Motivations for reducing alcohol consumption: An international survey exploring experiences that may lead to a change in drinking habits

Title page

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Abstract

Aims: Brief interventions delivered by doctors and other healthcare practitioners might be meaningfully enhanced by understanding what individual experiences might lead patients to cut down. The aim of the current paper was to explore the experiences that might lead people to reduce their alcohol consumption and to compare these findings between respondents from 21 different countries.

Methods: Global Drug Survey is an online cross sectional, opportunistic anonymous survey. This paper includes 72209 respondents from 21 counties with over 250 respondents (60.8% male)

Results: Almost a third (32.9%) of participants reported that they would like to drink less alcohol over the next 12 months, and a third thought their GP would tell them to cut down if they were honest about their drinking. The primary experiences that were rated as most likely to lead to a change in behaviour were related to physical health, sexual assault and having to seek emergency medical treatment. Respondents from Germany were more likely to select embarrassment as a motivation to reduce drinking than those from other counties. Females were more likely to report indicate motivations related to sexual regret, sexual assault or seeking treatment. Older participants and those in the low risk audit category were more likely to report embarrassment or forgetfulness as potential motivation for change.

Conclusion: Understanding the different motivations that may lead individuals to change their drinking behaviours can be used to inform targeted brief interventions and targeted public health guidance.

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Introduction

Alcohol is embedded in cultural practice worldwide, facilitating social interactions (Gordon, Heim, & MacAskill, 2012) and demarking 'time out' from everyday pressures (Measham, 2004). People often report psychological or social benefits (Peele & Brodsky, 2000), and many feel happy when drinking (Geiger & MacKerron, 2016), however, alcohol misuse contributes to poor health and premature death across the globe (WHO, 2014). In many Western countries, liver disease is the only major cause of death still increasing; in England, around a third of cases relate to excessive drinking (Public Health England, 2016). Alcohol is not only harmful to consumers, individuals are frequently harmed by other people's drinking (Laslett et al., 2010). At present, more work is needed to meet the 2025 target of a 10% relative reduction in harmful alcohol use set out by the WHO, who have underscored the importance of this occurring both within and between WHO member states (WHO, 2014).

Many countries publish guidelines for low risk levels of consumption. In the United Kingdom, 14 units per week (one unit =10ml) (Department of Health, 2016) and in Australia, no more than two standard drinks per day (one standard =12.5ml) (National Health and Medical Research Council, 2009). Systematic assessment of the diversity of government alcohol guidelines has drawn attention to the considerable lack of agreement about what constitutes excessive consumption during specific time periods in different countries (Furtwaengler & de Visser, 2013) and persuading people to remain within these limits often fails. In fact, many British drinkers, regularly exceed low-risk thresholds (HSCIC, 2016). One recent UK study found drinkers believed alcohol consumption guidelines encouraging daily low risk levels were not relevant for people who consumed large amounts of alcohol at the weekends (Lovatt et al., 2015). This 'guideline recommendations' public health paradigm has been criticised as a failed endeavour of broader neo-liberal policy where the detached role of government is to empower

individuals to make informed choices, thus removing responsibility from the government itself (Casswell, 2012).

Targeted interventions may offer a more effective approach and several large scale reviews have provided broad support for brief alcohol interventions (ABI) in primary care (Kaner et al., 2007; O'Donnell et al., 2014). General Practitioners are often the first port of call (Haighton et al., 2016), so are ideally placed to deliver ABI, however, there is less agreement about the optimal content of such interventions (Platt et al., 2016). Thus, it is timely to consider whether there are specific features of the advice provided to patients at this critical moment that might lead to sustained changes.

A comprehensive understanding of alcohol consumption, and therefore of advice likely to lead to behaviour change, also needs to take into account that drinking confers clear benefits and pleasures on the consumer. For example, pleasure is an important motivation for drinking in students (Hutton, 2012; Webb, Ashton, Kelly, & Kamali, 1996), and individuals often report social benefits, such as bonding (de Visser, Wheeler, Abraham, & Smith, 2013). Indeed, recognising the gap between public health discourses of 'intoxication as harm' versus everyday understandings of alcohol consumption as a form of enhanced bodily pleasure, positioned in a wider context of hedonistic pastime, has been proposed as central to progressive public health strategies (Keane, 2009). Such pleasures of drinking are not separate from the problems; these positives and negatives exist together, which is a fundamental problem for public health interventions (Room, 2000).

Given the personal benefits linked with drinking, drawing attention to abstract health risks and referring to unit guidelines may be unlikely to invoke lasting behaviour change. Understanding key motivations for reducing intake among people might present a novel focus for ABI. However, while a considerable volume of evidence has been generated to detail drinking motivations among young people (e.g. Kuntsche, Knibbe, Gmel, & Engels, (2005), there is a lack

of research exploring drinking motivations in older adults. Furthermore, relatively little attention has been paid to motivations to drink in moderation or to not drink at all, and individual differences may influence these decisions.

At different times across the lifespan, motivations for reducing alcohol consumption may change. For older adults, health reasons become more salient (Britton & Bell, 2015) while in working age adults motivations for moderate drinking focused on responsibilities to fulfil work and family commitments (Lovatt et al., 2015).   Losing control, by becoming loud and rude, or getting into trouble, has been identified as an important reason for reducing consumption in students and young adults (Epler, Sher, & Piasecki, 2009). For adolescents, reasons for limiting or not drinking may include family disapproval or religion (Stritzke & Butt, 2001).

