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Alcohol Expenditure, Generosity and Empathy

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ABSTRACT

Existing studies suggest that alcohol dependency (or recovery from alcohol dependency) is associated with lower levels of empathy and generosity. We present results from a charitable donation experiment which shows that in a student population, higher levels of alcohol expenditure are associated with significantly less generosity. However, there is no significant association between alcohol expenditure and empathy (as measured by the Empathy Quotient Scale), which suggests that the relationship between alcohol expenditure on generosity is mediated through some other channel.

JEL classification: D64; I19

Keywords: alcohol; generosity; empathy; Dictator Game

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1. Introduction

Existing studies, which are surveyed in the next section, suggest that alcohol dependency (or at least the process of recovery from alcohol dependency) is associated with significantly lower levels of empathy and generosity. In other words, everything else being equal, alcoholics are significantly more selfish than non-alcoholics. These studies are typically based on comparisons of recovering alcoholics with a control group, and our contribution is to examine whether this relationship generalizes beyond alcohol dependency by examining the relationship between alcohol expenditure, empathy, materialism and generosity in a broader sample of subjects recruited from a population of undergraduate students.¹ First, we use a Dictator Game experiment to investigate whether there is any association between the level of alcohol expenditure and generosity. Our results indicate that there is a large and statistically significant association ($p < 0.05$). Secondly, we investigate whether the effect is connected to levels of empathy and materialism. We find a very small and statistically insignificant association, which suggests the possibility that the alcohol effect is mediated through some channel other than empathy or materialism as they are conventionally measured.

2. Literature Review and Hypotheses

The bulk of the literature on the connections between alcohol consumption and empathy is in the clinical sciences, involving a comparison between levels of empathic concern among a control group and levels among a group meeting a standard criterion for alcohol dependence (e.g. DSM-IV-TR). Empathic concern is measured using psychological surveys such as the Empathy Quotient (EQ) scale of Baron-Cohen and Wheelwright (2004) or the Interpersonal Reactivity Index (IRI) of Davis (1983). Martinotti *et al.* (2009) and Amenta *et al.* (2012) find that alcohol-

¹ A question about alcohol expenditure was included in the participant survey that accompanied a previous set of experiments on generosity run by one of the co-authors of this paper: see Clark *et al.* (2017), appendix 2. There was a strong negative correlation between expenditure and generosity. However, the experiments were designed to test hypotheses about the framing of the participants' decisions, not about alcohol expenditure, and the survey did not include questions about other potential determinants of generosity that might also be associated with alcohol expenditure (e.g. questions about religion), so the correlation was not reported in Clark *et al.* Our current paper is based on a subsequent set of experiments and survey questions that were intentionally designed to test the hypothesis that higher alcohol expenditure is associated with lower generosity.

dependent subjects have a significant empathy deficit as measured by the EQ scale. Muraige *et al.* (2011) use EQ and IRI measures to distinguish between cognitive empathy (the ability to recognise the emotions of others) and emotional empathy (an affective response to the emotions of others). They find no evidence of a cognitive empathy deficit among alcohol-dependent subjects, but some evidence for an emotional empathy deficit. Kornreich *et al.* (2013) find similar results using alternative measures of empathy. These studies all use alcohol-dependent subjects who have abstained from alcohol for a period of a few weeks, but Erol *et al.* (2017) use the EQ scale to measure the size of the empathy deficit among alcohol-dependent subjects at different stages of detoxification. They find that there is a significant deficit in the first weeks of detoxification, but that this effect disappears within three months.

In addition, there are two papers in experimental economics (Bregu *et al.*, 2016 and Corazzini *et al.*, 2015) which analyze the effect on generosity of alcohol consumption during the experiment. In these studies, subjects are randomly allocated to different treatments, one of which involves consuming a small amount of alcohol, before taking part in a Dictator Game in which they are the dictator. In Corazzini *et al.* the recipient in the game is a charity whereas in Bregu *et al.* the recipient is another player. Corazzini *et al.* find that alcohol consumption is associated with less generosity whereas Bregu *et al.* find that alcohol consumption is associated with greater generosity. In contrast, our study, like those in the addictions literature, relates to the effects of habitual alcohol consumption.²

One possible reason for a relationship between alcohol dependency and generosity, proposed by Alcoholics Anonymous, is that alcoholism is a function of egocentrism. Recovery from alcoholism therefore involves a shift of focus from the self to others (Pagano *et al.*, 2009; 2013). Consistent with this view, Carter *et al.* (2012) find that adolescents suffering from substance dependence are less likely than their non-addicted peers to give money to a homeless person, and also donate to charity less frequently. Pagano *et al.* (2009) find that recovering alcoholics are more likely to help others (e.g. by donating money) than they were when they had been drinking.

² Also relevant to our study is the research which shows that alcohol consumption is not a significant determinant of tipping in restaurants (Lynn *et al.*, 2012; Azar *et al.*, 2015). Our finding of a connection between alcohol expenditure and generosity suggests that inherent generosity may not be a major factor in decisions about tipping.

Overall, the existing literature suggests that alcohol dependency is associated with lower levels of generosity and empathic concern, but that these effects disappear after a prolonged period of abstinence. Our experiment using of a sample of ethnic European university students was designed to test whether these results translate into a significant association between alcohol consumption and empathy in the wider population. (Whether anyone in the sample is likely to have an unhealthy level of alcohol consumption is discussed below.) The hypotheses are as follows.

1. Conditional on other characteristics, individuals reporting a higher level of alcohol expenditure behave less generously, giving less money to charity.
2. Conditional on other characteristics, individuals reporting a higher level of alcohol expenditure have lower levels of empathic concern.

Although the existing literature focuses on empathy measures, the potential link with egocentrism suggests the possibility that alcohol expenditure is also associated with higher levels of materialism. Materialism is associated with self-centeredness and less concern for others (Richins and Dawson. 1992). This leads to our third hypothesis.

3. Conditional on other characteristics, individuals reporting a higher level of alcohol expenditure have higher levels of materialism.

The next section of the paper describes the design of the study generating the data to test these hypotheses, and the subsequent section presents our results.

3. Materials and Methods

3.1 Overview

The experiment was designed to test two sets of hypotheses, one concerning the effects of oral communication and framing on generosity and the other concerning the effects of alcohol expenditure. This paper is concerned with the latter, so although we will briefly explain the whole of the experimental design, the different experimental treatments are incidental to this paper, and are discussed in more detail in a companion paper (Fielding *et al.*, 2017).

