2-16-2016

The Effects of Alcohol Use on Economic Decision Making

Klajdi Bregu
University of Arkansas

Cary Deck
Chapman University

Lindsay Ham
University of Arkansas

Salar Jahedi
RAND Corporation

The Effects of Alcohol Use on Economic Decision Making

Klajdi Bregu*
University of Arkansas

Cary Deck
University of Arkansas
Chapman University
University of Alaska Anchorage

Lindsay Ham
University of Arkansas

Salar Jahedi
RAND Corporation

February 16, 2016

Abstract

It is notoriously hard to study the effect of alcohol on decision making, given the selection that takes place in who drinks alcohol and when they choose to do so. In a controlled laboratory experiment, we study the causal effect of alcohol on economic decision making. We examine the impact of alcohol on the following types of tasks: math and logic, uncertainty, overconfidence, strategic games, food choices, anchoring, and altruism. Our results indicate that alcohol consumption, as measured by the blood alcohol concentration (BAC), increases cooperation in strategic settings and altruism in Dictator games. We do not find any effects of alcohol on individual decision making tasks with the exception of anchoring. People with higher BAC did better in the anchoring task. The results suggest that the effects of alcohol are domain specific.

*Contact Info: University of Arkansas, Walton College of Business, Department of Economics, Business Building 402 Fayetteville, AR 72701.
Email addresses: kbregu@uark.edu (K. Bregu); cdeck@walton.uark.edu (C. Deck); lham@uark.edu (L. Ham); sjahedi@rand.org (S. Jahedi).

1 Introduction

Alcohol is the most commonly abused substance in the US (SAMHSA Report, 2014) and problems arising from its misuse are estimated to cost $249 billion annually (Sacks et al., 2015). The health risks from alcohol are well-recognized: alcohol-related deaths are the fourth leading preventable cause of death in the United States (Stahre et al., 2014), alcohol is harmful during pregnancy, and it is responsible for nearly half of all liver disease deaths annually (Yoon et al., 2014). While the social and economic costs of alcohol consumption are established, less is known about the effects of alcohol on economic decision making.

Alcohol is typically associated with an increase in risk taking and impulsive decision making. However, given the nature of consumption, it is also quite challenging to establish causal relationships between alcohol and many socio-economic consequences. Many of the alcohol studies to date use survey data to compare behavior of people who abuse alcohol to those who do not. While being informative, interpretation of these studies can be difficult. One big problem is selection bias: people who abuse alcohol may differ fundamentally in their base levels of risk-taking and impatience. Any reported differences between the two groups may be due in part to initial differences in traits or behaviors. Another big problem is that it is hard to disentangle the effects of alcohol from the context in which drinking takes place. People may choose to drink at moments when they wish to act silly, or let their guard down. Any difference in their behavior across time may not necessarily be due to the Blood Alcohol Concentration (BAC), but rather to differences in attitudes.

In this study we use a controlled laboratory setting to look at the effect of alcohol on economic decision making. The use of random assignment in the lab allows us to overcome these limitations and estimate causal relationships. We recruit 82 subjects to the lab and assign them to either a control treatment or to an alcohol treatment. The control group drinks tonic water in a cup that contains traces of alcohol, whereas the alcohol treatment drinks tonic water with an amount of vodka designed to raise their BAC to 0.08 in expectation. All subjects are then asked to complete a battery of 59 questions involving a variety of tasks common to economic experiments including: math and logic problems, decisions involving risk, overconfidence tasks, anchoring tasks, snack choice tasks, coordination games, and games measuring altruism. We explore how being treated with alcohol affects people's behavior in these tasks.

Most of the research relating alcohol consumption and economic decision making has been concentrated in how alcohol affects risk taking behavior in individuals. Given the seemingly large importance of risk in the literature, our study specifically explores different types of risk-taking, including higher-order risk preferences such as prudence and temperance. Our study also examines other important economic tasks, with a focus on tasks that have been used in previous cognitive disruption studies and previous alcohol studies (Deck and Jahedi, 2015; Corazzini et al., 2014). In this sense, our paper is complementary to other papers that have jointly examined how a host of biases are impacted by depleted cognitive resources.

Our main results are as follows. We find that BAC is significantly associated with more cooperation in strategic games and more altruism in Dictator games. In individual decision making tasks, such as math and logic, risk-taking, overconfidence, and snack choice, we find that alcohol has no significant impact on decision making. For the anchoring task, we oddly find that alcohol improves guessing performance.

The remainder of the paper is organized as follows. We look at the literature in Section 2 and present our experimental design and procedures in Section 3. In Section 4 we present the results and conclude with Section 5.

2 Literature Review

Alcohol has been associated with a wide range of negative consequences that do not only affect the individuals who consume alcohol, but also hurt other people. Social scientists have developed a vast area of research on the impact of alcohol consumption in human behavior. Previous research has shown that alcohol is connected with traffic fatalities (Dee, 1999; Levitt and Porter, 2001; Cohen et al. 2002; Hingson et al. 2005) and increased crime rates (Gerson and Preston, 1979; Murdoch and Ross, 1990; Campbell et al. 2009).[1] In part these results may be driven by alcohol consumption causing people to alter their basic economic preferences such as how they view risk and altruism.

Corazzini et al. (2014) study the effect of alcohol on risk and altruism as well as optimism, time preferences, and willingness to pay in a controlled laboratory setting. Their study, which is the most similar to ours, uses three treatments to separate the pharmacological and psychological effects of alcohol. In their first experiment, no reference was made to alcohol. In the other experiment participants completed the same tasks as the benchmark, but here participants knew they could drink alcohol. In the second experiment half of the participants were given alcohol while the other half were given a non-alcoholic drink that smelled of alcohol. Our paper complements Corazzini et al. (2014) by examining the causal effect of alcohol consumption on seven tasks: math and logic, uncertainty, overconfidence, strategic games, food choices, anchoring, and altruism.

Other studies investigating the effects of alcohol consumption on basic economic decision making have tended to be more focused on specific behaviors. For example, Schilbach (2015) focuses on self control using a field study. He finds that financial incentives can be used to discourage drinking which in turn leads to more willingness to save. With respect to risk, Barsky et al. (1997), Anderson and Mellor (2008) and Galizzi and Miraldo (2012) all provide evidence of positive correlation between risk aversion and alcohol consumption in field data. However, Burghart et al. (2013) find that alcohol makes women more risk averse than men for low levels of BAC but that their tolerance towards risk increased as BAC increased further. Burghart et al. (2013) report that BAC level has no effect on the risk preferences men. Proestakis et al. (2013) find that both measured and perceived BAC increase risk aversion for women while for men only underestimation of one's BAC has a positive effect on risk taking. The laboratory does not provide consistent evidence either. Breslin et al.,

[1] Alcohol consumption is also associated with high school drop-out rates (Wichstorm, 1998; Chatterji and Desimone, 2005; Chatterji and Desimone, 2006, Townsend et al., 2007; and Singleton and Wolfson 2009), poor sleeping behavior (Singleton and Wolfson, 2009), and worse health conditions (Klatsky et al., 1977; Hoffemeister et al., 1999; Howland et al., 2010 Neufeld and Rehm, 2013; Rehm et al., 2013).

(1999), Cutter et al., (1973) Meier et al., (1996) Sjoberg, (1969) report no or mixed effects of alcohol on risk taking behavior. Lane et al., (2004) find alcohol consumption leads to more risk taking, but Corazzini et al. (2014) find that alcohol consumption increases risk aversion for women while having no effect on men. With respect to food choices, studies have found that alcohol consumption is correlated with high energy intake (Caton et al., 2007; Yeomans, 2010; and Schrieks et al., 2015).[2]

There are at least two studies that examine behavior in interactive settings. Corazzini et al. (2014) endow participants with 20 euro and have them participate in a dictator game to study altruism. The participants knew the money would go to either the humanitarian aid agency Medecins Sans Frontieres or to the Italian website on economic information LaVoce.info. The authors report that alcohol consumption had a negative and significant relationship on the amount of money donated. Hopthrow et al. (2007) look at how alcohol influences cooperation in a prisoner's dilemma game. The authors find no difference in the level of cooperation for individuals in alcohol and placebo treatments. Interestingly, the study also compares behavior by groups of people and finds that groups are less cooperative when the group members had been drinking.

Our study looks at the causal impact alcohol has on multiple decision making tasks simultaneously. The tasks used in our study are chosen to resemble tasks used in other cognitive impairment studies; insofar as alcohol impairs mental resources, we can identify how this translates to decision making. To create exogenous variation in alcohol consumption, a randomly selected group of participants were given enough alcohol so to get to an expected 0.08 BAC level. Our results indicate that at these levels of alcohol consumption, decision making is not impacted very much; though it does appear that people cooperate more and are more altruistic in interactive settings.

3 Experimental Design

A between subjects design was implemented to examine the effect of alcohol consumption on basic economic decision making. Participants were randomly assigned to either the treatment group or the control group. The treatment group consumed an amount of alcohol expected to generate a BAC of 0.08. The control group did not consume a measurable amount of alcohol and thus maintained a BAC of 0.00 throughout the study.

A total of 82 participants *completed* the study; half in each condition. The experiments were conducted at the Behavioral Business Research Lab (BBRL) at the University of Arkansas. Participants were drawn from the BBRLs standing subject pool. Of the participants, 54 were male and 28 were female. All were at least 21 years of age. Some of the subjects who registered for the study were not allowed to participate due to usage of prescription or over-the-counter drugs in the 24 hour period prior to the start of the study. As explained below, participants went through the study in matched pairs. One subject

[2] There is also some evidence that people who consume more alcohol tend to have lower quality diets (van Kooten et al., 2007; Breslow et al., 2010 and 2013).

experienced a negative reaction to consuming alcohol during the study. This subject and his matched counterpart were both withdrawn. Their responses are not included in the analysis.

All participants received a fixed payment of $10 for the 90 minute experiment. On average, participants also earned $12.76 based upon their choices (described below). Because subjects in the treatment group were required to remain in the lab until their BAC fell below 0.04, a process that was expected to take an additional 3 hours, these subjects were paid an extra $15.00 to reflect the opportunity cost of their time.

3.1 Procedures

Potential subjects were contacted via email and invited to register online for a session. This initial contact revealed that study participants might consume alcohol and therefore had to meet all of the following criteria: 1) be 21 years of age with a valid ID, 2) not be pregnant, nursing, or trying to become pregnant, 3) not taking prescription or over-the-counter drugs (other than birth control), 4) not taking illegal drugs, 5) not be under the care of a doctor or therapist for a condition that precluded the use of alcohol, *and* 6) have consumed alcohol in the last 3 months without a negative reaction. Potential subjects were also told that the actual experiment was expected to last 90 minutes, but that they needed to be able to remain in the lab for 4.5 hours as they would not be allowed to leave until their BAC was below 0.04. Because of the large time commitment, sessions were conducted in the evenings to minimize the disruption participation would have on a subject's daily routine. Finally, the subjects were told that they needed to abstain from eating or smoking for three hours prior to arriving at the lab. Those interested in participating could log into their lab accounts and register for a session. Registered subjects were given a notice the day before the experiment reminding them of the conditions required for participation.

Upon arrival at the lab, subjects read an explanation of the study and gave informed consent. At this point, females were given a *BFP Midstream Pregnancy Test* and directions. After completing the pregnancy test in private, females initialed a statement indicating they were not pregnant. Next, each person completed a medical screening questionnaire. After completing the questionnaire, the respondents entered a second room where their responses were privately reviewed by a researcher. Those who failed the screening were dismissed from the study. Those who passed the screening signed a behavioral contract where they agreed to remain in the lab until their BAC was below 0.04 and gave the researcher their car keys. These subjects were given a numbered sticker to wear and sent to another room. This number was used as the subjects ID number throughout the session. In the next room, a subject was weighed, given a breathalyzer tube and a small plastic bag. The subject then had their BAC measured using a Alco-Sensor FST (Intoximeter) breathalyzer, in part to familiarize the subject with the procedure. Any subject who had a BAC above 0.00 would have been dismissed from the study, but this never occurred. This initial BAC measure is referred to as BAC1. BACs were measured at several other points in the experiment, as described below, and the plastic bag was used to store the tube between measurements. At this point, the subject was taken to the computer lab.

