Article:
Davies, E.L., Martin, J. and Foxcroft, D.R. (2015) Age differences in alcohol prototype perceptions and willingness to drink in UK adolescents. Psychology, Health and Medicine. ISSN 1354-8506

https://doi.org/10.1080/13548506.2015.1051556

Age differences in alcohol prototype perceptions and willingness to drink in UK adolescents

Authors: Emma L Davies[1], Jilly Martin[2], David R Foxcroft[3]

[1] Department of Psychology, Social Work and Public Health, Faculty of Health and Life Sciences, Oxford Brookes University, Headington Campus, Gipsy Lane, Oxford, OX3 0BP, United Kingdom, edavies@brookes.ac.uk 01865 484056

[2] Department of Psychology, University of Sheffield, Western Bank, Sheffield, S10 2TN, United Kingdom, jilly.martin@sheffield.ac.uk 0114 222 6513

[3] Department of Psychology, Social Work and Public Health, Faculty of Health and Life Sciences, Oxford Brookes University, Jack Straw's Lane, Marston, Oxford, OX3 0FL, United Kingdom david.foxcroft@brookes.ac.uk 01865 485283

Corresponding author: Emma L Davies edavies@brookes.ac.uk

Acknowledgements

The authors are grateful to the participants who gave their time to take part in the project.

Funding

This work was supported by Alcohol Research UK [under grant number RS10/02]

Word count 2993 (not including abstract, references, tables or figures)

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Abstract

Using the Prototype Willingness Model (PWM) as a framework, this study sought to explore the relationship between prototype perceptions, willingness and alcohol consumption in a sample of adolescents in the United Kingdom. Adolescents aged 11-17 were asked about their alcohol prototype perceptions, willingness to drink, intentions, alcohol consumption, drunkenness and harms using a cross sectional online survey. Participants were recruited through opportunity sampling via schools and parents. The survey was completed by 178 respondents (51% female; 91 aged 11-15, 87 aged 16-17). Multivariate analysis revealed significant differences between participants aged 11-15 and 16-17 on PWM measures, even when experience with drinking was accounted for (p<.001). There were significant interactions (p<.001) between age and prototype perceptions; younger participants rated non-drinker prototypes as more favourable and more similar to the self than 16-17 year-old participants. Willingness and intentions interacted with age; both measures were similar in 16-17 year-olds, whereas younger participants scored significantly higher on willingness than intentions (p<.001). Three distinct scales of prototype descriptions were identified in principal components analysis. Characteristics related to sociability significantly predicted willingness to drink alcohol in the sample (p<.001). This study extends previous research by demonstrating that the PWM can provide a theoretical explanation of adolescent drinking in the UK. The results suggest that 11-15 year-olds may the most suitable age for an intervention that targets alcohol prototypes, with a focus on sociability characteristics.

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Introduction

Adolescent alcohol misuse is associated with a number of harmful consequences (Alcohol Concern, 2011; Newbury-Birch et al., 2009). Interventions that aim to reduce risky drinking in adolescents are often based on theories that assume this behaviour can be changed by targeting attitudes and intentions. However, adolescence is characterised by high levels of impulsivity (Arnett, 2007; Powell, 2006) and drinking tends to occur in social situations where peer influences are strong (Gibbons, Gerrard, & Lane, 2003; Kelly et al., 2012).

The Prototype Willingness Model (PWM) (Gibbons & Gerrard, 1995) accounts for adolescent risk taking by suggesting two routes to behaviour. The first a rational, planned route via attitudes, norms and intentions, and the second a reactive, unplanned route, operating outside of conscious control (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008). The reactive pathway acknowledges the social context and often unplanned nature of adolescent risk behaviour. It incorporates the typical images or 'prototypes' adolescents hold about people their age who behave in particular ways. Prototype perceptions determine an individual's 'willingness' to perform a behaviour; for example when non-drinker prototypes are favourable, then adolescents may be less willing to drink (Gerrard et al., 2002).

