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Decision making in students differing in binge drinking patterns

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Introduction

- Alcohol and substance dependent persons perform less well on behavioral decision making tasks, like the Iowa Gambling Task (IGT; Bechara et al., 1999).
- Heavy social drinking has been associated with diminished attention and visuospatial skills, especially for heavy social drinkers (>21 drinks/week; Parsons and Nixon, 1998).
- Little is known regarding the relation between heavy social drinking or binge drinking and decision making skills among young adults.
- The goal of this study was to determine whether levels of alcohol use and binge drinking are related to differential decision making, as measured by the IGT.
- We also investigated the relation between decision making and self-report measures of impulsivity, real life negative consequences of alcohol use, and a more general heavy drinking measure.

Method

- Participants were selected from a cohort of 2866 individuals taking part in a longitudinal study of student health (IMPACTS), assessing alcohol and substance related behaviors every six months, from precollege (Wave 0) through Fall of the third college year (Wave 4).
- Latent Class Growth Analysis (LCGA) was used to classify students into one of four groups, based on their binge drinking across 5 time points:
  - Non-binge drinking at any time point (36%)
  - Moderate binge drinking at any time point (30%)
  - Increasing binge drinking across time (10%)
  - Heavy binge drinking at all time points (24%)
- 50 participants were selected from each binge drinking group.

Measures

**Decision Making Task:**
Iowa Gambling Task – computerized (Bechara et al., 1999)
The task required 100 choices from one of four card decks:
- 2 disadvantageous decks: high rewards, but even higher losses
- 2 advantageous decks: lower rewards but also lower losses
Subjects had to discover which decks were advantageous and learn to select cards accordingly.

**Diagnostic Interview Schedule (DIS; Robins et al., 1998)**
Axis 1 Diagnoses established based on this structured clinical interview

**Impulsivity:**
Barratt Impulsivity Scale (BIS)
Zuckerman Impulsivity/Sensation Seeking Scale (ImpSS)

**Negative Alcohol Consequences:**
Composite of a 5-item inventory, e.g.: Drunk driving, not showing up at class or work, being drunk at school/work, continuing drinking despite physical/psychological problems that get worse with drinking.

Data Analysis

- The LCGM resulted in a four class solution, with a probability of categorization in the correct class (frequent binge drinking class): see left Figure:
  - 88% for the Non binge drinkers
  - 71% for the Moderate binge drinkers
  - 71% for the Increasing binge drinkers
  - 82% for the High binge drinkers

**Results**

- **MANCOVAs Iowa Gambling Task:**
  Although all four groups learned to choose the advantageous decks (positive slope over 4 learning stages: see Figure on the right):
  - A Group by Advantageous choice interaction was present, $F(3,184)=5.40, p<.01, 
  - Posthoc analyses showed that the high binge drinking group performed worse than the non-binge drinking group ($p<.01$, Bonferroni corrected)

<table>
<thead>
<tr>
<th></th>
<th>Age (SD)</th>
<th>% Caucasian</th>
<th>ACT composite score (SD)</th>
<th>Family History for Alcoholism (0/1)</th>
<th>Drinks/Week Fall Freshman Year – Wave 1 (SD)</th>
<th>Age at First Full Drink (SD)</th>
<th>Barratt Impulsivity Scale (SD)</th>
<th>Impulsivity Sensation Seeking Scale (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non binge drinkers</td>
<td>19.9 (0.40)</td>
<td>94%</td>
<td>27.2 (3.7)</td>
<td>68/30/2</td>
<td>1.24 (2.14)</td>
<td>15.6 (2.13)</td>
<td>23.6 (7.35)</td>
<td>7.62 (3.52)</td>
</tr>
<tr>
<td>Moderate binge drinkers</td>
<td>19.9 (0.30)</td>
<td>94%</td>
<td>26.8 (3.3)</td>
<td>75/21/4</td>
<td>4.74 (6.39)</td>
<td>14.9 (1.96)</td>
<td>28.2 (6.94)</td>
<td>9.70 (3.80)</td>
</tr>
<tr>
<td>Increasing binge drinkers</td>
<td>20.0 (0.30)</td>
<td>98%</td>
<td>26.7 (3.4)</td>
<td>62/30/8</td>
<td>14.00 (11.40)</td>
<td>15.0 (2.07)</td>
<td>26.9 (10.9)</td>
<td>9.65 (4.10)</td>
</tr>
<tr>
<td>High binge drinkers</td>
<td>20.0 (0.40)</td>
<td>96%</td>
<td>26.9 (2.9)</td>
<td>62/28/10</td>
<td>17.96 (13.77)</td>
<td>13.8 (1.45)</td>
<td>28.3 (8.64)</td>
<td>9.04 (3.86)</td>
</tr>
</tbody>
</table>

**Correlations**

- IGT Advantageous Choices (Stage 2 + 3 + 4) and Impulsivity: No significant correlations.
- IGT Advantageous Choices correlates negatively with Negative Alcohol Consequences at Wave 0 through Wave 4 ($r=-.28$ to -.19), but was non-significant for Wave 5 and Wave 6.
- IGT Advantageous Choices correlates negatively with a composite score of heavy drinking (binge drinking, getting high, and getting drunk), but only at wave 0 ($r=-.28$) and wave 2 ($r=-.24$)

**Effects of Alcohol Use Disorders**

- Manovas with the AUD group (n=68) and non-AUD group (n=124), did not reveal significant effects.
- Decision making was not affected by lifetime presence of alcohol abuse or dependence.

Conclusions

- Chronic binge drinking students, who consume high amounts of alcohol, perform worse on a decision making task than non-binge drinking students.
- Less advantageous decision making is associated with higher levels of real life disadvantageous decisions related to alcohol use (Negative Alcohol Consequences).
- Decision making strategies are not related to impulsivity or sensation seeking.

- The results imply that in young adults, the amount of alcohol used, and pattern of alcohol use (binge drinking) may have a stronger relation to diminished neurocognitive functions, than alcohol use diagnoses per se.

References


Reprints

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