In the computer lab, the subject was given a set of paper instructions describing the computerized tasks that would be encountered once the experiment began.[3] Thus, the subjects all had a BAC of 0.00 when reading the directions. The directions are available in the appendix and each of the experimental tasks is described in the next subsection.

While subjects were reading the directions, researchers prepared a beverage for each subject in the session. A session involved 10-20 subjects. Half of the subjects in a session were randomly assigned to the treatment group. The beverage for a male in the treatment group consisted of 2.37 ml of 40% Vodka per kg the subject weighed. The beverage also included $3 * 2.37$ ml of tonic water per kg the subject weighed. So for example, a 180 lb male received approximately 6.5 oz of vodka and 19.5 oz of tonic water. For females in the treatment group the serving of vodka was 2.18 ml/kg and for tonic it was $3 * 2.18$ ml/kg.[4] Males in the control group received $4 * 2.37$ ml of tonic water per kg while females received $4 * 2.18$ ml of tonic water per kg. For all subjects, the beverage was placed in a small pitcher and stirred. Some of the beverage was then poured into a plastic cup. To mask the treatment to the subject, a trace amount of vodka was splashed over both the pitcher and the cup and the cup rim was wiped with a vodka soaked sponge.

Once all of the drinks were ready, the drinks were served to the subjects at their computer stations. The stations were separated by privacy dividers so that subjects could not see each other. Subjects were given 20 minutes to consume their beverage. During this time a researcher read the task directions aloud and answered any questions. Any beverage not consumed within the time limit was collected and measured. Beginning 10 minutes after the subject finished drinking and repeated every 5 minutes thereafter until the computerized experiment began, the BAC was measured. Because there is heterogeneity in the rate of absorption of alcohol into the blood, the following procedures were used. First, unknown to the subjects, a subject pair always included one person in the treatment condition and one person in the control group. This is because the person in the control group could start the computer program at any point after having been breathalyzed at this stage. Second, once a person in the treatment group registered a BAC above 0.06 the computer program was started. If a subject in the treatment group had not registered a BAC above 0.06 with 25 minutes of finishing her drink, the computerized experiment was started. Some treated subjects did not reach a BAC of 0.08 because they did not finish their drink whereas others most likely had not complied with the fasting rule.[5] The last BAC measurement recorded before the computerized experiment began is denoted BAC2, even if the subject's BAC was measured several times at this stage.

Subjects faced 59 choices in the experiment. At the half way point, the program paused so that a BAC reading could be obtained. This measure is denoted BAC3. The breathalyzer is always administered in a standing position. To hide the identity of the matched partner, who would necessarily reach the halfway point at the same time, the two subjects were seated on opposite sides of the computer lab. The computer lab is a large room with a moveable wall running down the center aisle so that people on one side cannot see people on the other.

[3] The experiment was programmed and conducted in z-Tree (Fischbacher, 2007).

[4] This dose is based on the recommendations from Friel et al. (1999) and has been used in many studies to achieve this target BAC (e.g., Davis, et al. 2009).

[5] It is possible that some of these subjects reached the 0.08 BAC in between measurements.

There were people in both the treatment and control groups on both sides of the lab. All BAC measurements taken in the computer lab were done in such a way that no participant could observe anyone's BAC.

After the last computerized choice, the breathalyzer was administered again. This measure is denoted BAC4. Subjects then completed a brief survey, which asked them to guess the highest BAC they reached, which is denoted *Belief*BAC. At this point, a subject was taken to a private room and debriefed. Those subjects in the control group received their payment as well as a snack (based on their choices in the experiment as described below), had their keys returned and were dismissed from the experiment. Those subjects in the treatment group were also debriefed, but were not paid at this point. They received a snack (based on their choices in the experiment), were told their BAC4 measure and were taken to another room in the BBRL where they could work or socialize. A breathalyzer was conducted every 30 minutes after a participant in the treatment group completed the study until the participants BAC was below 0.04 at which point the breathalyzer was administered more frequently. During this time, subject could have more of the chosen snack as well as beverages (water, coke, energy drinks, etc.) provided by the researchers. Once a subject had a measured BAC below 0.04 on two consecutive readings, the subject was re-debriefed, paid, given their keys and dismissed. The final BAC reading was recorded as BAC5. Most subjects in the treatment group had left the lab with 5 hours of start of the experiment, although one subject was in the lab until 2:00 am for a session that began at 6:00 pm.

Figure 1 reports the four actual BAC measures and the *Belief*BAC reported by participants in post experiment survey. There are two important observations based on the summary statistics shown in Figure 1. First, the BAC level remains relatively steady during the experiment for those in the treatment group. Second, some participants in the control group perceive that their BAC is higher than 0 suggesting that the condition was masked for some, although not all, of these subject thereby allowing us to examine a placebo effect.

3.2 The Tasks

Participants were presented with a series of 59 tasks. Each task was of one of the following types: 1) math and logic, 2) uncertainty tasks, 3) overconfidence tasks, 4) strategic games, 5) food choices, 6) anchoring tasks, and 7) altruism. The number of each type of task a subject faced was the same for all subjects, but the order was randomized for each subject.

The experiment also included three control tasks to verify that subjects were making deliberate choices: one for overconfidence, one for strategic games, and one for risk. There were different sub-tasks for some of these tasks. Below we go over each of these main tasks and describe the sub-tasks and methods that were used to create specific realizations.

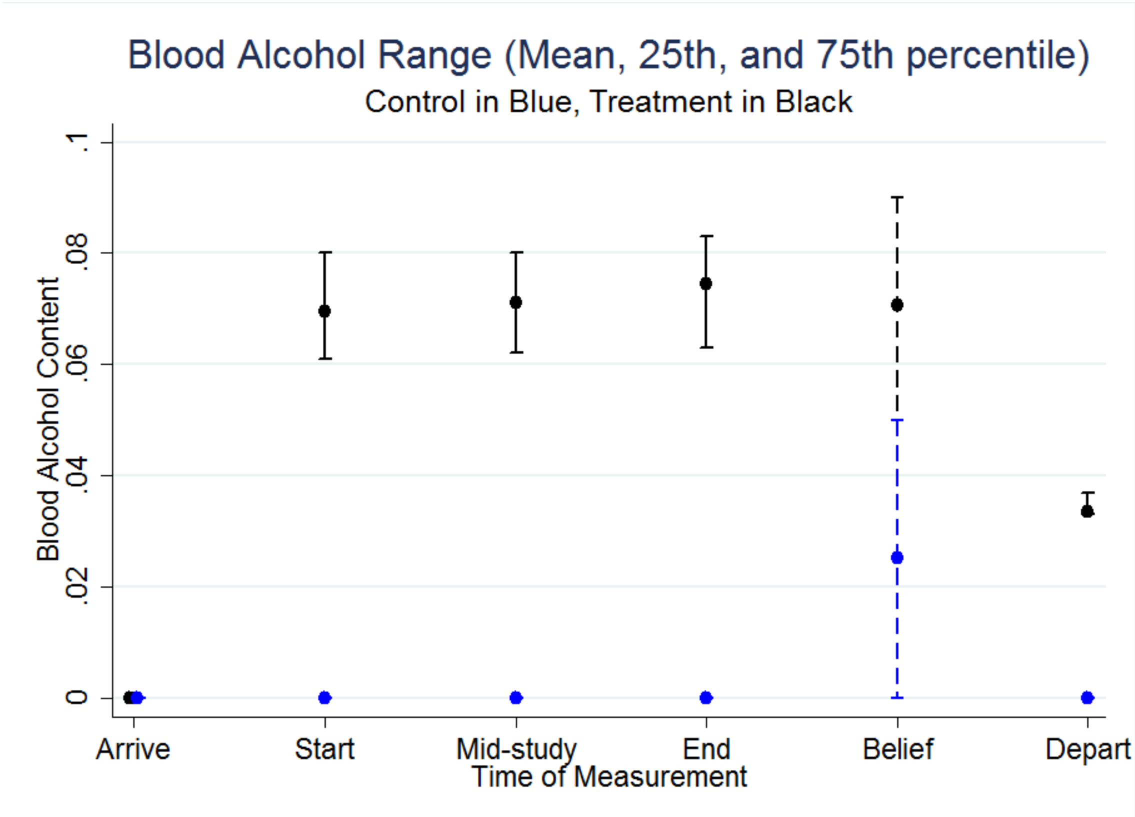


Figure 1: Measured and perceived BAC for both treatments

3.2.1 Math and Logic

There were three types of math and logic problems: addition, multiplication, and word problems. The addition problems were of the form add $a_1 + a_2$ where $a_1 \sim$ [11,99] and $a_2 \sim$ [1,20]. The multiplication problems were of the form multiply $m_1 *$ m_2 where $m_1 \sim$ [13,19] and $m_2 \sim$ [5,9]. The logic problems are from the cognitive reflection task of Frederick (2005). If the subject answered correctly in the 10 second time limit the subject earned $20. Otherwise, the subject earned $0 for this type of task (and thus an incorrect response and a failure to respond are treated identically). Over the course of the experiment a subject faced 5 addition, 5 multiplication, and 3 logic problems.

3.2.2 Uncertainty Tasks

Over the course of the experiment, a subject faced 18 decisions under uncertainty. For each question the subject had 10 seconds to make ic outcome determined randomly by the computer. If a subject failed to respond within the time limit then she earned $0. For the uncertainty tasks, lotteries always had two equally likely outcomes and were presented as a circle with a line through the middle, see Appendix B.

For four of the risky decisions a subject was given an endowment of $2 and faced a choice of the form pick between $g with certainty or $2g+2 with a 50% chance and $0 with a 50% chance. For these tasks, framed as financial gains, taking on a risk is beneficial in expectation. Subjects also faced four risk decisions framed as losses. For these tasks, the subject was given an endowment from which losses could be reduced.[6] The lotteries were constructed in such a way that the possible outcomes (endowment minus loss) were the same as those described above for the gain domain. Hence, for these tasks taking a risk increases ones expected payoff.

The third type of risky choice presented two options with the same expected value, but where the variance differed between the two choices. Such task allow for the classification of a subject as risk loving or risk averse. Subjects faced 3 of these types of risks. Subjects also completed three tasks to measure the higher order risk property of prudence and three tasks to measure the higher order risk properties of temperance. These higher order risk properties can be identified through binary choices over compound lotteries (see Deck and Schlesinger 2014 for a discussion). Sample higher order risk tasks are shown in Appendix B.

Finally, subjects faced one risky choice in which the risky option first order stochastically dominated the certain payment option. This choice serves as check that participants are making deliberate choices.

3.2.3 Overconfidence Task

Subjects faced 9 overconfidence tasks, which closely follow Bregu and Forbes (2015). In these tasks, subjects were shown a grid of 100 colored rectangles and were instructed to count the number of red rectangles. The rectangles were only shown to participants for six seconds before they were required to report the number of red rectangles. Then the subject was asked to identify how accurate her guess had been. A subject who stated her response was within 1 of the correct answer would earn $25 if her guess was in fact within 1 of the correct answer. If she correctly reported being with 3 of the true number she would earn $20, within 6 would earn $14, and within 12 would earn $6. If the number of red rectangles reported by the subject was not within the claimed bounds, then the subject was overconfident and earned $0. No time limit was imposed on reporting the number of red rectangles or in providing ones confidence. Participants were not provided with any feedback at the end of the overconfidence task so they could not learn how effective they were at guessing the number of red rectangles. In general the time limit was too short to count the number of red rectangles; however, subjects did experience one overconfidence task with no red rectangles to serve as a check on responses.

