The world's favourite drug: What we have learned about alcohol from over 500,000 respondents to the Global Drug Survey

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Chapter summary

The Global Drug Survey (GDS) runs the world's largest anonymous annual web survey of drug use. This chapter provides an overview of GDS history and methods before presenting alcohol findings from 2015-2020, starting with drinking prevalence in respondents from different countries. Then, we explore intoxication, regrets, and pre-loading. Many GDS respondents consume in excess of weekly guidelines in order to feel their desired level of intoxication. Next, we discuss harms from drinking, including seeking emergency treatment and harms from others' drinking. We then examine GDS data about interventions. While digital tools are popular, heavier drinkers in the sample preferred face to face specialist support. Our findings on alcohol labelling are stark; two thirds of respondents were unaware about links between alcohol and cancer. Finally, we reflect on what we need to do better in order to improve diversity of the GDS sample. Our research with trans participants is helping us to understand and advocate for trans people who use alcohol. However, there is work to do to include and advocate for more diverse groups of people. Throughout, we discuss practical implications and further research that is needed to help reduce harms associated with the world's favourite drug.

1. Introduction

The Global Drug Survey (GDS) is an independent research organisation that runs the world's largest anonymous annual web survey of drug use. The purpose of GDS is to understand new trends in drug use, and to use these data to inform harm reduction measures that make drug use safer, regardless of the legal status of the drug. It is important to note that GDS refers to the name of the organisation, which has subsidiary activities, as well as the survey itself. Between GDS2012 and GDS2020 over 650,000 people completed the survey and alcohol is, unsurprisingly, the most common drug that respondents use – around 98% of respondents report having ever used alcohol and around 80-90% report last year use of alcohol in each survey.

This chapter will draw on GDS alcohol findings from GDS2015-2020. We will begin by outlining GDS methods, the structure of the survey, and will then consider the utility of non-probability samples in exploring alcohol use before considering the alcohol-related research areas that we have explored over the last 5 years. An overview of the topics covered, papers published on the topic and approximate Ns are given in table 1

Table 1: *Overview of GDS alcohol content discussed in this chapter, Ns and papers published.*

Year	Topic	N	Chapter section	Publication
2015	Normative misperceptions	9,820	6.2	(Garnett et al., 2015)
2015	Harms from others' drinking	63,725	5	(Bellis et al., 2015)
2015	Getting drunk and the tipping point	61,043	4.1	(Davies et al., under revision)
2015	Pre-drinking	64,485	4.2	(Ferris et al., 2019; Labhart et al., 2017)
2015	Motivations for reducing drinking	72,209	6.1	(Davies, Conroy, et al., 2017)
2016	Emotions and types of drinking	29,836	4.3	(Ashton et al., 2017)
2017	Sources of support for reducing drinking	82,190	6.2.1	(Davies et al., 2019)
2018	Alcohol labelling	75,969	6.2.3	(Davies et al., under review; Winstock, Holmes, et al., 2020)
2018/2019	Comparisons between cisgender and trans respondents	118,157	7	(Connolly et al., 2020)
2019/2020	Frequency of getting drunk and feeling regret	2019: 88,604 and 2020: 51,433	4.2	Papers in preparation (Winstock, Barratt, et al., 2020)

Although the area of the survey's focus has changed each year, typically building on from previous results, there is a consistent set of questions that are included within the core alcohol section, which is offered to all those who have used alcohol in the last 12 months. These include the 10 item Alcohol Use Disorders Identification Test (AUDIT), questions on whether the participants would like to use less alcohol next year, whether they would like help and if so whether they plan to seeking help to use less, as well as questions on whether they have sought emergency medical treatment following the use of alcohol.

A brief summary of the areas explored are given below before we describe in more detail the findings from each of our discreet research projects within this chapter. In GDS2015 we sought

to explore the amount of alcohol needed to reach different stages of intoxication (Davies et al., under revision). The following year in GDS2016 we explored the commonly-cited myth that different types of alcohol might lead to different emotional effects (Ashton et al., 2017). In GDS2017 we added detail regarding the consistent finding that 30-40% of GDS participants who report drinking alcohol wish to drink less in the next 12 months. The GDS also covers questions relating to harm from alcohol and ways to reduce this harm. In sections on harm reduction, we focus on what factors would lead people to think about cutting down (GDS2015) and what kind of help they would like to do so from (GDS2017). We discuss interventions, both at an individual level, for example in the use of online self-help tools (e.g. the free Drinks Meter app / drinksmeter.com) and at a population level in terms of product/container health warning labelling (GDS2018). Interventions may benefit from tailored content, and thus during GDS2019 and GDS2020 we have explored drinking and regrets.

After a brief history of GDS, we start the chapter looking at findings about drinking prevalence, and then experiences of intoxication, before moving on the consequences of drinking and interventions to reduce associated harms. Finally, we reflect on what GDS has learned about alcohol so far, while setting out our vision for future research into the world's favourite drug.

2. GDS history and methods.

The first iteration of GDS - before it was called GDS – began in collaboration with MixMag, a dance music magazine, when Dr Adam Winstock began collecting data from people who use drugs in the United Kingdom (U.K.) in 1999 (see figure 1). In 2011, reborn as the Global Drug Survey, our annual survey stepped beyond the initial focus on club drug use to engage with the wider populations and tribes who used drugs. GDS surveys follow a unique naming convention whereby the survey name (e.g. GDS2020) is based on the year the associated report was released and not on the year data collection commenced (e.g. November 2019). GDS2012 was the first in this new series of surveys but was only available in English, but GDS2013 was

translated into seven languages. Since inception, GDS has not received funding from the alcohol, tobacco or cannabis industries. Many of the people working with GDS volunteer their time, or their time is supported by their host institution, for example through university-funded research time. Other sources of funding include that received from media organizations, government and non-governmental organizations, and consultancy work.

Figure 1: **Examples of MixMag covers from the early days of Global Drug Survey.**

GDS treats participants as experts in their own experiences. The data that participants share with GDS is used to inform harm reduction tools, such as the Highway Code (see https://www.globaldrugsurvey.com/brand/the-highway-code/), and safer use limits (see http://saferuselimits.co/?LMCL=b8uKmA). GDS recruits people through media partners and harm reduction partners who promote the annual survey through their distribution means, including Facebook, Twitter and other social media. In GDS2012, 22,000 people took part, from four English speaking countries (AU, UK, USA and NZ) and this number increased to 135,000 in GDS2018 from over 50 countries when the survey was translated into 19 languages. GDS2020 received over 110,000 respondents and to date almost 900,000 people have taken part in our

surveys. GDS does struggle to retain participants for the full duration of the survey. If a respondent reports last year / last month use of a number of different drugs, then this means they are directed to all questions relevant to that drug, which can make the survey feel arduous.

The opportunistic nature of recruitment into GDS delivers a large but non-probability sample and initially many journal reviewers and editors were critical about the sample composition. With over 60 publications to the group's name however, and focusing on those areas here, non-probability samples are useful complements to more representative surveys such as household surveys, meaning that GDS has become an increasingly recognised source of drug information. Seminal papers on new and emerging drugs trends such the use of darknet drug markets (Barratt et al., 2014) and novel drugs such as mephedrone and Synthetic Cannabinoid Receptor Agonists (Winstock & Barratt, 2013) have been produced. GDS data can be used to its greatest effect when we segment populations of people who use drugs to identify dose-response relationship between consumption, risk and pleasure. For example, looking at peripheral neuropathy with nitrous users (Winstock & Ferris, 2019), maculopathy with poppers (Davies, Borschmann, et al., 2017), and ketamine bladder (Winstock et al., 2012).