The PWM has been used as the basis for interventions which have shown promise in targeting risk behaviours, for example increasing condom use (Blanton et al., 2001) and reducing willingness to smoke (Andrews et al., 2011). Less research however, has explored the PWM in relation to adolescent drinking in the United Kingdom (UK), and no existing preventive interventions targeting this specific population have been identified. Indeed, within a recent meta-analysis of the PWM, only nine out of the 80 included studies were conducted in the UK (van Lettow, de Vries, Burdorf, & van Empelen, 2014), and only three with adolescents (average

age 16) (Rivis, Sheeran, & Armitage, 2006, 2010, 2011). Within Europe the UK is considered one of the higher alcohol consumption countries for adolescents (Hibell et al., 2012). Although the legal age for purchasing alcohol is 18, by the age of 16 most UK adolescents have tried alcohol, and many drink regularly (Hibell, et al., 2012; Newburn & Shiner, 2001).

Gibbons et al. (2000) argue that individuals who are intending to drink might be more accepting of the consequences (such as a hangover) whereas individuals who are willing, but not intending, to drink do not anticipate adverse outcomes. This lack of forethought means unplanned behaviour may be harmful to younger adolescents who may not consider themselves to be personally vulnerable (Gibbons, Gerrard, Ouellette, & Burzette, 1998). In a qualitative study with UK adolescents, it was found that there was a difference between older (aged 16-17) and younger (aged 11-13) participants whereby older participants made plans to drink (indicating their drinking was predominantly intentional), whereas, younger participants did not make plans to drink – indicating drinking was driven by a particular social situation (Davies, Martin, & Foxcroft, 2013). This suggests that targeting prototype perceptions could provide a suitable basis for an intervention aimed at younger adolescents with less experience of drinking.

Given the emphasis on prototype perceptions in the PWM, it is important to understand how they are described and evaluated in order to target them in interventions. Previous studies conducted in Germany and The Netherlands have examined the specific characteristics of prototypes. Zimmermann and Sieverding (2011) identified two underlying dimensions labelled 'sociability/ hedonism' and 'responsible', comprising characteristics from semantic differential scales. Another study asked young people aged 18-25 to describe five different prototypes (abstainer, moderate drinker, heavy drinker, tipsy, and drunk person) generating 23 descriptive words (Van Lettow, Vermunt, de Vries, Burdorf, & van Empele, 2012). These studies were important for determining intervention targets for students, however, apart from one small study (Davies, et al., 2013) we have not identified studies that have examined prototype descriptions with UK adolescents. This is important, as a recent systematic review concluded

that variation in intervention effectiveness could be due to differences in local setting and population group characteristics (Foxcroft & Tsertsvadze, 2012).

The overall purpose of the current study was to explore the application of PWM to UK adolescent alcohol consumption. The specific aims were 1) to describe the relationship between prototypes, willingness, intentions and alcohol consumption; 2) to explore whether there are differences in these relationships between older (aged 16-17) and younger (aged 11-15) adolescents ; and 3) to explore how drinker and non-drinker prototypes are rated on a set of descriptive characteristics. The two groups were compared based on literature indicating that drinking is normalised for 16-17 year-olds (Newburn & Shiner, 2001) and 11-15 year-olds are advised to avoid alcohol (Donaldson, 2009).

Method

Participants

Adolescents (*N*=178) aged 11-17 (*M*=14.81; 51% female) were recruited through schools and parents. Participants and parents were given information about the study and they decided independently whether or not to take part. The only criteria for inclusion in the study was that adolescents had the means to complete the online survey, and, if under 16, could also provide a consent form signed by their parent. There were 87 participants aged 16-17 (62% female) and 91 aged 11-15 (44% female). No other background information was collected on the sample.

Design and Measures

A cross sectional anonymous survey was administered online. As in previous research (Zimmermann & Sieverding, 2010) prototype favourability was measured from 0 (extremely negative) to 100 (extremely positive) and similarity from 1 (not at all) to 7 (very). Participants were asked to rate how 18 characteristics (derived in focus groups (Davies, et al., 2013), see Table 3) described the typical drinker or non-drinker from 1 (not at all) to 7 (exactly like this).