3.2.4 Strategic Games

Subjects played 7 strategic games. Two of the games were prisoner's dilemmas in which subjects chose to either cooperate or defect. If both players cooperated, then both earned $20. If both defected then both earned $10. In the low gain version, if one player defected

[6] Due to institutional restrictions participants cannot lose money they had before entering the laboratory.

while the other cooperated then the defector earned $25 and the cooperator earned $5. In the high gain version, the defector earned $30 while the cooperator earned $0.

Subjects also played two games of chicken. If both players were tough (non-cooperative), then both of the players earned $0. In the high reward game, playing tough while the counterpart plays chicken (cooperative) earns $35 for one's self and $5 for the counterpart while if both play chicken then both earn $10. In the low reward game, playing tough when one's counterpart plays chicken results in a payoff of $30 for ones self and $5 for the counterpart while both earn $20 if both play chicken.

Additionally, subjects played two stag-hunt games. In these games, the non-cooperative action results in a guaranteed payment of $10. In the high reward game, if both players are cooperative they both earn $22. In the low reward game, mutual cooperation only results in a payoff of $18 to each player. In either game, being cooperative when the other player is not results in a payoff of $0.

Finally, subjects faced one strategic game that was designed as a check. In this game, the subjects own choice did not impact the counterpart, but the subject did have a dominant strategy. Samples of each type of game are shown in Appendix B.

In all of the strategic games, the actions were unlabeled. That is, no action was identified to the subjects as being cooperative. The row and column associated with the cooperative action was reverse the second time a subject saw a particular type of strategic game.

3.2.5 Snack Choice

In four tasks, participants were presented with two snack options, one healthy and one unhealthy based upon the calorie content. Subjects had 10 seconds to respond. A complete list of the snacks choices can be found in Appendix B.

3.2.6 Anchoring

The anchoring task had two stages. In the first stage participants were shown a 10 x 10 matrix of letter "S" and number "5" characters for 2 seconds. The participants were then asked to state if there were more "S" characters or fewer "S" characters than a randomly generated number that flashed below the matrix. The randomly generated number was equally likely to be any integer 1 to 100 and was drawn independently of the number of "S" characters in the matrix. In the second stage subjects saw the matrix again while the random number, which serves as the anchor, was shown below the matrix. Subjects had 10 seconds to count and enter the number of "S" characters in the matrix. This time is not enough for the typical participant to count all the characters. Subjects were paid based on their accuracy in reporting the number of "S" characters in the matrix. If they were within five of the correct number they earned $15. If participants were further away than five or failed to enter an answer in the allotted time they earned $0. Each subject faced five anchoring tasks.

3.2.7 Altruism

Three dictator decision were used to measure altruism. One decision was a standard dictator game in which the subject was endowed with 30 tokens to allocate between herself a randomly assigned counterpart. Each token was valued at $1 in this case. In the high cost of giving dictator game, the subject was endowed with 20 tokens to allocate and each token the subject kept was valued at $2 while each token given to the counterpart was valued at $1. In the low cost of giving game, the dictator again had 20 tokens, but the value of any token that was kept was $1 and the value of any token allocated to the counterpart was $2.

3.2.8 Payment

At the conclusion of the experiment, a participant received two forms of compensation. First, she received the selected option from one of her four snack choice tasks. Second, she received a payment based upon her earnings in one non-snack choice task. If a participant was paid based on a choice in a strategic game, then the counterpart was also paid based upon this same strategic game. If a dictator decision was selected for payment, then this held for the counterpart as well and further one person in the pair was randomly selected to be the recipient.

4 Results

The data consist of the choices of 82 participants on 59 choice tasks. However, three of the tasks were desinged to verify that subjects were making deliberate rather than random choices. In each case, subjects were unambiguously more likely to select the dominant option. These three questions are dropped from the analysis leaving 4592 choices. Table 1 reports the summary statistics by treatment for each decision task.

The outcome variable differs across the task types. For the arithmetic and anchoring tasks, we report the fraction of individuals who responded with a correct answer. For these tasks, non-responses (blanks) are coded as incorrect. The remaining tasks did not have correct answers and thus omitted responses were kept unassigned. For the Uncertainty tasks, we report the fraction that undertake more risk, more variance, more prudence, or more temperance, respectively. For the Strategic Games, we report the fraction that are cooperative. For the Snack choice task, we report the fraction that choose the healthy (lower calorie) snack. For the Altruism task, we report the amount of money that the dictator allotted to the receiver. It should be noted that for the overconfidence, altruism, and strategic games, subjects had to give an answer to continue with the experiment, so there are no blanks for those answers. There are no blanks in the food choice task since subjects selected one of the two items for each task despite these tasks being timed indicating that subjects were paying atention throughout the study.

The last column of Table 1 reports the p-value of the coefficient from a Wald Test regressing performance in each task on treatment, with no additional controls. In all regressions, the standard errors were clustered by participant. This is the same regression that is labled

Table 1: Summary statistics for each subtask.

	Control			Treatment			
	Percent	Obs	Blank	Percent	Obs	Blank	Wald Test
Math and Logic							
Correct Addition	88.8%	205	9	87.3%	205	11	$p = 0.696$
Correct Multiplication	48.8%	205	48	49.8%	205	41	$p = 0.887$
Correct CRT	15.5%	123	16	13.0%	123	15	$p = 0.669$
All Math and Logic	56.5%	533	73	55.9%	533	67	$p = 0.882$
Uncertainty Tasks							
Beneficial Risk Taking (gains)	61.6%	164	0	62.0%	163	1	$p = 0.960$
Beneficial Risk Taking(losses)	52.8%	161	3	59.2%	164	0	$p = 0.333$
Variance Increasing Risk Taking	39.2%	120	3	40.3%	119	4	$p = 0.879$
Prudence	54.1%	122	1	57.4%	122	1	$p = 0.651$
Temperance	52.3%	109	14	52.2%	113	10	$p = 0.989$
Overconfidence							
Self-predicted Within 1	24.0%	25	0	77.8%	18	0	$p = 0.024$
Self-predicted Within 3	51.1%	92	0	56.3%	64	0	$p = 0.220$
Self-predicted Within 6	45.2%	135	0	53.6%	168	0	$p = 0.282$
Self-predicted Within 12	30.7%	75	0	30.8%	78	0	$p = 0.324$
Overestimation	41.9%	327[a]	0	49.4%	328	0	$p = 0.132$
Cooperation Rate in Games							
Prisoner's Dil. (Large Gain)	48.3%	29[a]	0	44.8%	29[a]	0	$p = 0.797$
Prisoner's Dil. (Small Gain)	69.0%	29[a]	0	75.9%	29[a]	0	$p = 0.565$
Chicken Game (Large Gain)	56.1%	41	0	65.9%	41	0	$p = 0.371$
Chicken Game (Small Gain)	31.7%	41	0	31.7%	41	0	$p = 1.000$
Stag Hunt (Large Gain)	34.2%	41	0	43.9%	41	0	$p = 0.371$
Stag Hunt (Small Gain)	75.6%	41	0	85.4%	41	0	$p = 0.271$
Strategic Games (All 6)	51.8%	222	0	57.7%	222	0	$p = 0.157$
Food Choice							
Healthy Choice	40.2%	164	0	31.1%	164	0	$p = 0.135$
Anchoring							
Responses within 5	20.5%	205	41	27.3%	205	54	$p = 0.125$
Altruism							
Standard Dictator's Game	$6.29	41	0	$8.34	41	0	$p = 0.240$
Low Cost of Giving	$8.78	41	0	$10.34	41	0	$p = 0.482$
High Cost of Giving	$4.02	41	0	$5.61	41	0	$p = 0.191$
Dictator's Game All 3	$6.37	123	0	$8.10	123	0	$p = 0.223$

a. The missing observations for both prisoner's dilemma tasks (12 observations for each task) and the overconfidence task (1 observation) are due to a coding error.

Model 1 in Table 2 through Table 21 where each task is considered in more detail. Thus, this column provides an initial glimpse of the results that follow. As is apparent from the Table 1 we do not find any treatment effects, but we find that the either measured or perceived BAC have some effect in a few tasks: overconfidence, food choice, anchoring, altruism and strategic games.

In what follows, we estimate OLS regressions that relate performance in each task to the treatment. The dependent variables are constructed similar to the variables listed in Table 1, and all regressions include clustered standard errors at the participant level. For each task, we regress performance on the following variables: (1) an indicator designating assignment into the alcohol treatment, (2) the actual blood alcohol level at the midway point of the experiment, BAC3,[7] (3) the self-reported belief of the blood alcohol level as reported after the experiment. We also repeat the analyses above, controlling for gender and controlling for the experimental period that the task was asked.

4.1 Math and Logic

In total, participants saw five addition tasks, five multiplication tasks, and three Cognitive Reflective Task questions. In Table 1 we report the percentage of questions that were answered correctly by treatment. For the most part, addition questions were answered correctly and this did not differ significantly from control to treatment (88.8% vs. 87.3%). On average, multiplication questions were less likely to be correct, though this too did not differ by treatment. Participants in the control treatment correctly answered 48.8% of multiplication questions whereas participants in the alcohol treatment correctly answered 49.8%. Based on the summary statistics, it appears that being served alcohol did not seem to impact the ability for people to make arithmetic calculations. Tables 2 and 3 presents the results in a regression framework for addition and multiplication tasks separately. For both the addition and multiplication tasks, the point estimates indicate that none of the following significantly impacted arithmetic performance: (1) being in the alcohol treatment, (2) the blood alcohol concentration midway through the experiment, and (3) a subject's posterior belief of their BAC during the experiment. The results are robust to adding controls for gender and period.

We find similar results for the CRT questions. As shown in Table 1, the fraction of correct CRT responses is around 14%. The participants in the control treatment were 2.5 percentage points more likely to respond correctly than the participants in the alcohol treatment; however, this difference is not statistically significant. Regression results in Table 4 show that the measured BAC midway through the experiment also did not impact performance in the CRT task. Interestingly, it appears that participant's belief of their BAC level did have a strong and significant negative effect (at 5% level) on the number of correct questions answered by participants. A person who believes they were at 0.08 would be associated

[7] The results are robust to using the starting and ending BAC levels (BAC2 and BAC4) as well as the maximum and average of the three measures. Some participants were allowed to begin the experiment with blood alcohol levels below 0.06. If we exclude these individuals from the analysis, our results do not change.

with a 12.6 percentage point decrease in their likelihood to answer any of the CRT questions correctly. This suggests that those participants who were not served alcohol, but reported the belief that they were, scored lower on the CRT task. It is important not to over-infer from this finding that alcohol has psychological effects on decision making; it is completely possible that there is a selection bias here where people who report having had alcohol when they did not, also have lower cognitive reflective skills.

Finally, we pool all the math questions together in Table 5. We do not find any significant treatment effects under any of the model specifications here.