GDS stresses to our media and research partners as well as academic publications that GDS is not representative of the populations of the countries in which the participants reside. The strength of GDS is that it taps into more hidden populations of people who use drugs, and unlike national probabilistic surveys, GDS is able to reach large numbers of people who use a variety of drugs. Each year, the GDS drug screen module asked participants which of over 150 different drugs they have used. The list includes common drugs (alcohol, tobacco, cannabis and cocaine), more traditional drugs (ayahuasca, kava and betel nut) as well as new and emerging psychoactive substances (NPS; NBome etc.). The drug screen module has allowed GDS experts to respond to changes in drug supplies through the dark web and explore the emergency of trends such as changes in drug supplies through the dark web, exploring the emergence of trends such as inhaling alcohol (Winstock et al., under review), the use of ayahuasca (Lawn et

al., 2017), the recreational use of nitrous oxide (Kaar et al., 2016), and the characteristics of methamphetamine 'cooks (Puljević et al., under revision). While this data set is therefore not intended to be representative, analyses have shown that GDS recruits people similar in demographic characteristics to people who reported alcohol use from representative surveys undertaken in the U.S., Australia, and Switzerland (Barratt et al., 2017).

3. Drinking prevalence and patterns in the GDS.

Alcohol is treated like any other drug with the annual survey. An initial screen identifies if respondents have ever consumed the drug, and then if they have used it in the last 12 months. Those who have used within the last 12 months are then offered the opportunity to complete a more detailed section concerning that drug, looking at key issues such as frequency of use, amount used, acute harms and source of purchase. We use standardised measures that are consisted across the years. In the alcohol section, other than days used in the last year and month, respondents are always presented with the 10 item AUDIT (Babor et al., 2001). AUDIT is scored from 0-40 and then categorized: 0-7= low risk, 8-15= increasing risk 16-19= higher risk; 20+ = possible dependence. In GDS2020, 99% of the sample said they had 'ever' used alcohol, and 96.3% had used it in the last year. Of those, we have full AUDIT scores for 90,646 respondents. Table 2 illustrates how participants scored on the AUDIT in GDS2020. Nearly half were classified as low risk drinkers according to AUDIT. Larger proportions of women aged 25 and over were classified as low risk compared to other groups. A larger proportion of men aged 25 and over are classified as possibly dependent compared to other groups.

Table 2. *AUDIT scores in the GDS2020 sample by gender and age group with percentages rounded to one decimal place*

	Low risk (0-7) N(%)	Increasing risk (8-15) N(%)	Higher risk (16-19) N (%)	Possible dependence (20+) N(%)
All	40843 (45.1)	36105 (39.8)	8001 (8.8)	5697 (6.3)
Men <25	10294 (38.6)	12131 (45.5)	2558 (9.6)	1692 (6.3)
Women <25	6189 (43.8)	5996 (42.4)	1185 (8.4)	761 (5.4)
Men 25+	14281 (44.5)	12244 (38.2)	3122 (9.7)	2413 (7.5)

Women 25+	9564 (57.3)	5339 (32.0)	1050 (6.3)	730 (4.4)

One of the greatest assets of the GDS is the large numbers of respondents from countries around the world. When comparing respondents from different countries, it is important to keep in mind that these are not representative samples of people who drink in each country and in part reflect the variation in mean age of different country samples. Nonetheless, some interesting differences in country-level AUDIT scores are observed, which largely, reflect cultural patterns of drinking observed in other studies. Figure 2 displays the median AUDIT score for each country where there were at least 250 respondents to GDS2020 (which includes the Balkan region capturing– Albania; Bosnia and Herzegovina; Bulgaria; Croatia; Kosovo; Macedonia; Serbia; Slovenia). The data presented in Figure 2 is also categorised by sex. Respondents from Denmark had the highest median AUDIT score of 12, followed by Scotland with 11. Respondents from Argentina, Romania and Russian Federation had the lowest median AUDIT score of 6.

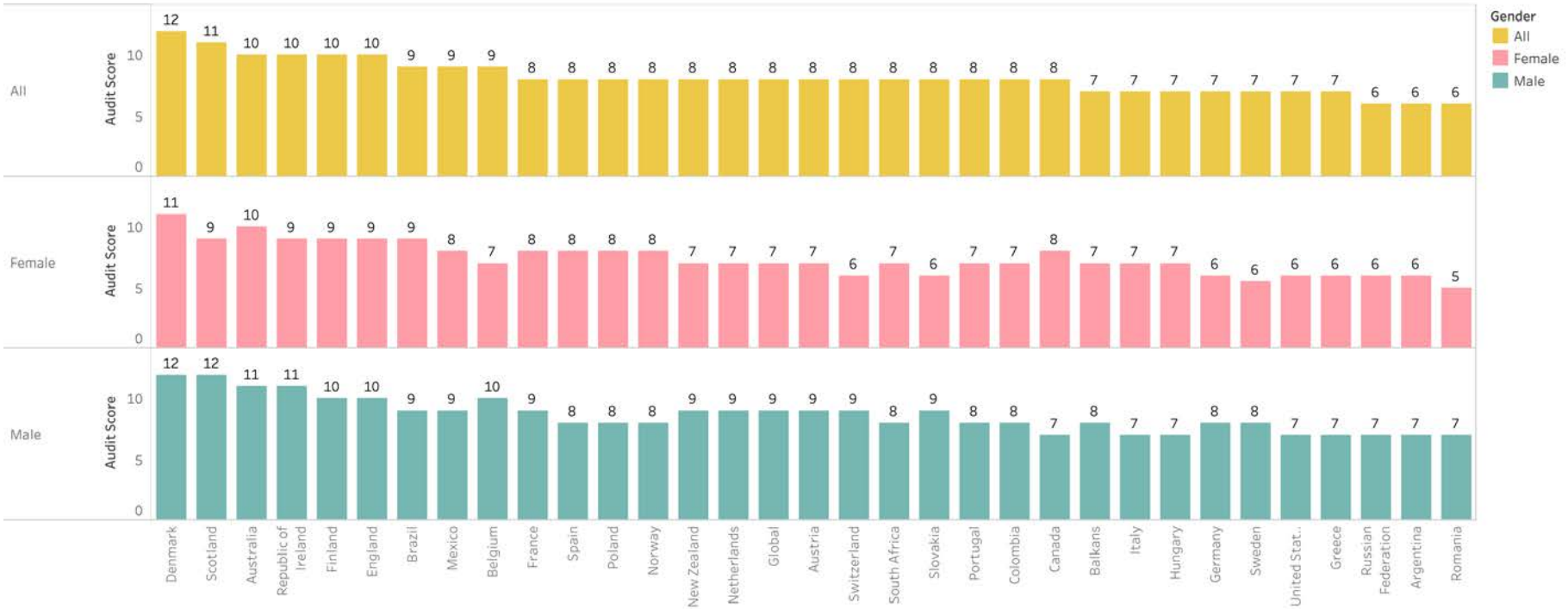

Figure 2: **Median AUDIT scores for GDS2020 respondents by country and sex, presented in rank order of 'all'**

4. Getting drunk

4.1 Reaching your tipping point

An important feature of GDS is that it acknowledges that people get pleasure from taking drugs, including alcohol. Many people around the world really like drinking to intoxication, or drunkenness, as means unwinding or enhancing social occasions (de Visser et al., 2013; Measham & Brain, 2005). Understanding more about how much alcohol people need to drink to get drunk, is a good way to start thinking about how to help them do this more safely.

In GDS2015, participants were asked about three different stages of intoxication: 'feeling the effects' of alcohol, being 'as drunk as you would like to be' and 'the tipping point – starting to feel more drunk than you want to be' (Davies et al., under revision). To explore these three stages, respondents indicated their usual drink type: wine; beer, cider or lager; spirits and alcopop/coolers (i.e. pre-mixed single container) and then what a typical sized drink was for them (sizes presented were as follows; wine = small wine 125ml, medium wine 175ml, large wine 200ml or other; beer/cider/lager = small 300ml, medium 400ml, large 500ml / other; spirit = small 30ml, large 60ml or other; alcopops = small 350ml large 700ml or other). Respondents where then presented with the following scenario: "Imagine you were drinking just this type of drink and not using any other drugs. How many drinks would it take for you to reach the three stages of intoxication?" Respondents then answered: "Over the last 12 months, how often have you reached each of these stages of intoxication?" We applied alcohol by volume (ABV) to each drink size using estimates for each product (wine = 12%, beer = 4.5%, spirits = 40% and alcopops = 5%) and then converted this volume into mass representing 10 grams of alcohol per 100 milliliters of the beverage.