Willingness to drink was also measured in the same way as previous research (Teunissen et al., 2012) using hypothetical scenarios: a family wedding, a house party and at the park, based on drinking experiences elicited in focus groups (Davies, et al., 2013). Participants indicated how likely it was that they would a) take a drink, or b) say no thanks, from 1 (unlikely) to 7 (likely) and a total score was calculated, reversing answers to b) (6 items; α=.932). Participants rated intentions to drink alcohol in the next month from 1(definitely do not) to 7 (definitely intend to).

Participants were asked '*have you ever had an alcoholic drink – a whole drink and not just a sip?*' as in national surveys (Fuller & Hawkins, 2014). They were asked about frequency of drunkenness in the last month (0 -9 or more times). Quantity of alcohol consumed was measured in the same way as previous research (Coleman, Ramm, & Cooke, 2010) by asking participants to report the number of pints, cans, bottles, glasses of wine, shots or alcopops they had when they usually drank. This was converted to approximate units.

A harm scale was constructed from a measure based on a scale used in a national survey (Fuller, 2013) and drawing on insights from focus groups (Davies, et al., 2013). Participants were asked to tick if any of the consequences had ever happened when they had been drinking (been sick, memory loss, been embarrassed, trouble with the police, suffered injury, taken to hospital, had a fight, lost something such as a phone or 'other'). The number of harms ticked were summed to comprise a harm score where a higher score (max = 9) indicated that more harm was experienced.

The study took 20-25 minutes to complete and was approved by XXXXXX Ethics Committee (registration number XXXXXX).

Results

Descriptive statistics

The mean age of first drink was 13.09 and 64.67% had tried alcohol. Of those aged 11-15, 38.20% reported ever having a drink, similar to the 39% reported a recent national survey (Fuller & Hawkins, 2014). Of the 16-17 year-olds, 94.88% had tried alcohol.

Aim 1: *The relationship between prototypes, willingness, intentions and alcohol consumption*

Significant positive correlations were found between drinker prototype perceptions (favourability and similarity), willingness to drink, intentions, alcohol consumption, drunkenness and harms (p<.05). Significant negative correlations were found between non-drinker prototype perceptions (favourability and similarity), willingness, intentions and harms (p<.001). Non-drinker prototype perceptions were not correlated with alcohol consumption, but non-drinker similarity was significantly correlated with drunkenness (see Table 1)

[Insert Table 1]

Correlations (Table 1) suggested similarity might be the primary correlate of willingness and could be more important than favourability for predicting willingness. Thus, hierarchical regression was performed to enter similarity at step one and add favourability at step two. In step one the model predicted 49.8% of the variance in willingness (R^2= 49.8, F(2, 153)=75.01, p<.001). Adding favourability accounted for an additional 4.6% of the variance in willingness (R^2 =54.4, F(4, 153) =44.42, p<.001). Overall, prototype perceptions accounted for a large proportion of the variance in willingness.

Three simple linear regression analyses were carried out with willingness as the predictor variable for the three self-reported alcohol measures. Willingness significantly predicted drunkenness (β=.406, t(79)= 3.94, p<.001) explaining 16.5% of the variance (R^2= .165, F(1,79)=15.58, p<.001); alcohol consumption (β=.313. t (97)= 3.24, p<.001) explaining 9% of

the variance (R^2= .107, F(1,98) =10.51, p=.001); and harms (β =.414, t(105)= 4.66, p<.001) explaining 17.1% of the variance (R^2=.171, F(1,106)= 21.713, p<.001).

