

# GENDER DIFFERENCES IN THE BEHAVIORAL ECONOMICS OF ALCOHOL CONSUMPTION AMONG COLLEGE STUDENTS



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Supported by NIH Grant # R21 AA020955; No conflicts of interest to report



## Background

Approximately 20% of college students meet DSM-IV criteria for an alcohol use disorder (AUD).<sup>1</sup> Research further suggests that college drinking behaviors (e.g., binge drinking) contribute to long-term consequences, such as the risk of alcohol dependence and abuse during the later years of adulthood.<sup>2</sup> Recent studies suggest that rates of binge drinking among college-aged females are increasing faster than among their male counterparts.<sup>3</sup> Despite the fact that men, on the average, drink more than women,<sup>4</sup> evidence has emerged that women may be particularly vulnerable to physiological<sup>5,6</sup> and cognitive<sup>7</sup> problems associated with alcohol consumption. As such, it is crucial to elucidate how college-aged females and males differ in terms of their decisions to consume alcohol and their regulation of alcohol intake. Consistent with this possibility, researchers have found that undergraduate women who drink heavily exhibit greater general deficits in trait impulsivity than men, exhibiting poorer self-regulation.<sup>8,9</sup>

Behavioral economics is a useful tool to assess the regulation of drinking behavior. The Alcohol Purchase Task (APT), which measures the demand for alcohol in relation to increasing costs, has been shown to be associated with heavy drinking in college populations.<sup>10</sup> However, only two studies to our knowledge have assessed gender differences in alcohol demand;<sup>11,12</sup> the latter revealed that women may be less sensitive to rising prices than men.

The goal of the present study, therefore, was to investigate gender differences in: 1) trait dysregulation (i.e., general levels of impulsivity), and 2) the regulation of alcohol intake using an alcohol purchase task.

## Hypothesis

**Women, compared to men, would exhibit: 1) poorer regulation of drinking during a hypothetical alcohol purchase task, and 2) higher levels of trait impulsivity. Additionally, we predicted that higher impulsivity scores would predict reduced regulation of drinking as determined by APT indices.**

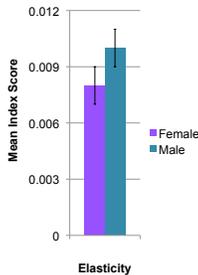


Figure 1. Gender differences in elasticity.

## Methods

### Participants

Social Drinkers ( $n=72$ ); 61.1% female and 38.9% male. Mean age 21.8 ( $SD= 3.2$ ). Participants reported on average drinking 2.9 alcoholic beverages per episode ( $SD= 1.5$ ) over the three-month period prior to study. Exclusion Criteria: Alcohol-related problems, history of major mental illness or other substance abuse, current pregnancy.

### Measures

**Alcohol Purchase Task (APT):** Participants reported the number of drinks that they would hypothetically purchase and consume when the price of each drink corresponded to one of 25 varying price points (range=\$0-\$20) (e.g., "How many drinks would you have if they were \$1.00 each?"). The data yielded several indices to examine participants' demands for alcohol: (a) intensity of demand (i.e., alcohol consumption when drinks are free), (b) breakpoint (i.e., the first price at which alcohol consumption is zero), (c) elasticity (i.e., the degree to which an increased per-drink price influences consumption), (d) Omax (i.e., maximum alcohol expenditure), and (e) Pmax (i.e., price at maximum alcohol expenditure).

**Barrett Impulsiveness Scale (BIS-11):** Participants rated 30 items (e.g., "I plan tasks carefully") on a 4-point Likert scale (i.e., 1-rarely/ never, 2-occasionally, 3-often, 4-almost always/ always). Items were summed for each individual to obtain an overall score for trait impulsivity. We also calculated scores with respect to each of the second- (i.e. Attentional, Motor, and Nonplanning Impulsiveness) and first-order factors (i.e. Attention, Cognitive Instability, Motor, Perseverance, Self Control and Cognitive Complexity) with the understanding that impulsivity as a personality construct is multifaceted.

**Alcohol Timeline Followback (ATF):** Using a calendar, individuals were asked to provide retrospective estimates of the number of drinks they consumed each day for the last 3 months.