We compared the grams of alcohol that were reported to the stated guidelines for low risk consumption in each included country (see Table 3). What was striking was that the amount of alcohol typically consumed to reach what respondents considered an ideal level of intoxication

was almost double the upper limit recommended in most countries. The average amount of alcohol to be 'as drunk as you like' was 88 grams for men and 70 grams for women, compared to a maximum of 40 grams recommend by many countries. Moreover, these average amounts were still substantially higher than the 60 grams of alcohol in a single session that is considered to be heavy episodic drinking (HED) by the WHO (2018). For example, in Austria, the daily alcohol consumption guidelines for females are 16 grams of pure alcohol (Eurocare, 2016), but on average, female respondents indicated needing 26.32 grams of alcohol to feel the effects and 51.70 grams to deem themselves as being as drunk as they would like to be (3.3 times the Austrian guidelines). Moreover, males in Austria on average reported that they needed 33.01 grams of alcohol to feel the effects and 69.99 grams to be as drunk as they would like to be (almost 3 times the guidelines). Strikingly, even to simply feel the effects of alcohol, not to be drunk, the amounts reported by some respondents approach the WHO HED level. For example, female respondents from the Netherlands on average needed 42.49 grams of alcohol and male respondents needed 48.11 grams to feel the effects. Some respondents needed to drink in excess of weekly country guidelines, in a single session, to reach their tipping point. For example, In the UK, the average amount of alcohol to reach the tipping point was 113.20 grams for females and 144.13 grams for males on a background of a weekly recommended 112 grams of alcohol (Department of Health, 2016).

Table 3: *Comparison of daily and/or weekly low risk drinking guidelines in grams of pure alcohol between countries included in the study*

	Daily		Weekly		Mean grams female			Mean grams male		
Country	Female	Male	Female	Male	Feel effects	As drunk as you want to be	Tipping point	Feel effects	As drunk as you want to be	Tipping point
Australia	20	20			33.37	77.22	109.44	40.20	99.8	149.38
Austria	16	24	112	168	26.32	51.70	86.98	33.01	69.99	117.42
Belgium	-	-	100	100	36.31	75.76	109.40	43.70	99.72	149.57
Brazil	20	30			43.65	84.60	133.71	49.57	103.85	172.26
Canada	27	40.7	136	204	33.57	78.50	113.77	36.62	93.52	137.90
Denmark	12	24	84	168	36.75	72.60	120.14	41.20	106.33	172.40
France	20	30	140	210	34.99	76.22	115.74	37.79	90.56	140.98
Greece	20-32	30-48			37.06	69.30	99.00	51.26	93.55	139.72
Hungary	17	34	-	-	32.70	65.45	102.65	39.65	85.23	137.99
Republic of Ireland	-	-	110	170	39.76	84.56	119.04	49.42	109.85	159.11
Italy	20	36	-	-	34.67	69.82	109.26	35.62	76.60	120.99
Netherlands	20	30			42.49	94.63	136.05	48.11	116.22	174.66
New Zealand	20	30	100	150	36.30	79.92	112.62	46.43	112.11	164.89
Poland	20	40	140	280	33.92	81.21	112.55	37.61	95.29	142.32
Portugal	10--24	10--24			35.13	68.70	108.09	46.04	93.26	153.01
Spain	-	-	110	170	32.61	66.28	96.19	36.41	80.82	118.17
Sweden	10	20	-	-	28.04	64.53	102.77	33.68	89.31	142.06
Switzerland	20-24	30-36	-	-	32.31	62.32	98.22	37.79	80.05	129.64
UK	-	-	112	112	34	79.14	113.2	40.43	99.74	144.13

United States	42	56	98	196	33.17	73.13	104.94	34.88	87.06	128.84
Germany	12	24			25.26	49.89	84.53	32.92	70.71	121.73

Information gathered from multiple sources (Eurocare, 2016; Furtwaengler & de Visser, 2013; Kalinowski & Humphreys, 2016; WHO, 2018)

Respondents were also asked where they did most of their drinking (at home on your own, at home with partner/family, at house parties, at pubs or bars, at clubs). House parties were the most frequently chosen drinking location (34.1%), followed by pubs/bars (31.8%), at home with partner/family (19.5%), clubs (8.2%) and drinking at home alone (6.4%) (Davies et al., in preparation). Tipping point consumption was highest in clubs (136.66g), followed by house parties (131.41g) and pubs (128.32g) and lower at home alone (126.02g) and at home with partner or family (110.70g).

We have also explored tipping point consumption in relation to the type of drink preferred by respondents. Respondents who consumed alcopops (134.11g) and wine (133.01g) reported the highest tipping point consumption (Davies et al., in preparation). However, it is also important to note that people may drink alcohol alongside other drugs and this may influence how the tipping point is experienced. People may also consume alcohol with energy drinks, which may increase feelings of arousal and increase the amount of alcohol that is consumed before the tipping point is reached (Peacock et al., 2017).

Twenty percent of the sample reached their tipping point at least once a month, meaning that they were more intoxicated than they actually wanted to be. This gives us a useful place to direct/ target interventions. The experience of reaching the tipping point is generally experienced as psychologically and physically unpleasant (e.g. Burgess et al., 2019). Given the volume of alcohol that respondents said they consumed to be as drunk as they would like to be, it may be controversial to encourage people to 'only' drink that much and not reach their tipping point (Davies et al., under revision). Tipping point drinking is associated with both acute and chronic harms to the drinker and those around them (Laslett et al., 2010). As such, reducing the number of occasions an individual reaches tipping point has the potential to reduce a range of harms.

4.2 Enjoying and regretting getting drunk

GDS2019 started to explore respondents' experiences of getting drunk and feelings of regret as one possible avenue to reducing HED. They were presented with the following text:

> *We would like to know how often you get drunk and how often you enjoy it. On approximately how many days did you get drunk last year?*

When we released the data in May 2019, the British press (e.g. Boyd, 2019; Marsh, 2019) were quick to pick up on the finding that respondents from the UK reported getting drunk on average 51 times a year – so about once a week - and this was more than respondents from all the other included countries. Figure 3 shows the mean number of times that respondents reported getting drunk. The USA and Canada come second and third to the UK, while respondents from Chile, Portugal and Germany report getting drunk on far fewer occasions.