It is also important to acknowledge that drinking attitudes and behaviours are closely linked to cultural factors, and differ between countries (Labhart, Ferris, Winstock, & Kuntsche, 2017; Savic, Room, Mugavin, Pennay, & Livingston, 2016). Distinctive patterns of drinking behaviour have been crudely classified as culturally 'wet' (e.g. Italy, France; high per capita alcohol consumption) or 'dry' (e.g Sweden, U.K.; low per capita alcohol consumption). However, the wet/dry dichotomy has proven increasingly problematic partly given the convergence of per capita consumption rates between cultures but also given the European and English-speaking focus of the approach. Alternative typologies have been proposed to account for distinctive cultural factors involved in contemporary drinking behaviour. These have placed different emphases including attention to the relative hedonism of drinking behaviour within cultures (Room & Makela, 2000) and to alcohol's ritualistic/inter-personal functions but also how socio-cultural factors are involved in how alcohol use is controled (Gordon et al., 2012). Different customs and traditions also surround alcohol consumption within countries as well as between countries. For example, in the U.K. there has been shift towards the acceptance of public drunkenness as evidenced by increasing 'cultures of intoxication' and 'determined drunkenness' (Measham, 2006; Measham & Brain, 2005). Individuals such as students, who may share

demographic characteristics, may drink for broadly similar reasons across different countries (Mackinnon et al., 2017). Thus there are likely to be differences within and between countries in those factors which might lead individuals to reduce drinking (Labhart et al., 2017).

The overall aim of this paper was to explore potential motivations for reducing alcohol consumption in an international sample. We sought to identify which motivations might lead to reduced consumption and to see how motivations varied between countries, as well as to understand variations according to age, gender and AUDIT category.

Method

Design and procedure

The Global Drug Survey (GDS) is a cross sectional online survey developed by academics and experts to monitor trends in alcohol and drug use and harms. GDS has media and harm reduction partners in Europe, Scandinavia, North America, South America and Australasia who promote the survey, and detailed recruitment and sampling information is available elsewhere (Barratt et al. 2017). GDS2015 took place between November 2014-January 2015, collecting anonymous data in 174 countries and 11 languages (English, German, Greek, Polish, French, Italian, Spanish, Portuguese, Flemish, Hungarian and Danish). Ethical approval was obtained from the Joint South London and Maudsley and Institute of Psychiatry NHS Research Ethics Committee (reference number 141/02).

Participants

GDS2015 was promoted in magazines, newspapers and social media and thus the sample was self-selecting and opportunistic. In total there were 97855 respondents from 174 countries. This study draws on data from male and female respondents from countries where the sample size was over 250 respondents who drank alcohol and with no missing data on any of the variables of interest.

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Measures

AUDIT (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) is a 10 item questionnaire to assess alcohol consumption and harms. Participants receive a score from 0-40 (0-7= low risk, 8-15= increasing risk 16-19= higher risk; 20+= possible dependence). Respondents were asked *'would you like to drink less alcohol over the next 12 months?'* and *'would you like help to drink less over the next 12 months?'* (yes/no)*, and "If you went to the doctor next week and were honest about how much you drank what do you think they would say?'* (drink less/drink more/nothing/don't know).

Motivations for reducing alcohol consumption were explored by asking the following question; *"We are interested in which 3 experiences (in order of importance) would be most likely to get you thinking about reducing the amount you drink/change the way you drank alcohol".* The following 13 items were presented: 1) Social embarrassment/humiliation; 2) Being sexually assaulted /taken advantage of; 3) Sexual regret (e.g. ending up in bed with someone); 4) Injured in an accident; 5) Unable to remember the night before; 6) Seeking emergency medical treatment; 7) Physical health condition related to/worsened by alcohol; 8) Mental health condition related to/worsened by alcohol; 9) Concerns raised by partner /friends about what you are like when you are drunk; 10) Negative impact on education/study/work; 11) Involved in violent incident; 12) Trouble with the police; 13) Financial worries. Participants selected their first, second and third most important choices. If responses were selected more than once, the highest ranking for that experience was retained. GDS2015 also contained a range of demographic measures including gender, age, country of residence, and ethnicity.

Analysis

Data were analysed using descriptive statistics and Chi Square to compare differences between respondents. Dichotomous variables were created to indicate whether or not a participant had selected the 13 motivations in their top three, and logistic regression was used to explore

associations between motivations by respondents by country, taking into account sex, age and AUDIT categories as demographic confounders. Multiple correspondence analysis (MCA) was used to explore patterns within motivations for reducing alcohol consumption by order of importance, age, gender, and AUDIT category.

Results

The final sample included 72209 respondents from 21 countries (60.8% male; 44.7% aged 18-24; 91.8% white). Internal consistency for the AUDIT scale was acceptable, both within the sample as a whole (10 items; α = 784), and when calculated by country and language (Table 1). The median AUDIT score for the whole sample was 8 (*IQR*= 7) and 48% were classed as low risk drinkers. Demographic information, median AUDIT score and the proportion categorised as low risk from each included country is shown in Table 1. Median AUDIT scores were highest in respondents from Republic of Ireland (*Mdn*= 11; *IQR*= 9) and lowest in respondents from Portugal (*Mdn*= 6; *IQR*= 5) and Switzerland (*Mdn*= 6; *IQR*= 6). Portugal had the greatest proportion of respondents categorised as low risk (63.15%) and Republic of Ireland had the smallest proportion of respondents categorised as low risk (26.7%).

