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<b>Title</b>	Behavioural economics and drinking behaviour : preliminary results from an Irish college study
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<b>Publication date</b>	2007-01-31
<b>Series</b>	UCD Geary Institute Discussion Paper Series; WP/4/2007
<b>Publisher</b>	University College Dublin. Geary Institute
<b>Link to online version</b>	<a href="http://geary.ucd.ie/images/Publications/WorkingPapers/GearyWp200704.pdf">http://geary.ucd.ie/images/Publications/WorkingPapers/GearyWp200704.pdf</a>
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# **UCD GEARY INSTITUTE DISCUSSION PAPER SERIES**

## **Behavioural Economics and Drinking Behaviour: Preliminary Results from an Irish College Study**

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Version 1.05

**31 January 2007**

This paper is produced as part of the Behaviour, Risk & Welfare research programme at Geary; however the views expressed here do not necessarily reflect those of the Geary Institute. All errors and omissions remain those of the author.

We thank Arnaud Chevalier, Kevin Denny, Orla Doyle, Arie Kapteyn, James Smith and Ian Walker for their useful comments in both the design and execution of this study and this paper. Lorna Sweeney, Martin Ryan, Claire Milner, Maurice Collins, Fearghal O hAodha worked superbly on various aspects of the project. Bas Weerman and Tim Colvin of RAND programmed the web-based survey. UCD Geary Institute is a recipient of funding from Diageo Ireland PLC, a major drinks company. ADDRESS FOR CORRESPONDENCE: Professor Colm Harmon, UCD Geary Institute, University College Dublin, Belfield, Dublin 4, Ireland; [colm.harmon@ucd.ie](mailto:colm.harmon@ucd.ie), +353 1 7164615.

## **Abstract**

This paper examines the results of single-equation regression models of the determinants of alcohol consumption patterns among college students modelling a rich variety of covariates including gender, family and peer drinking, tenure, personality, risk perception, time preferences and age of drinking onset. The results demonstrate very weak income effects and very strong effects of personality, peer drinking (in particular closest friend), time preferences and other substance use. The task of future research is to verify these results and assess causality using more detailed methods.

## **1. Introduction**

This paper provides an examination of alcohol consumption among a sample of students at an Irish university. We examine the role of key demographic factors such as gender, age, year in college, housing tenure and parental socio-economic circumstances in determining student alcohol consumption. Moreover, we attempt to measure and model behavioural parameters such as time preferences, risk perception and personality as direct influences on consumption. We also examine the effects of peer, sibling and parental drinking.

## **2. Potential Determinants of Alcohol Consumption – Behavioural Drivers**

The literature on alcohol consumption has identified a number of key influences.<sup>1</sup> However the role of individual differences in personality merits consideration in the examination of health risk behaviour patterns.

The most validated personality assessment tool currently used is based on the “Big-Five” personality framework, a multidimensional typology assessing personality on five dimensions - extraversion, agreeableness, conscientiousness, emotional stability and openness to experience. For example, a study of university students by Lemos-Giraldez and Fidalgo-Aliste (1997) found that “conscientiousness” and “agreeableness” measures were significant predictors of health related behaviours and attitudes regarding smoking and alcohol consumption. “Low

<sup>1</sup> For example, the international literature on health risk behaviours reflect consistent gender differences in alcohol consumption and frequency of use. For example Courtenay (2000) reviews a substantial body of national data and meta-analyses and concludes that males of all ages are more likely than females to engage in behaviours that increase the risk of disease, injury and death, many of which are preventable.