Aim 2: Age differences

Age groups were compared on PWM measures using a between subjects multivariate analysis of variance with prototype perceptions, willingness and intentions entered as dependent variables. Using Pillai's trace, there was a significant effect of age on prototype perceptions, willingness and intentions, (V=.41, F(6, 146)=16.44, p<.001 *partial η2*=.403. These age differences are still present when drinking experience (age – age at first drink) is taken into account as a covariate (V=.196, F(6,144)=5.84, p<.001, *partial η2=.196).*

Age groups were then compared on alcohol consumption, drunkenness and harms. Using Pillai's trace, there was a significant effect of age on these measures, V=.19, F(3,72)=5.63, P=.002 *partial η2=.19.* When drinking experience is added as a covariate the difference between the groups is reduced, but is still approaching significance V=.10, F(3,70) =2.683, p=.053 *partial η2=.103.* T-tests (Table 2) confirmed that shows that age differences between the variables described in these analyses were significant with an appropriate adjusted alpha level.

[Insert Table 2]

Three subsequent sets of analyses, with age as the between subjects variable were performed to explore these differences. A two way ANOVA with favourability (drinker/non-drinker) as the repeated measures variable found a significant interaction between age and prototype, F(1,152)=38.99, p<.001, *partial η2* =.204, showing a greater difference between the favourability of drinkers and non-drinkers by 11-15 year-olds; they were significantly more positive about non-drinkers (M= 73.48, SD= 22.41) and negative about drinkers (M= 38.05, SD= 26.57). Whereas for 16-17 there was a smaller difference the ratings of drinkers (M= 61.69, SD= 18.25) than non-drinkers (M= 63.89, SD= 17.22) (Figure 1).

[Insert Figure 1]

A two way ANOVA with similarity (drinker/non-drinker) found a significant interaction between age and similarity $F(1,152)=37.36$, $p<.001$, *partial* $\eta 2=.197$. For younger adolescents, non-drinker prototypes were rated as much more similar to the self ($M= 5.01$, $SD= 1.88$) than drinker prototypes ($M= 2.60$ $SD= 1.77$), however there was a smaller difference between ratings of drinker ($M= 4.36$ $SD= 1.75$), and non-drinker ($M= 3.72$, $SD= 1.79$), prototype similarity for older participants (Figure 2).

[Insert Figure 2]

A two way ANOVA with determinant (willingness/intentions) found a significant interaction between age and determinant $F(1,164)=26.50$, $p<.001$, *partial* $\eta 2=.139$ (Figure 3). Willingness to drink ($M=3.30$, $SD=1.79$) was higher than intention to drink ($M=2.57$, $SD= 1.97$) for younger participants, whereas intention to drink ($M=5.47$, $SD=2.11$) was higher than willingness to drink ($M=4.93$, $SD=1.68$) for older participants.

[Insert Figure 3]

Aim 3: Prototype characteristics

Drinkers were rated highly on careless, sociable, rebellious and confident. Non-drinkers were rated highly on responsible, healthy and sensible (Table 3). Principal component analysis (PCA) was conducted on the 18 items for drinker prototypes items with an orthogonal rotation (varimax). Assumptions for PCA were met. Three components, explaining 61.5% of the variance in the data, were retained following an examination of the eigenvalues and the scree plot (Table 3).

[Insert Table 3]

Component one consisted of *responsible*, *sensible*, *respectful*, *grown-up*, *healthy* and *calm*; this was named 'responsibility'. Component two consisted of *aggressive, careless, rebellious, tough,*

anti-social and *stupid*; this was named 'rebelliousness'. Component three consisted *of sociable, fun, boring* (reversed) *confident* and *cool*; this was named 'sociability'. The items on the factors were summed to create new variables named 'drinker responsibility' (α=.918), 'drinker rebelliousness' (α= .802) and 'drinker sociability' (α= .733).

Three components explaining 56.87% of the variance in the data were retained from PCA of non-drinker characteristics (Table 3). They were categorised in the same way as the typical drinker characteristics into 'non-drinker responsibility' (*sensible, responsible, healthy, respectful, grown-up*, and *calm,* α= .877), 'non- drinker rebelliousness' (*aggressive, rebellious, careless, stupid* and *tough,* α= .722) and 'non- drinker sociability' (*fun, sociable, cool, boring* (reversed), *anti-social* (reversed) and *confident*, α= .794).

