

Washington University School of Medicine

Digital Commons@Becker

---

Posters

2004: Alcoholism and the Latest Genetics and  
Neuroscience Findings

---

2004

## Stimulant users are sensitive to the stimulant properties of alcohol as indexed by alcohol-induced heart rate increase

C. Brunelle  
*McGill University*

S. P. Barrett  
*McGill University*

R. O. Pihl  
*McGill University*

Follow this and additional works at: <https://digitalcommons.wustl.edu/guzeposter2004>



Part of the [Medicine and Health Sciences Commons](#)

---

### Recommended Citation

Brunelle, C.; Barrett, S. P.; and Pihl, R. O., "Stimulant users are sensitive to the stimulant properties of alcohol as indexed by alcohol-induced heart rate increase" (2004). *Posters*. Paper 3 Samuel B. Guze Symposium on Alcoholism.

<https://digitalcommons.wustl.edu/guzeposter2004/3>

This Poster is brought to you for free and open access by the 2004: Alcoholism and the Latest Genetics and Neuroscience Findings at Digital Commons@Becker. It has been accepted for inclusion in Posters by an authorized administrator of Digital Commons@Becker. For more information, please contact [vanam@wustl.edu](mailto:vanam@wustl.edu).

Stimulant Users are Sensitive to  
the Stimulant Properties of Alcohol  
as Indexed by Alcohol-Induced  
Heart Rate Increase

Brunelle, C., Barrett, S. P., &  
Pihl, R. O., McGill University,  
Montréal, CANADA

# Abstract

- **Aims:** One indicator of increased sensitivity to alcohol-induced reward is a heightened heart rate (HR) increase following alcohol intoxication, a characteristic that has been associated with increased alcohol-induced DA release. The goal of this study is to determine whether users of drugs known to induce DA release have higher HR increases after alcohol intoxication than non-users.  
**Methods:** 64 male individuals with known drug-use histories participated in an alcohol challenge.  
**Results:** Stimulant users had significantly higher ethanol-induced HR increases, while use of marijuana or hallucinogens was not associated with high HR response to alcohol.  
**Discussion:** In addition to indicating risk for alcohol abuse, high HR response to alcohol may also suggest increased propensity for psychostimulant use.

# Introduction

- Stimulants and ethanol are the most frequently co-abused drugs.
- These substances have been demonstrated to induce dopamine (DA) release, a neurotransmitter involved in reward and reinforcement.
- Certain individuals may have increased sensitivity for DA-enhancing drugs.

# Intro (continued)

- An exaggerated heart rate (HR) increase following alcohol intoxication has been suggested as a marker of sensitivity to alcohol-induced reward.
- This marker has been associated with DA release following alcohol intake and high sensitivity to reward.

# Goals and hypotheses of the study

- Investigate the relationship between drug use and HR response to alcohol.
- Our hypothesis is that stimulant users will have elevated HR increases following alcohol intoxication relative to non-stimulant users.

