



Alcohol and cannabis effects on young adults' neurocognitive function

Janette Smith & Richard Mattick

Medicine

National Drug and Alcohol Research Centre

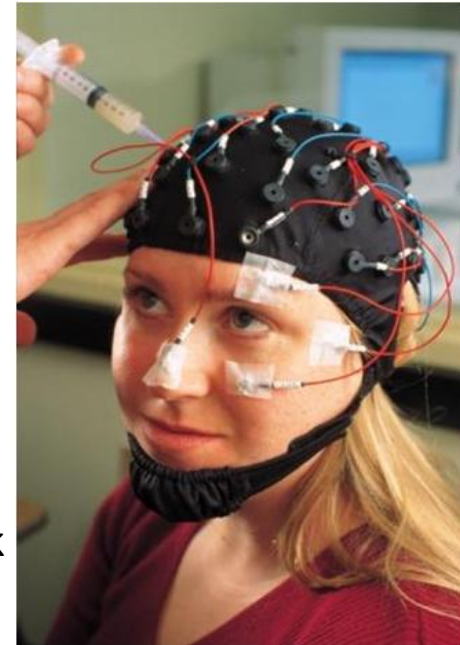
Introduction

- 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?



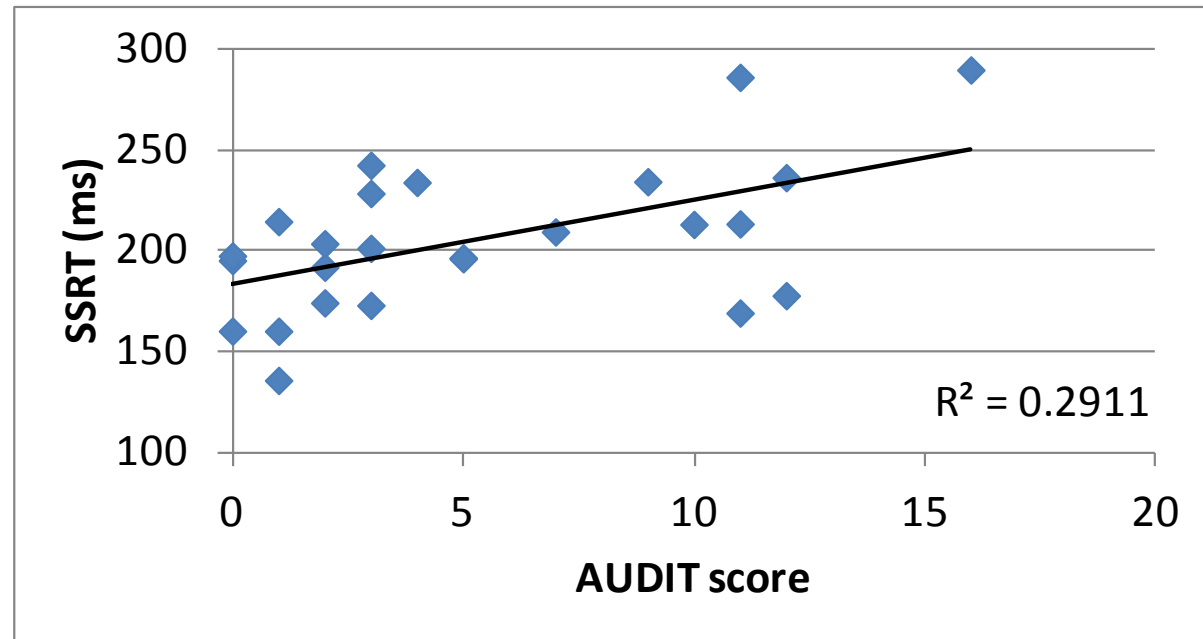
Methods

- 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”)