Pearson's correlations demonstrated that willingness was significantly positively correlated with 'drinker responsibility' (r(158 =.406, p<.001) and 'drinker sociability' (r(159)=.448, p<.001). Willingness was significantly negatively correlated with 'drinker rebelliousness' (r(157)=-.249, p=.002), 'non-drinker responsibility' (r(158)=-.205, p=.009) and non-'drinker sociability' (r(155) =-.387, p<.001). Multiple regression analysis was conducted with willingness as the outcome variable, firstly with the three drinker scales, and secondly, with the three non-drinker scales as predictors. Together, the drinker scales predicted more of the variance (24.1%) in willingness than the non-drinker scales (15.9%). However in both models, the sociability scale was the only significant predictor of willingness (drinker; β= .311. t(153)=3.737, p<.001; non-drinker; β=-.365. t(152)=4.328, p<.001).

Discussion

Prototype favourability and similarity were correlated with willingness as predicted by the PWM (Gerrard, et al., 2008). These measures were also related to intentions, alcohol consumption and harms, supporting the expectation that the PWM is related to risk behaviour in this population. More favourable and similar drinker prototypes were associated with greater willingness, intentions, alcohol consumption, drunkenness and harms, whereas for non-

drinker images, generally the reverse pattern was found. Overall, prototype perceptions accounted for a large proportion of the variance in willingness. Furthermore, willingness made a significant contribution to the individual prediction of drunkenness, alcohol consumption and harms. Drunkenness is a key factor in harmful longer term consequences for adolescents (Kuntsche et al., 2013), as well as short term harms such as accidents (Newbury-Birch, et al., 2009), thus reducing this behaviour is of paramount importance.

Analyses revealed significant differences between the two age-groups on all measures. Interactions between age and favourability and similarity were observed. There were greater differences between younger participants' ratings of favourability and similarity for both prototypes, whereas these differences were reduced in older respondents. These findings suggest that younger participants perceived the two alcohol prototypes as more distinct. The age differences in PWM measures remained when drinking experience was controlled for. It is possible that both age and experience are important in explaining the relationship between prototypes and willingness, and the shift from willingness to drink to intentional planned drinking behaviour.

The significant interaction between age and behavioural determinant indicated that for 16-17 year-old participants, willingness and intention measures were similar, whereas for 11-15 year-olds they appeared to capture something different. For these younger respondents, willingness was higher than intentions, indicating that, in line with the assumptions in the PWM, those who were not intending to drink, may still recognise that they are open to the opportunity in a particular social context. This means that targeting willingness may be more appropriate in younger, but not older adolescents.

Previous studies suggest a shift from reactive to planned behaviour with age and experience (Pomery, Gibbons, Reis-Bergan, & Gerrard, 2009), and that the PWM is better at explaining adolescent drinking than young adult drinking (Todd, Kothe, Mullan, & Monds, 2014). Our findings indicate that the social reaction pathway in the PWM may be better able to explain

alcohol consumption in younger compared to older adolescents in the UK who have less experience of drinking.

Three underlying prototype dimensions related to sociability, responsibility and rebelliousness were identified. Adolescents who rated drinker prototypes highly on responsibility and sociability (more pro-social, positive traits) reported higher levels of willingness to drink. The sociability scale predicted more of the variance in willingness than the responsibility or disruptiveness scales. This analysis resulted in similar dimensions to Zimmermann and Sieverding (2011) who identified 'sociability/hedonism' and 'responsibility' scales in a sample of young adults, and concluded that the former should be targeted in their sample. Our study builds on this by applying the exploration of characteristics in a younger sample. In addition, the present study identified an additional distinct scale named 'rebelliousness', which may be explained by age of the participants, for whom drinking alcohol was a forbidden activity. The sociability scales included descriptions such as confidence, coolness and boring, which may be important to younger adolescents who are forming their identity and self-image (Spijkerman, van den Eijnden, & Engels, 2005).