Agreeableness” (which indicates hostility, for example) has been linked with poor health behaviours (Smith and Christensen, 1992).<sup>2</sup>

Parental and sibling factors have also been investigated as determinants of alcohol consumption patterns (e.g. Windle 2000). These effects could operate through a number of channels. The alcohol consumption patterns of family members may be reflective of genetic predispositions to alcohol consumption. Individual consumption patterns may be reflective of imitative behaviour or parental/sibling alcohol use (e.g. Brody et al 2000). Different home environments may also be conducive to differential exposure to alcohol. Parents and siblings may also form part of an individuals' budget and time constraints.<sup>3</sup> Moreover, parent and sibling effects may operate at a lag. Thus, while the literature emphasises the importance of peer as opposed to parental effects on current alcohol consumption, this is mainly examined through the lagged effect of family alcohol patterns on current alcohol consumption with childhood exposure to alcohol predictive of later alcohol consumption patterns (e.g. Webster et al 1989).

Many studies have shown that peers exert a decisive influence over adolescent risk-taking behaviour, with a greater influence than parental effects (Urberg et al., 1997; Allen et al., 2003; Garnier and Stein, 2002). Peers can shape participation in risk-taking behaviours, such as alcohol or drug use, through a number of means- by influencing attitudes, norms and values, by modelling the behaviour and by offering opportunity and support for the behaviour (Bauman and

<sup>2</sup> Kubicka et al. (2001) examines whether childhood personality ratings on three of the “Big Five” dimensions would predict adult drinking and smoking behaviour and shows that low levels of “conscientiousness” emerged as a significant predictor in adult smoking and heavy episodic drinking, while those exhibiting high “extraversion” show higher daily levels of alcohol consumption (Kubicka et al., 2001).

<sup>3</sup> For example, it is important to assess for college students whether the student is still living at home with their parents in which case one might expect that their behaviour would be more constrained by family norms regarding alcohol consumption

Ennett, 1996). Alexander et al. (2001) emphasised how “best friends” or close friendships may have a greater impact on behaviour than a larger peer network, due to the level of contact such relationships provide. They find that the risk for regular smoking was increased if the individual had one or two very close friends who were also regular smokers.

Finally the age at which the person begins to consume alcohol has been implicated in later patterns of heavy alcohol use by a number of papers. This could be due to common unobserved factors affecting both onset and later alcohol use. However, there is strong evidence that alcohol consumption is habitual and highly persistent. Grant and Dawson (1997) examined interview data with current and former drinkers from the 1992 National Longitudinal Alcohol Epidemiologic Survey and assessed the probability of alcohol abuse and dependence as a function of the age at which the individual began to consume alcohol. While only four per cent of those who began to drink after the age of 20 experienced lifetime alcohol abuse, this figure rose to 11 per cent for those who began drinking at 16 years or younger. Similarly with regards to prevalence rates for lifetime alcohol dependence, it was found to be 10 per cent in those who began drinking at 20 years and older and more than 40 per cent in those who began at 14 years or younger. The authors concluded that for each increasing year of age of alcohol initiation, the probability of lifetime alcohol abuse declined by 8 per cent and the probability of lifetime dependence declined by 14 per cent.

The perception and judgement of risk is also central to any theoretical model of health risk behaviour on the belief that an individual’s behaviour is influenced by how they perceive the consequences of their actions and whether they believe themselves to be vulnerable to these consequences (Millstein and Halpern-Felsher, 2002). As outlined by Slovic (1987), psychological research on risk perception developed from studies of probability assessment and

decision-making processes. A body of literature has demonstrated that individuals systematically misperceive risk and that the degree of misperception can be reliably predicted by a number of factors including the salience of the risk, its immediacy and several other factors. This work implied that the risks of alcohol consumption may be underestimated as the main consequences may not be revealed for a number of years, the risks are largely self-imposed and relatively predictable.

Alcohol consumption may also be viewed as a manifestation of underlying time preferences. The question of how individuals process future priorities is interesting in this context - alcohol consumption has frequently been viewed as myopic and indicating a high rate of time preference. This has recently attracted the attention of economists (e.g. O'Donoghue and Rabin 2000, Fehr 2002). There have been some attempts to integrate survey measures of time preferences as independent variables explaining different types of health risks. For example, Borghens and Golsteyn (2005) conclude that survey measures of discount rates can explain some of the variance in BMI, though they find no evidence for changing discount rates being a driver for increases in obesity rates. Henson et al (2006) find strong associations between future time orientation (as measured by the Zimbardo Time Perspective Inventory), higher engagement in health protective behaviour and lower engagement in health risk behaviour.