Table 2: Addition Task

The dependent variable is whether the addition task was answered correctly.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	-.015			-0.013		
	[0.037]			[0.038]		
BAC3		-0.334			-.315	
		[0.3517]			[0.531]	
BeliefBAC			-0.151			-0.152
			[0.611]			[0.616]
Gender (Male=1)				-0.017	-0.016	-0.019
				[0.039]	[0.039]	[0.038]
Period				-0.0001	-0.0001	-0.0001
				[0.0008]	[0.0009]	[0.0009]
Constant	0.888***	0.892***	0.888***	0.896***	0.899***	0.898***
	[0.024]	[0.235]	[0.035]	[0.040]	[0.039]	[0.044]
R-squared	0.0005	0.0015	0.0002	0.0012	0.0021	0.0010
Observations	410	410	410	410	410	410

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 3: Multiplication Task

The dependent variable is whether the multiplication task was answered correctly.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	.010			0.0002		
	[0.069]			[0.0683]		
BAC3		0.070			-0.0716	
		[0.943]			[0.928]	
BeliefBAC			1.565			1.565
			[1.049]			[1.040]
Gender (Male=1)				0.098	0.098	0.098
				[0.076]	[0.076]	[0.076]
Period				-0.0001	-0.0001	0.0001
				[0.0012]	[0.0012]	[0.0012]
Constant	0.488***	0.490***	0.418***	0.431***	0.433***	0.358***
	[0.046]	[0.041]	[0.056]	[0.071]	[0.073]	[0.086]
R-squared	0.0001	0.00001	0.0105	0.0085	0.0086	0.0190
Observations	410	410	410	410	410	410

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 4: CRT Questions Task

The dependent variable is whether the CRT task was answered correctly.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	-.024			-0.033		
	[0.057]			[0.059]		
BAC3		-0.259			-0.387	
		[0.705]			[0.755]	
BeliefBAC			-1.581**			-1.576**
			[0.756]			[0.760]
Gender (Male=1)				0.093	0.093	0.089
				[0.059]	[0.059]	[0.054]
Period				-0.0004	-0.0004	-0.0003
				[0.0013]	[0.0013]	[0.0013]
Constant	0.155***	0.152***	0.218***	0.110*	0.108*	0.169***
	[0.044]	[0.042]	[0.055]	[0.055]	[0.055]	[0.064]
R-squared	0.0012	0.0008	0.0220	0.0175	0.0170	0.0371
Observations	246	246	246	246	246	246

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 5: All Arithmetic Tasks

The dependent variable is whether the arithmetic task was answered correctly.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	-.006			-0.011		
	[0.038]			[0.038]		
BAC3		-0.138			-0.217	
		[0.500]			[0.499]	
BeliefBAC			0.198			0.194
			[0.586]			[0.582]
Gender (Male=1)				0.053	0.054	0.052
				[0.041]	[0.041]	[0.041]
Period				0.0002	0.0002	0.0002
				[0.0008]	[0.0008]	[0.0008]
Constant	0.565***	0.567***	0.552***	0.525***	0.527***	0.512***
	[0.023]	[0.023]	[0.032]	[0.043]	[0.044]	[0.048]
R-squared	0.0000	0.0001	0.0002	0.0027	0.0028	0.0027
Observations	1066	1066	1066	1066	1066	1066

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.2 Uncertainty Tasks

In total, each participant was given: 4 risk-in-gains tasks, 4 risk-in-losses tasks, 3 increased variance tasks, 3 prudence tasks, and 3 temperance tasks. When the gamble was framed as a gain, around 62% of participants took the gamble. When it was framed to appear like a loss, about 56% of participants took the gamble. In both cases, participants in the alcohol treatment tended to take slightly more risk than those in the control treatment but in both cases, the difference is not statistically significant. In the increased variance tasks on average about 40% of participants took the gamble that had the higher variance suggesting risk loving behavior and this did not differ significantly across control and alcohol treatments. In the prudence tasks subjects chose the prudent option 54.1% in the control treatment and 57.4% of the time in the alcohol treatment, but this was not a statistically significant difference. In the temperance task, overall 52% of participants chose the temperate option, and this too did not vary signficantly across treatments.[8]

Tables 6 - 10 report the results of the relevent OLS regressions. There does not appear to be any significant effect of alcohol on any of the risk tasks examined. Furthermore, neither the physiological blood alcohol level nor the perceived BAC seem to impact behavior in the risk tasks. This did not change once gender or period variables were included as controls;

[8]The level of risk loving behavior is higher than what is typically observed while the rate of temperate and prudent behavior is somewhat less than typically observed.

though it did seem that people behaved ever-so-slightly less prudently as the experiment progressed (see Model 4-6 of Table 9).

Table 6: Beneficial Risk Task (Gains)

The dependent variable is whether the participant chose the gamble.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.004			0.007		
	[0.074]			[0.074]		
BAC3		0.169			0.220	
		[0.939]			[0.932]	
BeliefBAC			-0.423			-0.464
			[1.146]			[1.132]
Gender (Male=1)				-0.067	-0.068	-0.066
				[0.070]	[0.070]	[0.070]
Period				0.002	0.002	0.002
				[0.002]	[0.002]	[0.002]
Constant	0.616***	0.612***	0.638***	0.614***	0.611***	0.637***
	[0.049]	[0.048]	[0.065]	[0.079]	[0.077]	[0.093]
R-squared	0.0000	0.0002	0.0008	0.0069	0.0071	0.0078
Observations	327	327	327	327	327	327

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 7: Beneficial Risk Task (Losses)

The dependent variable is whether the participant chose the gamble.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.064			0.054		
	[0.065]			[0.066]		
BAC3		0.400			0.258	
		[0.894]			[0.923]	
BeliefBAC			0.071			0.030
			[0.913]			[0.915]
Gender (Male=1)				0.079	0.082	0.085
				[0.066]	[0.066]	[0.065]
Period				-0.001	-0.001	-0.001
				[0.002]	[0.002]	[0.002]
Constant	0.528***	0.546***	0.557***	0.504***	0.522***	0.529***
	[0.045]	[0.044]	[0.059]	[0.076]	[0.076]	[0.089]
R-squared	0.0041	0.0009	0.0000	0.0103	0.0077	0.0073
Observations	325	325	325	325	325	325

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 8: Increasing Variance Risk Task

The dependent variable is whether the participant chose the higher variance option.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.012			0.013		
	[0.076]			[0.078]		
BAC3		0.420			0.451	
		[1.022]			[1.037]	
BeliefBAC			1.019			1.042
			[1.178]			[1.182]
Gender (Male=1)				-.003	-0.006	-0.001
				[0.083]	[0.083]	[0.082]
Period				-0.001	-0.001	-0.001
				[0.002]	[0.002]	[0.002]
Constant	0.392***	0.383***	0.349***	0.426***	0.419***	0.384***
	[0.050]	[0.050]	[0.062]	[0.094]	[0.093]	[0.104]
R-squared	0.0001	0.0011	0.0047	0.0015	0.0025	0.0062
Observations	239	239	239	239	239	239

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 9: Prudence Task

The dependent variable is whether the participant chose the the prudent option.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.033			0.037		
	[0.072]			[0.071]		
BAC3		0.286			0.352	
		[0.962]			[0.945]	
BeliefBAC			0.789			0.706
			[1.013]			[1.012]
Gender (Male=1)				-0.080	-0.080	-0.080
				[0.073]	[0.073]	[0.073]
Period				-0.0034*	-0.0034*	-0.0034*
				[0.0020]	[0.0020]	[0.0020]
Constant	0.541***	0.547***	0.520***	0.689***	0.694***	0.670***
	[0.049]	[0.048]	[0.063]	[0.087]	[0.086]	[0.097]
R-squared	0.0011	0.0005	0.0027	0.0196	0.0189	0.0204
Observations	244	244	244	244	244	244

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 10: Temperance Task

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Treatment	-0.0008			-0.006		
	[0.0614]			[0.062]		
BAC3		-0.073			-0.126	
		[0.824]			[0.833]	
BeliefBAC			0.408			0.354
			[0.949]			[0.957]
Gender (Male=1)				.0003	0.001	-0.0008
				[0.0704]	[0.071]	[0.0697]
Period				0.002	0.002	0.002
				[0.002]	[0.002]	[0.002]
Constant	0.523***	0.525***	0.503***	0.463***	0.464***	0.446***
	[0.047]	[0.045]	[0.045]	[0.098]	[0.097]	[0.104]
R-squared	0.0000	0.0000	0.0007	0.0037	0.0037	0.0042
Observations	222	222	222	222	222	222

The dependent variable is whether the participant chose the temperate option.
OLS regressions, standard errors clustered by participant.

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.3 Overconfidence

We first created a variable aimed at measuring a participants' tendency to overestimate her guessing ability. A participant is said to overestimate her ability if she reports a higher accuracy level than was true. For instance, if a participants stated that her guess was within three when in fact her guess was off by four or more, the person is identified as having overestimated her ability. Table 1 reports the fraction of overconfident responses by reported accuracy level and overall. In the control treatment, there were 25 instances when subjects reported that their guess had a margin of error of 1 or less and this was an overestimation 24% of the time. In the alcohol treatment, there were 18 instances when subjects reported their guess had a margin of error of 1 and this was an overestimation 78% of the time. This difference is large and statistically significant. For the remaining accuracy levels, the alcohol group was more likely to overestimate as compared to the control treatment, but the difference is not statistically significant. For all of the overconfidence task responses pooled, Table 1 shows that participants in the alcohol treatment overestimate their ability 49% of the time while participants in the control treatment overestimate their ability 42% of the time. This difference of 7.5% is not significant (p-value=0.132).

Table 11 reports regression results on the impact of actual and *belief* BAC on overestimation in the data across reported accuracy levels. We find that measured and perceived BAC have a statistically significant impact on overconfidence. In Model 2, we see that BAC3 signficantly effects overestimation. For every 0.08 unit increase in actual BAC, there is 9 percentage point increase in overestimation. Given that the base rate of overestimation is about 42%, this amounts to a 20% increase in overestimation. While this is statistically significant at the 10% level, the effect is not overly robust as significance disappears once we add controls as in Model 5. The perceived BAC also has a significant effect on overestimation. This is partly due to the pure BAC effect as most people in the alcohol treatment correctly believe that their BAC is high. Nonetheless, people who overestimate their BAC seem to also overestimate their accuracy level in this overconfidence task. When we control for gender and time effects the perceived BAC is still large and significant at the 5% level. We do not find any significant effects of gender and time in the level of overconfidence.

Table 11: Overconfidence Task

The dependent variable is whether the participant overestimated her abilities.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.075			0.073		
	[0.049]			[0.049]		
BAC3		1.101*			1.076	
		[0.659]			[0.658]	
BeliefBAC			1.586**			1.587**
			[0.714]			[0.722]
Gender (Male=1)				0.022	0.020	0.030
				[0.054]	[0.054]	[0.054]
Period				-0.0008	-0.0008	-0.0008
				[0.0011]	[0.0011]	[0.0011]
Constant	0.419***	0.417***	0.380***	0.430***	0.429***	0.385***
	[0.037]	[0.035]	[0.041]	[0.059]	[0.058]	[0.0637]
R-squared	0.0057	0.0071	0.0109	0.0068	0.0082	0.0124
Observations	655	655	655	655	655	655

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.4 Strategic Games

Participants were presented with two different versions of Prisoner's Dilemma, the Game of Chicken, and the Stag Hunt Game: one version rewarded cooperation relatively moreso than the other. As shown in Table 1, the incentives did effect the cooperation rates across the versions of the game. On average across the three games, there was about a 33 percentage point increase in cooperation when comparing the two versions of the games to one another. However, this difference did not significantly differ by treatment. An analysis of all tasks pooled together reveals that cooperation occurred 51.8% in the control group and 57.7% in the treatment group (Wald test, p-value=0.157).

Tables 12 - Table 15 report OLS regressions for each type of game separately, as well as all six games pooled. While alcohol consumption does not seem have any significant effect on cooperation in the Prisoner's Dilemma and Chicken Games, it does have an impact on behavior in the Stag Hunt games. Specifically, BAC level seems to significantly increase the cooperation rates in this game. A 0.08 increase in alcohol content increases the likelihood of making the cooperative choice from 54% to 68%, and this is significant at the 5% level. This is true even after we control for additional factors such as gender and period effects. Given the previously reported result that BAC does not impact risk taking, this change in behavior could be attributable to a greater belief that others will cooperate or a greater concern for others.

Interestingly, when we pool all six strategic tasks together as in Table 15, we find similar results: BAC seems to increase the level of cooperation, and is marginally significant at the 10% level. While these effects are driven mainly by the effect of measured BAC in the Stag Hunt game, it should be noted that the other games did have positive but insignificant coefficients for the BAC. Pooling the data together, it appears likely that cooperation across all three games is influenced with an increase in BAC. Being male has a negative effect on the level of cooperation for the game of chicken but it does not significant for any of the other games or for all games together.