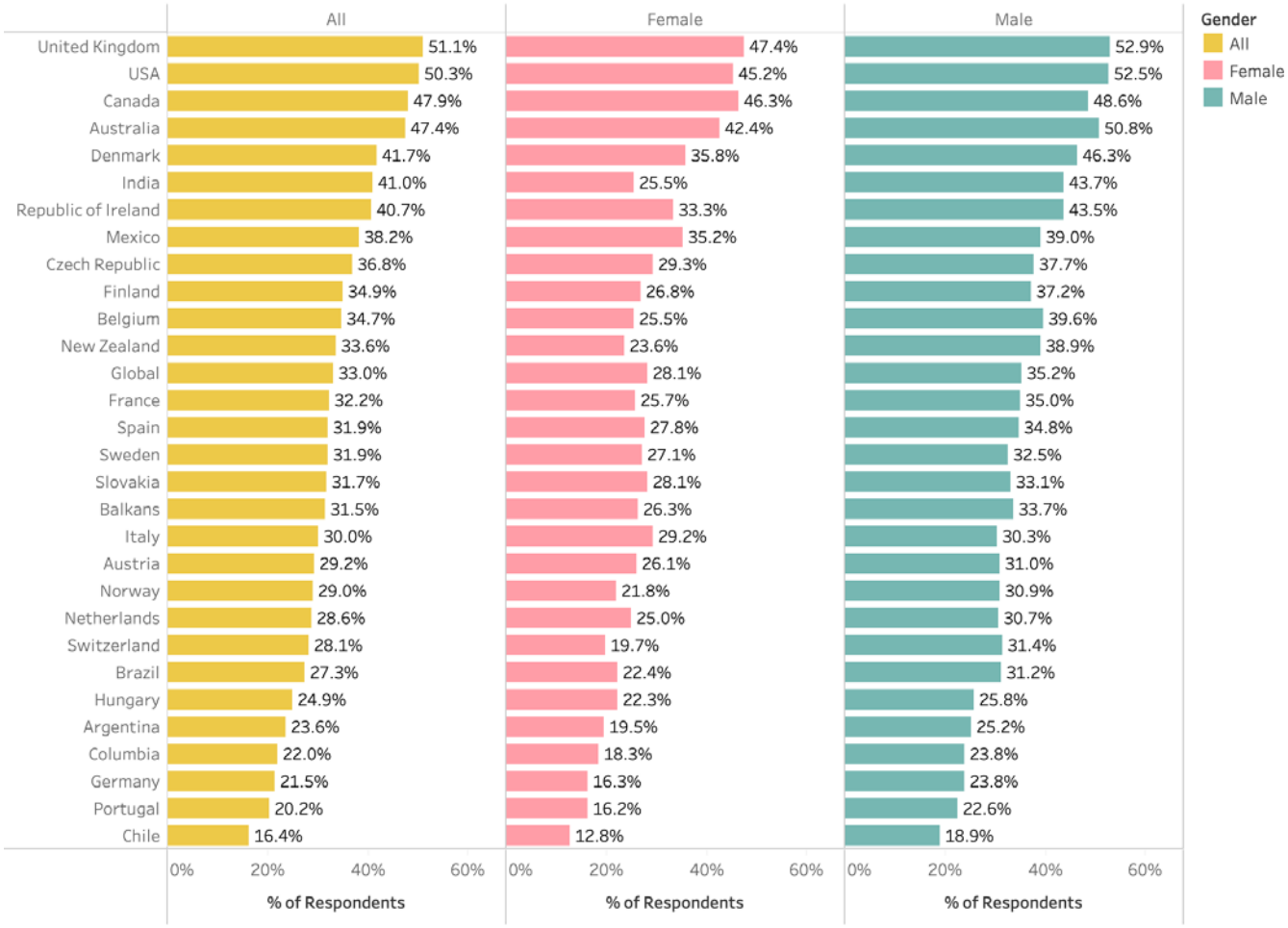

Figure 3: **Mean number of times drunk in the last year by country and sex in GDS2019 presented in rank order of 'All'**

Regardless of the definitions used, simply knowing that respondents get drunk a certain number of times may not on its own be a useful starting point when considering ways to reduce alcohol consumption. This could be particularly tricky when we consider the study discussed in the previous section that also found that 65.6% of respondents got 'as drunk as they would like to be' on a monthly or weekly basis (Davies et al., under revision). Thus, in GDS2019, we also asked respondents to estimate how many of those times they really enjoyed getting drunk and how many times they regretted it. Figure 4 shows the same countries, but this time the number of times participants really enjoyed or regretted getting drunk is expressed as a percentage of the total number of times they reported getting drunk. Here we can see that German respondents reported they regretted a greater percentage of the times they got drunk whereas Danish respondents reported that they regretted a smaller percentage of time they got drunk. Comparing this to Figure 2, it can be seen that there is a possible relationship between frequency of drunkenness and regrets or enjoyment. For example looking at the UK, the percentage of times that respondents regret getting drunk is relatively low, even though they reported getting drunk the most, whereas those from Chile get drunk the least, but regretted a larger proportion of these occasions.

Overall, the 2019 data showed that in the global sample our respondents enjoyed getting drunk 73.55% of the time and regretted it 21.80% of the time. People were not required to ensure that their responses to these questions added up to the number of times they said they got drunk, which is why these figures do not add up to 100%. It is possible that sometimes people neither really enjoy nor regret getting drunk– perhaps they are ambivalent about it. However, if people regret getting drunk around one-fifth of the times that they do it, this could be another useful avenue for encouraging them to reduce their alcohol consumption.

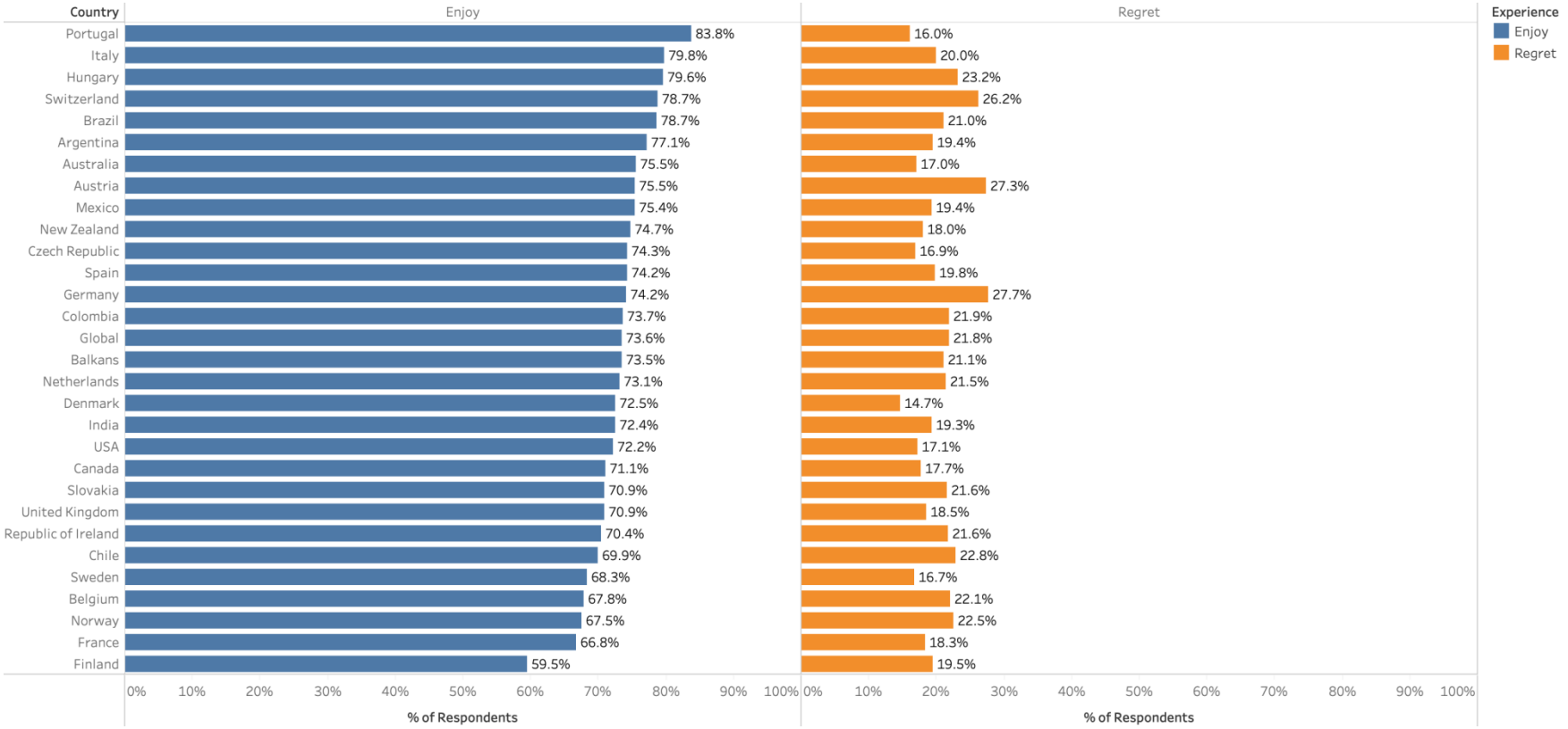

Figure 4. **Percentage of times GDS2019 respondents enjoyed and regretted getting drunk by country presented in rank order of 'enjoy'**

Regrets in GDS2020

In GDS2020 we asked the same question about how many times people got drunk and how many times they regretted it. However, a more detailed definition of 'getting drunk' was provided in this survey. Respondents were presented with the following text:

> *First of all how many times did you get drunk in the last 12 months (we define drunk as having drunk so much that your physical and mental facilities are impaired to the point your balance / speech may be effected, you are unable focus on clearly on things and that your conversation and behaviours are disinhibited).*

The reported number of times drunk per year was considerably lower; for example those from UK (capturing England, Scotland, Wales and Northern Ireland) reported getting drunk an average of 33 times compared to 51 times the previous year. However, they were still the top country followed closely by Australia (Mean = 31.78) and Denmark (Mean = 31.32), and overall there was no change in the pattern of results by country. When looking at the percentage of times that respondents regret getting drunk, we observed some surprising country differences (see Figure 5). It appears that those from Colombia, Argentina and Mexico, regret getting drunk a lot more than respondents from other countries. When we analysed this data we were struck by these differences. It appears that these countries also report fewer mean occasions when they get drunk (Colombia= 11.16, Argentina, = 13.44, Mexico = 16.67). The differences could therefore reflect public acceptability of drunkenness. However, we also considered the way that our definition of drunkenness was translated into Spanish and how this may have been interpreted by respondents. Issues with precise translation are another challenge faced when delivering the same survey questions across different languages and cultures.