### **3. UCD Geary Institute Health Behaviour Study**

The UCD Geary Institute Health Behaviour Study is planned as a major longitudinal study on a number of diverse populations. In the current phase, all the students of a large Irish university were contacted via email and asked to participate in a web-based survey.

The literature points to several advantages of our approach in terms of data-collection. However, achieving high response rates is difficult with this format. To encourage participation,

we offered an incentive of a lottery with 10 prizes of €1000 (approximately \$1300 at current rates). The current pilot is based on a sample of 4,500 students, which represents approximately 20 per cent of the total body of 20,000 students. This response is relatively low, taking the population as a whole. However statistics provided from the University suggest that only half of the student body utilise the college email system would imply that our total sampling frame population is closer to 10,000 which implies that our response rate is 50%. More convincing is that the mean outcomes from this data closely align with the administrative records in terms of distribution across degree programmes, course year and other demographics such as age and gender.

The survey was divided into nine modules: personal information such as gender and age; physical health and psychological well-being; alcohol consumption patterns; personality as measured by a short "Big Five" inventory (Gosling et al 2003); vignettes surrounding occasional alcohol consumption; risk perceptions and other risk behaviours; anchoring vignettes; questions on time management and time preferences; further demographic and family background questions. Drinking behaviour was assessed utilising a number of measures. Firstly, we examined monthly expenditure on alcohol. We also administered the World Health Organisation (WHO) AUDIT examination - a screening test for alcohol misuse that includes several questions on different aspects of alcohol-related behaviour.<sup>4</sup> Descriptive statistics are displayed in Table 1.<sup>5</sup>

<sup>4</sup> The Alcohol Use Disorders Identification Test (AUDIT) was developed and validated over the past two decades by the World Health Organisation as a simple screening instrument for excessive drinking (Babor et al, 2001). Initially designed for use in primary health care settings, it can also be self-administered or used by non-health professionals, to identify alcohol dependence and a number of specific negative consequences of drinking. The AUDIT explicitly focuses on symptoms within the past year. It is the only alcohol screening test designed for international use; its use with primary health care patients has been validated in six countries (Babor et al., 2001).

<sup>5</sup> Statistics are displayed both for all people who responded to the given question and all people who responded to every single question. This gives some indication of the nature and scope of potential biases related to partial



#### 4. Results

In the empirical model individuals maximise inter-temporal utility subject to their budget constraint. Standard preference parameters are included such as measures of time preferences (as measured by survey scales) and risk tolerance (as measured by smoking). As in many different behavioural models, consumption can be generated by lack of information about risk. Drinking patterns are assumed as influenced exogenously by peer groups and parents.<sup>6</sup> Age of onset influences alcohol consumption through the effects of persistence and habit. Table 2 displays the results of multiple regression models assessing the determinants of participation, expenditure and scores on the AUDIT scale.

Participation (i.e. whether a person drinks at all as opposed to abstaining) is determined by a number of variables. Males are less likely to participate than females controlling for other factors. Foreign students are not significantly more or less likely to participate than Irish students. Higher parental income makes one more likely to participate. With regard to effects of parental and peer drinking, we find little evidence that parental drinking influences the decision to participate in alcohol consumption. Participation is related to closest peer and outside college peer drinking though not college friend drinking.

Secondly, we examine the determinants of scores on the WHO AUDIT scale. The time preferences scale substantially predicts higher drinking levels across all specifications. The results reveal a substantial effect of peer group drinking but very little effect of parent drinking.

response. As can be seen, those who completed the survey fully tended to be slightly younger, with lower parental income, and were less likely to be smokers. The effects are not substantial but do give a useful clue as to the potential direction of survey biases.

