



Sleepiness: How a biological drive can influence other risky road user behaviours

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Centre for Accident Research & Road Safety - Queensland

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Outline

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- Effects of Sleepiness
- Sleepiness and other Risky Road Behaviours
- Protective Factors
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Introduction

- The 'fatal five' continue to be major causes of road trauma
- Driver sleepiness is relatively unregulated among non-professional drivers
- Strongest evidence (case-control data) suggests that 19% of all fatal and severe crash are due to sleepiness
- Crashes often have multifactorial causes, and sleepiness may contribute to crashes that were primarily attributed to other factors

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Introduction

- The causes of sleepiness are numerous
- Sleep deprivation leads to a sleep debt and to daytime sleepiness
 - Acute/partial (1-4 hrs deprivation of sleep duration)
 - Total (no sleep)
 - Chronic (repeated long-term deprivations)
 - Shift work
 - Sleep disorder
 - Life circumstances (newborn, stress, work)
- Sleepiness is a state that most, if not all drivers have experienced, and are habitually exposed too

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Societal Sleepiness

- Sleep disruption, sleep disorders, poor sleep habits, and daytime sleepiness is increasing
 - A fifth of Australians sleep less than 6.5 hrs/night
 - Chronic daytime sleepiness occurs in 11.7% of Australians
 - 9.8% of younger Australians (18-24 years) report chronic daytime sleepiness levels
- Sleeping < 7 hrs/night leads to lowers levels of personal wellbeing
- Two fifths of individuals fall asleep at work from excessive daytime sleepiness

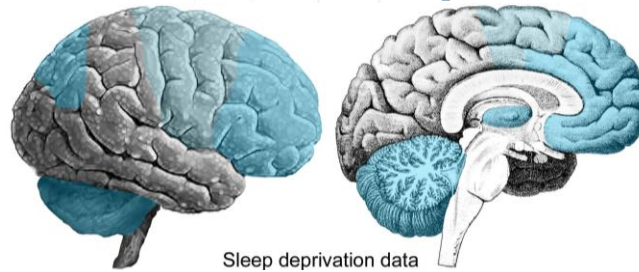
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Effects of Sleepiness

- Sleepiness has detrimental impact on a number of psychological processes:
 - The ability to maintain alertness
 - Efficient and precise cognitive functioning
 - Accurate risk-perceptions
 - Impulse control
 - Swift reaction times
 - Emotional regulation and interpersonal communication
- Blood Alcohol Content (BAC) comparisons
 - 17-19 hours awake \approx BAC of 0.05%
 - > 24 hours awake \approx BAC of 0.1%

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Effects of Sleepiness



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Sleepiness & other Risky Road Behaviours

- Sleepiness impairs a number of psychological process that are important for safe driving
- Many of these psychological process are also involved with other risky road behaviours
- The potential causes for risky driving behaviours are numerous and complicated
 - attitudes, personality, risk perceptions, etc
- The effects from sleepiness are present from the moment of awakening

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Sleepiness & Drink Driving

- Sleepiness and alcohol produces levels of impairment that are greater than the impairment from either sleep deprivation or alcohol alone
 - Combining 5 hrs of sleep and a BAC < .04%, leads to more microsleeps and poorer vehicle control
 - Effects are still present when BAC levels are near to zero
- Majority of alcohol-related crashes and BAC apprehensions occur between 01:00-04:00
- Substantial increases of the odds of crashing when acutely sleepy and alcohol

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Sleepiness and Speeding

- Sleepiness effects the ability to adequately control a vehicle
- Sleepiness leads to increases and decreases of speed variability
- The magnitude of the variations increases with longer driving durations
- Some sleepy drivers will purposefully speed to facilitate an increase of arousal levels
- **Multiplicative effects from**
 - Sleepiness: impaired cognitions and slower reaction times
 - Speeding: less time to react

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Sleepiness and Distracted Driving

- Sleepiness effects the ability to maintain attention and limits the ability to filter task irrelevant stimuli
- Sleepy drivers divert their gaze more leading to more distraction-related driving incidents
- Sleepiness + BAC < .05 + mobile usage leads to impaired driving performance
- Distractibility increases with longer driving durations
- Likely due to seeking novel stimuli to increase arousal levels

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Sleepiness and Aggression

- Emotional regulation and interpersonal functioning are compromised by sleepiness
- Sleepiness leads to greater emotional reactivity to neutral and negative stimuli
- Sleepy individuals are more reactive to low levels of stress and use poorer coping skills with stressful situations
- Impulse control is impaired with sleepiness when responding to negative stimuli compared to positive stimuli

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Sleepiness and Young People

- Younger drivers are more critically affected by sleepiness
- Younger persons show greater impairments of vigilance, vehicle control, and hazard perception skills when sleepy than older drivers
- Younger drivers hold erroneous risk perceptions of the dangerousness of sleepy driving
- Younger drivers:
 - Frequently drive during times of high sleepiness
 - Have greater sleep debts before a long drive
 - Less likely to use sleepiness countermeasures

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Protective Factors

- Increasing total sleep time
 - Increasing sleep time (7 to 8-9 hrs) improves daytime alertness, neurobehavioural performance, and mood
 - Longer sleep times can potentially buffer the impairments from sleep deprivation
- Improving sleep quality
- Regularising of sleep-wake times
 - Increases mood, daily functioning, and sleep quality
 - Regular sleep-wake times can buffer the impairments from sleep deprivation
- Sleep education programs are effective

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Conclusion

- Driver sleepiness contributes substantially to road trauma
- The effects from sleepiness are profound and far reaching
- Current data suggests that societal sleepiness is increasing
- Sleepiness is a state that most, if not all drivers have experienced, and are habitually exposed too
- Reductions of sleepiness might lead to reductions of other risky driving behaviours

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Thank you for listening!

**Comments
or
Questions?**

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*"I'm not asleep... but that doesn't
mean I'm awake."*

(Unknown Author)



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