[Insert Table 1]

Within the sample, 32.9% of the respondents answered 'yes' to the question *would you like to drink less alcohol over the next 12 months?*' Poland had the greatest proportion of respondents who said yes (41%) and the Netherlands the fewest (24%). A significantly greater proportion of increasing, higher risk and dependent compared to low risk drinkers in the sample said they want to drink less in the next 12 months (χ^2(3)= 6533.28,*p*<.001). In the sample as a whole 2.7% of respondents said they would like help to drink less (Australia (6.5%) had the highest and Netherlands (1.3%) the lowest proportions). A significantly higher proportion of increasing, high risk, and dependent compared to low risk drinkers in the sample reported wanting help to drink less (χ^2(3)=2160.03,*p*<.001). In total, 35.5% of the respondents reported

said thought their doctor would tell them to drink less if they were honest about their drinking (Portugal (21.1%) had the smallest proportion, Republic of Ireland (49.9%). the largest). A significantly higher proportion of increasing, high risk, and dependent drinkers compared to low risk drinkers said they thought their doctor would tell them to drink less (χ^2(9)=21857.18,p<.001).

Binomial logistic regression was conducted to explore relationships between country of residence and motivations ranked as most likely to lead to a change drinking, adjusting for the co-variates of age group, gender and AUDIT category [Table 2]. Germany, with the largest proportion of respondents (33%), was used as the reference category. Selecting sexual assault as a motivation was most likely in respondents from France (OR=2.72; 95% CI: 2.54-2.91). Selecting physical health as a motivation was most strongly associated with being from Brazil, Portugal and Spain. Being motivated to reduce alcohol use because of mental health problems were most strongly associated with being from Portugal (OR=2.21; 95%CI: 1.94-2.53). Being motivated to reduce consumption because of a violent incident was most strongly associated with being from France (OR= 8.54;95% CI: 7.97-9.14). Selecting suffering an injury as a motivation for reducing drinking was most strongly associated with being from Greece (OR= 3.78; 95%CI: 3.00-4.75). Respondents from all countries other than Austria and Denmark were less likely to select social embarrassment as a reason to reduce drinking in comparison to Germany. Respondents from the USA were more likely to select getting into trouble with the police (OR=3.73;95% CI: 1.48-4.00).

[Insert Table 2]

Multiple correspondence analysis (MCA) was conducted to explore differences in the order in which motivations were ranked as first, second or third most important. Country MCA is a technique that allows patterns of relationships to be detected within several categorical variables. It is used to detect underlying structures within the data in a similar manner to

principal components analysis for interval level data. Categories on the MCA plots that cluster together are associated (Greenacre, 1991; Greenacre & Blasius, 2006). Whilst the following covariates where modelled, response order, motivation, sex, age and audit category, Figure 1 presents the biplot of response order and motivation. The figure, with each motivation and its ranking, highlighted that the primary motivation tends to be more about seeking emergency treatment, sexual regret and injury. Experiencing sexual assault, although a rare response, was also most likely to be reported as the first motivation for changing drinking habits. Financial concerns were also less common and if reported it was more likely to be the third motivation. Social embarrassment and forgetfulness where typically paired as first and second reasons; as well as the pairing of seeking emergency treatment and injury.

Figure 2, presents results from the full model, highlighting the co-location of sex , AUDIT score and age group. This model demonstrated that females were more likely to endorse motivations related to sexual regret, sexual assault or seeking treatment. Respondents of a younger age were more likely to endorse 'sexual-based' motivations and violence. Older respondents were more likely to endorse forgetfulness and social embarrassment motivations Respondents aged 25-34 and 35-44 were also more likely to select physical health and family. Males were more likely than females to raise motivations related to work/education, financial issues and mental health issues. Higher audit categories were associated with violence and mental health issues. Trouble with the police was more likely to be selected by younger participants.

[Insert Figures 1 & 2]

Discussion

This study was designed (1) to identify which motivations might lead to reduced alcohol consumption and to see how motivations varied between countries and (2) to understand how

the most endorsed motivations varied in association with demographic factors (age, gender, and AUDIT category). Overall, one third (32.9%) of respondents were willing to contemplate drinking less in the next 12 months. Countries with a smaller proportion of low risk drinkers were more likely to endorse moderate drinking. It is possible abstinence is viewed as unachievable or even undesirable in countries with higher levels of drinking, and further research should explore this. Portugal, with the largest proportion of low risk drinkers, were least likely to endorse moderate drinking, By contrast, Ireland and Poland, with the smallest proportions of low risk drinkers, were most likely to endorse moderate drinking in the next 12 months. From a theoretical perspective this is important: contemplating behaviour is an important first step in enacting change (Prochaska & Diclemente, 1983). From a practical perspective this is important: if a sizable minority of individuals are willing to endorse reasons for moderate drinking this presents an important interventional target for health promotion policy and practice. Given the burden of alcohol misuse worldwide, small intake reductions could yield a large health impact. Our data provided a mixed picture in terms of whether/how support should be provided to individuals who are motivated to reduce their alcohol intake; only a minority (2.7%) stated that they would like support. This recalls broader discussion about the importance of preserving individuals' agency about decisions concerning alcohol consumption.

A further important finding was that just over a third of reported they thought their doctor would tell them to drink less if they were honest about their consumption. This was associated with AUDIT categories, with heavier drinkers more likely to say they thought their doctor would want them to cut down, which suggests they were aware of their drinking and could be motivated to change. While doctors are well placed to deliver ABI, evidence suggests patients tend to underestimate their drinking behaviour, particularly those who consume more alcohol (Beich, Gannik, & Malterud, 2002). Foregoing the positive aspects of drinking can mean health advice to reduce alcohol intake is disregarded (Haighton et al., 2016). An alternative approach may be to discuss more personally relevant motivations for reducing alcohol consumption.

Doctors could target their advice based on demographics, for example applying the finding of the current study that older participants may be more concerned about embarrassment or forgetfulness.