Figure 5 **Percentage of times drunk that were regretted by country in GDS2020 in rank order of all.**

In GDS2020 we asked people to tell us their top three reasons for feeling regret after getting drunk. With the new definition of getting drunk, we observed a higher percentage of regretful occasions; respondents said they regretted getting drunk an average of 32.75% of the time, while 28.2% never regretted it and 14% of respondents said they regretted getting drunk every time. The most commonly selected reasons for regretting getting drunk were having a hangover (74.6%), saying something they would not normally say (42%) and feelings of increased anxiety the next day (31.1%). The proportion of respondents who selected these reasons was compared by country (Figure 5). Unsurprisingly, hangovers were a common reason for regret across sample. Respondents from Northern European countries reported higher proportions of feeling anxious the following day.

A focus on anticipated regret – the emotions and cognitions that may be experienced if behaviour is not changed – has been explored in relation to alcohol reduction (Cooke et al., 2007). Studies have posited that encouraging people to think about the possible regrets they may have the next day may be one way to encourage them to drink less. However, such studies rarely consider the broader consequences of drinking that might be regretted – instead they ask people the extent to which they will regret getting drunk (Davies & Joshi, 2018). Furthermore, a previous study suggested that those who experienced more regrets had a higher level of optimism about their susceptibility to alcohol related health harms (Davies & Joshi, 2018), highlighting that this approach needs to be applied with caution. Our GDS2020 findings provide a cornerstone to develop more targeted anticipated regret interventions by exploring socio-demographic factors associated with the top three regrets that are selected.

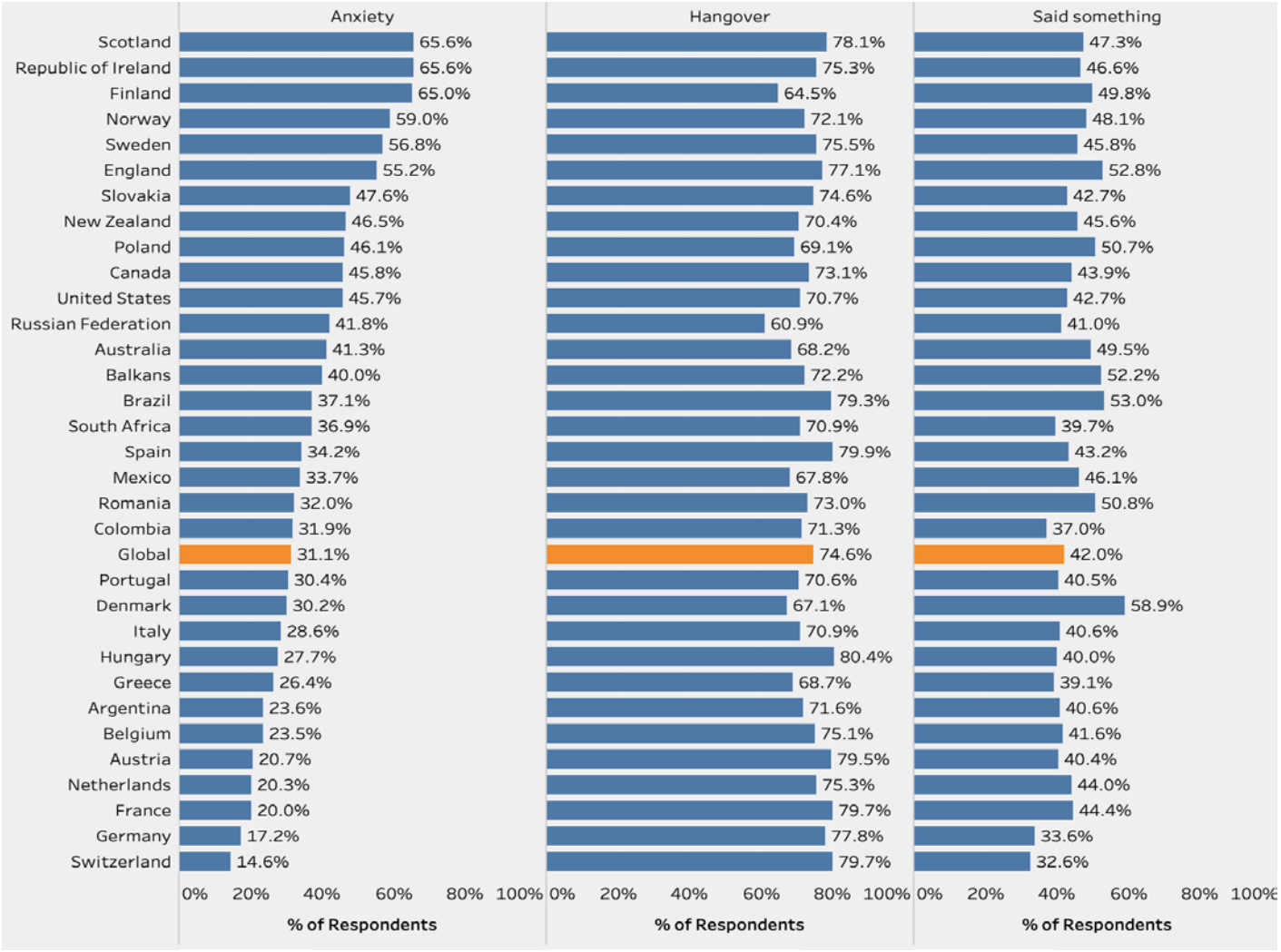

Figure 6: **Top three reasons for regret in GDS2020 sample compared by country and ranked by proportion reporting anxiety.**

4.3 Emotions and drink type

Of course, regret is not the only emotion associated with drinking alcohol. GDS2015 respondents were asked to self-report the types of alcohol they consumed and which emotions (energised, relaxed, sexy, confident, tired, aggressive, ill, restless and tearful) they associated with these drinks (Ashton et al., 2017). Positive emotions such as energy, confidence and feeling sexy were associated with drinking spirits, while red wine and beer were associated with feeling relaxed. Spirts were also associated with feeling more aggressive, ill, restless and tearful compared to other drink types. Respondents who scored 20+ on AUDIT reported feeling a greater range of both positive and negative emotions from their drinking (Ashton et al., 2017). Knowledge of the drink types and demographic characteristics associated with negative emotions, such as aggression, which may lead to violent incidents, can also inform targeted interventions to reduce harm to others as well as the drinker themselves.

4.4 Pre-loading

As discussed in section 4.1, respondents who did most of their drinking in clubs were among those who reached their tipping point most frequently (Davies et al., in preparation). However, across many countries many people begin their night out by drinking at home before heading out to pubs and clubs. This serves the purpose of saving money, but is also an important time for socialising with friends away from busy nightlife settings (Atkinson & Sumnall, 2017; Davies & Paltoglou, 2019). This practice, often referred to as pre-loading or pre-drinking, has been associated with increased overall alcohol consumption during a night out, as well as increased experiences of negative consequences such as fights and accidents (Hughes et al., 2008; Miller et al., 2016).