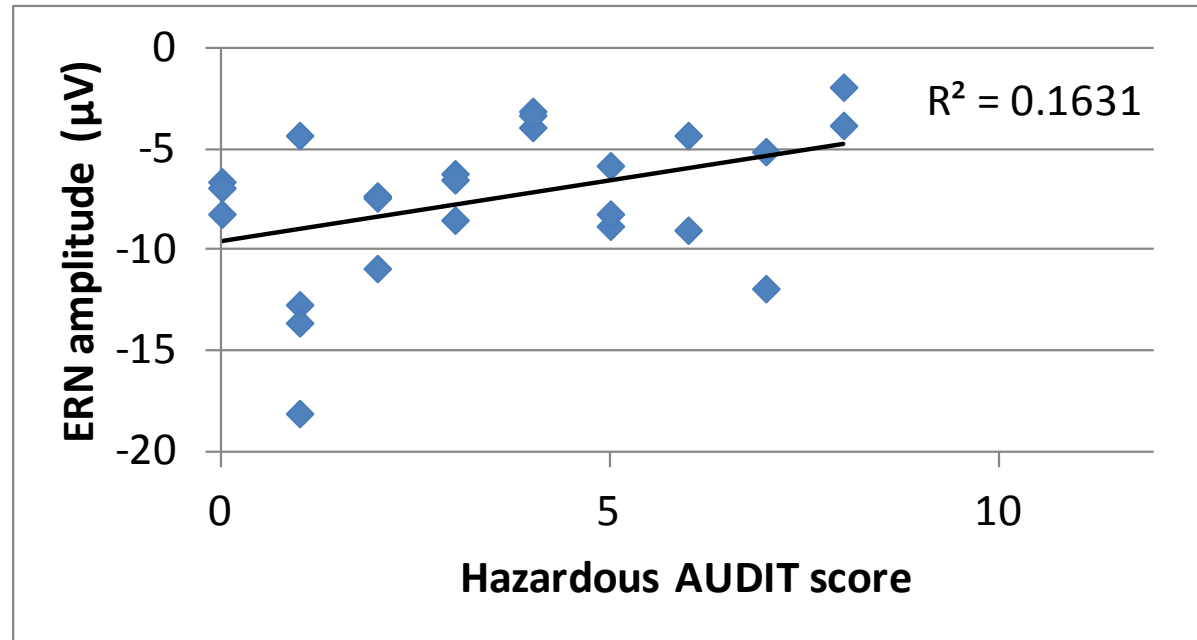
The stop-signal reaction time

- 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.



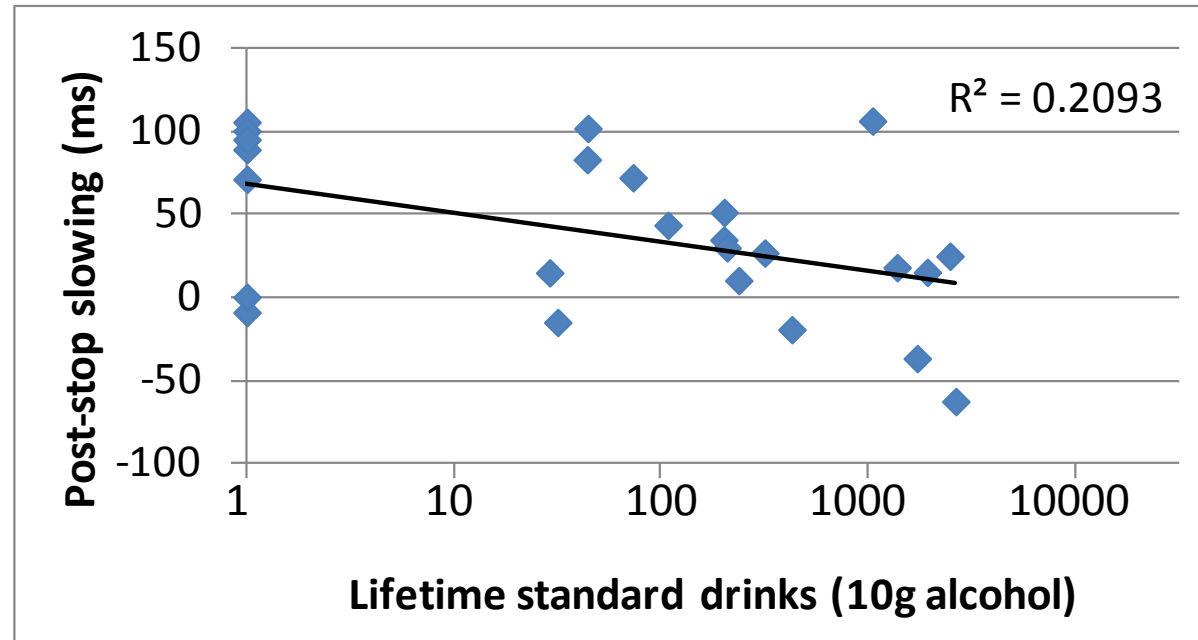
The error-related negativity

- 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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