



Florida Atlantic University
presents

**Fatigue and
Fatigue Countermeasures**

Module 3 Objectives

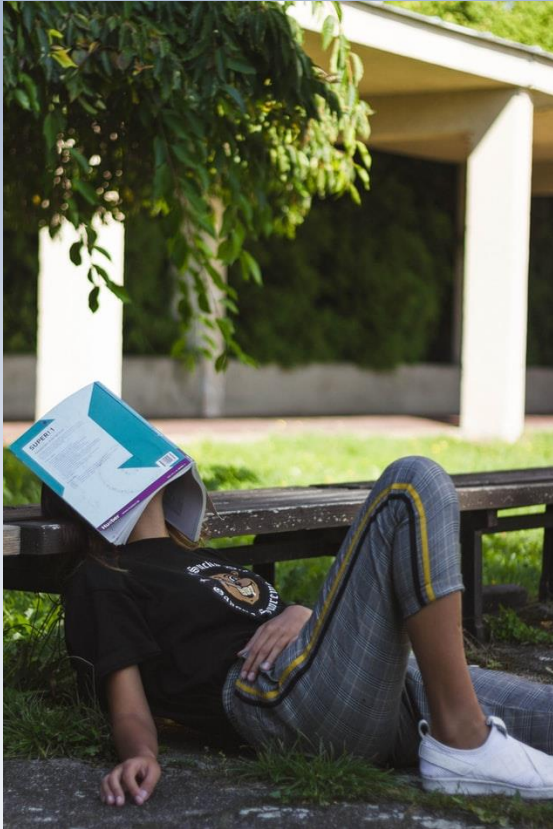
1. Define fatigue
2. Recognize signs of fatigue
3. Identify and implement fatigue countermeasures
4. Identify high-risk fatigue occupations and activities



**Fatigue Countermeasures Lab
San Jose State University Research Foundation**

Cassie Hilditch, PhD

What is Fatigue?



- **Acute sleep loss** (e.g., staying awake too long)
- **Cumulative sleep loss** (e.g., losing a little sleep several nights in a row)
- **Circadian misalignment** (e.g., trying to stay awake at night when your body is designed to sleep)
- **Poor sleep quality** (e.g., disrupted by noise, sleep disorders)

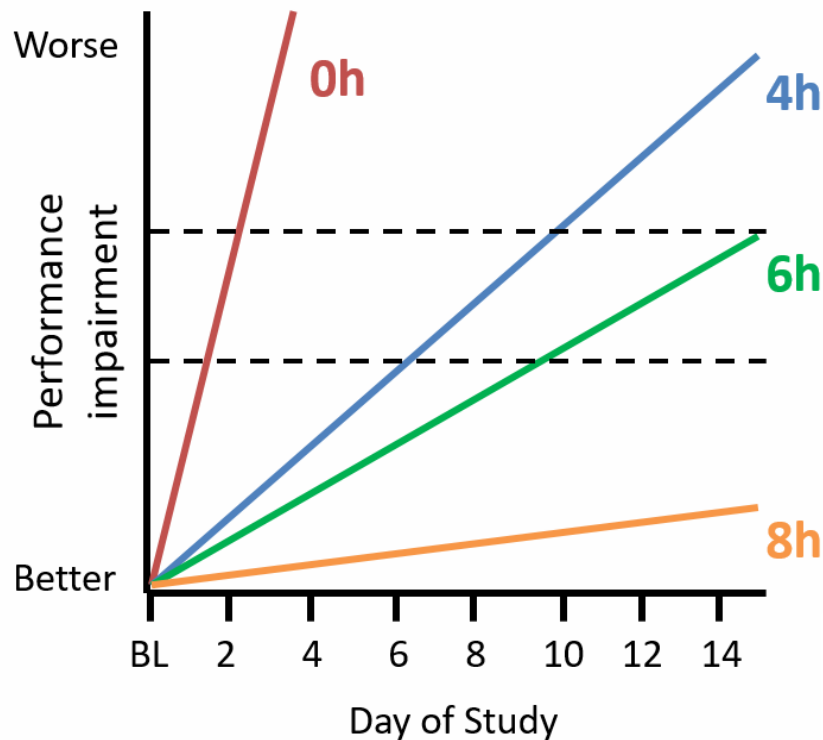
Signs of Fatigue

- Yawning, slow eye blinks, heavy eyelids, head nodding
- Feeling tired, sleepy, sluggish
- Poor mood, irritable, reduced communication
- Poor judgement, decision-making
- Impaired cognitive skills – reaction time, simple calculations, processing information