The country-level effects of drinking and drink prices on pre-loading behaviours were explored in 65,126 GDS2015 respondents from 25 countries (Labhart et al., 2017). The estimated percentage of pre-drinkers per country ranged from 17.7% among respondents in Greece, to

85.4% among those from Ireland. The eight countries with the highest percentages of pre-drinkers were either English speaking (e.g. Ireland, Canada, New Zealand, UK) or Nordic (e.g. Norway, Denmark, Finland, Sweden), while the eight countries with the lowest percentages were mostly Southern and Eastern European (e.g. Greece, Hungary, Poland, Switzerland, Italy, Belgium), or Latin American (Brazil, Mexico). Across all countries, we found that the higher the prevalence of current drinkers, the higher the percentage of pre-drinkers. In addition, an interaction between the prevalence of heavy drinkers (those who reported drinking 60 or more grams of pure alcohol on at least one occasion at least monthly) and each country's ratio of on premise versus off-premise drink prices was found. In countries with a low price ratio (e.g. Norway, we found a higher prevalence of heavy drinkers, and a higher percentage of pre-drinkers. The opposite effect was observed in countries with high price ratios (Labhart et al., 2017).

Further analyses of these data investigated the role of sex and age on pre-loading behaviours among this sample (Ferris et al., 2019). Results suggested that males were more likely to engage in pre-drinking than females, other than for respondents in Canada and Denmark, where females were more likely to pre-load (Ferris et al., 2019). This gender difference may reflect findings from other studies showing that females are more likely to pre-drink to socialise and get ready for the night out together (Atkinson & Sumnall, 2017), or as an opportunity to match the intoxication levels of their male counterparts (Paves et al., 2012). Interestingly, while the GDS analyses also suggested that the probability of pre-loading decreased after age 21 for most respondents, there also appeared to be an increase in the probability of pre-drinking after age 30 among respondents from Brazil, Canada, Ireland, New Zealand, England and the United States (Ferris et al., 2019). While younger respondents may pre-drink to save money or get intoxicated earlier, it is possible that these pre-drinkers aged in their thirties are enjoying a drink at home with friends before going out for dinner (Ritchie et al., 2009).

5. Consequences

Alongside patterns in drinking behaviours discussed in section 4, GDS also collects data on the negative impacts of drinking alcohol. For example, each year respondents are asked if they have had to seek emergency medical treatment as a result of their drinking. Fortunately, only a small proportion (2%) of the sample have had this experience, but there are gender and age differences observed (see Figure 7). When split further by age females under the age of 25 (3.4%) were more likely to have sought treatment than to their male counterpart (2.8%) and compared to those over the age of 25 years (males 1.3%; females 1.2%).

It is important to recognise that harms are also experienced by people around the drinker (Laslett et al., 2010; Laslett et al., 2011). GDS respondents were asked about their experiences of harm from others' drinking in 2015 (Bellis et al., 2015). The question posed was as follows: 'In the last 12 months have you been negatively affected by someone else's drinking in any of the following ways: (1) physically assaulted by someone who was drunk; (2) sexually harassed or assaulted by someone who was drunk; (3) called names or insulted by someone who was drunk; (4) injured accidentally by someone who was drunk; (5) had property damaged by someone who was drunk; (6) involved in a traffic accident caused by a drunk driver or pedestrian; (7) kept awake by drunken noise.' Overall, 9.2% of men and 4.7% of women reported experiencing physical assault, and 15.3% of women and 2.5% of men reported sexual assault or harassment (Bellis et al., 2015).

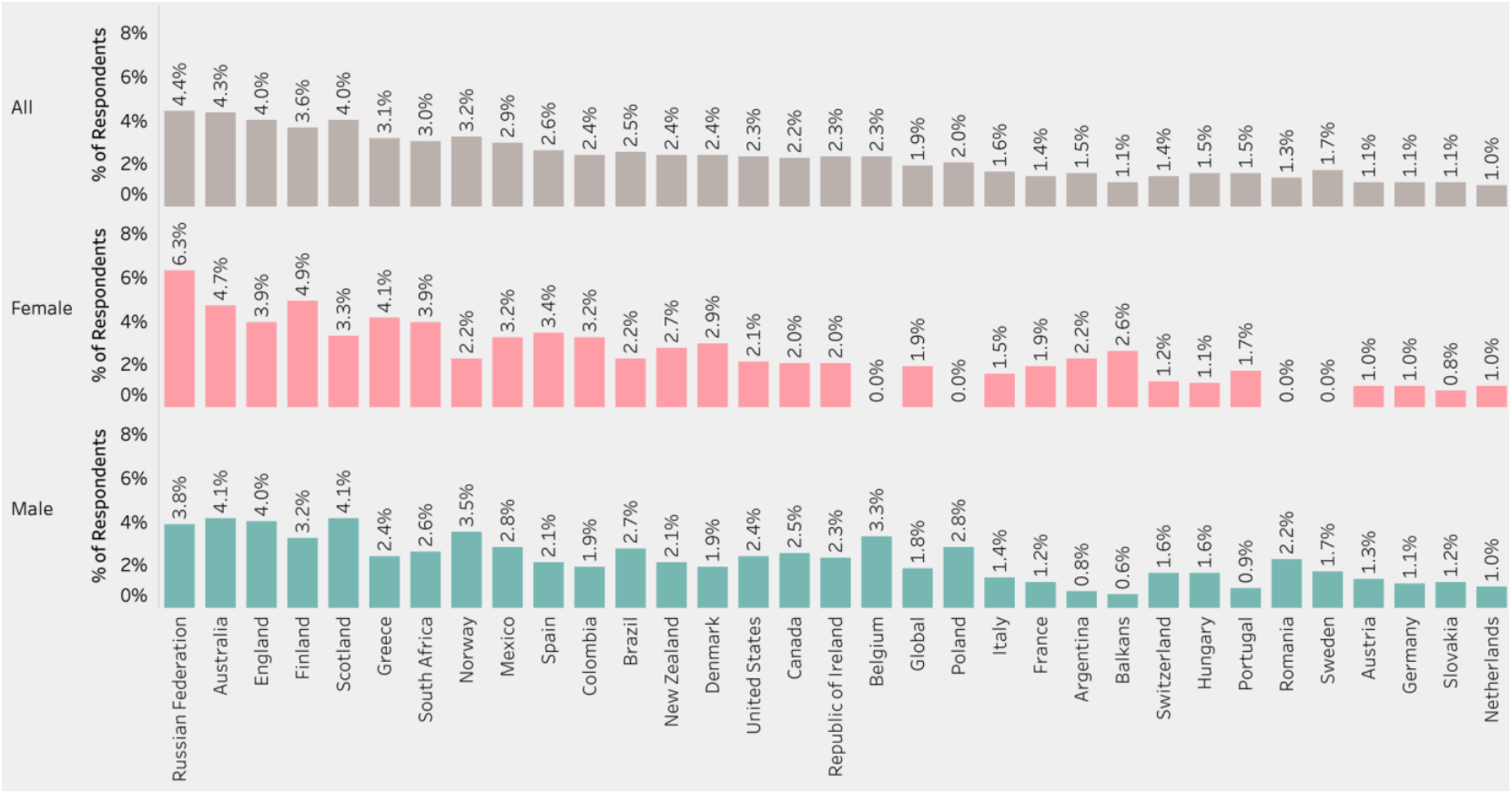

*Figure 7.***Percentage of respondents seeking emergency medical treatment by country and gender in GDS2020 in rank order of 'all'.**

6. Reducing harms

6.1 Cutting down on alcohol

In this chapter so far, we have discussed a selection of GDS studies exploring the experience of drinking and drunkenness, and some of the negative consequences of drinking alcohol. With 20% of respondents reaching their tipping point at least monthly, and around 20% of drunken occasions being regretted, it is clear that there is potential for reducing alcohol related harms, without necessarily reducing the enjoyment that people get from drinking. In order to understand what might lead respondents to think about drinking less, we explored a range of possible experiences which might motivate people to think about cutting down (Davies, Conroy, et al., 2017). Respondents viewed the following list of 13 possible experiences and asked to select their top three in order of importance.

1) social embarrassment/humiliation;
2) being sexually assaulted /taken advantage of;
3) Sexual regret (e.g. ending up in bed with someone) ;
4) getting injured in an accident;
5) Being 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.