<sup>6</sup> This will be tested in later work through the gathering of more detailed information on family background.

Indeed, parental variables in general are poor explanatory variables in explaining AUDIT scores with neither parental income nor parental education having an effect on individual AUDIT scores. The drinking levels of the individuals closest peer are most predictive of own drinking, with the drinking behaviour of friends outside college more predictive than the drinking levels of college friends. In terms of personality variables, conscientiousness predicts lower scores on the AUDIT, while extraversion predicts higher scores. There is a slight relationship between openness to experience and lower scores, and no discernible relationship between scores and measures of “agreeableness” or “nervousness”. High perception of risks related to drinking predicts lower AUDIT scores. Consistent with the previous literature, AUDIT scores are higher for those who begin drinking at an earlier age. Both cannabis usage and ecstasy usage predict higher scores on the AUDIT, pointing toward complementarities between consumption of alcohol and illegal drugs. However, even after controlling for all these factors, males score substantially higher than females on the AUDIT. The drinking behaviour of domestic students in college dorms is more pronounced than the other groups. In fact, the raw correlation between living in a student dorm and drinking is actually negative but this reflects the higher number of foreign students who live in dorm accommodation. Most interestingly from an economic perspective, high time preferences (i.e. lower patience scores) increase AUDIT scores, but scores are not related to personal disposable income.

Finally we examine the determinants of alcohol expenditures. Alcohol expenditures and alcohol consumption are not necessarily strongly related, particularly among students as students may access cheap alternatives if their income is not high. This is borne out by the fact that our results demonstrate that disposable income does not have an effect on the AUDIT score, but it does have an effect on alcohol expenditures. Moreover, while older students do not score higher

on the AUDIT, they do spend more on alcohol and nights out. This points to a substitution toward more expensive types of drinking occasions as both income and age increases. Once again, we find very little evidence for parental effects on alcohol expenditures either in terms of parental education, parental income, or parental drinking. Those living away from home spend more on alcohol than those residing at home. In this instance, the drinking behaviour of the individuals' closest friend, average friend at college and average friend outside of college all have a similar positive effect on alcohol expenditures. Higher perceptions of risks from drinking do not have an effect on alcohol expenditures. High time preferences predict higher alcohol expenditure. Both cannabis and ecstasy usage predict alcohol expenditures suggesting consumption complementarities.

## **5. Conclusion**

This paper is an initial attempt to incorporate several important economic and psychological parameters into the study of alcohol consumption and provides a useful baseline study for future research in this area. The results provide evidence that income is a very weak explanatory factor for alcohol consumption patterns and that higher income students, instead of consuming more alcohol, tend to consume more expensive alcohol. Alcohol consumption is better explained by personality and peer factors than by parental resources, family background or disposable income. In terms of individual psychological and economic parameters, time preferences are strongly related to alcohol consumption and we also find an effect of extraversion, conscientiousness and levels of well-being.

Exploring the use of psychometric measures of time preferences in explaining risk behaviour is an important future question for this study. The exploration of the interplay between parental, peer and sibling effects is also a high priority for future research. While the models

outlined in this paper indicate that drinking behaviour by close friends affects one's own drinking, and that peer and sibling drinking have much bigger effects than parental drinking, more work needs to be done to examine the transmission of parental drinking to peer selection and the endogeneity of peer effects.

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**Table 1: Descriptive Statistics**