The cross sectional design of this study limits conclusions about causal mechanisms. The sample size and opportunistic nature of sampling is a further limitation that prevents us from making firm inferences about the representativeness of our final sample. Conducting alcohol research with under 16s is challenging for many reasons, including the requirement to gain parental as well as child consent (Tyler & Davies, 2013); this can limit the potential pool of respondents (Tigges, 2003), and may also mean that confidentiality is doubted. Whilst the study has good internal validity, the potential generalizability of the results to other population groups is unclear. Willingness and intentions were highly correlated, suggesting they share similar properties. Questionnaire measures of willingness have been criticised for failing to tap into the automatic nature of this construct because they involve some deliberation (Fishbein, 2008). To overcome this Comello and Slater (2011) measured reaction times to willingness

questions. It is also possible that an indirect measure, for example using implicit attitudes, may be more able to capture willingness; further exploration of an appropriate means of measuring adolescents' propensity to engage in unplanned drinking is needed.

Despite these limitations, this study applied the PWM in a younger adolescent population than previously explored in the UK and suggests those aged 11-15 may be a potential focus for future harm-reduction interventions that aim to reduce willingness to drink. Such an intervention that targets drinker prototypes and addresses the risky nature of unplanned drinking may have the potential to reduce willingness to drink in this population. Relevant behaviour change techniques should be directed at changing prototypes in order to impact willingness, and therefore the potential harms associated with adolescent drinking.

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Tables and figures

Table1. *Correlations and significance levels between prototypes, willingness, intentions and alcohol consumption for the whole survey sample*

	DPF	DPS	NDF	NDS	W	Int	A	D
Mean (SD)	49.04(25.85)	3.40(1.95)	68.99(20.65)	4.44(1.97)	24.49(11.59)	7.05(6.64)	11.73(8.64)	2.19(2.17)
Drinker prototype favourability (DPF)								
Drinker prototype similarity (DPS)	.724**							
Non-drinker favourability(NDF)	-.242**	-.298**						
Non-drinker similarity (NDS)	-.356**	-.545**	.640**					
Willingness (W)	.542**	.604**	-467**	-.621**				
Intentions (Int)	.482**	.598**	-.389**	-.518**	.725**			
Alcohol consumption (A)	.299**	.330**	-.172	-.188	.313**	.321**		
Drunkenness (D)	.236*	.325**	-.175	-.358**	.406**	.394**	.303**	
Harms (H)	.384**	.504**	-.291**	-.580**	.414**	.425**	.519**	.513**

Note ** $p<.001$ *$p<.05$

Table 2 *Means, standard deviations T-tests to compare 11-15 and 16-17 year-old participants on survey measures of prototypes, willingness, intentions and alcohol consumption*

	Age			
Mean (SD)	11-15	16-17	*t* statistic	Effect size
Drinker prototype favourability	37.85 (26.33)	61.15 (18.23)	6.40**	.47
Drinker prototype similarity	2.58 (1.75)	4.31 (1.77)	6.29**	.44
Non-drinker prototype favourability	74.05 (22.45)	64.29 (3.57)	3.04*	.23
Non-drinker prototype similarity	5.05 (1.88)	3.78 (1.87)	4.29**	.32
Willingness	19.66 (10.80)	29.79 (10.07)	6.31**	.44
Intentions	2.57 (1.97)	5.47 (2.11)	9.18**	.58
Drunkenness	1.65 (0.70)	3.61(2.11)	6.27**	.59
Alcohol consumption	7.15 (6.74)	13.19 (8.73)	3.68**	.30
Harms	1.00 (1.52)	2.71 (2.22)	4.64**	.45

Note ** $p<.001$, *$p<.005$ (alpha level adjusted to .005 to account for multiple comparisons)

Table 3 *Summary of exploratory factor analysis results for the typical **drinker prototype** and **typical non-drinker prototype** characteristics (loadings of less than .1 have been suppressed)*