### Data Analysis

First, we compared men's and women's drinking habits. Then, we conducted a multivariate analysis of variance (MANOVA), with the APT indices as the outcomes and gender as the predictor, controlling for demographics and drinking habits. Next, we performed ANOVAs on the BIS and its subscales to compare men and women. Lastly, we explored the possibility that impulsivity, as measured by the BIS-11, was either a mediator or moderator of gender effects on APT indices.

## Results

- Men ( $M_{drinks/drinking\ day} = 3.6$ ), compared to women ( $M_{drinks/drinking\ day} = 2.4$ ), reported consuming significantly more alcoholic beverages per day over the last 3 months,  $t=3.884$ ,  $p<.001$ .
- There was a significant overall effect of Gender on the APT ( $p< 0.008$ ).
- Follow-up univariate analyses revealed that women exhibited lower elasticity ( $p<0.014$ ) (Figure 1); higher breakpoint ( $p<0.005$ ), higher Omax ( $p<0.037$ ), and higher Pmax ( $p<0.021$ ), than men (Figure 2).
- Contrary to expectations, there were no gender differences in BIS scores (Figure 3), nor did BIS predict APT indices overall ( $p>0.5$ ).
- Interestingly, however, a significant Gender x BIS interaction ( $p < 0.046$ ) revealed that BIS Attentional Impulsivity scores did predict APT scores among women, but not among men. Follow-up univariate analyses revealed that women with higher levels of attentional impulsivity had particularly low elasticity ( $p<0.007$ ), high Omax ( $p<0.004$ ), and marginally higher Pmax and breakpoint ( $p's<0.08$ ).
- Interactions between gender and the total BIS, as well as other BIS subscales, however, were not significant.

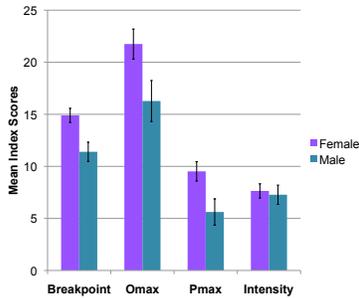


Figure 2. Gender differences in Breakpoint, Omax, Pmax, and Intensity.

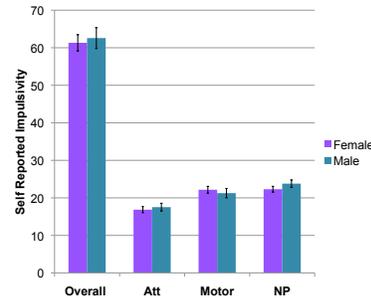


Figure 3. No gender differences were observed on the BIS-11 or any of its subscales ( $p's > .01$ ). Second-order factors: Att= Attentional Impulsiveness (i.e. inability to focus); Motor= Motor impulsiveness (i.e., acting without thought); NP= Nonplanning Impulsiveness (i.e., lack of strategy, present oriented).

## Discussion

Partially consistent with previous work, results demonstrated that there are gender differences among college students in their motivation to drink in the face of rising costs. Interestingly, one study<sup>11</sup> that found women to have lower alcohol demand was conducted among smokers, raising the possibility that polysubstance use can have an important impact on decisions to drink.

Our findings suggest that college-aged females are less sensitive to price increases, and overall have higher alcohol demand indices, than men—even though: 1) men in this sample reported consuming more per drinking episode, and 2) there were no gender differences in consumption when drinks were "free" (i.e., intensity). In other words, college-aged females may exhibit impaired decision-making skills, as prices had less of an effect on their reported purchasing and consumption.

Although we failed to identify gender effects on BIS-11 and its subscales, we did find that women with higher levels of attentional impulsivity had particularly high levels of alcohol demand on the APT.

Our results add to a growing literature that highlight the importance of examining gender differences in the behavioral economics of alcohol consumption. Moreover, our results support focusing on improving alcohol-consumption-related decision-making, particularly among impulsive young women. Future research might also appropriately focus on examining the role of impulsivity in drinking decisions among women who are polysubstance users.

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Annual Scientific Meeting, June 2016, New Orleans, LA