Across all countries, experiencing problems with physical health was commonly selected as an important motivation for thinking about reducing drinking. However, prior research suggests alcohol guidelines that draw attention to health risks are often dismissed (Casswell, 2012). There may be many reasons for this: for example, individuals tend to underestimate personal risk relative to others reflecting an 'unrealistic optimism' about their own health (McKenna, 1993). Our data indicates a wide range of motivations was endorsed in each country. This suggests a more fruitful health promotion approach may be to appeal to less obvious endorsed factors for moderate alcohol intake which could draw on more direct and personal relevant recent drinking experiences.

Logistic regression analysis highlighted how motivations for reducing drinking also varied between countries and regions, highlighting the importance of cultural factors. Selecting social embarrassment in the top three was associated with respondents from Germany and was rated highly in other Northern European countries, suggesting that upholding a personal reputation in public might be important in these cultures. Few studies have explored whether feeling embarrassment from behaviours when drinking leads to reduced drinking. One study with students found those who were lower in embarrass-ability were more likely to have experienced alcohol related problems (Gibson, Schreck, & Miller, 2004). In contrast, respondents from other European countries rated injuries and violence as more important motivations than those from Germany, which may reflect broader cultural differences. Mediterranean countries also rated injuries more highly. In the United States, respondents rated being in trouble with the police as more important. This could reflect harsher penalties and cultural norms around law enforcement. Another interesting variation was found when looking

at the counties who rated financial concerns as more important, such as Poland and Greece, as this may reflect broader financial challenges in these countries.

MCA demonstrated differences in the order that motivations were selected, and how they varied by demographic characteristics. Younger participants rated violence and sexual experiences as more important, whereas experiencing memory loss or embarrassment was more important to older participants. Males rated work/education, financial and mental health as more important and for females it was experiencing sexual assault. Findings suggest there are between and within country differences in motivations. This supports the assertion that drinking cultures can vary within and across countries (Gordon et al., 2012; Savic et al., 2016).

The findings of the current study can be linked with recent studies demonstrating the lack of relevance of public health guidelines (Lovatt et al., 2015). Rather than prescribing low risk levels of alcohol consumption, an alternative approach might be to focus health information on specific concrete experiences drinkers may be able to relate to, and to target these approaches according to demographic and cultural features.

Limitations include that while the GDS sample is large the respondents are self-selecting and therefore not representative. Interestingly, it does appear to reach a greater proportion of males than other surveys. A large proportion of the sample was from Germany, whereas there were considerably fewer respondents from some countries. Thus, the sample is limited by primarily consisting of English speaking and European respondents, 91.8% of whom identified as White. It is also not possible to explore cultural differences within counties and to explore any language differences between versions of the survey and future waves of GDS should attempt to address this by targeting a wider demographic. A further consideration is that we are unable to capture whether these experiences lead to behaviour change.

Nonetheless, the strengths of the current study are that it drew on a large international sample and explored the personal experiences that might lead to reduced drinking, rather than

focussing on addressing informational or educational issues. The observed differences across counties and between demographic groups provide a foundation for future research. Such studies should address how much behaviour change might be brought about by the different types of experiences, relative to other factors.

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Tables and Figures

Table 1: *Demographic characteristics of respondents from each country, median AUDIT score, % in AUDIT low risk category, whether they would like to drink less over the next 12 months and whether they would like help to drink less over the next 12 months, what would GP say about your drinking?*

Country	Survey Language	N(%)	Mean age (SD)	% male	% White	AUDIT Median (IQR)	Cronbach's alpha for AUDIT scale [a]	Low risk %	Drink less (% yes)	Help to cut down (% yes)	What would GP say(% drink less)
Australia	English	3087 (4.3)	36.25 (14.40)	62.0	91.2	8 (8)	.828	48.0	39.6	6.5	43.6
New Zealand	English	2636 (3.6)	35.80 (13.97)	53.3	89.3	7 (8)	.819	51.1	34.2	5.0	38.3
United Kingdom	English	5966 (8.3)	30.14(11.59)	65.0	94	9 (7)	.789	38.1	36.4	4.3	47.7
Republic of Ireland	English	1996 (2.8)	24.80 (8.26)	50.6	97.1	11 (9)	.802	26.7	38.7	6.0	49.9
United States	English	4661 (6.5)	27.63 (11.73)	41.9	84.4	7 (7)	.798	51.6	25.0	2.6	33.7
Canada	English	1017 (1.4)	27 (11.52)	37.5	87.1	8(8)	.782	47.3	27.5	2.8	32.7
Brazil	Portuguese	3760 (5.2)	25.64 (6.85)	57.0	62.3	8 (8)	.791	43.2	32.5	3.5	27.7
Portugal	Portuguese	919 (1.3)	30.93 (9.20)	60.6	89.2	6 (5)	.776	63.1	21.9	1.8	21.1
Spain	Spanish	722 (1)	30.22(10.39)	66.9	87	7 (6)	.759	50.4	31.4	2.4	35.0
France	French	7069 (9.8)	28.05 (9.34)	59.7	90.7	10 (8)	.763	33.6	32.4	3.2	47.6
Belgium	Flemish	1545 (2.1)	29.08 (9.75)	67.3	95.1	9 (8)	.790	41.8	28.4	2.1	37.9