The experiment incorporated two surveys and a Dictator Game in which the participants were given the opportunity to make a donation to World Vision New Zealand, an international development charity with a high profile in the country. Copies of the written material used in the experiment are included in the appendices. There were eight experimental sessions; as described below, these sessions incorporated a 2×2 design with some variation in the extent of oral communication with the participants and some variation in the information given to participants about the possible reasons they might have for making a donation. However, these different treatments turned out to have no significant effect on the level of donations conditional on reported alcohol expenditure ($p > 0.1$).

In the first survey, participants answered questions about their spending habits and socio-demographic characteristics. The spending questions were designed to measure the main components of personal expenditure over the previous month. The expenditure categories included alcohol (our main variable of interest) and also donations to charity. The socio-demographic survey enabled us to control for other characteristics that might be correlated with both alcohol expenditure and generosity; these characteristics include age, gender, ethnicity and frequency of religious observance.

The second survey was designed to measure each participant's levels of materialism and empathy. It included 28 questions from the IRI and 15 questions from the material values scale (MVS) of Richins (2004). The response to each question is measured on a five-point Likert scale. The IRI comprises four sections, each with seven components, but for this study we focus on the fourth section, which is designed to measure empathic concern, i.e. sympathy and concern for others' misfortune. The MVS is designed to measure the weight given to owning and acquiring material possessions when considering major life goals. Validation of the IRI is discussed by De Corte *et al.* (2007), Gilet *et al.* (2013), and Siu and Shek (2005); validation of the MVS is discussed by Richins (2004), and its relationship to generosity is discussed by Meleddu and Pulina (2016).

3.2. Experimental protocol

The experiments were conducted at a New Zealand university on two consecutive Saturdays in September 2016. Each participant was seated behind a partition, in order to ensure that he/she could not be seen by the researchers or by the other participants. Sessions were held

at 11am, 12:30am, 2pm and 3:30pm on each Saturday. (Each of the four versions of the experiment in the 2×2 design was conducted on each day, with the order varying from one day to the next; neither the time nor day of the session had any significant effect on donations.)

An e-mail inviting participation in the experiment was sent to first- and second-year students enrolled in classes in Economics, Business Statistics, English and Law. The invitation was sent both to ethnic European and non-European students, but the results in this paper focus on the behavior of the Europeans.³ The e-mail stated that participation would involve the completion of two surveys – one on spending habits and another asking some psychological questions – plus a decision-making task. The e-mail also indicated that each participant would be paid \$20 for taking part, and that the experiment would last no longer than 45 minutes. Volunteers were asked to say which of the sessions they could take part in, and were then randomly allocated to one of these sessions. There were 157 participants in total. Most sessions ran with 19-21 participants; the maximum number was 23 and the minimum 16. Every session was conducted by the same experimenter (one of the authors) with the help of research assistants.

On entering the room, participants each saw a small manila envelope placed on the desk in front of them. They were asked to open the envelope in order to verify that it contained \$20. The \$20 payment comprised one \$10 note, one \$5 note, two \$2 coins and one \$1 coin. This ensured that in the decision-making task participants were able to donate any whole dollar amount between \$0 and \$20. After signing a receipt (which was collected immediately), participants selected a large brown envelope from a box carried around the room by a research assistant. This envelope contained the survey on spending habits, plus the socio-demographic questions. The survey included questions about the participant's expenditure on gifts for others, charitable donations, and a range of other items. One of these items was alcohol, but the survey did not draw particular attention to this category: see Appendix C. Participants had ten minutes

³ Not all of the students were majoring in these subjects, and the appendices include information on the distribution of participants by major subject. The behavior of the non-European subjects was of interest in the other research project (not related to alcohol expenditure). We exclude the non-European subjects from our analysis here because they belong to a wide variety of different ethnic groups, each of which might have its own social norms relating to alcohol consumption. There are too few participants from any one group for us to be able to identify these ethnicity-specific effects.

to complete the survey, and were then asked to place their survey back into the brown envelope, but not to seal the envelope yet.

After this, participants selected a white envelope from a box carried around the room by a research assistant. In four of the sessions (the ones with minimal oral communication), this envelope contained a form with instructions for the decision-making task. The instructions invited participants to donate all or part of their \$20 payment to World Vision in order to help fund health-related projects in low-income African countries. The instructions made it clear that any donation would be matched dollar-for-dollar by the experimenters. No additional information about World Vision was given, but it is a well-known charity in New Zealand, especially in schools, many of which participate in its annual “40-hour famine” fundraiser. On the form was a space for participants to indicate how much money, if any, they wanted to donate, and how much World Vision would receive with the experimenters’ matching subsidy. As detailed in the appendices, there was some variation across sessions in the information that the form gave about the possible reasons for making a donation. Four other sessions involved an experiment including slightly more oral communication, with some of the instructions read aloud by an experimenter. In all sessions, the participants were then asked to put the completed form and any donation in the white envelope, to seal the white envelope and to put this envelope in the large brown envelope, but to not seal the brown envelope yet.

After this, a research assistant handed out copies of the psychological survey. Participants had five minutes to complete this survey, and were then asked to place it in the large brown envelope and to seal the envelope. At this point the envelope contained the two surveys, the decision-making form and the donation (if any). This permitted the experimenters to match the participants’ survey responses with their donation while preserving their anonymity. Participants then left the room one at a time, putting the brown envelope in a box outside the door as they left.

4. Results

4.1. Sample distributions of the key variables

Hypothesis 1 above relates to the relationship between alcohol expenditure and generosity. Our measure of generosity is *donation_i*, i.e. the amount of money donated by subject *i* in the experiment. We also have survey data on reported charitable donations over the previous

month, but only 23% of participants reported any donation at all, and what little variation there is in this variable is not significantly correlated with individual characteristics such as alcohol expenditure ($p > 0.1$); further details are available on request. As discussed below, the proportion of participants making a donation in the experiment is much higher than this, and it is important to stress that our experimental results are based on generosity in response to an explicit request. Our measure of alcohol expenditure is *alcohol_i*, i.e. the subject's reported monthly Dollar expenditure on alcohol. Hypotheses 2-3 relate to the relationship between alcohol expenditure and empathic concern / materialism. These characteristics are measured by *empathic-concern_i* (i.e. the first principal component of the seven empathic concern responses in the IRI index), and *materialism_i* (i.e. the first principal component of the 15 components of the MVS index); both of these measures are normalized so that the sample mean equals zero and the standard deviation equals one.