Within the whole sample, the physical health item (7) was one of the most commonly selected experiences that would lead the respondents to think about reducing their alcohol consumption. However, there were some gender and country differences observed. For example, female respondents were more likely to select the sexual assault item than male respondents. Respondents from Germany and Northern European countries were more likely to select social embarrassment/humiliation, whereas respondents from Southern Europe were more likely to pick injuries and violence. Those from the United States were more likely to pick the item about

being in trouble with the police and those from Poland and Greece picked financial issues more often (Davies, Conroy, et al., 2017). Such differences are interesting when we think about patterns of drinking observed in the GDS sample, as well as cultural differences in drinking patterns more broadly. They suggest brief interventions to reduce drinking could be enhanced by a focus on the most demographically relevant experience that is likely to motivate someone to reduce their drinking. Harm reduction messages, including those contained in digital interventions, and information on alcohol product labels could be similarly targeted.

6.2 Interventions

6.2.1 Individual level interventions

In GDS2017, 34.8% of respondents said they would like to drink less in the following 12 months, which is in line with the proportion who say this each year of the survey. This is a sizeable group of people, and the GDS2017 data suggested that respondents in higher AUDIT categories were those more likely to say they want to drink less in the next year (Davies et al., 2019). For example, 56.4% of those in the AUDIT 16-19 group (higher risk drinkers) and 69.4% of those in the AUDIT 20+ group (possibly dependent drinkers) said yes to this question, compared to 21.8% in the 0-7 group (low risk) and 40.0% in the 8-15 (increasing risk) group. In general, respondents from heavier drinking countries were also more likely to say they wanted to cut down. However, in total only 7.6% of respondents wanted help to reduce their drinking. This is not to say that those who do not want help will be unsuccessful, but it is important to acknowledge that individuals may not wish to seek help as they are worried about feeling stigmatised (Khadjesari et al., 2015). There can also be considerable delays in treatment seeking rates in those with alcohol use disorders (Chapman et al., 2015), and financial barriers to treatment seeking (Schuler et al., 2015).

We explored the preferred sources of support for help to reduce drinking in the 2118 respondents who said they would like help (Davies et al., 2019). They were asked *'which of the*

following would you be most likely to use to get help with your drinking?' They could select one of the following options: self-help tool (online or via app); counselling via email; counselling via phone; counselling via Skype/live video; counselling at a family doctor (GP); counselling or therapy at a specialist doctor; alternative therapy. Only a small number picked counselling via email (N= 102), phone (N= 62) and Skype/live video (N=30) and so these were combined into a category named' non-face-to-face counselling'. There were two important differences, which related to the selection of digital tools compared to face to face counselling or therapy with a specialist. Respondents with low risk drinking patterns, who were educated and not taking a prescribed medication for a mental health condition were more likely to select online tools. On the other hand, being in the higher AUDIT categories and taking a prescribed medication for a mental health condition were associated with preferring the support of a specialist counsellor (Davies et al., 2019).

6.2.2 Digital tools and e-health

These are important findings in a landscape where digital tools such as websites, apps and wearables are being rapidly developed due to their potential to engage more people outside clinical settings and to reach large numbers of people relatively cheaply (Kaner et al., 2017). However, even though there are a large number of alcohol apps on the market, only a minority have a focus on improving health, and few contain recognized behaviour change techniques (Crane et al., 2015). Until recently, there was little evidence to suggest that digital tools were effective in reducing alcohol consumption. However, a recent systematic review suggested that participants who were using a digital tool reduced their drinking by up to three UK units of alcohol (24 grams) compared with control participants (Kaner et al., 2017). Our findings highlight the importance of ensuring access to good quality face to face support for heavier drinkers with co-morbid mental health issues. Online tools offering screening and brief advice should signpost such drinkers to specialist treatment services, which must continue to receive sufficient funding in order to help those at most risk (Davies et al., 2019).

One possible issue with engaging drinkers who would benefit from reducing their drinking is that often people compare their drinking behaviours more favourably to others. GDS data suggests that many respondents underestimated the amount of alcohol they consumed compared to others (Garnett et al., 2015). This misperception was common in Caucasian respondents, those under the age of 25, males, those from the UK, as well as those less well educated and unemployed. Drinkers may also believe their own behaviour is not as bad as others when they are drunk (Davies et al., 2018). These kinds of issues pose a challenge for the reach and impact of individual level interventions.

GDS has developed a digital intervention – The Drinks Meter (see www.drinksmeter.com) – which attempts to counter misperceptions about drinking. Drinks Meter is a free tool based on identification and brief advice, which also provides people with normative information about how their drinking compares to other people with similar demographic/ geographic characteristics. This resource has been has been highly rated by users (Milward et al., 2016). In a pilot trial, which compared this app to another app and to a control group, we actually found that all groups significantly decreased their drinking over four week period (Davies, Lonsdale, et al., 2017). The pilot trial had a number of limitations, including the possibility of demonstrating the mere measurement effect on reported alcohol reduction, as well as being insufficiently powered. Drinks Meter has recently been updated and has new behaviour change techniques and a new study of its impact will be undertaken.

A further GDS app, also tested in our pilot trial was OneTooMany (see Figure 8; onetoomany.co). On the OneTooMany website people are asked to respond to 20 questions about embarrassing situations that they may have experienced while drinking. Situations include posting an embarrassing photo on social media, being sick in public, or getting into fights. The website asks participants to indicate whether each of the 20 experiences have occurred 'in the last month', 'in the last year' or 'never/not in the last year'. On completion, the participant is presented with an alcohol related social embarrassment (*ARSE*) score (ranging from 0-40). The

app uses light-hearted language to provide feedback on the associated risks and consequences of one's score and signposts to other services. In a qualitative study we found that this humorous approach might have costs as well as benefits. Young adults said that some of the embarrassing consequences of drinking were seen as a badge of honour, however many thought that using humour to get the message across could be effective (Davies, Law, et al., 2017).

Figure 8. **Screen shots of Drinks Meter and OneTooMany apps.**

6.2.3 Population level interventions

The limitations of using individual approaches, such as apps, is that people have to acknowledge and decide they want to cut down and make changes to their behaviour in a strongly 'alcogenic' environment (Hill et al., 2018). Population approaches, such as alcohol product labelling may be advantageous in promoting messages to a wide audience of people who drink alcohol. The United States first introduced mandatory labels in 1989, which included information about the risks of driving while drunk and about drinking in pregnancy. However, while these messages were successful in raising awareness of such risks (Kaskutas & Greenfield, 1992; Mazis et al., 1991) there was little evidence that they were actually able to change behaviours (Stockwell, 2006). In recent years, there has been a resurgence of interest in the possibilities of communicating risk information on labels, and research has begun to focus on more specific

messaging, such as that about the links between alcohol and cancer – for which levels of awareness appear to be low in the general population (Blackwell et al., 2018).

In GDS2018, we included seven health information labels that were developed from a review of the literature (relating to heart disease, liver, cancer, calories, violence, taking two days off and the myth of benefits to moderate drinking – see Figure 9). Respondents were asked if the information was new to them, if they believed it, if it was personally relevant and if it would make them would make them consider drinking less (Winstock, Holmes, et al., 2020). A sample of 75,696 respondents from 29 countries was included in this study.

Figure 9. ***The seven alcohol labels included in GDS2018***

When it came to how 'new' the information on the labels was, 61.8% said the cancer message was new, compared to only 11.2% for the violence message. The message about violence was also the most believable (89.4%) and the most relevant (40.1%) message in the sample. This is an interesting finding, perhaps reflecting that the GDS sample often witness or experience violent behaviour when they are drinking alcohol. The least believable message (62.3%) was the one about the myths of benefits to moderate drinking. Perhaps this reflects that there are often media stories promoting the health benefits of drinking red wine, and that people want this information to be true, as it supports their continued alcohol consumption. However, it was also rated the least relevant (15.1%) message and the one least likely to make respondents consider drinking less (14.2%). The message about cancer was the one that most respondents (39.6%) said it would make them consider drinking less. The liver message was in second place

with 31.0% saying it would make them consider drinking less. New, believable and personally relevant information on product labels was associated with potential behaviour change (Winstock, Holmes, et al., 2020).