| Country	Language	N (%)	Mean (SD)				α				
Netherlands	Flemish	4323 (6)	23.81 (6.70)	56.2	91.3	10 (8)	.753	34.1	24.0	1.3	39.9
Germany	German	23840 (33)	29.09 (9.67)	64.9	96.1	7 (6)	.758	56.5	35.4	1.6	29.8
Italy	Italian	297 (0.4)	30.77(10.24)	64.3	89.2	8 (6)	.793	49.3	32.1	2.7	35.4
Greece	Greek	300 (0.4)	28.26 (8.35)	80.0	99.3	7 (7)	.758	58.3	26.8	3.3	29.0
Austria	German	1326 (1.8)	27.44 (7.94)	61.2	97.1	7 (6)	.752	51.4	36.8	1.4	30.5
Switzerland	German	4036 (5.6)	30.14(10.69)	61.9	94	6 (6)	.768	60.4	28.8	2.0	28.9
Hungary	Hungarian	3593 (5)	27.81 (7.96)	69.0	97.8	8 (7)	.791	46.3	31.7	2.3	32.3
Poland	Polish	319 (0.4)	25.95(7.14)	69.9	98.4	10 (8)	.819	36.1	41.0	2.8	33.9
Denmark	Danish	342 (0.5)	27.02 (7.92)	71.9	91.2	9(7)	.762	35.4	35.6	2.3	31.6
Sweden	English	455 (0.6)	27.73 (8.17)	73.6	92.7	7 (6)	.779	50.5	34.7	2.0	29.0
Whole sample	**-**	**72209**	**28.86 (10.40)**	**60.8**	**91.8%**	**8 (7)**	**.784**	**48**	**32.9**	**2.7**	**35.5**

[a] Note: Internal consistency for AUDIT scale was also calculated by survey language for the countries where respondents completed in the same language (English α = 806, Portuguese, α = .791, German, α =759; Flemish α =762)

Table 2: *Results of regression models: Adjusted odds ratios, significance level, and confidence intervals at country of residence level for top three potential motivations for changing drinking habits organised by language and region*

	Embarrassment	Sexual assault	Sexual regret	Injured	Remember	Emergency	Physical health	Mental health	Concerns	Work/ study	Violence	Police	Financial
Australia	0.74 *** (0.68-0.80)	1.16 ** (1.04-1.29)	0.61 *** (0.52-0.71)	1.20 *** (1.10-1.32)	0.77 *** (0.70-0.86)	0.93 (0.85-1.01)	0.93 (0.86-1.01)	1.21 *** (1.11-1.31)	0.80 *** (0.74-0.88)	0.69 *** (0.63-0.75)	2.76 *** (2.48-3.06	1.53 *** (1.39-1.69)	1.39 *** (1.24-1.55)
New Zealand	0.76 *** (0.70-0.83)	1.59 *** (1.43-1.77)	0.94 (0.82-1.08)	0.97 (0.87-1.07)	0.89 * (0.80-0.99)	0.74 *** (0.68-0.82)	0.78 *** (0.72-0.85)	.075 *** (0.68-0.83)	0.91 * (0.83-0.99)	0.66 *** (0.60-0.72)	2.66 *** (2.38-2.99)	2.07 *** (1.88-2.28)	1.99 *** (1.78-2.23)
United Kingdom	0.65 *** (0.61-0.70)	1.71 *** (1.58-1.84)	0.75 *** (0.67-0.83)	0.97 (0.90-1.04)	0.72 *** (0.66-0.78)	0.93 * (0.87-0.99)	0.98 (0.93-1.04)	1.29 *** (1.22-1.38)	0.76 *** (0.71-0.81)	0.67 *** (0.63-0.72)	2.51 *** (2.31-2.73)	1.51 *** (1.40-1.62)	1.46 *** (1.35-1.59)
Republic of Ireland	0.80 *** (0.72-0.89)	1.71 *** (1.53-1.92)	1.05 (0.91-1.21)	1.01 (0.90-1.14)	0.96 (0.84-1.09)	0.79 *** (0.72-0.87)	0.72 *** (0.66-0.80)	1.21 *** (1.09-1.34)	0.60 *** (0.53-0.67)	0.60 *** (0.54-0.67)	2.77 *** (2.44-3.14)	1.54 *** (1.38-1.73)	1.85 *** (1.63-2.09)
United States	0.47 *** (0.43-0.51)	1.58 *** (1.46-1.71)	0.64 *** (0.57-0.72)	1.60 *** (1.49-1.72)	0.73*** (0.67-0.81)	1.19 *** (1.12-1.27)	0.61 *** (0.57-0.65)	0.70 *** (0.64-0.75)	0.58 *** (0.53-0.62)	0.63 *** (0.58-0.68)	2.90 *** (2.65-3.17)	3.73 *** (1.48-4.00)	1.19** 1.07-1.32)
Canada	0.56 *** (0.48-0.66)	1.71 *** (1.47-1.98)	0.82 (0.67-1.02)	1.57 *** (1.36-1.81)	0.74 ** (0.62-0.89)	1.10 (0.96-1.25)	0.74 *** (0.64-0.85)	0.94 (0.81-1.09)	0.61 *** (0.56-0.66)	0.71 *** (0.61-0.82)	2.13 *** (1.77-2.56)	1.70 *** (1.46-1.98)	1.54 *** (1.28-1.85)
Brazil	0.75 *** (0.69-0.81)	1.19 *** (1.08-1.30)	0.64 *** (0.57-0.73)	0.56 *** (0.51-0.62)	1.00 (0.91-1.09)	0.18 *** (0.16-0.20)	1.45 *** (1.35-1.55)	1.67 *** (1.55-1.79)	0.61 *** (0.56-0.66)	0.69 *** (0.63-0.74)	8.02 *** (7.39-8.70)	0.97 (0.88-1.07)	1.72 *** (1.56-1.89)
Portugal	0.35 *** (0.29-0.41)	1.26 * (1.05-1.50)	0.56 *** (0.43-0.74)	0.82 * (0.69-0.97)	0.78 * (0.65-0.94)	0.45 *** (0.38-0.54)	1.30 *** (1.14-1.49)	2.21 *** (1.94-2.53)	0.62 *** (0.53-0.73)	0.78 ** (0.68-0.91_	7.16 *** (6.21-8.26)	0.90 (0.74-1.09)	1.38 ** (1.13-1.68)
Spain	0.49 *** (0.41-0.59)	0.72 ** (0.57-0.91)	0.68 ** (0.51-0.90)	2.82 *** (2.42-3.28)	0.90 (0.74-1.11)	0.66 *** (0.56-0.78)	1.30 ** (1.12-1.51)	1.92 *** (1.65-2.23)	0.53 *** (0.44-0.63)	0.72 *** (0.61-0.85)	2.38 *** (1.94-2.91)	0.83 (0.67-1.04)	0.97 (0.76-1.23)
France	0.34 *** (0.32-0.37)	2.72 *** (2.54-2.91)	0.86 ** (0.79-0.95)	2.11 *** 1.98-2.24)	0.94 (0.88-1.01)	0.73 *** (0.69-0.77)	0.70 *** (0.66-0.74)	0.96 (0.90-1.02)	0.46 *** (0.43-0.50)	0.55 *** (0.52-0.59)	8.54 *** (7.97-9.14)	1.04 (0.96-1.12)	0.84*** (0.76-0.92)
Belgium	0.55 *** (0.48-0.62)	1.12 (0.97-1.30)	0.76 ** (0.63-0.92)	1.60 *** (1.43-1.80)	1.37 *** (1.20-1.55)	0.69 *** (0.61-0.78)	0.71 *** (0.64-0.80)	1.48 *** (1.33-1.65)	0.84 ** (0.75-0.94)	0.86 ** (0.77-0.96)	2.36 *** (2.05-2.73)	1.19 * (1.03-1.36)	1.26 ** (1.08-1.47)
Netherlands	0.45*** (0.42-0.49)	0.76 *** (0.70-0.84)	1.04 (0.94-1.15)	0.98 (0.90-1.06)	1.49 *** (1.37-1.62)	1.14 *** (1.07-1.22)	0.71 *** (0.66-0.76)	1.34 *** (1.25-1.44)	0.91 * (0.84-0.98)	1.09 * (1.02-1.17)	1.35 *** (1.21-1.51)	1.14 ** (1.04-1.24)	1.82 *** (1.66-1.99)
Italy	0.63 ** 0.48-0.82)	0.96 (0.69-1.33)	0.80 (0.53-1.21)	1.59 *** (1.23-20.5)	0.92 (0.67-1.25)	0.69 ** (0.53-0.90)	1.11 (0.88-1.40)	1.36 * (1.06-1.44)	0.67 ** (0.52-0.89)	0.85 (0.66-1.09)	1.79 ** (1.27-2.53)	1.24 (0.92-1.68)	1.77 *** (1.30-2.41)