Figures 1-4 contain histograms for these four variables for the European subjects in the experiment. Figure 1 shows that the modal level of alcohol expenditure was zero, but 16 subjects reported expenditure over \$100 per month and the highest reported expenditure is \$300 per month. (All of the subjects were aged 18 years or over, and so able to purchase alcohol legally in New Zealand.) At the liquor stores adjacent to the campus, four-litre packs of 7° proof RTDs (i.e. 28 standard units of alcohol) and a six-litre packs of 4° proof beer (i.e. 24 standard units of alcohol) retail at \$20-25, so the price of a unit is about one dollar, in which case \$100 of expenditure equates to three or four units per day. It is therefore likely that some of the subjects reporting expenditure over \$100 per month have consumption levels in excess of the limit recommended by most OECD countries. Figures 2-3 show that *empathic-concern* and *materialism* are roughly normally distributed, though the *empathic-concern* distribution is slightly negatively skewed and the *materialism* distribution slightly positively skewed. Figure 4 shows that although the modal donation in the experiment was zero, a large majority of subjects did donate something, with a handful of subjects donating the full \$20. Further descriptive statistics appear in the appendices.

The scatterplot in Figure 5 shows a marked negative correlation between *donation* and *alcohol* ($\rho = -0.18$). The unconditional correlations between *empathic-concern* and *alcohol* ($\rho = -0.07$) and between *materialism* and *alcohol*, ($\rho = 0.04$) are much weaker, so these scatterplots are omitted. However, we should not read too much into these unconditional

correlations: both generosity and alcohol expenditure could be correlated with confounding factors such as age (Mooney *et al.*, 1987; Bekkers, 2007), gender (Wilsnack *et al.*, 2000; Bolton and Katok, 1995), wealth (Brenner, 1975; Fisman *et al.*, 2015), or religion (Poulson *et al.*, 1998; Ahmed and Salas, 2011), and similar confounds could affect *empathic-concern* and *materialism*. For this reason, we need to fit regression equations for *donation*, *empathic-concern* and *materialism* conditional on both *alcohol* and the potentially confounding factors.

4.2. Regression results

Our regression equations are as follows. Equation (1) is a Tobit model that allows for the fact that *donation* is bounded from below by zero and from above by \$20; Equations (2-3) are fitted by Ordinary Least Squares.

$$\begin{aligned}
 y_i &= \beta_1 \cdot age_i + \beta_2 \cdot female_i + \beta_3 \cdot non-alcohol_i + \beta_4 \cdot alcohol_i \\
 &+ \sum_j \beta_j^5 \cdot \mathbf{I}(religious_i = k) + \sum_k \beta_k^6 \cdot \mathbf{I}(major_i = k) + u_i \\
 donation_i &= \max(\min(y_i, 20), 0)
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 empathic-concern_i &= \gamma_1 \cdot age_i + \gamma_2 \cdot female_i + \gamma_3 \cdot non-alcohol_i + \gamma_4 \cdot alcohol_i \\
 &+ \sum_j \gamma_j^5 \cdot \mathbf{I}(religious_i = k) + \sum_k \gamma_k^6 \cdot \mathbf{I}(major_i = k) + v_i
 \end{aligned} \tag{2}$$

$$\begin{aligned}
 materialism_i &= \delta_1 \cdot age_i + \delta_2 \cdot female_i + \delta_3 \cdot non-alcohol_i + \delta_4 \cdot alcohol_i \\
 &+ \sum_j \delta_j^5 \cdot \mathbf{I}(religious_i = k) + \sum_k \delta_k^6 \cdot \mathbf{I}(major_i = k) + w_i
 \end{aligned} \tag{3}$$

Here, age_i is the participant's age in years, $female_i$ is an indicator variable which equals one if the participant is female and zero otherwise, and $non-alcohol_i$ is reported dollar expenditure on all items other than alcohol, gifts and charitable donations in the previous month. The expenditure variable, calculated from responses to the questionnaire on spending habits, is included in order to control for the participant's level of disposable wealth. $Religious_i$ is a variable measuring the reported frequency of attendance at religious services (1 = more than once per week, 2 = once per week, 3 = once per month, 4 = infrequently, 5 = never; the omitted category is 1), and $\mathbf{I}(religious_i = j)$ is an indicator variable identifying observations for which $religious_i$ is equal to j .

$I(\text{major}_i = k)$ is an indicator variable identifying observations for which the participant's major subject is equal to k .⁴ The variables u_i , v_i and w_i are error terms. The results table in the main text pertains to a sample comprising those participants who answered all of the survey relevant questions and indicated that their ethnicity was European ($N = 93$ for equation (1) and $N = 92$ for the other equations). Results for non-European participants are discussed briefly in the main text, with more details in the appendices.

Estimates of the coefficients in equations (1-3) are presented in Table 1, along with t-ratios computed from heteroscedasticity-consistent standard errors.⁵ It can be seen that age has a significant association with the amount donated in the experiment ($p < 0.05$): for an individual whose characteristics place her sufficiently far from the upper and lower bounds (zero and \$20), each extra year of age corresponds to a donation that is 68 cents lower. The only other characteristic for which there is a significant association is reported expenditure on alcohol: every hundred dollars of expenditure per month corresponds to a reduction in the donation of \$3.60. By contrast, reported alcohol expenditure appears to have no significant association with empathic concern or materialism: these variables are significantly associated with the age and (in the case of empathic concern) gender of the subject, but, as shown by the R^2 statistics in the table, over two thirds of the variation in empathic concern and materialism is independent of any observable characteristic. Results in the appendices show that the main difference in the sample of non-European subjects is that neither age nor alcohol expenditure are significant determinants of the experimental donation. This insignificance could result either from a relatively small sample or from the cultural heterogeneity of the subjects concerned.

4.3. Robustness checks

Table 2 includes some results on the robustness of the alcohol effect in Table 1. First of all, the table shows coefficients and t-ratios from a Tobit model of experimental generosity in which non-alcohol_i is replaced by the different components of non-alcohol expenditure on oneself: hot drinks, energy drinks, other drinks, snacks, movies, sports, other entertainment, music, clothing,

⁴ Major subjects are grouped as follows: accounting, economics, finance, international business, law, psychology, other science, other arts, and other subject / not specified. Some students were studying for more than one major, so the categories are not mutually exclusive.

⁵ Coefficients on the major subject indicator variables are not included in the table but are available on request.

books and beauty products. None of these expenditure categories is significantly associated with generosity, and they are not jointly significant ($p > 0.1$). Some of them are correlated with alcohol expenditure, so their inclusion does slightly reduce the size and precision of the *alcohol* coefficient estimate: each extra hundred Dollars of alcohol expenditure now corresponds to a reduction in the donation by \$2.78, an effect that is significant at the ten percent level.

