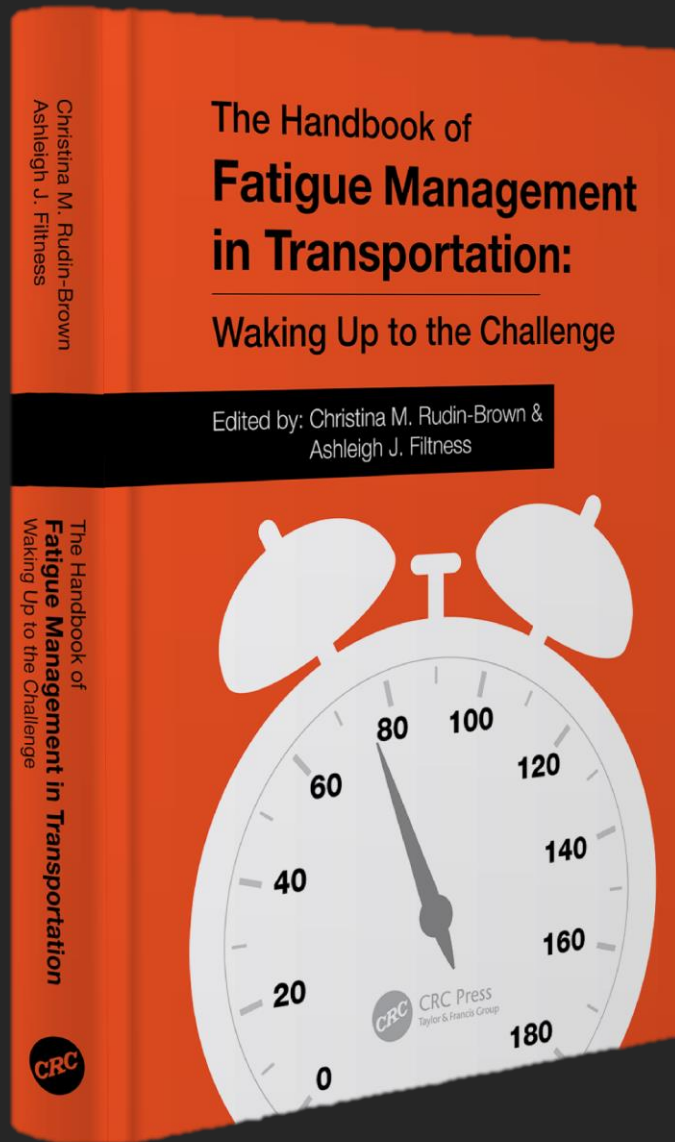


Jet Lag, Sleep Timing, & Sleep Inertia

Cassie J. Hilditch, PhD



Fatigue management in transportation

13/03/2024

What is sleep inertia?

- Temporary period of grogginess and performance impairment immediately after waking

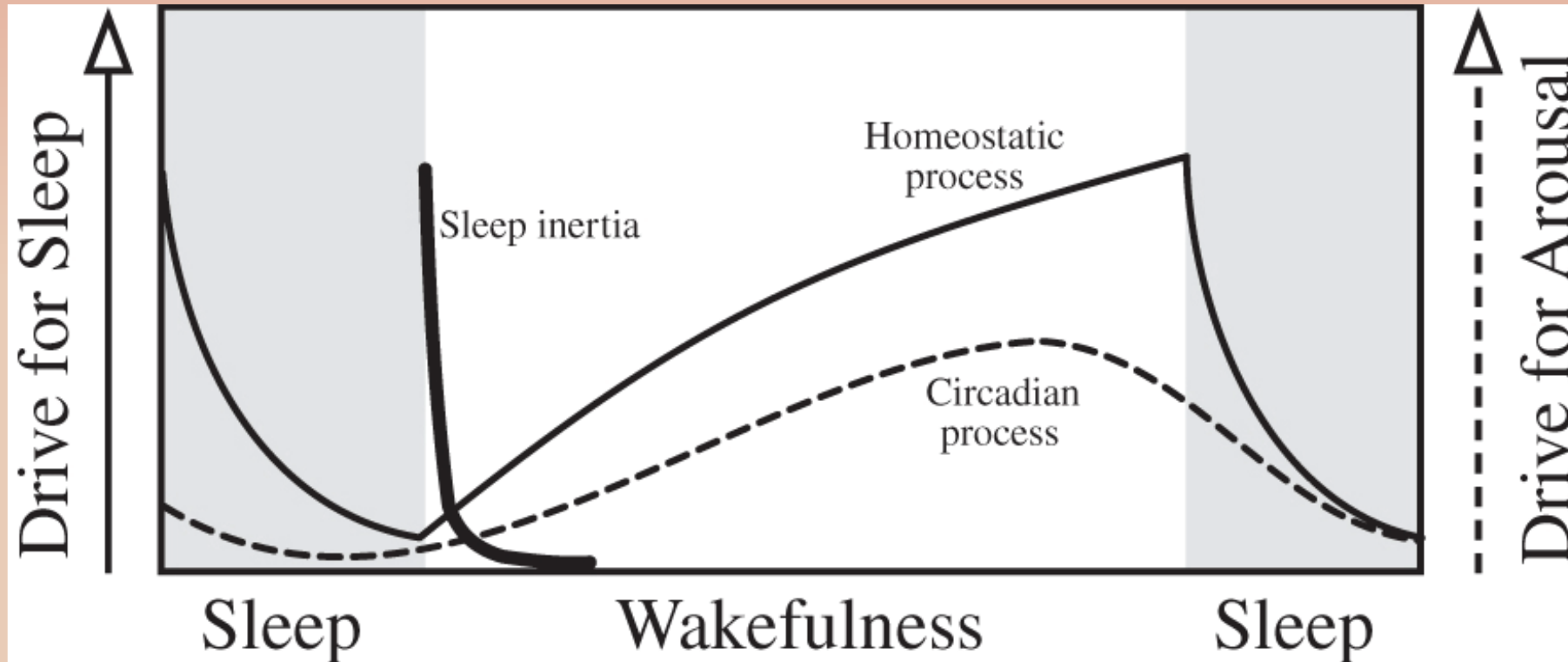


Image: Figure 3.2.2 Hilditch & Fischer, 2023



What causes sleep inertia?