		Rotated Factor Loadings					
	Drinker Prototype				**Non-drinker Prototype**		
Item	*Mean (SD)*	responsibility	rebelliousness	sociability	*Mean (SD)*	responsibility	rebelliousness	sociability
responsible	2.77 (1.65)	**.854**	-.210	.152	5.24 (1.74)	**.815**	-.230	
sensible	2.76 (1.68)	**.817**	-.254		5.3 (1.67)	**.819**	-.240	.153
respectful	3.09 (1.69)	**.810**	-.297	.127	5.14 (1.52)	**.756**	-.122	.225
grown-up	3.15 (1.73)	**.790**		.329	4.63 (1.59)	**.695**		.217
healthy	2.99 (1.6)	**.768**	-.107	.273	5.29 (1.59)	**.767**	-.175	.147
calm	3.13 (1.47)	**.738**	-.241		4.88 (1.5)	**.624**	-.188	.269
aggressive	4.13 (1.79)	-.252	**.794**	-.147	2.43 (1.4)	-.342	**.758**	
careless	4.61 (1.85)	-.419	**.714**		2.48 (1.5)	-.227	**.646**	
rebellious	4.88 (1.84)	-.339	**.671**		2.35 (1.51)	-.429	**.655**	
tough	3.64 (1.72)	.270	**.594**	.249	3.13 (1.48)	.307	**.452**	.239
anti-social	3.18 (1.88)		**.582**		2.44 (1.57)		.483	**-.589**
stupid	4.38 (1.93)	-.507	**.565**	-.247	2.44 (1.57)	-.407	**.630**	-.278
pressured [a]	3.87 (1.67)	-.169	.277	-.150	3.09 (1.75)		.334	-.376
sociable	4.82 (1.75)	.297		**.752**	4.71 (1.56)	.320		**.700**
fun	4.51 (1.76)	.374		**.707**	4.55 (1.58)	.238		**.787**
boring	2.84 (1.6)		.352	**-.653**	3.22 (1.77)	-.227	.299	**-.675**
confident	5 (1.67)			**.615**	4.47 (1.62)		.316	**.555**
cool	3.76 (1.77)	.545		**.573**	4.03 (1.54)	.364		**.682**
Eigenvalues		7.083	2.2	1.77		6.21	1.69	2.33
% of Variance		39.35	12.232	9.921		34.518	9.37	12.99
α		.918	.802	.733		.877	.722	.794

[a] Note: pressured was not included in the reliability analyses due to low factor loadings