Table 12: Both Prisoner's Dilemma Games

The dependent variable is whether the participant cooperated.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.0172			0.005		
	[0.084]			[0.085]		
BAC3		0.539			0.320	
		[1.007]			[1.035]	
BeliefBAC			0.551			0.409
			[1.374]			[1.398]
Gender (Male=1)				0.108	0.104	0.107
				[0.091]	[0.093]	[0.092]
Period				0.001	0.001	0.001
				[0.003]	[0.003]	[0.003]
Constant	0.586***	0.574***	0.568***	0.482***	0.475***	0.468***
	[0.061]	[0.060]	[0.083]	[0.124]	[0.121]	[0.132]
R-squared	0.0003	0.0019	0.0014	0.0128	0.0134	0.0135
Observations	116	116	116	116	116	116

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 13: Both Chicken Games

The dependent variable is whether the participant cooperated.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.049			0.058		
	[0.067]			[0.063]		
BAC3		0.330			0.487	
		[0.837]			0.791	
BeliefBAC			1.151			1.033
			[1.011]			[0.977]
Gender (Male=1)				-0.128**	-0.126**	-0.122*
				[0.063]	0.064	[0.063]
Period				0.0035	0.0035	0.0034
				0.0021	[0.0021]	[0.0021]
Constant	0.439***	0.452***	0.408***	0.414***	0.423***	0.391***
	[0.050]	[0.048]	[0.065]	[0.094]	[0.092]	[0.102]
R-squared	0.0024	0.0006	0.0057	0.0360	0.0340	0.0372
Observations	164	164	164	164	164	164

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 14: Both Stag Hunt Tasks

The dependent variable is whether the participant cooperated.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.100			0.089		
	[0.063]			[0.063]		
BAC3		1.740**			1.598**	
		[0.770]			[0.774]	
BeliefBAC			0.757			0.754
			[0.956]			[0.979]
Gender (Male=1)				0.089	0.083	0.100
				[0.067]	[0.065]	[0.068]
Period				-0.002	-0.001	-0.002
				[0.002]	[0.002]	[0.002]
Constant	0.549***	0.536***	0.561***	0.541***	0.528***	0.544***
	[0.042]	[0.042]	[0.055]	[0.091]	[0.091]	[0.099]
R-squared	0.0099	0.0182	0.0026	0.0192	0.0263	0.0137
Observations	164	164	164	164	164	164

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 15: All Six Strategic Games

The dependent variable is whether the participant cooperated. OLS regressions, standard errors clustered by participant.						
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.059			0.058		
	[0.041]			[0.041]		
BAC3		0.916*			0.924*	
		[0.523]			[0.529]	
BeliefBAC			0.864			0.829
			[0.679]			0.675
Gender (Male=1)				0.006	0.003	0.012
				[0.041]	[0.041]	[0.041]
Period				0.001	0.001	0.001
				[0.001]	[0.001]	[0.001]
Constant	0.518***	0.514***	0.506***	0.474***	0.471***	0.462***
	[0.027]	[0.026]	[0.040]	[0.056]	[0.056]	[0.062]
R-squared	0.0035	0.0050	0.0033	0.0056	0.0073	0.0052
Observations	444	444	444	444	444	444

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.5 Food Choice

Participants were presented with four binary choices between healthy and unhealthy snacks. In Table 1, we report the fraction of times that participants chose the healthy snack. We find that participants who were in the control group chose the healthy snack 9% more frequently than those in the alcohol treatment, but this difference is not statistically significant (Wald test, p-value = 0.135).

In Table 16, we present OLS regression results from the snack choice task. We find that the perceived BAC has a negative and significant impact on healthy snack choice. A 0.08 unit increase in perceived BAC is associated with a 23 percentage point decrease in the healthy snack choice. Given that the coefficient on the physiological BAC is not nearly that large, this implies that those people who believe that they were served alcohol are more likely to choose unhealthy snacks. This may be a psychological effect due to false perception, but it also may be due to heterogeneous selection effects. It is possible that those people who falsely believe that they have higher BAC than they actually have also prefer more unhealthy snacks. Gender and time at which the task was completed have no significant effects on the snack choices made by the participants.

Table 16: Food Choice Task

The dependent variable is whether the participant chose the healthy snack.
OLS regressions, standard errors clustered by participant.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Treatment	-0.092			-0.096		
	[0.061]			[0.063]		
BAC3		-0.943			-1.015	
		[0.825]			[0.851]	
BeliefBAC			-2.862***			-2.863***
			[0.943]			[0.937]
Gender (Male=1)				0.051	0.050	0.041
				[0.066]	[0.066]	[0.062]
Period				0.0004	0.0004	0.0004
				[0.0017]	[0.0017]	[0.0016]
Constant	0.402***	0.390***	0.494***	0.360***	0.348***	0.456***
	[0.045]	[0.044]	[0.056]	[0.069]	[0.068]	[0.076]
R-squared	0.0091	0.0056	0.0383	0.0117	0.0081	0.0401
Observations	328	328	328	328	328	328

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.6 Anchoring

Overall, responses in the anchoring task were strongly influenced by the anchor: people were twice as likely to guess a number that was between the anchor and the true number of "S" characters than they were to guess a number on the opposite side of the anchor. This means that, if the true number of "S" characters is 40 and the participants saw an anchor below 40, their guess would be below 40 about $\frac{2}{3}$ of the time and above 40 about $\frac{1}{3}$ of the time. Alternatively, if the true number of "S" characters is 40 and the random anchor is greater than 40, then participants' guess would be greater than 40 about $\frac{2}{3}$ of the time. If anchoring had no effect, one would expect the guess of participants to be on either side of the true number of "S" characters about half the time. The results are consistent in size to the results in Jahedi et al. (2015).

We analyze the effect of alcohol on correct responses to the anchoring task. A guess is deemed correct if it was within 5 of the actual number of S characters, the rule used to determine if the subject earned a positive payment for the task. As shown in Table 1, we find that participants in the alcohol treatment actually did better than those in the control treatment. In total, 20.5% of guesses were correct in the control group and 27.3% of guesses were correct in the alcohol treatment, though these two did not differ statistically (Wald test, p-value=0.125). Table 17 presents the regression analysis. As evident from Model 2 and Model 5, the BAC is associated with a large and significant increase in performance. For a 0.08 unit increase in the BAC, performance in the anchoring task improves by nearly 10 percentage points. Given that the base performance is about 20-25%, this amounts to a sizeable improvement. This effect holds even after we control for gender and time effects. We do not find gender or time effects in any of the specifications we use.

It is somewhat puzzling that we find positive effects of alcohol on performance in a counting task, since one would expect the opposite to be true. Looking closely at the data, we do find that the distributions of correct answers in the alcohol treatment and control treatment do differ. In the control treatment no participant answered more than 75% of the anchoring questions correctly. In the alcohol treatment, 5 participants answered 75% or more of the anchoring questions correctly. At the other tail of the distribution, in the control treatment, 20 participants answered 25% or fewer of the questions correctly as compared to 10 participants in the alcohol treatment. It seems unlikely that alcohol would cause people to perform so much better, but based on the demographic data gathered in the experiment, we are unable to determine the reason that subjects in the treatment did better although it could be spurious.

Table 17: Anchoring Task

The dependent variable is whether the participant's guess was correct.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	0.068			0.072		
	[0.044]			[0.044]		
BAC3		1.186**			1.255**	
		[0.594]			[0.594]	
BeliefBAC			0.348			0.360
			[0.698]			[0.686]
Gender (Male=1)				-0.047	-0.050	-0.039
				[0.043]	[0.042]	[0.044]
Period				0.0007	0.0007	0.0007
				[0.0013]	[0.0012]	[0.0013]
Constant	0.205***	0.197***	0.222***	0.255***	0.250***	0.271***
	[0.028]	[0.028]	[0.036]	[0.052]	[0.052]	[0.058]
R-squared	0.0064	0.0112	0.0007	0.0098	0.0151	0.0035
Observations	410	410	410	410	410	410

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

4.7 Altruism

Donation rates of participants were analyzed in three dictator games, each with different costs of giving. It is clear from Table 1 that the lower the cost of giving, the more money was donated. On average, the giving rate doubles from $4.81 from the high cost of giving to $9.56 to the low cost of giving. Further, participants who were treated with alcohol tend to give more money in each of the three cases, but the differences are not statistically significant when the three tasks are considered separately.

In Tables 18 through 21, we present results from regressions that look at the impact of alcohol on altruism. The coefficients on treatment, BAC, and perceived BAC are generally positive, but there is not enough data to draw meaningful conclusions. When we pool the results of all three dictator games, we find that blood alcohol concentration is large and significant. A .08 unit increase in BAC is associated with an increased donation of $2.77. This suggests that the physiological blood alcohol level can make people more altruistic. We find no significant effects of perceived BAC, gender or time at which the task was completed on the amount given by the dictator.

Table 18: Standard Dictator's Game

The dependent variable is the amount of money given by the dictator.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	2.049			1.961		
	[1.730]			[1.763]		
BAC3		30.32			28.670	
		[22.66]			[23.300]	
BeliefBAC			44.88*			42.920
			[26.16]			[26.56]
Gender (Male=1)				-0.215	-0.289	-0.025
				[1.877]	[1.878]	[1.848]
Period				0.042	0.038	0.039
				[0.056]	[0.057]	[0.056]
Constant	6.293***	6.238***	5.166***	5.268**	5.403**	4.163
	[1.223]	[1.181]	[1.518]	[2.415]	[2.378]	[2.564]
R-squared	0.0172	0.0219	0.0355	0.0249	0.0283	0.0415
Observations	82	82	82	82	82	82

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 19: Low Cost of Giving Game

The dependent variable is the amount of money given by the dictator.
OLS regressions, standard errors clustered by participant.

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Treatment	1.561			1.856		
	[2.207]			[2.248]		
BAC3		46.080			50.050*	
		[28.620]			[29.070]	
BeliefBAC			-14.48			-13.240
			[33.76]			[34.24]
Gender (Male=1)				-0.897	-1.150	-0.704
				[2.357]	[2.327]	[2.354]
Period				0.054	0.057	0.047
				[0.064]	[0.063]	[0.064]
Constant	8.780***	7.921***	10.260***	7.673**	6.886**	9.306***
	[1.561]	[1.491]	[1.0960]	[2.924]	[2.832]	[3.195]
R-squared	0.0062	0.0314	0.0023	0.0172	0.0449	0.0106
Observations	82	82	82	82	82	82

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 20: High Cost of Giving Game

The dependent variable is the amount of money given by the dictator.
OLS regressions, standard errors clustered by participant.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Treatment	1.585			1.563		
	[1.203]			[1.248]		
BAC3		28.07***			28.070***	
		[15.66]			[16.26]	
BeliefBAC			16.92			16.96
			[18.46]			[18.65]
Gender (Male=1)				0.909	0.821	1.076
				[1.287]	[1.277]	[1.286]
Period				-0.009	-0.013	-0.018
				[0.037]	[0.037]	[0.036]
Constant	4.024***	3.818***	4.006***	3.732**	3.678**	3.353*
	[0.851]	[0.816]	[1.072]	[1.559]	[1.537]	[1.743]
R-squared	0.0213	0.0386	0.0104	0.0284	0.0453	0.0192
Observations	82	82	82	82	82	82

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

Table 21: All 3 Dictator's Games

The dependent variable is the amount of money given by the dictator.
OLS regressions, standard errors clustered by participant.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Treatment	1.732			1.699		
	[1.039]			[1.425]		
BAC3		34.820*			34.520*	
		[13.540]			[18.510]	
BeliefBAC			15.770			15.300
			[15.920]			[20.150]
Gender (Male=1)				-0.109	-0.249	0.079
				[1.557]	[1.554]	[1.542]
Period				0.022	0.019	0.024
				[0.027]	[0.027]	[0.028]
Constant	6.366***	5.993***	6.476***	5.795***	5.615***	5.725***
	[0.735]	[0.706]	[0.924]	[1.521]	[1.490]	[1.797]
R-squared	0.0113	0.0264	0.0040	0.0134	0.0281	0.0065
Observations	246	246	246	246	246	246