Secondly, Table 2 shows coefficients and t-ratios from a Tobit model of experimental generosity fitted to a sample excluding participants in the right-hand tail of the alcohol expenditure distribution. This distribution is highly skewed: the mean level of expenditure is \$71 but the standard deviation is \$63, and Table 2 shows two sets of restricted-sample results: the first is based on a sample excluding participants spending over \$200 per month on alcohol (i.e. excluding observations over two standard deviations above the mean), while the second is based on a sample excluding participants spending over \$150 per month on alcohol (i.e. excluding observations over 1.25 standard deviations above the mean). The estimated *alcohol* coefficients are slightly larger than in Table 1; the effect in the first case is significant at the five percent level while the effect in the second case is significant at the ten percent level.

5. Summary and Conclusion

Student subjects in an experiment who report high levels of alcohol expenditure demonstrate significantly less generosity in a simple Dictator Game experiment. However, using standard instruments to measure empathic concern and materialism, alcohol expenditure by our subjects does not appear to be significantly associated with these psychological characteristics. Among our subjects, moderately high levels of expenditure on alcohol (\$150-300 per month) do indicate lower levels of generosity, but the channel for this effect does not appear to be a correlate of empathic concern or materialism.

The existing literature suggests that chronic alcohol dependency is associated both with lower levels of empathic concern and with less generosity. Our results indicate that these may be distinct effects. It is possible that the lower level of generosity is characteristic of a wide range of individuals with moderately high levels of alcohol consumption, but that the lower level of empathic concern is a product of chronic dependency, or of the process of recovery from chronic dependency. More research is required into the channels that explain the association between high levels of alcohol expenditure and low levels of generosity. One potential explanation is that

alcohol demand is negatively associated with risk aversion (Dave and Saffer, 2008) and risk aversion is positively associated with egalitarianism (Atkinson, 1970).

Finally, our results complement those of Brevers *et al.* (2013), who show that alcohol-dependent subjects are more likely to reject low offers in an Ultimatum Game experiment, suggesting that “alcohol dependence may be associated with less ability to regulate the emotional responses needed to make advantageous decisions for the self” (p. 774). Our results suggest that in some social contexts, this effect could be offset by a greater degree of selfishness among individuals with a higher level of alcohol consumption.

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Table 1

Models of the variation in materialism, empathic concern and donations (European participants only).

	<i>donation</i> (Tobit estimates)		<i>empathic-concern</i> (Ordinary Least Squares estimates)		<i>materialism</i> (Ordinary Least Squares estimates)	
	<i>N</i> = 93		<i>N</i> = 92		<i>N</i> = 92	
	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>
<i>age</i>	-0.678	-2.21	0.156	2.55	-0.077	-2.04
<i>female</i>	-0.965	-0.51	0.574	2.37	-0.257	-1.16
<i>non-alcohol</i> ÷ 100	-0.447	-0.65	-0.115	-1.40	0.162	2.05
<i>alcohol</i> ÷ 100	-3.598	-2.35	0.036	0.22	-0.160	-0.93
I(<i>religious</i> = 2)	-5.001	-1.31	0.521	0.62	0.508	0.85
I(<i>religious</i> = 3)	3.510	0.67	1.119	1.94	-0.725	-1.69
I(<i>religious</i> = 4)	-3.276	-0.94	0.459	0.83	-0.098	-0.22
I(<i>religious</i> = 5)	-4.249	-1.34	0.332	0.63	0.315	0.86
<i>R</i> ²			0.24		0.32	

Donation refers to the Dollar amount given by the subject in the Dictator game experiment. *Empathic-concern* refers to the first principal component of the subject's scores in the empathic concern section of the Interpersonal Reactivity Index of Davis (1983) and *materialism* refers to the subject's score in the Material Values Scale of Richins (2004); these principal components are standardized with a sample mean of zero and a standard deviation of one. *Age* refers to the subject's age in years, *female* is an indicator variable identifying female subjects, *non-alcohol* is the subject's monthly personal expenditure on all items (except alcohol) in Dollars, *alcohol* is the subject's monthly alcohol expenditure in Dollars, and *religious* is a measure of the frequency of religious observance. *Coeff* indicates the estimated coefficient, and the t-ratios are interpreted using a standard student's t distribution, so the null that the population coefficient is zero can be rejected at the 5% level when $|t\text{-ratio}| > 1.96$. The models also include major subject effects.

Table 2

Further Tobit models of the variation in donations (European participants only).

	<i>model with disaggregated non- alcohol spending</i>		<i>model excluding alcohol spending over \$200</i>		<i>model excluding alcohol spending over \$150</i>	
	<i>N = 93</i>		<i>N = 90</i>		<i>N = 86</i>	
	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>
<i>age</i>	-0.625	-2.02	-0.728	-2.33	-0.706	-2.17
<i>female</i>	-0.155	-0.06	-1.391	-0.74	-1.225	-0.64
<i>non-alcohol</i> ÷ 100			-0.552	-0.78	-0.526	-0.71
<i>hot-drinks</i> ÷ 100	-6.691	-0.73				
<i>energy-drinks</i> ÷ 100	4.684	0.38				
<i>other-drinks</i> ÷ 100	2.596	0.99				
<i>snacks</i> ÷ 100	-3.448	-1.24				
<i>movies</i> ÷ 100	2.853	0.50				
<i>sports</i> ÷ 100	7.719	1.51				
<i>other-entertainment</i> ÷ 100	-1.402	-0.92				
<i>music</i> ÷ 100	-13.456	-0.84				
<i>clothing</i> ÷ 100	-0.975	-0.95				
<i>books</i> ÷ 100	0.137	0.05				
<i>beauty-products</i> ÷ 100	0.789	0.34				
<i>alcohol</i> ÷ 100	-2.781	-1.80	-4.385	-2.52	-3.887	-1.71
<i>I(religious = 2)</i>	-5.720	-1.35	-4.912	-1.22	-7.265	-1.86
<i>I(religious = 3)</i>	0.873	0.20	3.860	0.71	3.903	0.70
<i>I(religious = 4)</i>	-5.318	-1.38	-3.427	-0.95	-3.571	-0.93
<i>I(religious = 5)</i>	-4.849	-1.34	-4.112	-1.23	-4.202	-1.20

See Table 1 for explanatory notes.