# Methods

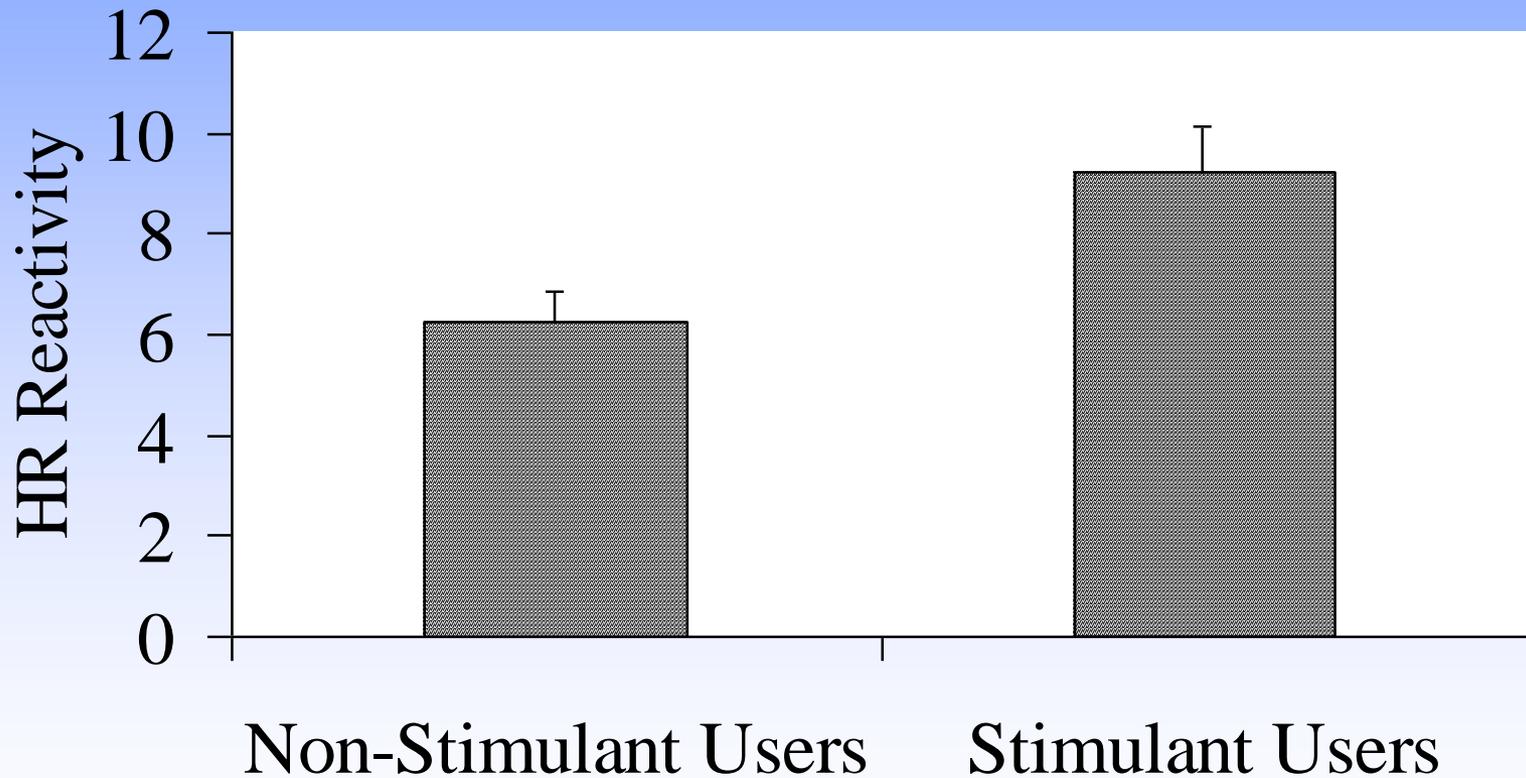
- 64 males ( $M = 22.46$ ,  $SD = 3.39$ ) received .75 g of pure ethanol per kg of body weight.
- HR was measured at baseline and 30 minutes post-intoxication.
- Drug use behavior was assessed using the Addiction Severity Index and included cannabis, cocaine, amphetamines, hallucinogens, heroin, PCP and inhalant use.

# Results

- Heroin, PCP, and Inhalants were used by a very small portion of the sample and hence were not included in the analyses involving HR response.
- Stimulant users had significantly increased cardiac reactivity to alcohol than non-stimulant users ( $p = .03$ ).

# HR Reactivity to Alcohol Intoxication in Stimulant and Non-Stimulant Users

- 



# Results (continued)

- In order to determine the size of the relationship between HR response and stimulant use, an odd ratio was calculated. The probability of having used stimulants increases by 19% as the HR response increases by one bpm.
- On the other hand, cannabis ( $p = .746$ ) and hallucinogen ( $p = .273$ ) use are not significantly associated with HR response.

# Discussion

- Only stimulant use was associated with HR reactivity to alcohol.
- Alcohol/stimulants increase DA levels.
- Sensitization is the potentiation of the effects of one drug following its frequent use.
- Sensitization to the cardiovascular effects of cocaine (Kollins and Rush, 2002) and ethanol (Newlin and Thomson, 1991) have been reported.

# Discussion (continued)

- Sensitization is also associated with increased DA availability.
- High HR response to alcohol intoxication may reflect sensitization to alcohol.
- Those who have sensitized to the cardiovascular effects of alcohol may be more sensitive to other DA-enhancing drugs such as stimulants.

# Discussion (continued)

- This study suggests that stimulant users are sensitive to the stimulant properties of alcohol.
- High HR response to alcohol may not only reflect sensitivity to alcohol reward but to all DA-enhancing drugs.
- Alcohol and stimulant co-abusers may show superior treatment response to treatments involving DA-mediated medications.