Standard errors given in brackets. *p<0.10, ** p<0.05, ***p<0.01

5 Discussion

In this study, we use a lab experiment to exogenously vary the blood alcohol concentration of participants to examine how judgment and decision making are effected in a variety of economic tasks. We successfully manipulate the blood alcohol concentration for 41 individuals, as measured by a breathalyzer. Over the course of an hour, participants completed a series of 59 individual and social tasks, including math and logic tasks, uncertainty tasks, overconfidence tasks, strategic games, food choice tasks, anchoring tasks, and altruism tasks. A control group completed the same set of tasks, but was not treated with alcohol. In the strategic games, the results indicate that blood alcohol concentration positively affects cooperation rates (mostly noticeably in the Stag Hunt game) and also increases altruistic giving in the Dictator games. For the individual decision making tasks including risk taking, we find little to no evidence of alcohol affecting behavior. Those who consumed alcohol did not take more risk, act more imprudently, or intemperately. They did not exhibit greater overconfidence, perform more poorly on math problems, or select more unhealthy snacks although they did in fact perform better on the anchoring task. We also note that we compared the payoffs of the two groups and we find that people in the control and alcohol treatments did not earn statistically different amounts of money over the course of the study. However, we do find that people's perception of BAC matters. Specifically, those who report believing that they have a high BAC are more overconfident and are more likely to select higher calorie snacks. It is tempting to conclude that our findings of perceived BAC impacting overconfidence and food choice are indications of the psychological effects of alcohol, but one should not make such an assertion because some other characteristic could be driving the behavior and the willingness to self-report a high BAC belief.

That we did not find alcohol to have an impact on risk-taking is in line with Meier et al. (1996) and Breslin et al. (1999), although Corazzini et al. (2014) find that alcohol impacts risk taking among women.[9] However, whereas we find that people become more altruistic with alcohol, Corazzini et al. (2014) find that subjects become less altruistic when they consume alcohol. While it is not clear why the findings differ, one possible explanation is that the tasks we employ are different. Corazzini et al. (2014) ask participants to donate money to two NGOs while we used standard dictator games where participants allocated some money to another person in the experiment. It is possible that participants feel closer to others in the room than to charitable organizations, but only further research will resolve this point. The result that we found the most puzzling is that performance on math and logic problems did not differ between the control and treatment groups.[10] This suggest that the impairment of cognitive ability from consuming an amount of alcohol designed to target a BAC of 0.08 is smaller than that of memorizing an 8-digit number (see Deck and Jahedi 2015). It is worth noting that although the dosage was designed to target a BAC of 0.08, the actual BACs when subjects began the experiment ranged from 0.036 to 0.124 with only 11 subjects crossing the 0.08 threshold. It would be interesting to know how larger dosages

[9]Evidence that alcohol consumption is correlated with risk taking is found in survey based studies by Barsky et al. (1997), Anderson and Mellor (2008) and Galizzi and Miraldo (2012).

[10]It is important to note that the manipulation was successful as verified by the breathalyzer.

of alcohol impact behavior as obviously there is a level at which cognitive ability falters, but there are clear ethical and legal issues with doing so. There are also several other interesting avenues for research looking at the impact of alcohol on economic decision making, such as how alcohol impacts bargaining behavior to the degree that deals are struck over drinks. Similarly, as more and more localities legalize the medical and recreational use of marijuana, parallel research on its effect on economic decision making is warranted.

References

[1] Anderson, L. R., & Mellor, J. M. (2008). Predicting health behaviors with an experimental measure of risk preference. *Journal of Health Economics*, 27(5), 1260-1274.

[2] Barsky, R. B., Kimball, M. S., Juster, F. T., & Shapiro, M. D. (1995). Preference parameters and behavioral heterogeneity: an experimental approach in the health and retirement survey (No. w5213). *National Bureau of Economic Research.*

[3] Bregu, K., Forbes, D. (2015). The Impact of Overconfidence in Acquiring Information (Working Paper).

[4] Breslin, F. C., Sobell, M. B., Cappell, H., Vakili, S., Poulos, C. X. (1999). The effects of alcohol, gender, and sensation seeking on the gambling choices of social drinkers. *Psychology of Addictive Behaviors*, 13(3), 243-252.

[5] Breslow, R. A., Guenther, P. M., Juan, W., & Graubard, B. I. (2010). Alcoholic beverage consumption, nutrient intakes, and diet quality in the US adult population, 1999-2006. *Journal of the American Dietetic Association*, 110(4), 551-562.

[6] Breslow, R. A., Chen, C. M., Graubard, B. I., Jacobovits, T., & Kant, A. K. (2013). Diets of drinkers on drinking and nondrinking days: NHANES 20032008. *The American Journal of Clinical Nutrition*, ajcn-050161.

[7] Burghart, D., Glimcher, P., Lazzaro, S., 2013. An expected utility maximizer walks into a bar... *Journal of Risk and Uncertainty* 46 (3), 215246.

[8] Campbell, C. A., Hahn, R. A., Elder, R., Brewer, R., Chattopadhyay, S., Fielding, J., ... & Task Force on Community Preventive Services. (2009). The effectiveness of limiting alcohol outlet density as a means of reducing excessive alcohol consumption and alcohol-related harms. *American Journal of Preventive Medicine*, 37(6), 556-569.

[9] Caton, S. J., Bate, L., & Hetherington, M. M. (2007). Acute effects of an alcoholic drink on food intake: aperitif versus co-ingestion. *Physiology and Behavior*, 90(2), 368-375.

[10] Chatterji, P., & DeSimone, J. (2005). Adolescent drinking and high school dropout (No. w11337). *National Bureau of Economic Research.*

[11] Chatterji, P., & DeSimone, J. (2006). High school alcohol use and young adult labor market outcomes (No. w12529). *National Bureau of Economic Research.*

[12] Cohen, D. A., Mason, K., & Scribner, R. (2002). The population consumption model, alcohol control practices, and alcohol-related traffic fatalities. *Preventive Medicine*, 34(2), 187-197.

[13] Corazzini, L., Filippin, A., Vanin, P. (2015). Economic behavior under the influence of alcohol: an experiment on time preferences, risk-taking, and altruism. *PLoS ONE*, 10(4), e0121530.

[14] Cutter, H. S. G., Green, L. R., & Harford, T. C. (1973). Levels of Risk Taken by Extraverted and Introverted Alcoholics as a Function of Drinking Whisky*. *British Journal of Social and Clinical Psychology*, 12(1), 83-89.

[15] Davis KC, Stoner SA, Norris J, George WH, Masters NT. Womens awareness of and discomfort with sexual assault cues: Effects of alcohol consumption and relationship type. Violence Against Women. 2009, 15, 1106-1125.

[16] Deck, C., & Schlesinger, H. (2014). Consistency of higher order risk preferences. *Econometrica*, 82(5), 1913-1943.

[17] Deck, C., & Jahedi, S. (2015). The Effect of Cognitive Load on Economic Decision Making: A Survey and New Experiments. *European Economic Review*, 78, 97-119.

[18] Dee, T. S. (1999). State alcohol policies, teen drinking and traffic fatalities. *Journal of Public Economics*, 72(2), 289-315.

[19] Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. *Experimental Economics*, 10(2), 171-178.

[20] Frederick, S. (2005). Cognitive reflection and decision making. *The Journal of Economic Perspectives*, 19(4), 25-42.

[21] Friel PN, Logan BK, OMalley D, Baer JS. Development of Dosing Guidelines for Reaching Selected Target Breath Alcohol Concentrations. *Journal of Studies on Alcohol and Drugs*. 1999;60:555-565.

[22] Galizzi, M. M., & Miraldo, M. (2012). Are you what you eat? Experimental evidence on risk preferences and health habits. Working Papers 9792, *Imperial College, London, Imperial College Business School.*

[23] Gerson, L. W., & Preston, D. A. (1979). Alcohol consumption and the incidence of violent crime. *Journal of Studies on Alcohol*, 40(3), 307-312.

[24] Hingson, R., Heeren, T., Winter, M., & Wechsler, H. (2005). Magnitude of alcohol-related mortality and morbidity among US college students ages 1824: Changes from 1998 to 2001. *Public Health*, 26.

[25] Hoffmeister, H., Schelp, F. P., Mensink, G. B., Dietz, E., & Bhning, D. (1999). The relationship between alcohol consumption, health indicators and mortality in the German population. *International Journal of Epidemiology*, 28(6), 1066-1072.

[26] Hopthrow, T., Abrams, D., Frings, D., & Hulbert, L. G. (2007). Groupdrink: The effects of alcohol on intergroup competitiveness. *Psychology of Addictive Behaviors*, 21(2), 272.

[27] Howland, J., Rohsenow, D. J., Littlefield, C. A., Almeida, A., Heeren, T., Winter, M., ... & Hermos, J. (2010). The effects of binge drinking on college students' nextday academic testtaking performance and mood state. *Addiction*, 105(4), 655-665.

[28] Jahedi, S., Deck, C., Ariely, D. (2015). The Impact of Sexual Arousal on Economic Decision Making (Working Paper).

[29] Klatsky, A. L., Friedman, G. D., Siegelaub, A. B., & Grard, M. J. (1977). Alcohol consumption and blood pressure: Kaiser-Permanente multiphasic health examination data. *New England Journal of Medicine*, 296(21), 1194-1200.

[30] Lane, S. D., Cherek, D. R., Pietras, C. J., & Tcheremissine, O. V. (2004). Alcohol effects on human risk taking. *Psychopharmacology*, 172(1), 68-77.

[31] Levitt, S. D., & Porter, J. (2001). How dangerous are drinking drivers?. *Journal of Political Economy*, 109(6), 1198-1237.

[32] Meier, S. E., Brigham, T. A., Ward, D. A., Myers, F., Warren, L., 1996. Effects of blood alcohol concentrations on negative punishment: Implications for decision making. *Journal of Studies on Alcohol* 57 (1), 8596.

[33] Murdoch, D., & Ross, D. (1990). Alcohol and crimes of violence: Present issues. *Substance Use and Misuse*, 25(9), 1065-1081.

[34] Neufeld, M., & Rehm, J. (2013). Alcohol consumption and mortality in Russia since 2000: are there any changes following the alcohol policy changes starting in 2006?. *Alcohol and Alcoholism*, 48(2), 222-230.

[35] Proestakis, A., Corts Aguilar, A., Espn Martn, A., Exadaktylos, F., Segun, O., Palacios Garca, L. A., 2013. The separate effects of self-estimated and actual alcohol intoxication on risk-taking: A field experiment. *Journal of Neuroscience, Psychology, and Economics* 6 (2), 115135.

[36] Rehm, J., Samokhvalov, A. V., & Shield, K. D. (2013). Global burden of alcoholic liver diseases. *Journal of Hepatology*, 59(1), 160-168.

[37] Sacks, J.J.; Gonzales, K.R.; Bouchery, E.E.; et al. 2010 national and state costs of excessive alcohol consumption. *American Journal of Preventive Medicine* 49(5):e73e79, 2015.

[38] Schilbach, F. (2015). Alcohol and self-control: A field experiment in India. *Unpublished manuscript.*

[39] Schrieks, I. C., Stafleu, A., Griffioen-Roose, S., de Graaf, C., Witkamp, R. F., Boerrigter-Rijneveld, R., & Hendriks, H. F. (2015). Moderate alcohol consumption stimulates food intake and food reward of savoury foods. *Appetite*, 89, 77-83.

[40] Singleton, R. A., & Wolfson, A. R. (2009). Alcohol consumption, sleep, and academic performance among college students. *Journal of Studies on Alcohol and Drugs*, 70(3), 355-363.