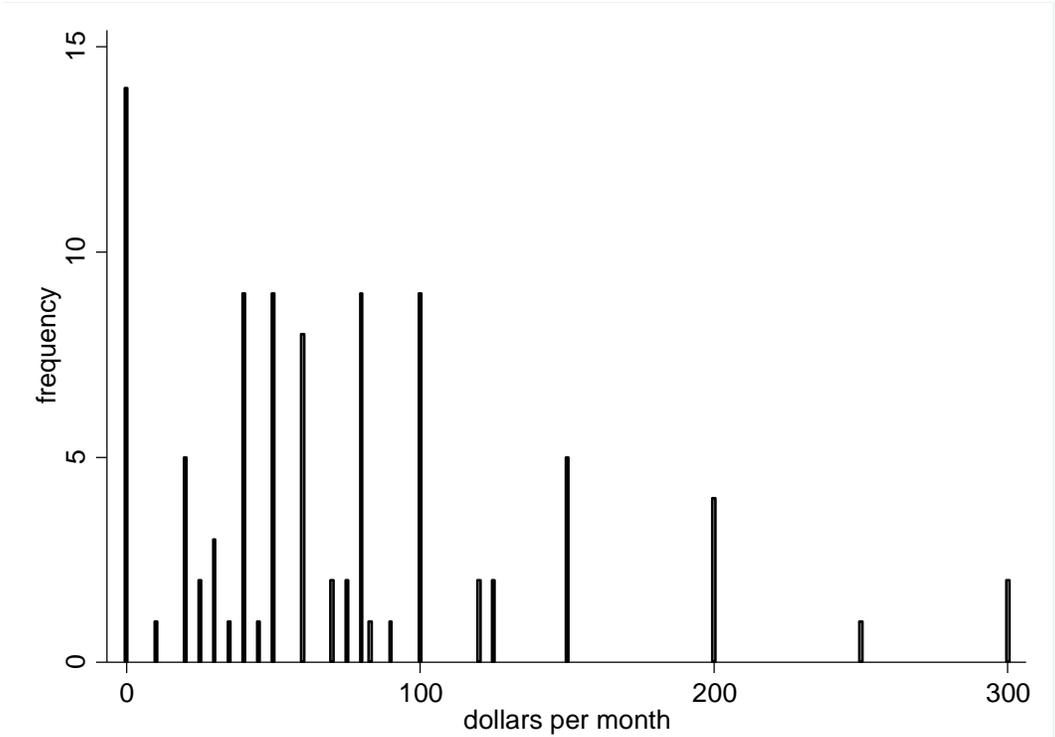


Fig. 1. Histogram of *alcohol* (European participants)

See Table 1 for the definition of *alcohol*

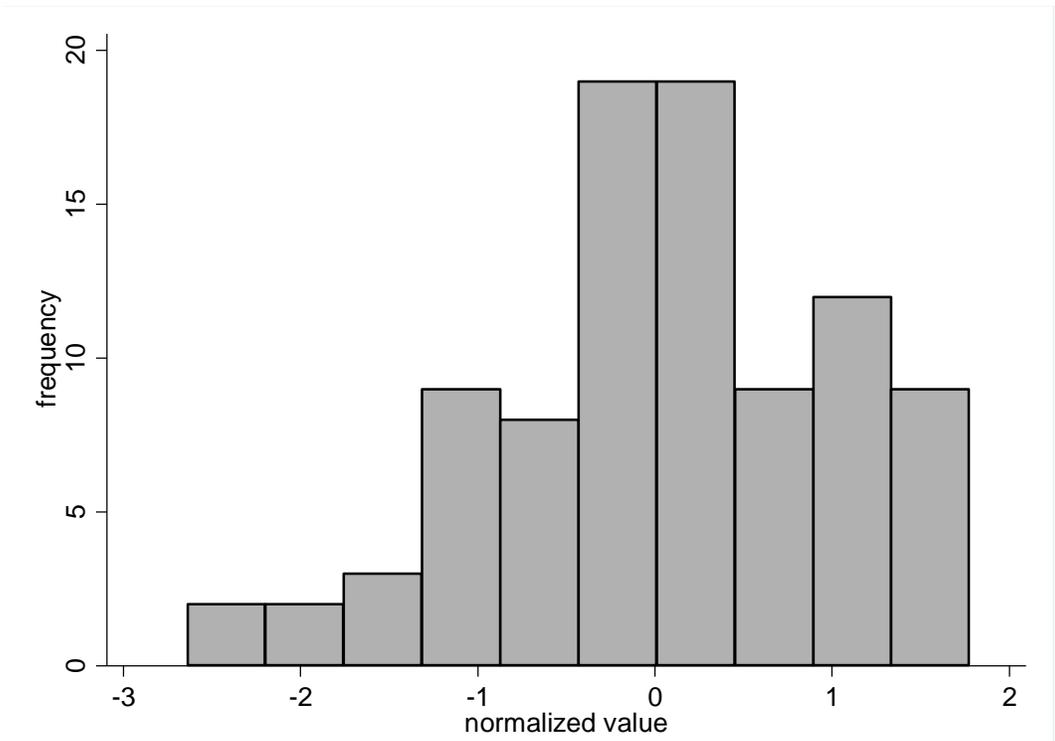


Fig. 2. Histogram of *empathic-concern* (European participants)

See Table 1 for the definition of *empathic-concern*

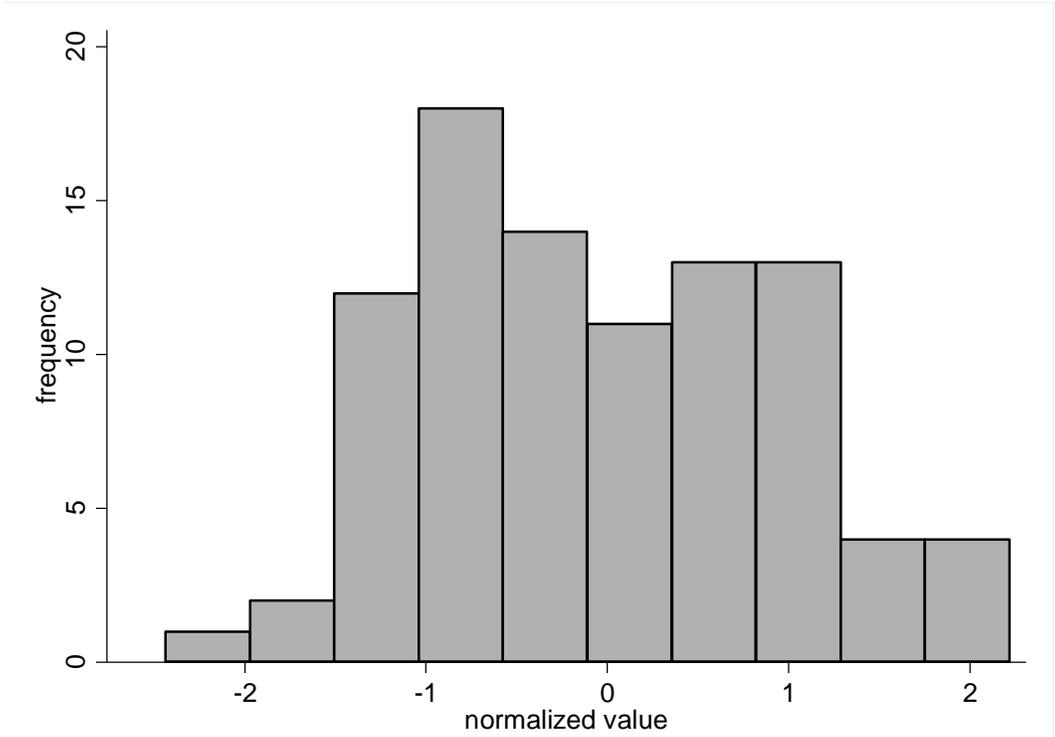


Fig. 3. Histogram of *materialism* (European participants)

