2004

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

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

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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.

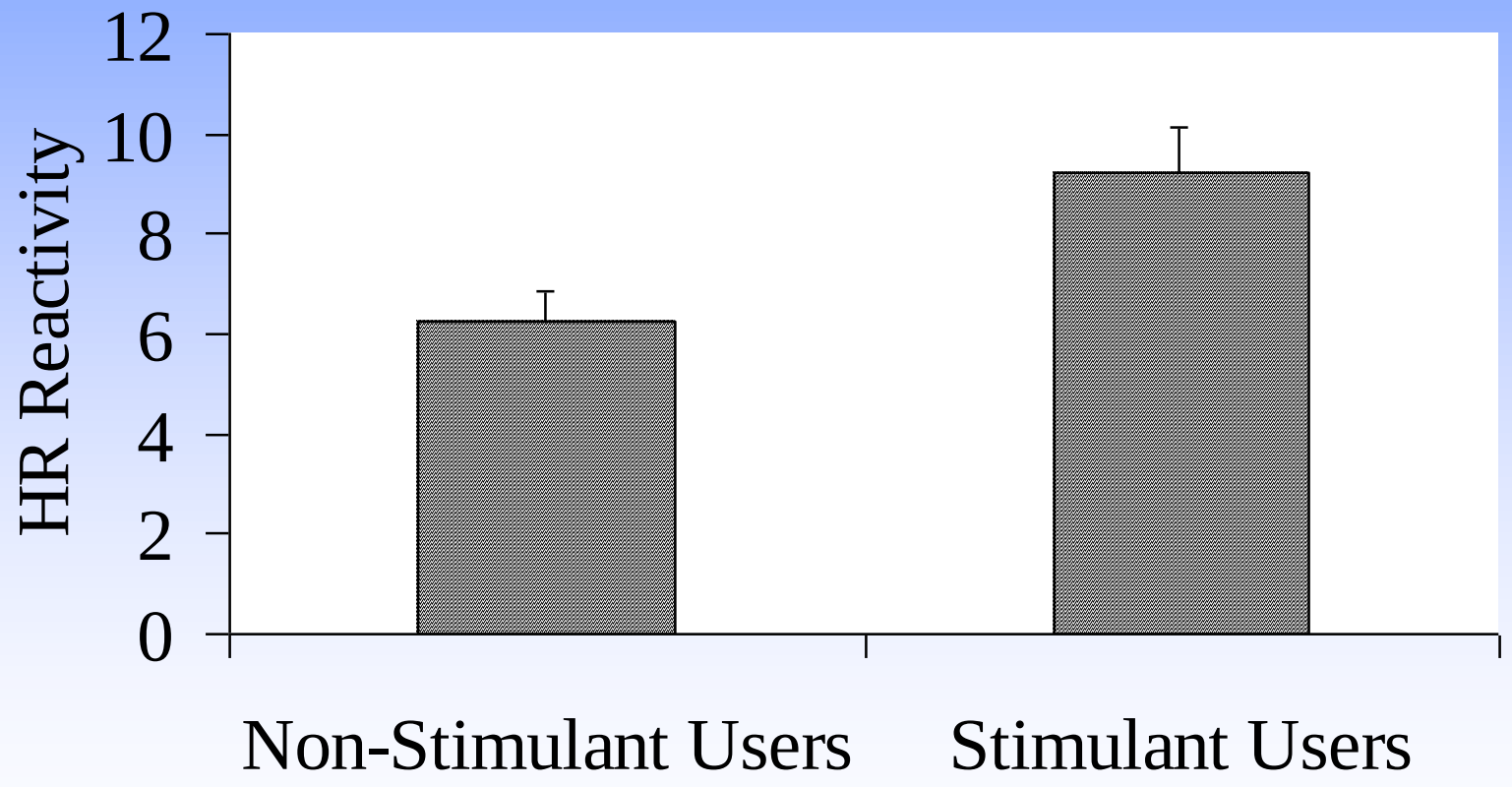
Methods

- 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.