[41] Sjoberg, L., 1969. Alcohol and gambling. *Psychopharmacologia* 14 (4), 28498.

[42] Stahre, M.; Roeber, J.; Kanny, D.; et al. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Preventing Chronic Disease* 11:E109, 2014. PMID: 24967831

[43] Substance Abuse and Mental Health Services Administration (SAMHSA). 2014 National Survey on Drug Use and Health (NSDUH). Table 2.41BAlcohol use in lifetime, past year, and past month among persons aged 18 or older, by demographic characteristics: Percentages, 2013 and 2014. Available at: http://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2014/NSDUH-DetTabs2014.htm#tab2-41b

[44] Townsend, L., Flisher, A. J., & King, G. (2007). A systematic review of the relationship between high school dropout and substance use. *Clinical Child and Family Psychology Review*, 10(4), 295-317.

[45] van Kooten, M., de Ridder, D., Vollebergh, W., & van Dorsselaer, S. (2007). What's so special about eating? Examining unhealthy diet of adolescents in the context of other health-related behaviours and emotional distress. *Appetite*, 48(3), 325-332.

[46] Wichstrom, L. (1998). Alcohol intoxication and school dropout. *Drug and Alcohol Review*, 17(4), 413-421.

[47] World Health Organization. (2014). Global status report on alcohol and health-2014. *World Health Organization.*

[48] Yeomans, M. R. (2010). Short term effects of alcohol on appetite in humans. Effects of context and restrained eating. *Appetite*, 55(3), 565-573.

[49] Yoon, Y.H.; Chen, C.M.; and Yi, H.Y. Surveillance report #100: Liver cirrhosis mortality in the United States: National, State, and regional trends, 20002011. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2014.

Appendix

A Instructions

In todays study you will make a series of economic choices. At the end of the study you will be paid based upon your choices, so it is important that you understand these instructions completely. This payment is in addition to the fixed amount of money you are receiving for participating in the study. The choices are timed, so it is not possible for you or the researcher to pause the study once it begins. So please ask any questions you may while you are reading the directions.

You should not communicate with or distract others during the study including this time in the directions. This means that you should not talk and that you should turn off and put away all electronic devices.

There are six different types of tasks that you will encounter.

Math Tasks:

You will be given a problem and asked to solve it. If you are correct you will earn $15 for that task. If you are wrong you will earn $0 for the task. Some math tasks are addition and multiplication problems like 15+25=___ or 34*15=___. Other math tasks are word problems.

Counting Tasks:

You will be asked to count items in a table. The more accurate you are the more you will be paid.

There are two types of counting tasks.

One type of counting task will show you 100 colored rectangle and you will need to count how many are red. You will only have 6 seconds to count the rectangles. You will then be asked to enter the number of rectangles. Finally, you will be asked to identify how accurate your answer was.

If your answer was within 1 on the correct number and it was, you will receive $25.

If your answer was within 3 on the correct number and it was, you will receive $20.

If your answer was within 6 on the correct number and it was, you will receive $14.

If your answer was within 12 on the correct number and it was, you will receive $6.

The second type of counting task will show you a table with one hundred characters. Each character will be either a number "5" or a letter "S". You will be shown the table for 10 seconds and then asked to guess if the number of letter S characters is smaller or bigger than a randomly generated number. You will then be given 10 seconds table to view the table again. After that you will be asked to report the number of letter S characters. If your answer is with 5 of the correct number you will earn $20.

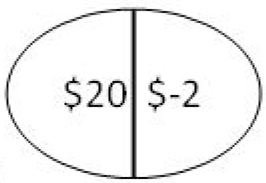
Uncertainty Tasks:

You will first be given an endowment of money (money that you will receive with certainty). You will also be asked to select between two options to determine the additional payment (the additional payment may be positive or negative). Some options are fixed amounts of money. These are shown as circles with a dollar amount inside. Some options are lotteries. Lotteries are shown as a circle with a line through the middle. For a lottery, there is a 50% chance you will receive what is on the left side of the circle and a 50% chance that you will receive what is on the right side of the circle. Sometimes what is on the left or ride side is another lottery. Here are some examples.

If you select an option like

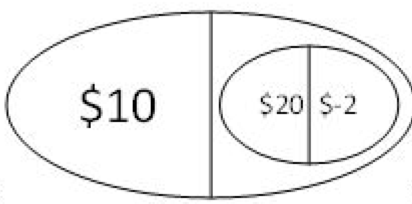
you would receive an additional $10.

If you select an option like



you would receive an additional $20 with a 50% chance and lose $2 with a 50% chance.

If you select an option like



you would receive an additional $10 with a 50% chance and with a 50% chance would receive a second lottery. From this second lottery you would gain $20 with a 50% chance and lose $2 with a fifty percent chance.

Table Tasks:

You will be randomly and anonymously matched with someone else in the study for this task. You and the other person will be shown a table like the following.

	They Pick Option A	They Pick Option A
You Pick Option A	$W, $W	$X, $Y
You Pick Option B	$Y, $X	$Z, $Z

Each of you will pick either option A or option B. The combination of the two choices identifies a cell in the table. Each cell lists your earnings and the earnings of the other person.

If you both pick A you both earn $W. If you pick A and the other person picks B then you earn $X and they earn $Y. If you pick B and the other person picks A then you earn $Y and they earn $X. If you both pick B you both earn $Z.

Food and Beverage Tasks:
You will be shown two options, either two drinks or two snacks. Your earnings are the item you selected.

Payment
You will not be paid for every task. Instead, one single task from among all of the Math Tasks, Counting Tasks, Allocation Tasks, Uncertainty Tasks, and Table Tasks will be randomly selected and you will be paid based on your earnings in that task. This does not mean that you are paid for one task of each type. For example, if you are paid for a Math Task you will not be paid for a Table Task. If you are paid for a Table task so is the person that you were randomly matched with. If you are paid for the Allocation Task then so is the person that you were randomly matched with. Further, only one of you will have your allocation choice implemented. That is, if your allocation choice is implemented then this is all of the additional money that you and the other person will receive in this study.

You will also receive the option you selected in one of the Food and Beverage Tasks.

B Tasks

Math and Logic

Addition

1. 35 + 9 = ___

2. 46 + 17 = ___

3. 27 + 18 = ___

4. 37 + 17 = ___

5. 43 + 19 = ___

Multiplication

1. 16 * 8 = ___

2. 13 * 7 = ___

3. 18 * 5 = ___

4. 14 * 9 = ___

5. 19 * 6 = ___

CRT

1. A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost (in dollars)?
2. It takes 5 machines 5 minutes to make 5 widgets. How many minutes would it take 100 machines to make 100 widgets (enter a numeric value)?
3. In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how many days would it take for the patch to cover half of the lake? (enter a numeric value)

Uncertainty tasks

Beneficial Risk Taking (gains)

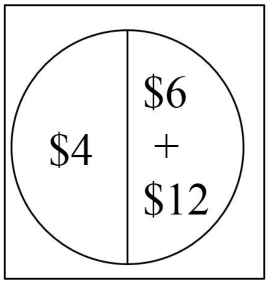
1. {sure gain $6} or {50% gain 0, 50% gain $14}
2. {sure gain $8} or {50% gain 0, 50% gain $18}
3. {sure gain $10} or {50% gain 0, 50% gain $22}
4. {sure gain $12} or {50% gain 0, 50% gain $26}

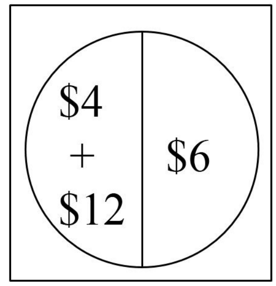
Beneficial Risk Taking (losses)

1. {sure loss $8} or {50% lose 0, 50% lose $14}
2. {sure loss $10} or {50% lose 0, 50% lose $18}
3. {sure loss $12} or {50% lose 0, 50% lose $22}
4. {sure loss $15} or {50% lose 0, 50% lose $28}