See Table 1 for the definition of *materialism*

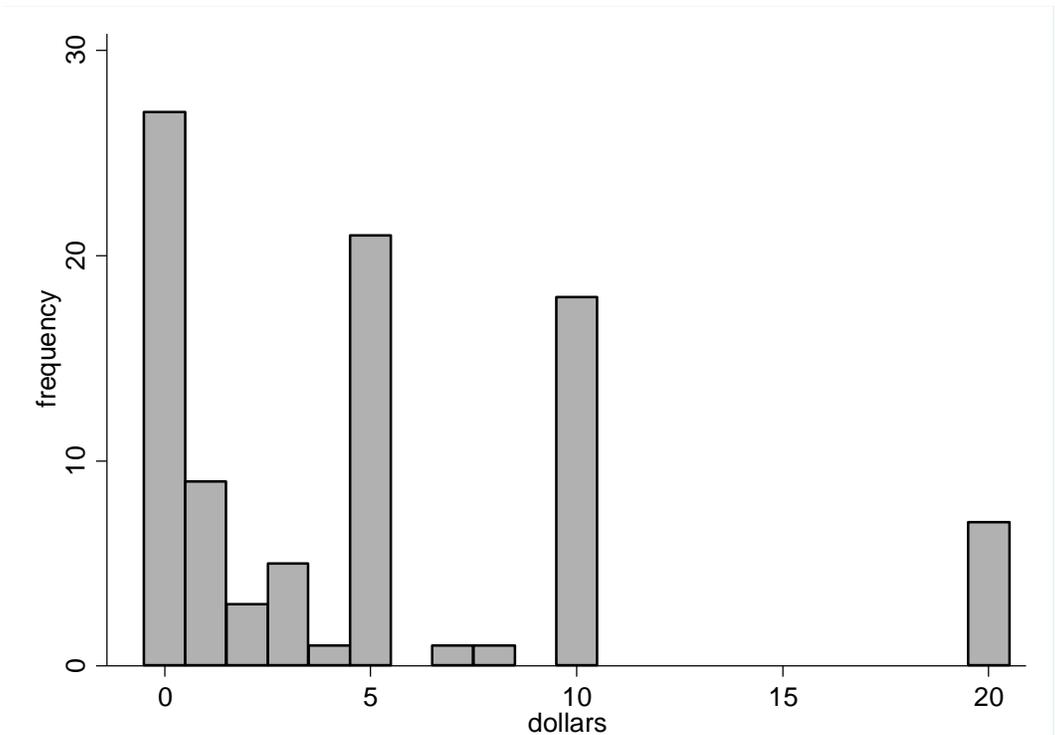


Fig. 4. Histogram of *donation* (European participants)

See Table 1 for the definition of *donation*

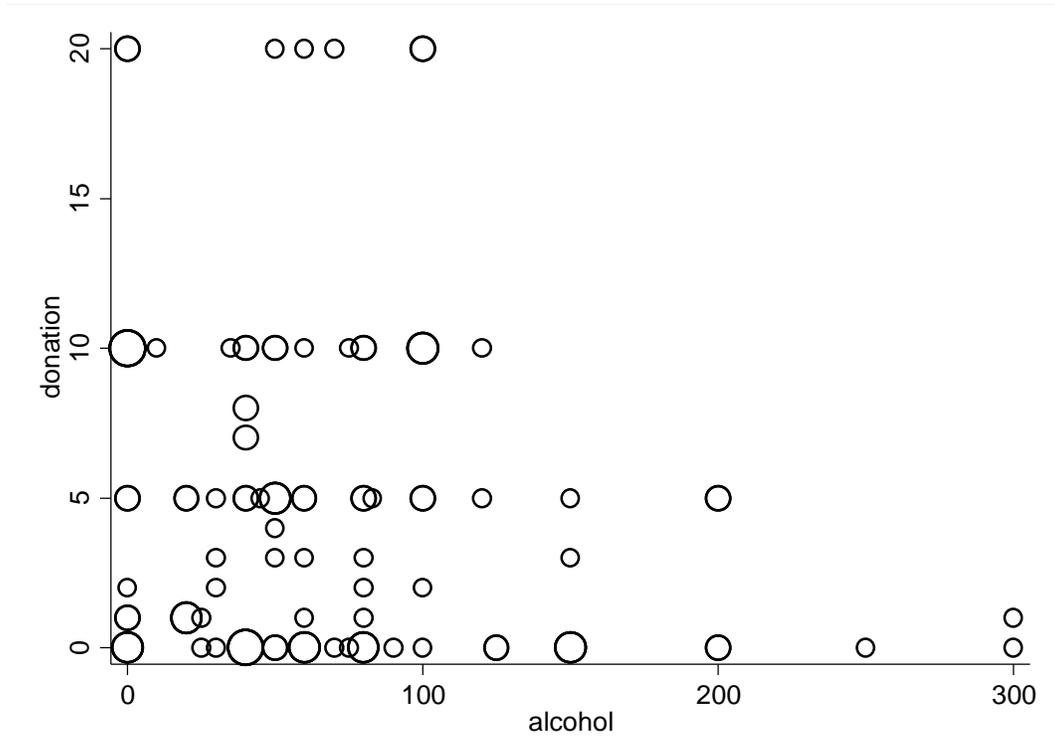


Fig. 5. Scatterplot of *donation* against *alcohol* (European participants)

See Table 1 for the definitions of *donation* and *alcohol*. The area of each circle indicates the relative frequency of that observation.

APPENDICES

A. The Instructions for the Experiment

“Thank you for taking part in our research project. Please turn off your cell phones and listen carefully to all instructions. Please also refrain from talking to any of the other participants until you have left the room. On the desk in front of you is an information sheet, a consent form and a small brown envelope. Before we begin, we need you to read the information sheet (if you haven’t read this already) and sign the consent form. Both forms are on the table in front of you. We will now give you two minutes to read the information sheet and sign the consent form. Do not open the small brown envelope yet.”

Pause for two minutes. Collect the consent forms.

