Latent deleterious effects of binge drinking over a short period of time revealed only by ERP measures.

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INTRODUCTION

- Episodic excessive alcohol consumption (i.e., binge drinking) is a major health problem, affecting about 40% of 18- to 24-year olds. Short- and long-term harmful consequences of this behaviour are clearly established at the medical, social and cognitive levels. Although the neurotoxicity induced by long-term chronic alcoholism is well known, the cerebral consequences of binge drinking are still unclear.
- This study is the first to explore, by means of event-related potentials, the midterm cerebral effects of binge drinking behaviours among young adults.

METHODS

- Initial screening of 462 first-year undergraduate students in order to evaluate their past, present and expected alcohol consumption for the academic year to come.
- Participants: 2 groups of 18 subjects without past alcohol consumption:
  - Binge drinkers expecting to have binge drinking behaviours during the year to come.
  - Controls expecting to remain abstinent during the year to come.
- Stimuli: Voices enunciating a semantically neutral word with an emotional prosody.
- Task: Emotional judgment, i.e., deciding if the voice prosody is negative or positive.
- Design: ERP recording at two sessions: Beginning and end of the academic year. In each session, 5 blocks of 32 stimuli presented for 700 ms (ISI: 800 – 1300 ms).

RESULTS

Alcohol consumption: No difference at Session 1. At Session 2, higher total consumption, number of drinking occasions per week, and number of drinks per occasion among binge drinkers.

Behavioural results: At both sessions, no group difference, neither for accuracy nor for reaction times.

Electrophysiological results:
- Amplitudes: No group difference.
- Latencies: No group difference at Session 1. At Session 2, binge drinkers had significantly longer latencies for the 3 components of interest:
  - P1 (F1,34 = 18.24, p < 0.001)
  - N2 (F1,34 = 13.41, p < 0.001)
  - P3b (F1,34 = 8.65, p = 0.006)

DISCUSSION

(1) The latency delays observed in binge drinkers on P1 (early perceptual processing), N2 (specific perceptual processing of human voices) and P3b (decisional processing) waves, are the ERP markers of a slowed cerebral activity during the processing of complex stimuli.
(2) Cerebral dysfunctions appear early in binge drinkers (after only 9 months) and before any detectable behavioural impairment.
(3) The ERP delays observed in binge drinkers are similar, even if less marked, to the deficits observed in chronic alcoholism

SUMMARY

- Knowledge about the cerebral effects of binge drinking is lacking.
- We compared young adult binge drinkers with matched abstinent controls in a test–retest paradigm, before the appearance of drinking habits (Session 1) and after 9 months of binge drinking (Session 2).
- The two groups did not differ on any measure at Session 1.
- At Session 2, binge drinkers had delayed P1, N2 and P3b latencies.
- These ERP deficits were observed in the absence of behavioural difference, and are similar to those observed in alcoholism.

REFERENCES
