

## COMPARISON OF THE SEDATIVE, COGNITIVE, AND ANALGESIC EFFECTS OF ETHANOL, NITROUS OXIDE, AND SEVOFLURANE.

Raquel Duarte\*, Alison McNeill\*, Gordon Drummond, Brian Tiplady\*  
Department of Anaesthesia, Pain, and Critical Care Medicine; University of Edinburgh, UK

Obtunding and immobilisation are recognised as different effects of anaesthetics. Other effects may be measured by studying subanaesthetic doses, to allow reporting subjective features. Previous studies have not compared nitrous oxide and a volatile agent with the effects of ethanol.<sup>1</sup>

We compared ethanol, nitrous oxide (15 and 25%) and sevoflurane (0.3 and 0.5%) in a double blind placebo controlled four session crossover study. In one session, no active agent was given: in another, the drink contained ethanol. In the other two sessions each one of the inhaled agents was presented using both concentrations in random order. We chose end-tidal values of anaesthetic that were equal fractions of the MAC, with the greater dose predicted to cause impairment similar to a blood ethanol concentration of 80 to 100 mg/100ml. We tested mood with visual analogue scales (e.g. alert-drowsy), psychomotor performance, logical memory, and sensation and pain threshold using von Frey filaments. We used analysis of covariance with the pre-treatment (baseline) value as a covariate. If the treatment effect was significant ( $P < 0.05$ ), differences between treatments, and differences between doses of the inhaled treatments were compared. The scales for sober—drunk, alert—drowsy were analysed individually, because these subjective effects were of specific interest.

We recruited four female and four male volunteers, aged 19-28 years (mean 22), weighing 47-87 kg (mean 65). All completed the study successfully. Peak ethanol concentrations of 84 mg/100 ml (SD 10) occurred 65 minutes after the drink. For all tests, at least one measure showed a significant treatment effect. The patterns of effects of nitrous oxide, ethanol, and sevoflurane were clearly different.

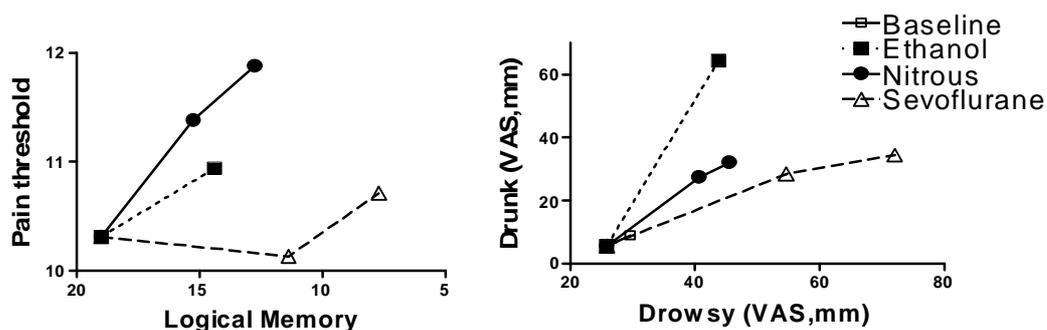


Figure: Progressive dose-related effects of the different agents.

We conclude that subjective reports of the effects of subanaesthetic doses of anaesthetics may allow selection of anaesthetics for specific properties.

Zacny JP, Camarillo VM, Sadeghi P, Black M. Effects of ethanol and nitrous oxide, alone and in combination, on mood, psychomotor performance and pain reports in healthy volunteers. *Drug and Alcohol Dependence* 1998; **52**: 115-23