“The small brown envelope on the desk in front of you contains your \$20 payment. Also on the desk is a receipt form which we need you to sign for audit reasons. Please open the envelope, check that it contains \$20 and sign the receipt form. We will give you one minute to do this.”

Pause for one minute.

“We will now collect the receipt forms.”

Collect the receipts.

“Over the course of this session you will be answering two different surveys and taking part in a decision-making task. Please be assured that we have designed the session in such a way that the answers you give in the surveys, and the choices you make in the decision-making task, are completely anonymous. There is nothing on the surveys or the envelopes that would enable us to identify who has given which answers or made which decisions. You will see that you are sitting

in cubicles where you cannot be seen by us when we are sitting down, or by other participants. We will sit down (so we cannot see you) when you are completing the surveys or doing the decision-making task. My colleague is now going to distribute the first survey. These surveys are in a large brown envelope in the box my colleague is carrying around the room. Please take any one of the large brown envelopes from the box, but do not open it yet.”

Distribute the surveys.

“Please remove the survey from the large brown envelope and check that there are five pages of questions. We will now give you ten minutes to complete the survey. Please answer as much of the survey as you are able to in the time available. If you finish before the ten minutes is up, please wait quietly in your seat.”

Pause for ten minutes.

“Please place your completed survey in the large brown envelope, but do not seal the envelope yet. My colleague is now going to distribute a white envelope. Please choose a white envelope from the box he/she is carrying around. Please do not open the envelope yet.”

Distribute the white envelopes.

Written treatment instructions

“Inside the white envelope is a decision-making form. This form includes the instructions for the decision-making task. Please open the white envelope and carefully follow the instructions, making sure you fill in the form. We will give you three minutes to complete this task.”

Pause for three minutes.

Oral treatment instructions

“I am now going to read the instructions for the decision-making task. Please listen carefully to the instructions. We would like to give you the opportunity to donate part or all of your payment to the charity World Vision New Zealand who will spend the money on health projects in low-income countries in Africa.”

In the oral altruism treatment only:

“Any donation you make will improve the happiness and wellbeing of an African family.”

In the oral self-interest treatment only:

“Research by psychologists shows that donating money to charity increases the happiness and wellbeing of the giver.”

“Any money you choose to donate to *World Vision* will be matched by us dollar for dollar (in other words, we will double your donation) and we will forward all money directly to *World Vision*. We have designed this exercise in such a way that no-one will ever know how much any individual has given. The small brown envelope you opened earlier contains a \$10 note, a \$5 note, two \$2 coins and a \$1 coin, so it is possible to donate any whole dollar amount, between \$0 and \$20 to World Vision. Please open the white envelope and remove the decision-making form from the envelope.”

Pause briefly.

“For audit reasons, we need you to write in the space provided how much money, if any, you wish to donate to World Vision. If you prefer not to make a donation, please write zero in the space provided on the decision-making form. We will give you 30 seconds to do this.”

Pause for 30 seconds.

“Please place the form, and any money you have chosen to donate, in the white envelope and seal the white envelope. We will give you 30 seconds to do this.”

Pause for 30 seconds.

In all treatments

“Please make sure you have placed the completed decision making form in the white envelope and sealed the white envelope.”

Pause for a few seconds.

“Please place the sealed white envelope in the large brown envelope, but please do not seal the large brown envelope yet. We are now going to ask you to complete the second survey. My colleague will now come round and distribute the surveys. Please choose a survey from the box she/he is carrying around, but do not start completing the survey yet.”

Distribute the surveys.

“You now have five minutes to complete this second survey. Please answer as much of the survey as you are able to in the time available. If you finish before the 5 minutes is up, please wait quietly in your seat.”

Pause for five minutes.

“Please place your completed survey in the large brown envelope. This large brown envelope should now contain the two completed surveys and the sealed white envelope. Please now seal the large brown envelope. We will now ask you to leave one at a time. As you leave please place the large brown envelope in the box at the door. Please make sure you take all your belongings with you when you leave. Thank you very much for taking part in our research.”

B. The Decision-Making Forms

B.1. The form for the oral treatments

Decision Making Form

I wish to donate \$_____ to *World Vision*. Given that the researchers will match my donation dollar for dollar, this means *World Vision* will receive \$_____ as a result of my donation.

B.2. The form for the written altruism treatment

Decision Making Form

We would like to give you the opportunity to donate part or all of your payment to the charity World Vision New Zealand who will spend the money on health projects in low-income countries in Africa. **Any donation you make will improve the happiness and wellbeing of an African family.**

Any money you choose to donate to *World Vision* will be matched by us dollar for dollar (in other words, we will double your donation) and we will forward all money directly to *World Vision*. We have designed this exercise in such a way that no-one will ever know how much any individual has given. The small brown envelope you opened earlier contains a \$10 note, a \$5 note, two \$2 coins and a \$1 coin, so it is possible to donate any whole dollar amount, between \$0 and \$20 to *World Vision*.

For audit reasons, we need you to write in the space provided below how much money, if any, you wish to donate to World Vision. If you prefer not to make a donation, please write zero in the space provided.

I wish to donate \$_____ to *World Vision*. Given that the researchers will match my donation dollar for dollar, this means *World Vision* will receive \$_____ as a result of my donation.

If you have chosen to make a donation you should place the money in the white envelope.

Whether you have made a donation or not, please now place this form in the white envelope and seal it.

B.3. The form for the written self-interest treatment

Decision Making Form

We would like to give you the opportunity to donate part or all of your payment to the charity World Vision New Zealand who will spend the money on health projects in low-income countries in Africa. **Research by psychologists shows that donating money to charity increases the happiness and wellbeing of the giver.**

Any money you choose to donate to *World Vision* will be matched by us dollar for dollar (in other words, we will double your donation) and we will forward all money directly to *World Vision*. We have designed this exercise in such a way that no-one will ever know how much any individual has given. The small brown envelope you opened earlier contains a \$10 note, a \$5 note, two \$2 coins and a \$1 coin, so it is possible to donate any whole dollar amount, between \$0 and \$20 to *World Vision*.

For audit reasons, we need you to write in the space provided below how much money, if any, you wish to donate to World Vision. If you prefer not to make a donation, please write zero in the space provided.

I wish to donate \$_____ to *World Vision*. Given that the researchers will match my donation dollar for dollar, this means *World Vision* will receive \$_____ as a result of my donation.

If you have chosen to make a donation you should place the money in the white envelope.

Whether you have made a donation or not, please now place this form in the white envelope and seal it.

C. The Questionnaire on Spending Habits

The following questions are about what you have spent money on in the last month. We realise you will not be able to remember exact amounts; an estimate is fine. When answering these questions, please include money spent on items that have not yet been consumed, for example a ticket you have purchased yesterday for a concert you have not been to yet. Do not include things you have consumed in the last month that were paid for over a month ago, for example a book you are reading that you bought last month.