Variable	Obs. used in the Full Regression Analysis					Total observed on each variable				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
AUDIT	1647	10.81526	5.97641	0	41	3980	11.36432	6.41615	0	41
Age	1647	20.85356	2.338071	17	29	4446	21.5578	4.33041	12	61
Male	1647	0.422987	0.494178	0	1	4440	0.453153	0.497857	0	1
Cannabis	1647	2.106745	1.227275	1	6	3492	2.130584	1.218878	1	6
Ecstasy	1647	1.179835	0.588057	1	5	3471	1.187842	0.597673	1	6
Father Drinking	1647	3.534884	1.514687	1	6	3381	3.558119	1.547648	1	6
Mother Drinking	1647	3.144282	1.485554	1	6	3419	3.169348	1.533224	1	6
Close Friend Drinking	1647	3.911267	1.136818	1	6	3437	3.939773	1.181017	1	6
College Friend Drinking	1647	4.187281	0.871446	1	6	3433	4.197786	0.916487	1	6
Home Friend Drinking	1647	4.056042	0.949243	1	9	3428	4.081389	1.000189	1	6
Parental Income	1647	4.876896	1.679349	1	7	2258	4.769708	1.72452	1	7
Time Preferences	1647	52.50351	9.127586	11	77	3436	53.16473	9.252668	11	77
GHQ-12	1647	29.13843	5.466925	12	48	4037	29.41243	5.361055	12	48
Openness	1647	10.48909	2.121953	3	14	3533	10.52335	2.144637	3	14
Conscientiousness	1647	9.837168	2.614222	2	14	3530	9.984986	2.625496	2	14
Extraversion	1647	8.823703	2.891579	2	14	3539	9.072337	2.914627	2	14
Agreeableness	1647	10.116	2.11491	3	14	3507	10.07015	2.183976	2	14
Nervousness	1647	6.684055	2.829748	2	14	3532	6.492922	2.819141	2	14
Disposable Income	1647	848.9627	729.1022	5	8550	3334	919.7682	786.075	5	8550
Religiosity	1647	3.325554	1.067577	1	5	3422	3.310929	1.094373	1	5
Risk Perception	1647	22.21762	23.36467	1	100	3330	23.02372	37.57011	1	100
Age Started Drinking	1647	17.09102	1.590214	1	27	2980	17.59329	18.56875	1	27
Private Renting	1647	0.357643	0.479446	0	1	4423	0.330771	0.470544	0	1
Student Residences	1647	0.151692	0.358827	0	1	4423	0.140176	0.347209	0	1
Own Property	1647	0.017503	0.131174	0	1	4423	0.046575	0.21075	0	1
Foreign Full-Time	1647	0.063011	0.243053	0	1	4343	0.072991	0.260152	0	1
Foreign Visiting	1647	0.025671	0.158198	0	1	4343	0.022795	0.149268	0	1
Never Smoked	1647	0.625438	0.484151	0	1	3510	0.580057	0.49362	0	1
Father Lower Secondary	1647	0.210035	0.407452	0	1	3416	0.16452	0.370801	0	1
Father Upper Secondary	1647	0.26021	0.438877	0	1	3416	0.229216	0.42039	0	1
Father University	1647	0.443991	0.496998	0	1	3416	0.537178	0.498689	0	1
Mother Lower Secondary	1647	0.181447	0.385501	0	1	3413	0.140639	0.347699	0	1
Mother Upper Secondary	1647	0.342474	0.474676	0	1	3413	0.323469	0.467869	0	1
Mother University	1647	0.432322	0.495543	0	1	3413	0.494287	0.500041	0	1
_Parents Separated	1647	0.129019	0.314201	0	1	3415	0.103075	0.295899	0	1

Notes: The highest level of non-response was on the parental income question. This generates the bulk of the disparity between the observed sample and those used in the full regression models. A number of other observations were discarded due to implausibility. The sample is also restricted to those aged under 30.