Recognizing Fatigue

We are not always great judges of our own impairment

Performance Impairment

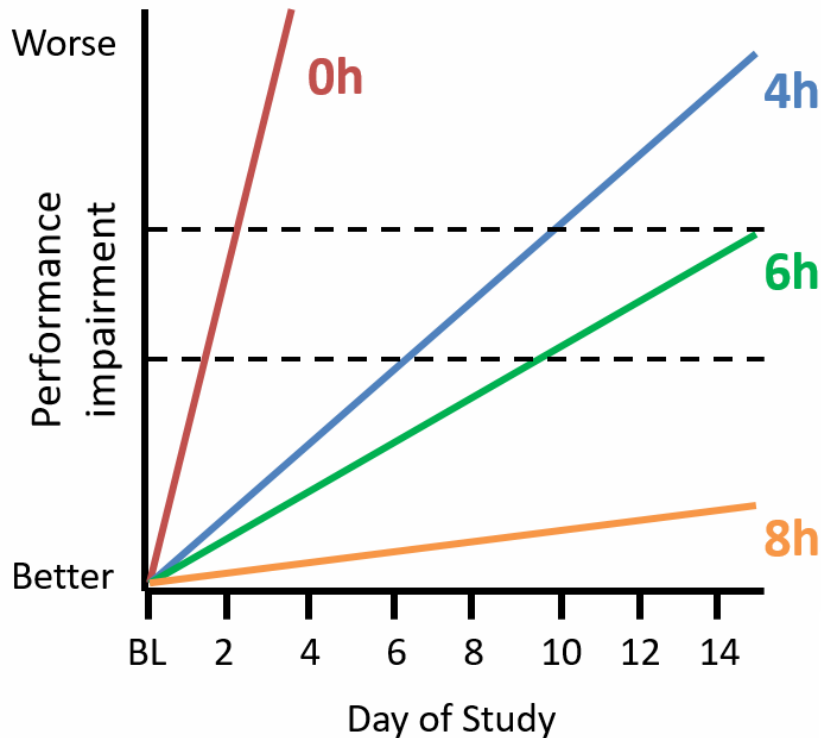


Adapted from Van Dongen et al., 2003

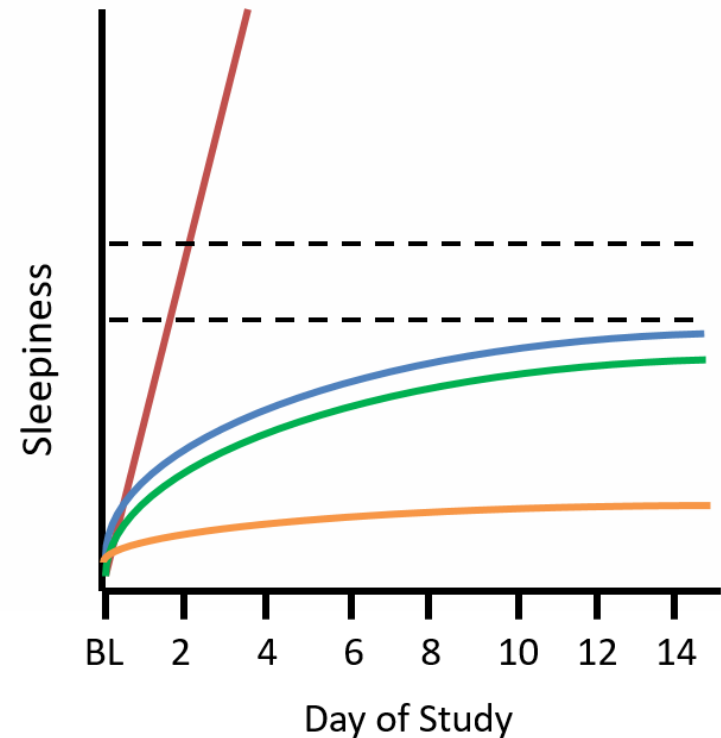
Recognizing Fatigue

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Performance Impairment



Self-Rated Sleepiness



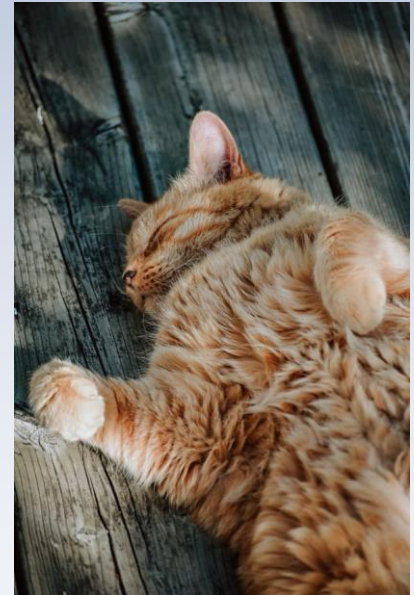
Adapted from Van Dongen et al., 2003

Fatigue Countermeasures

- **Proactive**
 - Improve sleep through sleep hygiene
- **Reactive**
 - Naps
 - Caffeine