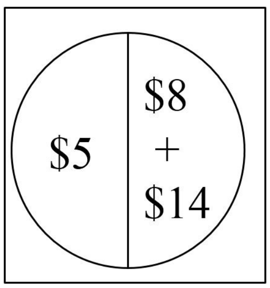
Variance Increasing Risk Taking

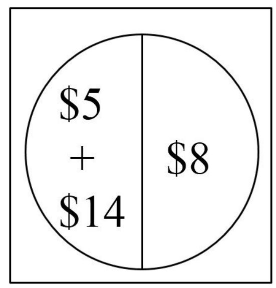
1. Pair 1



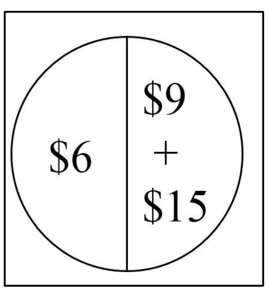


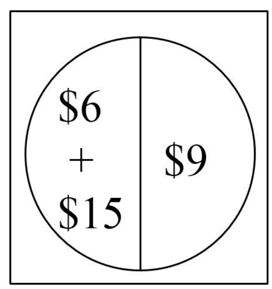
2. Pair 2





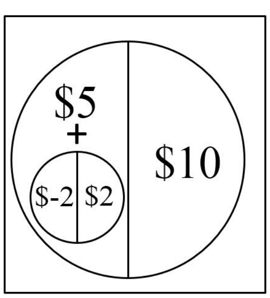
3. Pair 3

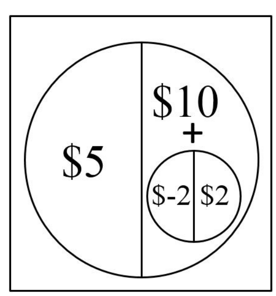




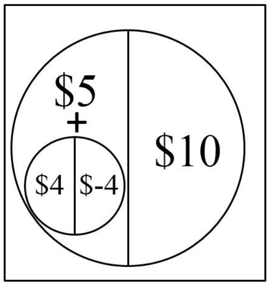
Prudence

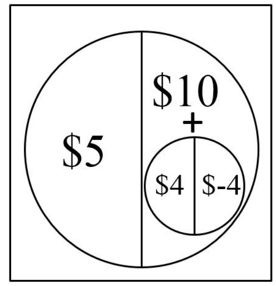
1. Pair 1



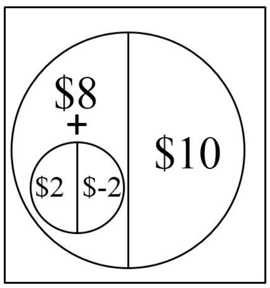


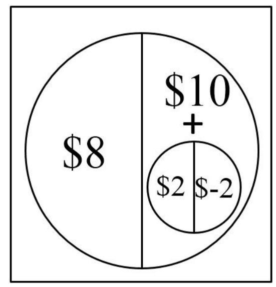
2. Pair 2





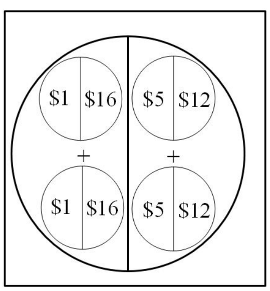
3. Pair 3

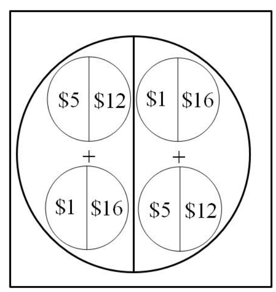




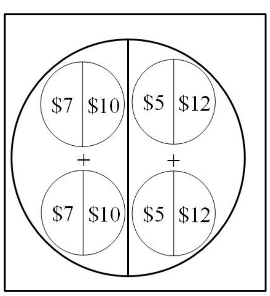
Temperance

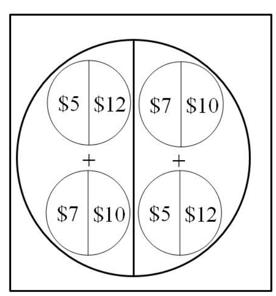
1. Pair 1



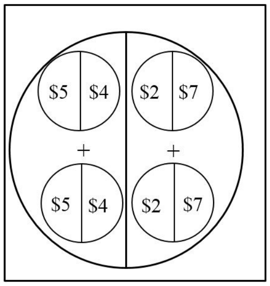


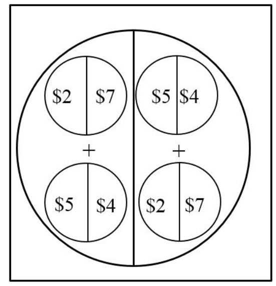
2. Pair 2





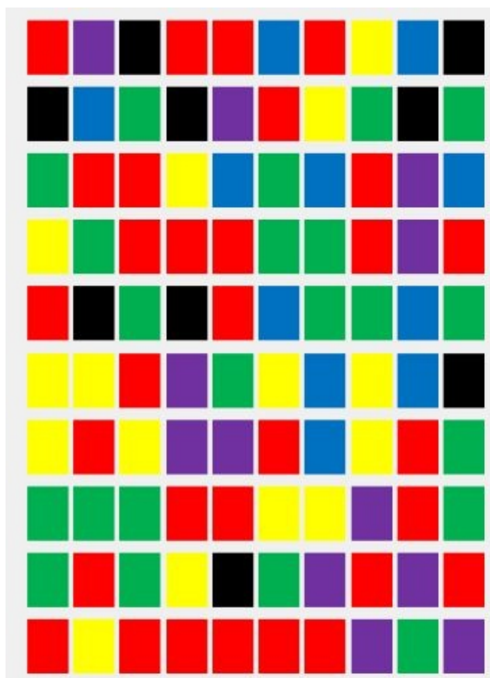
3. Pair 3



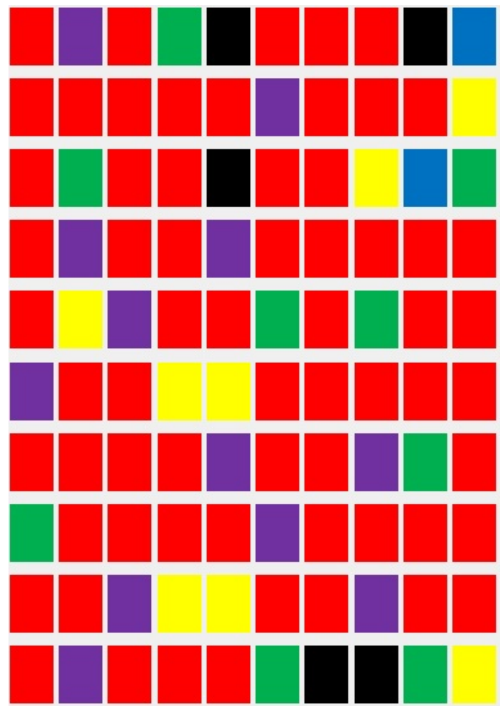


Overconfidence Tasks

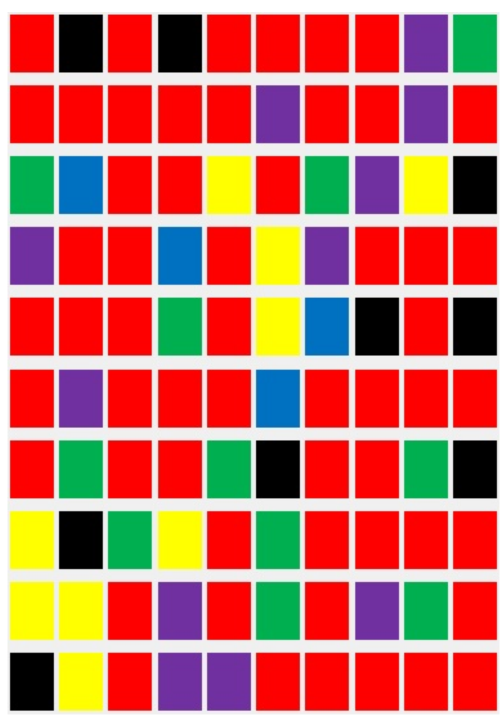
1. Task 1



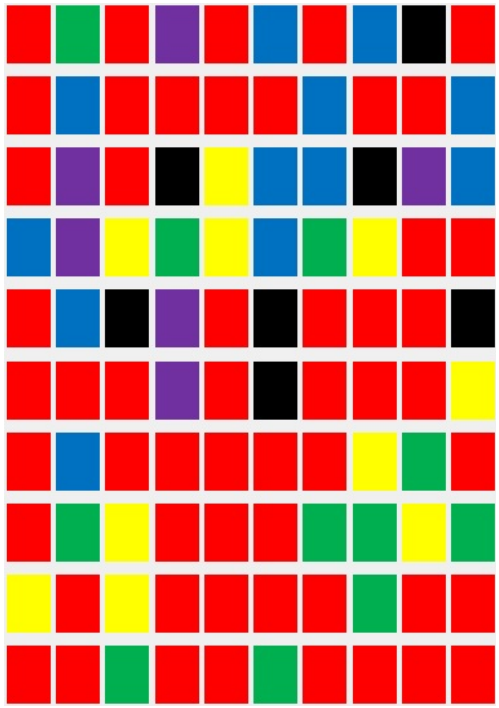
2. Task 2



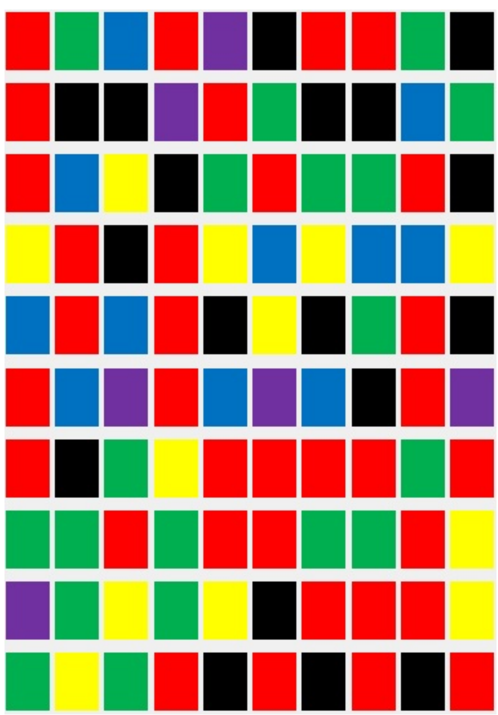
3. Task 3



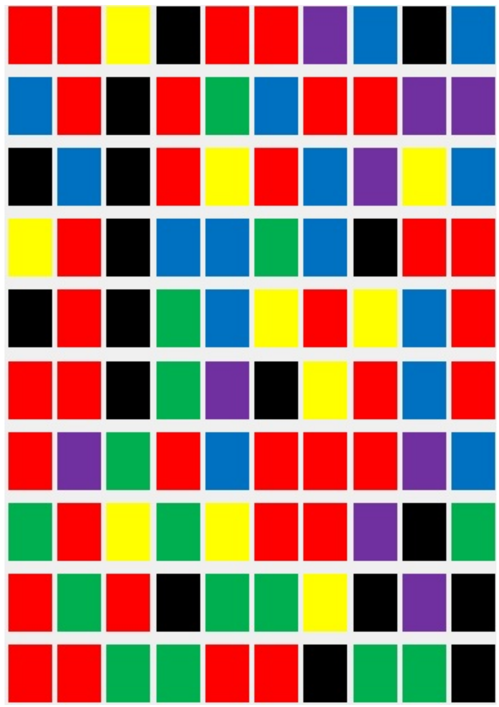
4. Task 4



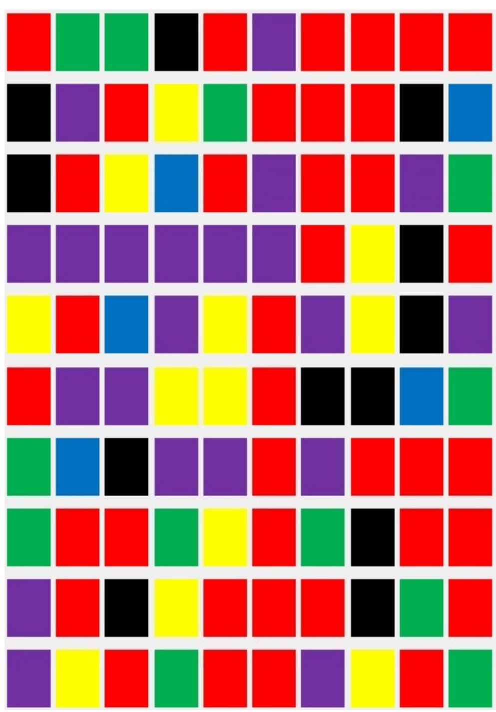
5. Task 5



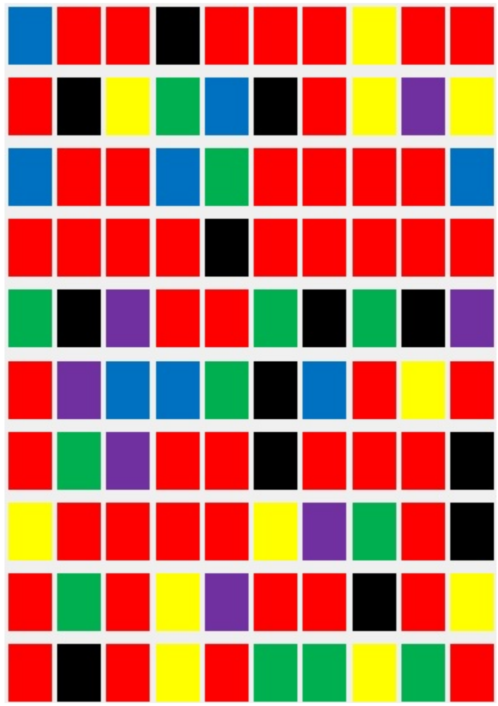
6. Task 6



7. Task 7



8. Task 8



Strategic Games

1. Prisoner's Dilemma (Large Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$10,\$10	\$30,\$0
You pick option B	\$0,\$30	\$20,\$20

2. Prisoner's Dilemma (Small Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$20,\$20	\$5,\$25
You pick option B	\$25,\$5	\$10,\$10

3. Chicken Game (Large Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$10,\$10	\$5,\$30
You pick option B	\$30,\$5	\$0,\$0

4. Chicken Game (Small Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$0,\$0	\$30,\$5
You pick option B	\$5,\$30	\$20,\$20

5. Stag Hunt Game (Large Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$10,\$10	\$10,\$0
You pick option B	\$0,\$10	\$18,\$18

6. Stag Hunt Game (Small Gain)

	Opponent picks option A	Opponent picks option B
You pick option A	\$22,\$22	\$0,\$10
You pick option B	\$10,\$0	\$10,\$10

Food Choice Pairs

Below we show the four pairs of snacks subjects saw in the experiment.

Healthy choice　　　　Unhealthy choice

1. Pair 1

2. Pair 2

3. Pair 3

4. Pair 4

Altruism

1. Participants had an endowment of 30 tokens. One token was worth $1 for the dictator and $1 for the receiver.
2. Participants had an endowment of 20 tokens. One token was worth $2 for the dictator and $1 for the receiver.
3. Participants had an endowment of 20 tokens. One token was worth $1 for the dictator and $2 for the receiver.

Check Tasks

In addition to the tasks above we included three check tasks.

Check "Uncertainty" Task

1. {sure gain $10} or {sure gain $20}

Check Strategic Games

2.

	Opponent picks option A	Opponent picks option B
You pick option A	$10,$10	$10,$20
You pick option B	$20,$10	$20,$20

Check "Overconfidence" Task

3.