**Table 2: Determinants of Alcohol Expenditure, WHO AUDIT and Alcohol Participation**

	Expenditure	WHO AUDIT	Participation
Age	2.27***	-0.15***	0.00
	0.87	0.05	0.00
Male	6.59***	1.83***	-0.02***
	4.07	0.25	0.01
Lodgings/Renting	-12.27***	0.57**	0.00
	4.46	0.28	0.01
College Dorm	-6.08	1.64***	-0.02**
	5.82	0.37	0.01
Own-Property	-20.36	0.03	-
	15.01	0.89	-
Foreign Full-Time Student	-28.55***	-1.95***	-0.02
	7.69	0.51	0.02
Foreign Visiting Student	-32.08***	-2.50***	-0.02
	11.27	0.74	0.02
Never Smoked	-19.81***	-1.31***	-0.01
	6.59	0.40	0.01
Cannabis Use (1 to 6 scale)	6.88***	0.82***	0.03***
	2.04	0.12	0.01
Ecstasy Use (1 to 6 scale)	12.89***	0.94***	-0.02
	3.75	0.22	0.01
Mothers Drinking (1 to 6 scale)	-2.26	0.07	0.00
	1.41	0.09	0.00
Fathers Drinking (1 to 6 scale)	-0.66	-0.05	0.00
	1.46	0.09	0.00
Close Friend Drinking (1 to 6 scale)	13.52***	0.84***	0.01***
	1.83	0.12	0.00
College Friends Drinking (1 to 6 scale)	9.44***	0.26**	0.01**
	2.41	0.16	0.00
Outside College Friends Drinking (1 to 6 scale)	9.70***	0.67***	0.01
	2.35	0.15	0.00
Father Lower Secondary	10.50	-0.16	-0.01
	7.67	0.48	0.01
Father Upper Secondary	4.96	-0.23	0.00
	7.69	0.48	0.01
Father Higher Education	4.47	-0.44	-0.02
	7.63	0.48	0.01
Mother Lower Secondary	10.70	0.20	0.02**
	9.71	0.62	0.01
Mother Upper Secondary	-4.22	-0.04	0.02
	9.40	0.61	0.01
Mother Higher Education	-12.97	-0.58	0.03**
	9.55	0.62	0.01
Parental Income (1 to 7 scale)	0.20	0.01	0.00
	0.15	0.01	0.00
Parents Separated	-8.93	-0.79	-0.01
	6.03	0.37	0.01
Time Preferences	-1.19***	-0.07***	0.001***
	0.23	0.01	0.00

Well-Being (GHQ-12, 12 – 48 positive scale))	0.63**	-0.07***	0.00
	0.37	0.02	0.00
Openness	-1.74*	-0.10*	0.00
	0.95	0.06	0.00
Conscientiousness	-0.56	-0.24***	0.00
	0.80	0.05	0.00
Extraversion	3.70***	0.26***	0.01**
	0.71	0.04	0.00
Agreeableness	1.42	0.04	0.01**
	0.90	0.06	0.00
Neuroticism	-0.39	0.00	0.00
	0.76	0.05	0.00
Disposable Income (€'s)	0.02***	0.00	0.00
	0.00	0.00	0.00
Religiosity (1 to 6 scale from religious to not religious)	1.25	0.03	0.01**
	1.84	0.12	0.00
Risk Perception (1 to 100 scale)	-0.15***	-0.01***	0.00
	0.06	0.00	0.00
Age Started Drinking	-1.01**	-0.08**	-
	0.46	0.04	-
Constant	-79.28	10.78	-
	33.15	2.08	-
N	1647	1647	1647
R-Squared/Pseudo R-Squared	0.28	0.40	0.29

Notes: Robust Standard Errors beneath Coefficient. Significant levels: \*\*\* 1%, \*\* 5% and \* 10%. The Base Category for "Lodging/Renting", "College Dorm" and "Own Property" is whether the individual lives with their parents. The Base Category for "Foreign Full-Time Student" and "Foreign Visiting Student" is "Irish student". Openness, Conscientiousness, Extraversion, Agreeableness and Nervousness are constructed by summing two items for each variable derived from the Gosling et al (2003) brief measure of the Big Five. Risk Perception was elicited by asking respondents to assign a probability of dying from alcohol-related diseases consequent on drinking specified quantities of alcohol over time. Marginal Effects are reported for the Participation Equation. Well-being was measured by coding and summing the 12 items of the GHQ giving a scale from 12 (lowest well-being) to 48 (highest well-being).