Napping

- Best countermeasure to fatigue
- Longer naps tend to give longer benefits
- A 10-min afternoon nap can boost performance
- Benefits of nap depend on:
 - Timing
 - Duration
 - Sleep/wake history

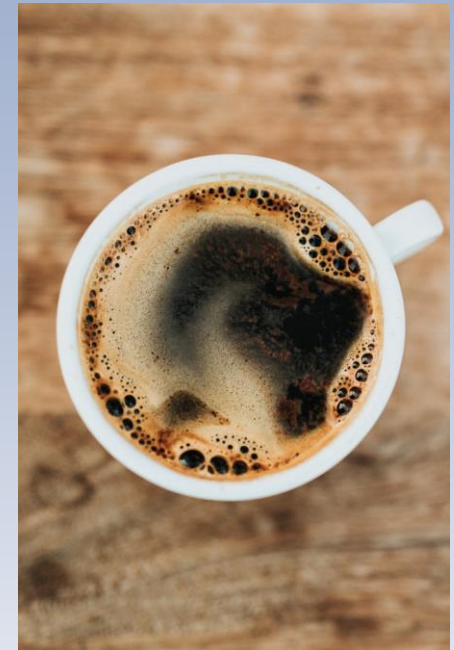


Sleep Inertia

- “Waking up tired”
- Groggy, disoriented, poor performance immediately after waking
- To reduce risk of sleep inertia:
 - Nap duration <30min
 - Nap during the day
- But note: sleep inertia can occur at ANY time

Caffeine

- Good *temporary* countermeasure
- Use strategically for best results
 - Avoid when not needed
 - Avoid within 5h of bedtime
- “Nappuccino”
 - Cup of coffee followed by a 20-min nap



Shiftwork

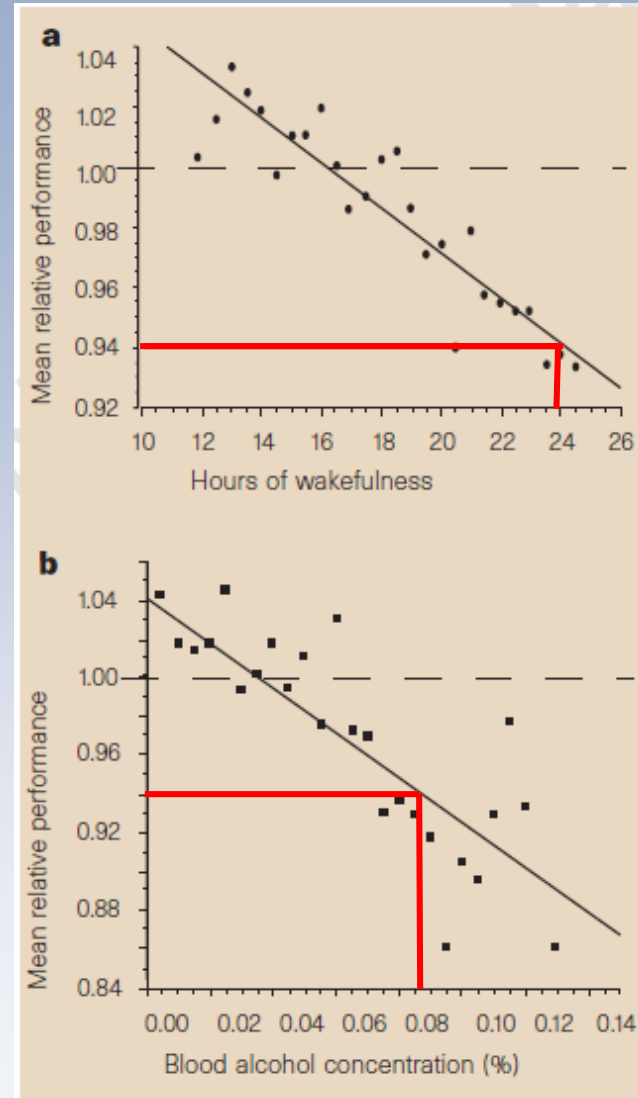


- Healthcare, emergency service workers, transport
- Irregular shifts
- Night shifts
- Type of task
 - Monotonous, vigilance, monitoring
 - Driving

Drowsy Driving

- Have you ever driven tired?
- High risk:
 - Professional drivers – long hours
 - Driving home from night shift
- **Driving fatigued can lead to performance impairments equivalent to driving drunk**

Dawson & Reid, 1997



Summary

- Fatigue is caused by sleep loss and circadian misalignment
- Used strategically, naps and caffeine can help to counteract the effects of fatigue
- Sleep inertia can cause performance impairment after waking from naps
- Shiftworkers have a high risk of fatigue
- Driving fatigued is very dangerous