The salience of the cancer message was one of the most important findings of this study. Not only was it more likely to change behaviour, but also it was the least well known of all the seven messages. Given that alcohol was first categorized as a Group 1 carcinogen by the International Agency for Research on Cancer (IARC) in 1988 (IARC, 1988), it is worrying that this knowledge is not well known. We acknowledge, and indeed further qualitative studies are underlining (Davies et al in prep), that people may well not wish to see messages about the links between alcohol and cancer on their products, but we believe that people have a right to accurate information about the products they consume. The issue with current product labels is that there is wide variability across the world in what is included. In many countries the alcohol industry self-regulate, meaning that seemingly pro-health messages, such as 'drink responsibly' are presented. Further analysis of the GDS data on alcohol labels has shown considerable variability in levels of awareness of the information that was presented in different countries. For example, lower levels of awareness for all messages were observed in Colombia, Poland, Mexico, Brazil, and higher levels in Finland, Scotland, Germany (Davies et al., under review).

7. Advocating for trans people who use alcohol

In GDS we continue to strive to represent under researched populations of drug users, but we have not always got this right. Up until GDS2017, gender was assessed by a single question and around 65% of the sample reported being male. However, in 2017, GDS responded to some helpful participant feedback which suggested how we could improve the way we record gender, to be more inclusive of transgender (trans) respondents (those whose lived gender identity differs from their birth-assigned gender).[1] From GDS2018 a two-stage approach to assessing

[1] Cisgender (cis) individuals are those whose lived gender identity matches that assigned to them at birth.

gender was adopted. The first question assesses participants' lived gender identity with the following options: 'male', 'female', 'non-binary', 'different identity'. The second question seeks to understand each participant's birth-assigned gender, with response options 'male' or 'female'. While 'non-binary' and 'different identity' are considered exclusively trans identities, the combination of responses to these questions allows us to determine which of those disclosing 'male' or 'female' gender identities are trans. For example, those who report female gender identity and male birth-assigned gender are classified as trans women.

With 1,710 and 1,799 trans respondents to GDS2018 and GDS2019 respectively, we believe that we are now reporting on the largest sample of trans people in the alcohol literature, which puts us in a unique position to understand and advocate for trans people who use alcohol. Early work has sought to compare alcohol use and dependence between five gender groups (cis women, cis men, trans women, trans men and non-binary people) responding to GDS2018. Given that non-binary refers to individuals whose gender identity exists beyond the binary categories of 'male' and 'female', it was decided that 'different identity' likely represented a collection of different labels for the same concept. As such, these groups were combined to increase statistical power. We found that last-year alcohol use was common among all gender groups (87.9-94.9%) but that non-binary people (AOR 0.42) and trans men (AOR 0.43) were half as likely as cis women to have used alcohol in the preceding year (Connolly et al., under review). Conversely, among those who have used alcohol, trans people were significantly more likely to report probable alcohol dependence (AUDIT ≥20). This was most significant for trans women (AOR 2.24) and non-binary people (AOR 3.28), highlighting the importance of disaggregating analysis for different subgroups of trans participants (Connolly et al., under review).

This work was followed up with a study comparing the same gender groups on their intention to reduce their alcohol use and to seek help to do so. We were able to combine GDS2018 and GDS2019 datasets to give a total sample of 185,055 (2,579 trans) participants (Connolly et al., 2020). We found no differences between trans and cis respondents on the intention to use less

alcohol. However, among those seeking to reduce their alcohol use, trans (particularly non-binary) respondents were more likely to want help to do so -10.5-14% vs 7.9-8.5% (Connolly et al., 2020). While we acknowledge that this work is introductory, we are motivated to understand the reasons why trans people are more likely to be alcohol dependent and to need help to reduce their use. We are specifically targeting our recruitment towards such minority groups to increase the diversity of our sample and give a voice to marginalized groups, often omitted from alcohol research.

8. Reflections and conclusions

This chapter has provided an overview of what we have learned so far about alcohol from over 500,000 GDS respondents from countries around the world. The majority of GDS participants receive an AUDIT score in the low risk drinking category, however the distribution of AUDIT scores varies by respondents' country of residence with median scores ranging from 6-12. As described, it is important to be cautious when making country comparisons within the GDS sample, as respondents are not representative of the general population, but it seems that the country differences we observe often fall in line with those observed in population studies.

Results from GDS presented in this chapter have many important implications for reducing alcohol related harms. For example, the finding that 20% of respondents reach their tipping point, an undesirable level of consumption, on a frequent basis is an opportunity for targeted interventions to encourage people to cut down without a losing the pleasure they get from drinking. Interventions that take into account the positive emotions associated with drinking are much more likely to hit their mark than those that simply warn of the risks and harms, which often people are aware of. Our labelling studies suggest that people are aware of many of the harms associated with drinking alcohol, but that they are not aware of the association between alcohol and cancers.

GDS has a rapidly expanding research profile; the team has published >60 academic papers in total, with alcohol experts drawing on our data to describe patterns and trends worldwide (Gage, 2020; Nutt, 2020; The Lancet, 2018). However, as we reflect on the strengths and implications of our body of work on alcohol so far, we acknowledge that there are many improvements we can make to our survey questions and to the diversity of drug users with whom we engage. Our sample is predominantly white, well educated, and from western countries; respondents must be literate and have internet access. An example of one area where some inroads have been made pertains to the inclusivity of different gender groups within the sample. However, we must do more to partner with organisations in a broader number of countries, in a number of other languages, in order to be a truly global survey. We are striving to do this and welcome collaboration and input in order to get better.

A major strength of the GDS research team is the ability to design, pilot and translate the large survey, recruit large numbers and then rapidly and report on this data each year. In 2020 this was put to the test when we chose to respond to the COVID-19 pandemic with a special edition of the survey. We recognised that the pandemic would have a significant impact on people's drug use, and particularly their alcohol consumption. We developed a survey to address the impact of lockdown conditions on drug use, with a particular focus on mental health and relationships. We found that around about a third of people reported drinking earlier in the day and although many people were drinking more frequently during lockdown due to boredom and having more time on their hands, many people had reduced their drinking, and were experiencing benefits to their physical and mental health as a result (Winstock, Davies, et al., 2020).

In the last eight years more than 500,000 people have completed the GDS specialist section on alcohol. Supported by granular details on demographics, lifestyle and mental health, we are able to explore novel areas using a unique and very large international dataset. Using the AUDIT each year, we have explored diverse questions that can be usefully explored using a non-probability

sample, focusing on analyses between different populations of drinkers. As the same survey is completed within the same time frame, using the same methodology across different regions we are able to explore cultural and legislative impacts upon drinking. Because we are self-funded, we can move quickly to focus on areas of public health importance and support areas relevant to policy.

To date our work has confirmed the existence of normative perceptions within diverse populations of heavy drinkers and have confirmed the potential utility of feedback using this information to nudge people's drinking behaviours (www.drinksmeter,com). We have collaborated with public health experts to highlight that those heavier drinkers who do themselves them greatest harm also have a significant adverse effects upon others in their community. Differential access and pricing between shops and bars has informed our work on the role of pre-drinking in excessive consumption in some regions.

Combined use with energy drinks and the role of excessive alcohol in the reporting of ketamine bladder symptoms demonstrate the importance of researching alcohol in the context of other drug use and showcase our ability to look at the negative consequences of the use of alcohol in combination with other substances. Work exploring how much people drink to get drunk and how different types of beverages impact on people's emotions allows us to start a dialogue with heavier drinkers to raise awareness of the risk of consuming more potent forms of alcohol such as spirits and challenge the current marketing that alcohol brands are allowed to exploit.

In more recent years we have focused on determining the motivations for people who want to drink less and identity the methods by which these groups would like to receive help. Our work on the impact of alcohol health warning labels and a focus on regret when drinking will hopefully inform future public health interventions and digital messaging to support and inform people to drink less but still have a good time. GDS's mission is to help people use drugs

regardless of the legal status of the drugs and to facilitate honest conversation about drug use. Our work on alcohol demonstrates this commitment.

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