Country													
Greece	1.18 (0.93-1.49)	0.78 (0.53-1.14)	0.71 (0.46-1.11)	3.78 *** (3.00-4.75)	1.44 ** (1.09-1.90)	0.61 *** (0.47-0.80)	1.25 (0.99-1.57)	0.76 * (.58-1.0)	0.36 *** (0.26-0.50)	0.35 *** (0.25-0.47)	2.33 (1.71-3.17)	0.79 (0.56-1.11)	1.84 *** (1.37-2.46)
Austria	0.91 (0.81-1.02)	0.87 (0.75-1.02)	0.84 (0.70-1.02)	1.00 (0.88-1.15)	0.90 (0.77-1.05)	0.88 * (0.78-0.99)	1.14 * (1.02-1.28)	1.26 *** (1.12-1.42)	0.97 (0.86-1.10)	1.11 (0.99-1.24)	1.05 (0.86-1.29)	0.88 (0.75-1.04)	1.16 (0.98-1.38)
Switzerland	0.68 *** (0.63-0.73)	1.23 *** (1.12-1.34)	0.99 (0.89-1.11)	1.68 *** (1.56-1.81)	0.98 (0.90-1.07)	0.90 ** (0.83-0.96)	0.76 *** (0.71-0.81)	0.75 *** (0.69-0.81)	0.84 *** (0.78-0.90)	0.94 (0.88-1.02)	2.13 *** (1.93-2.35)	1.28 (1.17-1.40)	1.31 *** (1.19-1.46)
Hungary	0.53 *** (0.49-0.58)	1.02 (0.92-1.13)	0.70 *** (0.61-0.79)	1.31 *** (1.21-1.43)	0.78 *** (0.71-0.87)	0.64 *** (0.59-0.70)	1.00 (0.93-1.08)	1.58 *** (1.47-1.70)	0.86 *** (0.79-0.93)	0.82 *** (0.76-0.89)	1.76 *** (1.58-1.96)	1.65 *** (1.52-1.80)	1.79*** (1.63-1.97)
Poland	0.70 ** *0.54-0.90)	1.11 (0.81-1.52)	1.51 ** (1.11-2.06)	0.95 (0.72-1.26)	0.99 (0.73-1.35)	0.29 *** (0.21-0.40)	0.93 (0.74-1.17)	1.68 *** (1.34-2.11)	0.91 (0.71-1.16)	0.60 *** (0.46-0.77)	2.95 *** (2.22-3.91)	1.19 (0.89-1.59)	2.59 *** (2.00-3.36)
Denmark	0.94 (0.75-1.18)	1.02 (0.74-1.39)	0.82 (0.56-1.20)	1.51 ** (1.19-1.92)	1.28 (0.98-1.68)	0.41 *** (0.31-0.55)	0.82 (0.66-1.03)	1.57 *** (1.26-1.96)	0.72 * (0.56-0.93)	0.94 (0.75-1.18)	1.79 *** (1.30-2.46)	0.92 (0.68-1.25)	1.82 *** (1.38-2.41)
Sweden	0.79 * (0.64-0.97)	1.10 (0.84-1.44)	0.80 (0.57-1.11)	0.93 (0.72-1.18)	1.13 (0.88-1.43)	0.65 *** (0.53-0.81)	0.89 (0.74-1.08)	1.40 ** (1.15-1.71)	0.98 0.80-1.20)	0.89 (0.73-1.08)	2.77 *** (2.18-3.52)	0.87 (0.66-1.14)	1.42 ** (1.09-1.85)