- Delay in neurophysiological transition from sleep to wake
 - Neuronal firing rate
 - Cerebral blood flow
 - Spectral power
 - Neural network connectivity
- Exacerbating factors:
 - Waking during biological night
 - Waking from recovery sleep following sleep loss (acute and chronic)
 - Waking from deep sleep
- Can occur after ANY sleep period
 - Short naps may still contain SWS if taken after extended wakefulness
 - Can occur after sleep with no SWS
 - Can occur after a full, aligned, nighttime sleep



What are the consequences of sleep inertia?

- Short but severe!

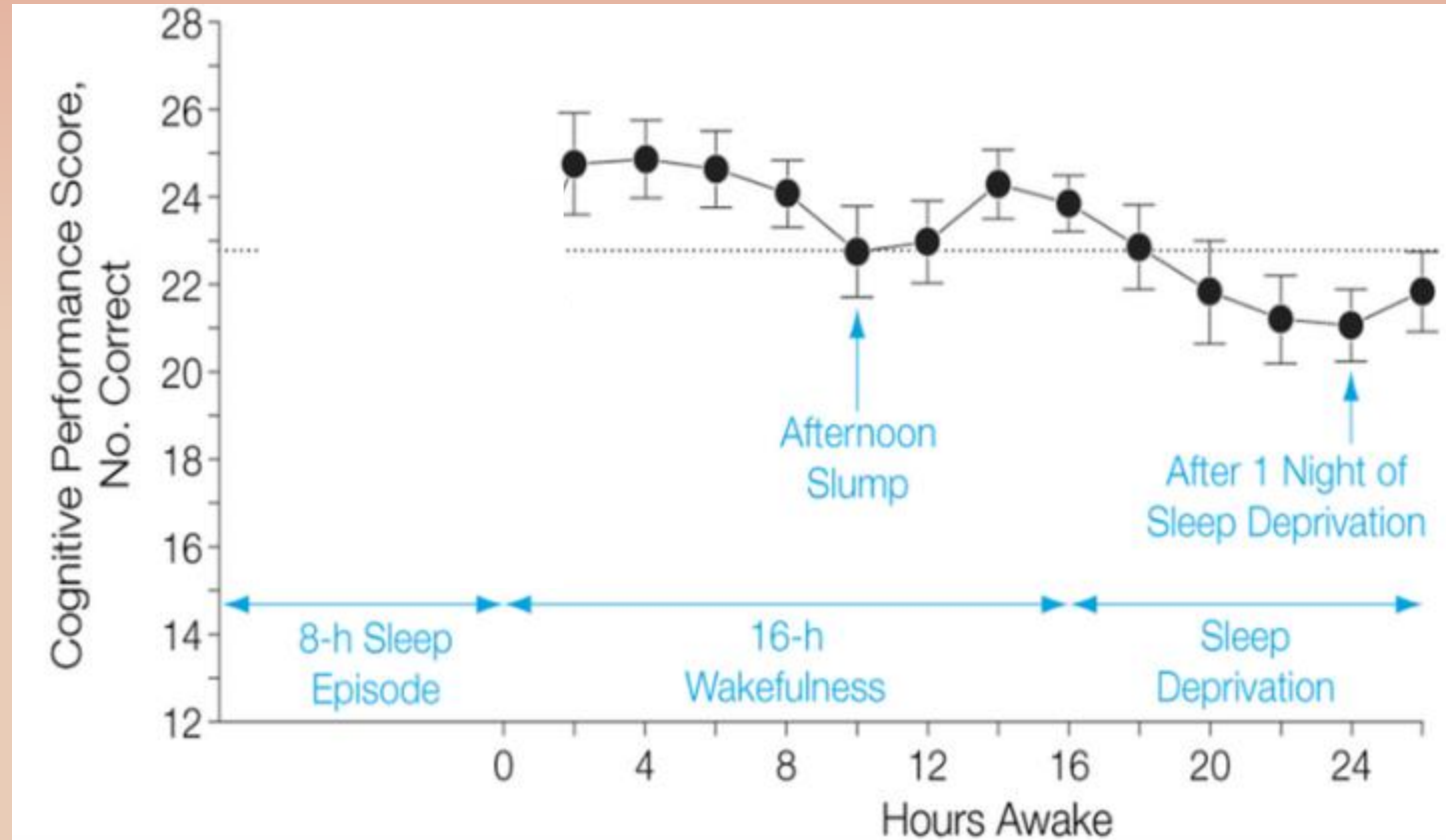


Image: Wertz et al., 2006



**The handbook of fatigue management in transportation:
Waking up to the challenge**

Examples of sleep inertia in transportation

Captain's Sleep Inertia Led to Tow Striking a Lock Gate

Air Canada pilot suffering from 'sleep inertia' put the whole flight in trouble: TSB



How can sleep inertia be managed?

- Proactive countermeasures:
 - Avoid factors that increase risk of sleep inertia
 - Caffeine (“nappucino”)
- Reactive countermeasures:
 - Light
 - *Research ongoing: exercise, temperature, sound, smells?*
- Field deployable
- Fatigue management framework, e.g., education
- Buffer (~20 min)

