



# Alcohol and cannabis effects on young adults' neurocognitive function

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Medicine

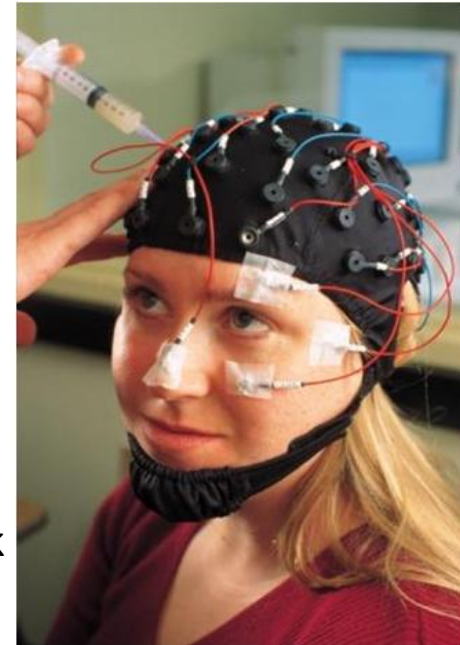
National Drug and Alcohol Research Centre

# Introduction

- Adolescence and young adulthood is a period of maturation, with the frontal and temporal lobes of the brain reaching maturity in the mid-twenties
- Executive function (e.g., decision-making, behavioural control, attentional control) and memory processes are subserved by these regions, and are known to be damaged in older, substance-dependent individuals
- Are there subtle deficits in brain function in younger individuals who have been using for a shorter period of time, but may be doing more damage to these developing areas of brain?

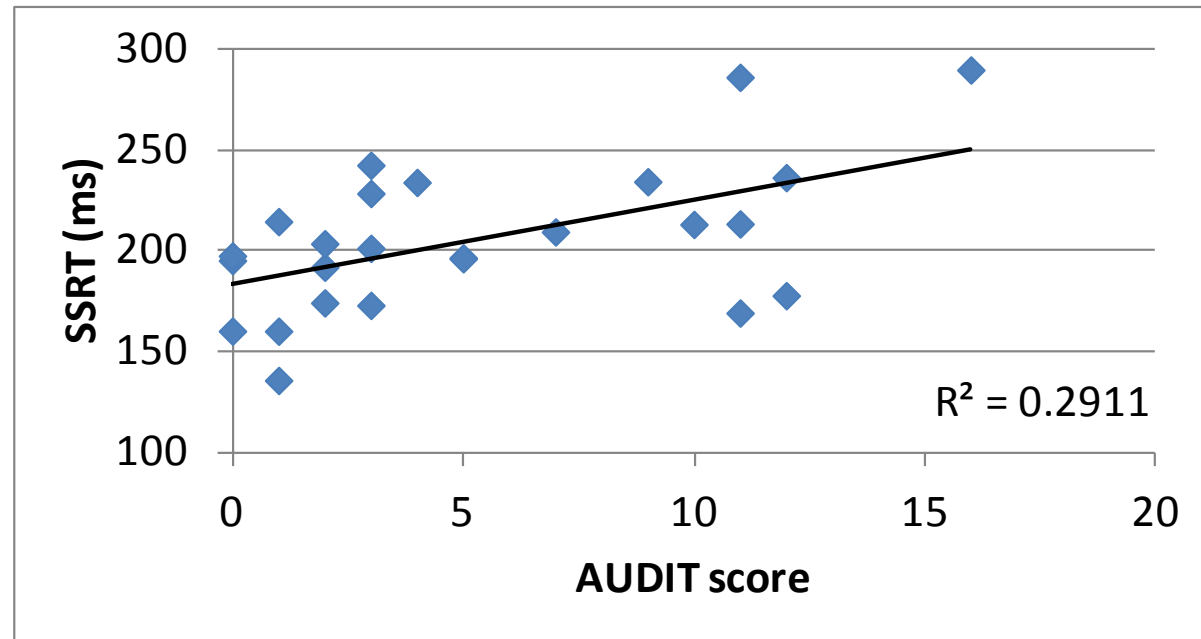
# Methods

- Recruited 33/60 young adults aged 18-21
  - Today, only presenting data from 25 participants who vary in alcohol use and do not regularly use other drugs
- Examination of
  - Alcohol Use Disorders Identification Test (AUDIT)
  - Lifetime alcohol and cannabis use
  - The electrical activity of the brain is recorded
  - Tests of cognition; today, discussing only inhibitory control task (the “stop-signal task”)