Reference category is Germany; covariates in the models were age group, sex and AUDIT category; * = $p<.05$, ** = $p<.01$, *** = $p<.001$
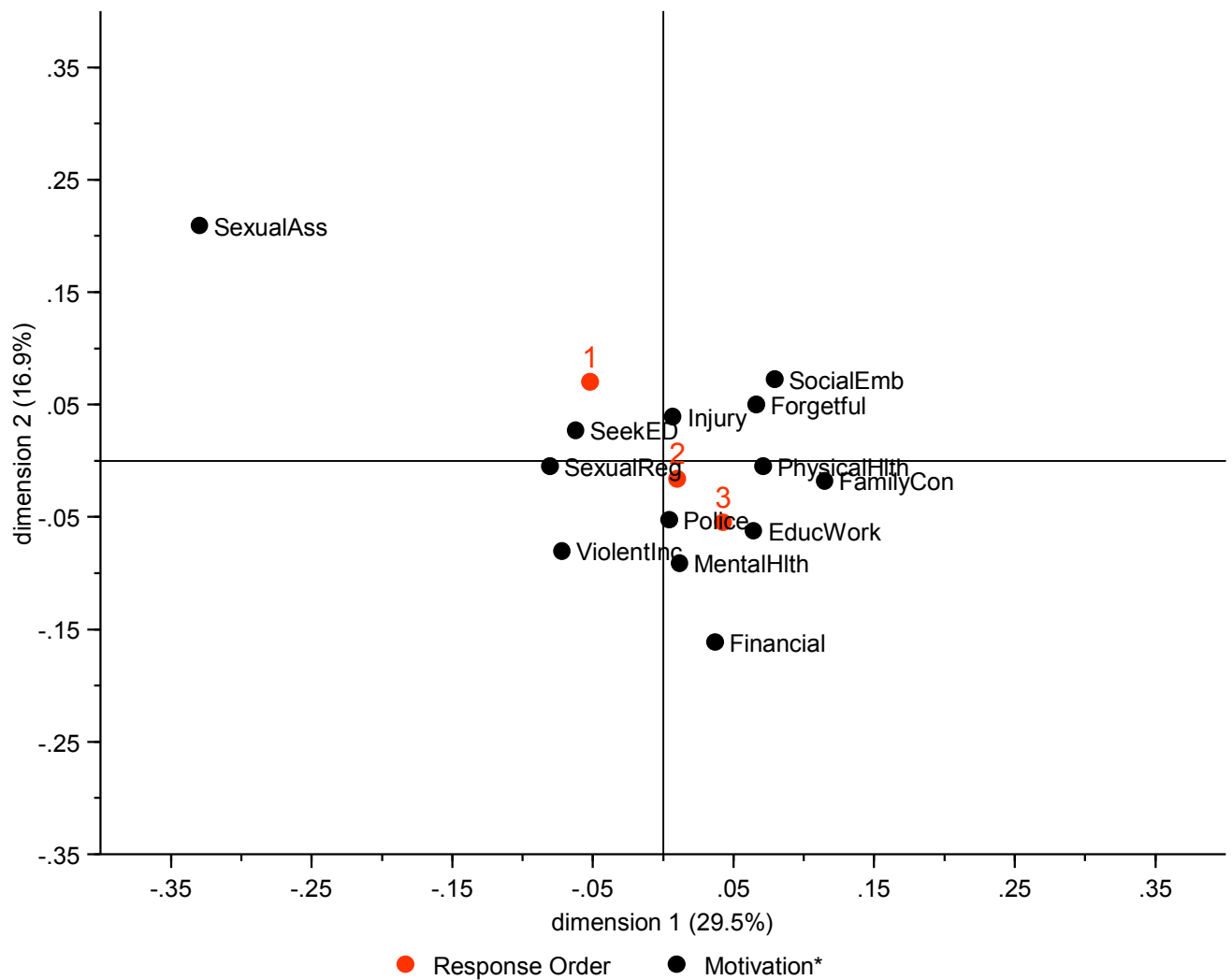
* EducWork ~ Negative impact on education/study/work; FamilyCon ~ Concerns raised by partner /friends about what you are like when you are drunk; Forgetful ~ Being unable to remember the night before because of alcohol; Injury ~ Being injured in an accident; MentalHlth ~ Mental health condition related to/worsened by alcohol; PhysicalHlth ~ Physical health condition related to/worsened by alcohol; SeekED ~ Having to seek emergency medical treatment; SexualAss ~ Being sexually assaulted /taken advantage of while drunk; SexualReg ~ Sexual regret (e.g. ending up in bed with someone); SocialEmb ~ Social embarrassment/humiliation; ViolentInc ~ Being involved in violent incident; Police ~ Getting in trouble with the police; Financial ~ Financial worries