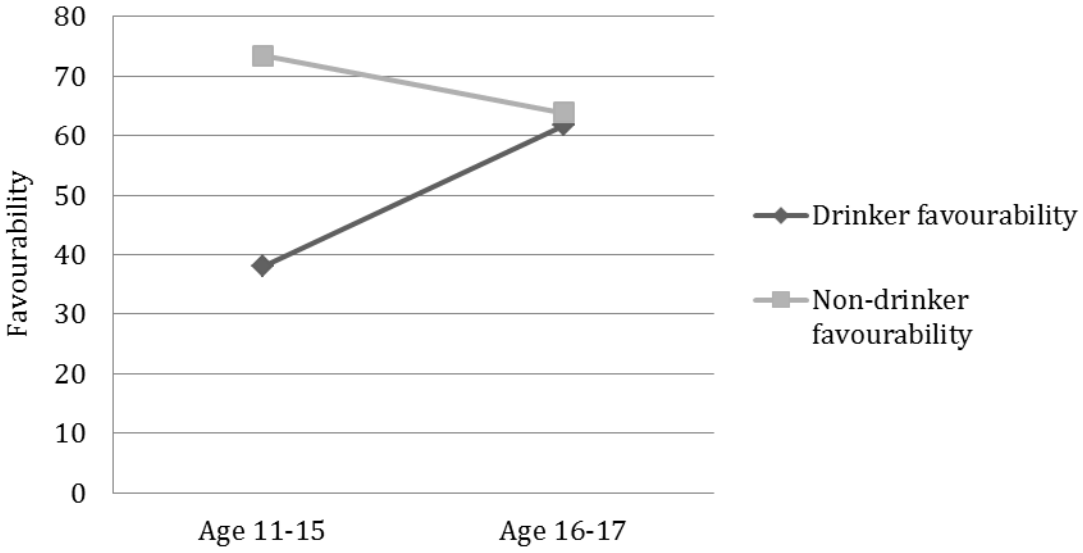

Figure 1 Favourability of drinker and non-drinker prototypes by age group

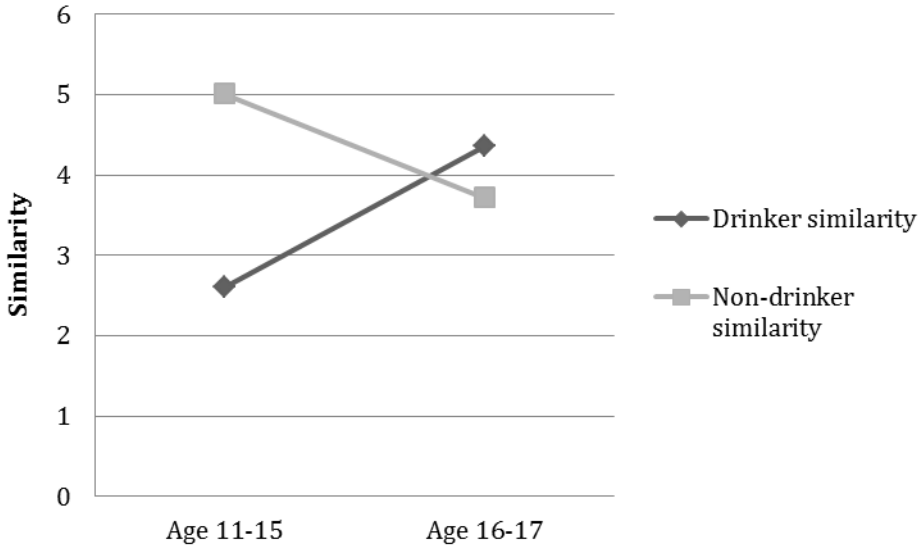

Figure 2 Similarity of drinker and non-drinker prototypes by age group

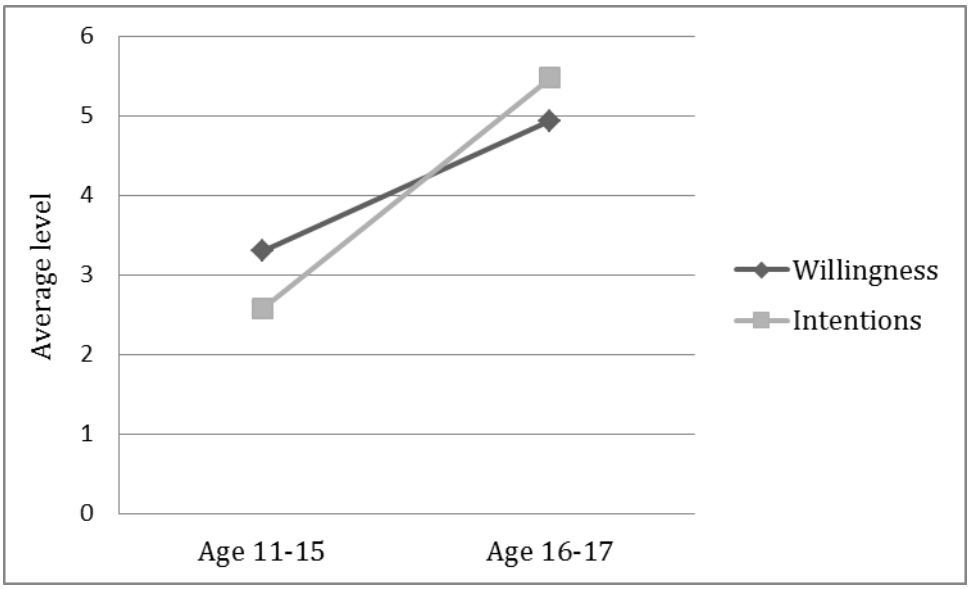

Figure 3 Willingness and intentions to drink by age group