In the past month, approximately how much have you spent on the following items? (Please write the amount in the space provided.)

(a) Drinks:

Alcoholic drinks \$ _____

Coffee or other hot drinks \$ _____

Energy drinks \$ _____

Other drinks (e.g. lemonade) \$ _____

(b) Snacks (any food not eaten at meal times) \$ _____

(c) Entertainment (the cost of any food or drinks purchased at any entertainment events should be included under drinks or snacks above)

Going to the movies, theatre or concerts \$ _____

Going to sports events \$ _____

Other \$ _____

(d) Purchasing music (either the purchase of CDs or downloading music) \$ _____

(e) Clothing \$ _____

(f) Books (including ebooks) \$ _____

(g) Beauty and grooming products \$ _____

(h) Gifts for other people (don't include donations to charity) \$ _____

(i) Donations to charity \$ _____

D. Participant major subjects

Accounting	7	Law / Economics	1
Accounting / Finance	3	Law / Economics / Finance	1
Accounting / Management	1	Law / Forensic Analytical Science	1
Anthropology	1	Law / Genetics	1
BA (unspecified)	1	Law / Marketing	1
Biochemistry	2	Law / Politics	2
Biomedical Science	1	Law / Psychology	3
Computer Science	5	Law / Sociology	3
Computer Science / Information Science	1	Law / Theology	1
Economics	7	Linguistics	1
Economics / Accounting / Finance	1	Management	6
Economics / Finance	4	Management / Information Science	1
Economics / Geography	1	Management / Marketing	2
Economics / International Business	1	Marketing	4
Economics / Management	1	Media and Film Studies	2
Economics / Marketing	3	Medicine	2
Economics / Mathematics	1	Medicine / Neuroscience	1
Economics / Politics	1	Music	1
Economics / Psychology	1	Neuroscience	1
English	1	Neuroscience / Marketing	1
Environmental Management	1	Philosophy, Politics and Economics	1
Finance	5	PPE / English	1
Food Science	1	PPE / Law	1
Genetics	1	Physics	1
Geology / Marine Science	1	Politics	1
Health Sciences	1	Psychology	11
History	1	Psychology / Politics	1
Information Science	1	Social Work	1
International Business	2	Surveying	2
International Business / Finance	1	Tourism	1
Law	19	Zoology	3
Law / Anthropology	1		

These students were recruited from classes in Economics, Business Statistics, English and Law.

N.b. the English class was in writing skills and not intended for English majors.

E. Summary Statistics and Results for Non-European Participants

Summary statistics for the key variables appear in Table A1, and statistics for the control variables in Table A2. The tables include information for the European and non-European subjects separately. The behavior of the non-European subjects is of interest in the other research project for which the experiment was designed, but, in light of the cultural heterogeneity of this group, we do not use their donations in the data analysis in the main text.

Table A3 presents regression results for the non-European subjects; this table has the same structure as Table 1 of the main text. It can be seen that alcohol expenditure is not significantly associated with any of the dependent variables, including the amount donated in the experiment. This lack of significance likely reflects the cultural heterogeneity of the group, which includes people from societies with widely differing views of alcohol consumption.

Table A1

Summary statistics for the key variables.

<i>European participants only (N = 93)</i>	<i>mean</i>	<i>std. dev.</i>
<i>alcohol expenditure (NZ dollars)</i>	70.89	63.10
<i>donation in the experiment (NZ dollars)</i>	5.10	5.62
<i>empathic-concern</i>	0.079	0.953
<i>materialism</i>	-0.019	1.009

<i>non-European participants only (N = 41)</i>	<i>mean</i>	<i>std. dev.</i>
<i>alcohol expenditure (NZ dollars)</i>	36.59	48.53
<i>donation in the experiment (NZ dollars)</i>	4.27	6.40
<i>empathic-concern</i>	0.128	0.846
<i>materialism</i>	-0.096	0.932

Table A2

Summary statistics for the control variables.

<i>European participants only (N = 93)</i>			
<i>religious observance</i>	<i>frequency</i>	<i>age</i>	<i>frequency</i>
<i>1. over once per week</i>	3	18	43
<i>2. once per week</i>	4	19	32
<i>3. once per month</i>	4	20	14
<i>4. infrequently</i>	23	21	2
<i>5. never</i>	59	22	2
		29	1
<i>non-alcoholic expenditure</i>	<i>NZ dollars</i>	37	1
<i>mean</i>	198		
<i>std. dev.</i>	131	<i>gender</i>	<i>frequency</i>
		<i>male</i>	36
		<i>female</i>	57
<i>Non-European participants only (N = 41)</i>			
<i>religious observance</i>	<i>frequency</i>	<i>age</i>	<i>frequency</i>
<i>1. over once per week</i>	6	18	10
<i>2. once per week</i>	3	19	10
<i>3. once per month</i>	4	20	12
<i>4. infrequently</i>	7	21	4
<i>5. never</i>	21	22	2
		23	1
<i>non-alcoholic expenditure</i>	<i>NZ dollars</i>	24	2
<i>mean</i>	185		
<i>std. dev.</i>	119	<i>gender</i>	<i>frequency</i>
		<i>male</i>	8
		<i>female</i>	33

Table A3

Models of the variation in materialism, empathic concern and donations (non-European participants only).

	<i>donation</i> (Tobit estimates)		<i>empathic-concern</i> (Ordinary Least Squares estimates)		<i>materialism</i> (Ordinary Least Squares estimates)	
	<i>N = 41</i>		<i>N = 39</i>		<i>N = 39</i>	
	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>	<i>coeff.</i>	<i>t-ratio</i>
<i>age</i>	0.621	0.54	0.001	0.01	0.072	0.61
<i>female</i>	-2.725	-0.60	-0.316	-1.04	0.275	0.62
<i>non-alcohol</i> ÷ 100	-2.058	-1.27	0.168	1.85	0.172	1.08
<i>alcohol</i> ÷ 100	-1.540	-0.45	0.217	0.62	0.309	1.12
I(<i>religious</i> = 2)	-7.194	-1.01	-0.200	-0.20	0.479	0.57
I(<i>religious</i> = 3)	2.861	0.38	0.519	1.08	-0.884	-0.72
I(<i>religious</i> = 4)	-10.958	-1.70	-0.379	-0.92	-0.270	-0.38
I(<i>religious</i> = 5)	-10.360	-1.67	-0.237	-0.56	-0.008	-0.01
<i>R</i> ²			0.34		0.34	

See Table 1 for explanatory notes.