Figure 1 Results of multiple correspondence analysis showing each of the 13 motivations and its ranking with coordinates in principal normalisation. Based on the location of the motivations dimension 1 items to the left of the y-axis reflect more extreme personal physical harms (violence, sexual assault) where items to the right of the y-axis reflect social harms (family concerns, social embarrassment): a physical/non-physical dimension. Dimension 2 reflects private/public harms. Items above the x-axis typically reflect harms to the respondent (injury, forgetfulness, sexual assault) whereas items below the x-axis reflect public-style harms (family, police, work). Categories further from the origin of the two axes typically indicate more rare responses; conversely categories closer to the origin indicate more common responses. Categories that cluster together on the plot are considered to be more associated. For example, the more common answered categories, such as injury or seeking emergency treatment, are

denoted due to the proximity of these motivations towards the centre of the axes. However, respondents typically indicated seeking emergency treatment as their first motivation (given this item being in the same quadrant as ranking 1) whereas injury, although sometimes answered as the first motivation was also more likely to be answered as the second or third motivation when an alternative motivation was offered prior. As seen in the figure seeking emergency treatment was less likely to be listed as the third response. Sexual regret and injury are also rated highly. Experiencing sexual assault, although a rare response, was also most likely to be reported as the first motivation for changing drinking habits. Financial concerns are shown to be common and if they were reported this was more likely to be the third motivation. Social embarrassment and forgetfulness where typically paired as first and second reasons; as well as the pairing of seeking emergency treatment and injury, as indicated by these motivations appearing together on the figure.
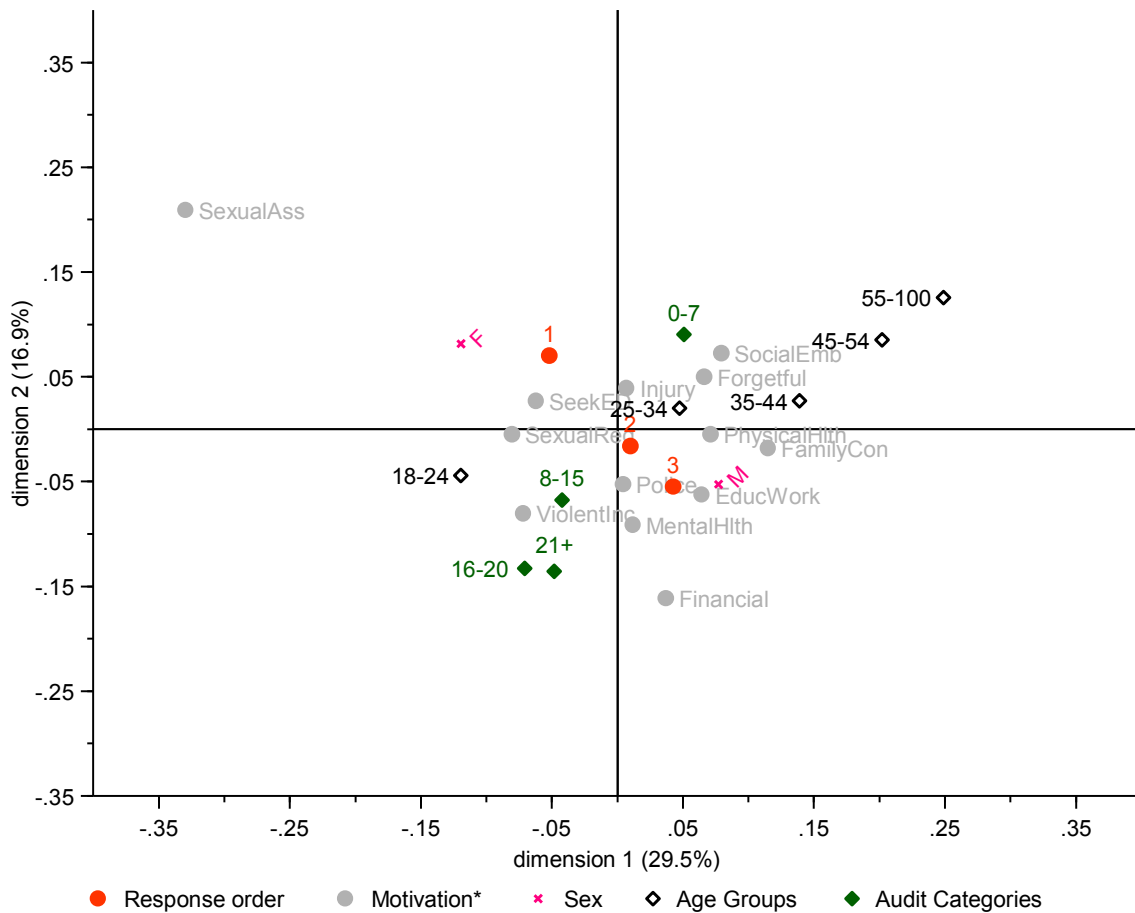
Figure 2: The classification of the two dimensions are the same as in Figure 1. However, the results in Figure 2 are of full model multiple correspondence analysis which including the depiction of gender (M~Male; F~Female), age group, audit categories and the ranked order of 13 motivations. Coordinates in principal normalisation. Categories that cluster together on the plot are associated: for example females were more likely to select motivations related to sexual regret, sexual assault or seeking treatment and typically this cluster of motivations by females was their first ranked response. Younger respondents selected 'sexual-based' motivations and violence, whereas older respondents were more likely to select forgetfulness and social embarrassment. Respondents aged 25-34 and 35-44 were also more likely to select physical health and family. Males were more likely than females to raise motivations related to work/education, financial issues and mental health issues. Higher audit categories were associated with violence and mental health issues. Trouble with the police was more likely to be selected by younger participants.