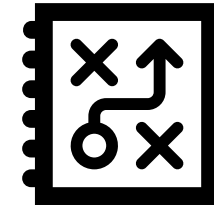
CONCLUSIONS



Short sleep during the in-port period prior to deployment should be considered when planning tasking for the beginning of deployment



While sleep duration was longer during deployment than while in port, many work-related and environmental factors disturbed sleep regularly



Identifying modifiable factors or mitigation strategies to address disturbed sleep during deployment remains critical



CONCLUSIONS

- U.S. Naval Air Forces (like others) are weighing the benefits and value added from continuous sleep monitoring
- Examining sleep in port and during deployment helps us understand how to best address sleep disturbances within these settings
- Sleep has the potential to serve as a combat-readiness enabler



QUESTIONS?

Alice LaGoy

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SELF-REPORTED SLEEP DISTURBANCES

Participants were asked to rate the extent to which the following factors impacted their sleep on a 5-point scale from 1 (*not at all*) to 5 (*extremely*)

- 1MC announcements
- Ambient noise
- Crewmate noise
- Flight noise
- Temperature
- Lighting
- Odors
- Air quality
- Ship movement
- Mattress
- Rack size
- Stress
- Pain
- Drills
- Watch
- Scheduled evolutions
- Task support
- Inspections
- Maintenance duties
- Covered shifts
- Other