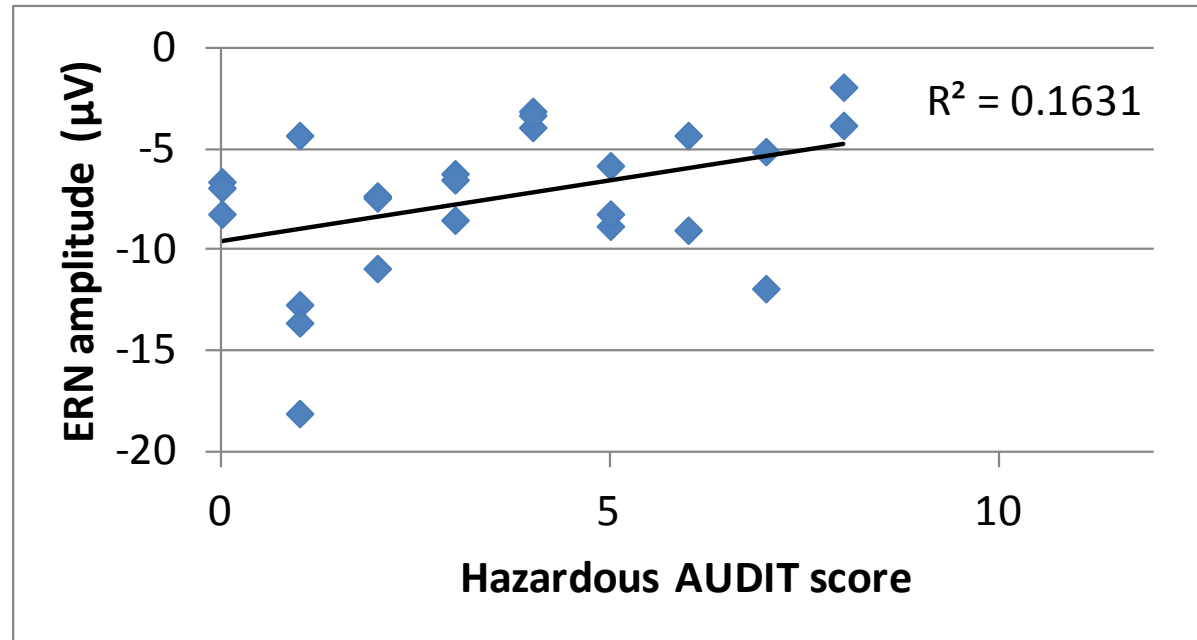
# The stop-signal reaction time

- An estimate of the time needed to stop a response
- Shorter SSRT reflects better inhibitory performance
- A higher AUDIT score is associated with a longer SSRT ( $r = .540$ ,  $p = .005$ ), indicating **deficient inhibition** in hazardous/harmful drinkers.



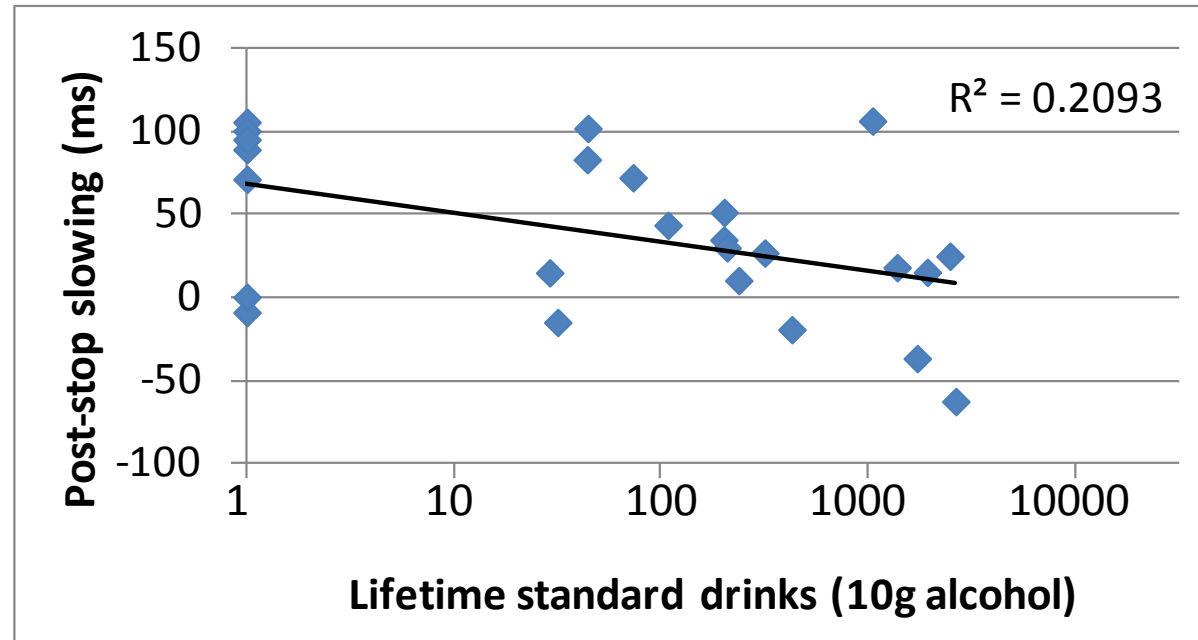
# The error-related negativity

- A brain potential indexing monitoring of actions and detection of errors
- Greater negativity relates to better performance monitoring
- Hazardous drinking is associated with a smaller ERN ( $r = .404, p = .045$ ), indicating **deficient monitoring of performance** in hazardous drinkers



# Post-stop slowing

- After a signal to inhibit is presented, participants typically slow down on the next trial
- Greater post-stop slowing indexes greater trial-by-trial adaptive adjustment of performance
- Those with a heavier lifetime history of alcohol use show **less adaptive adjustment** ( $r = -.457, p = .021$ ).



# Hazardous/harmful drinkers show:

- **Poorer behavioural inhibition** – more likely to make impulsive, inappropriate responses
- **Poorer brain monitoring of performance** – engage in less checking of actions relative to desired outcomes for long-term goals
- **Less adaptation of performance** following inhibitory tests
- If these results hold when the full sample is collected, atypicalities in inhibitory processing are apparent in a younger group with less alcohol exposure than previously considered
- Correlation is not causation: It may be that these deficits precede and contribute to later alcohol abuse problems – ask me next year!



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