Literature Review of Behavioural Insights to Reduce Alcohol Consumption

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DRINKAWARE

THE BEHAVIOURAL INSIGHTS TEAM

About Drinkaware

Drinkaware is the national charity working to prevent and reduce alcohol misuse in Ireland. Achieving this requires independence, ambition, trust, credibility and collaboration. Registered Charity Number: 20204601.

Our mission is guided by our Strategic Plan 2019-2021 to identify the attitudinal and behavioural drivers of the misuse of alcohol and using these collaboratively to support positive behavioural change.

Drinkaware believes in an evidence-led approach to our work and we regularly undertake research into key areas to inform our programmes and interventions. As with all our research, Drinkaware is publishing this report so that it can be shared and utilised by interested parties and be accessible to all. We are committed to ensuring that our research is open, accessible and usable, so it can have the greatest impact. In so doing, we hope that it will help sustain a crucial national conversation regarding alcohol and alcohol-related harm in Ireland.

The Behavioural Insights Team

The Behavioural Insights Team exists to improve people's lives and communities. We work in partnership with governments, local authorities, businesses and charities, often using simple changes to tackle major policy problems.

We generate and apply behavioural insights to inform policy, improve public services and deliver results for citizens and society. We have a track record of success across a range of policy areas, from healthcare to humanitarian aid, economic growth to early years, social capital to consumers. We also work to scale our successful interventions by sharing lessons and supporting wider adoption and spread of what works. The Team has grown from a seven-person unit at the heart of the UK government to a global social purpose company with offices around the world.

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Executive Summary

Drinkaware's vision is an Ireland where alcohol is not misused. An important step towards this vision is reducing the number of adults who drink above HSE guidelines[1]. Achieving this goal will require changes to current drinking behaviour. A survey in 2013 found that over half of Irish adults who drink were classified as harmful drinkers[2].

In 2018, Drinkaware commissioned the Behavioural Insights Team in the UK to conduct a review of behavioural change theory and evidence relevant to reducing the number of adults exceeding the HSE guidelines. This paper outlines the key findings of the BIT review. The review begins with an overview of what drives alcohol consumption before discussing relevant behavioural change theories.

Behavioural change theory and evidence

This section reviews two theories specific to alcohol consumption - Expectancy theory and Motivation theory - along with broader theories - the Health Belief Model (HBM) and the Theory of Planned Behaviour (TPB). These models can predict that on average, a person with certain attitudes and beliefs will tend to drink more (or less) than average. However, they do not accurately predict how much that person will consume, since most of what drives consumption (e.g. environmental factors) is not captured in these models. There is also no evidence that one model is superior to the others.

The Capability, Opportunity, Motivation - Behaviour (COM-B) model is a means of designing and categorising interventions rather than a model of behaviour. COM-B gives appropriate weighting to environmental influences while including psychological factors included in previous theories.

Interventions to reduce alcohol consumption

This section reviews individual-focussed and environment-focussed behavioural interventions. An overview of regulatory and non-regulatory interventions to reduce alcohol consumption finds that regulatory interventions such as taxation, reducing availability and restricting advertising are much more effective than behavioural interventions. Information and education alone can raise knowledge and awareness but have not been found to have long lasting effects on consumption.

There is evidence to support certain behavioural interventions such as Identification and Brief Advice (IBA), although participants in these studies were heavy drinkers identified in GP or emergency care settings. There is currently little evidence to support interventions such as staff training and health information in bar settings.

Conclusions from review of behavioural theories and interventions

The COM-B model provides a complete picture - no evidence was found to suggest that one behavioural theory best explains drinking behaviour. The COM-B model includes key aspects of behavioural theories and is designed to inform intervention design.

High quality evidence is lacking - Systematic reviews of alcohol interventions find that the existing evidence base is of moderate to low quality.

Individual behavioural interventions (IBA or similar) show promise – Identification and Brief Advice (IBA) has been found to lead to long-term reduction in consumption among

heavier drinkers. This suggests that multi-component interventions may be more effective than single components.

Education and information alone are unlikely to reduce consumption - Information about standard drinks and intake guidelines informs consumers but is unlikely to change long term drinking behaviour. However, supporting this information with evidence-based resources should help people to implement them.

Drivers of alcohol consumption

When, where, how and how much alcohol we consume is driven by a wide range of factors - environmental, social and individual[3]. In this section we provide a brief overview of some of these drivers. It should be noted that many of these factors interact with one another, making the relationships complex. Therefore, the relative importance of each of these drivers on behaviour has not been identified.

Environmental: The environment can be considered in the macro (cultural and economic) and the micro (drinking setting).

The macro environment includes cultural norms along with economic and legislative factors such a cost and availability. Indeed, cultural norms will often be reflected in legislation[4]. Interestingly, the cultural stereotype in Europe of restrained but regular wine consumption in southern Europe and less regular but much heavier consumption in northern Europe has been questioned by recent research[5]. Beer consumption is declining in Germany, while it is increasing in France and wine is becoming universally popular among women and the middle classes.

Micro-environments also influence consumption. In a bar or restaurant our drinking can be influenced by a range of factors. For example, studies have found that loud music, lack of food and lack of seating can increase consumption and the risk of alcohol-related injury[6] [7]. For more detail, see the sections on how the environment influences behaviour and environment-focussed interventions on page 14/later in this report.

Social: Alcohol is typically consumed with others; it is unsurprising then that social factors influence consumption. High parental and sibling alcohol consumption has been linked with higher alcohol intake[8]. Peers are also an obvious influence; the more your friends drink the more you are likely to drink[9]. Men are also more heavily influenced by peers[10]. In a given drinking session peer influences are also important; a study on the streets of Cardiff found that how drunk a person felt they were was predicted not by their *objective* breath alcohol content but by their breath alcohol content *relative* to others in their immediate environment[11]. See social norms and feedback in the Key Behavioural Insights section of this report for how this insight can be applied to reduce consumption.

Individual - personality: Two broad personality traits have been found to determine alcohol consumption. Firstly, impulsivity, sensation seeking and novelty seeking and secondly, neuroticism, negative affect and emotionality[12]. Disinhibition or behavioural under-control reflected by risk-taking and a lack of restraint in social settings has also been linked to future alcohol dependence[13].

Individual - age of onset of drinking: There is a link between young people beginning to drink earlier and higher rates of binge drinking. However, this is a correlation and not necessarily a causal relationship. Early consumption may occur when a young person is already at risk due to other deviant behaviours[14] [15]. The risk is also greater for young people who first drink outside the family, mainly due to the different patterns of drinking inside and outside the home[16].

Other factors which are correlated with higher alcohol intake, but which are less relevant to this review since they are beyond the scope of behavioural interventions are:

- *Gender:* Binge drinking more common among men in Ireland[17], this is in line with other countries[18].
- *Genetics:* Genes play a role in a range of factors related to alcohol consumptions including metabolism of alcohol and personality and mental health[19]. A study of adopted children found that 18% of those whose parents were alcohol dependent went on to develop alcohol related problems compared to 6% among those whose parents did not.
- *Socioeconomic status:* Lower socioeconomic status associated with higher likelihood of binge drinking in Ireland[20]. Although a study in the U.S. found there was no such socioeconomic relationship among adolescents[21].

Behavioural Theories

This section provides an overview of the behavioural theories most relevant to Drinkaware's goal to reduce the number of adults who drink above the HSE low-risk guidelines, and approach to achieve same. The first part reviews theories of individual behaviour where several established theories which have been tested empirically are outlined.

In the second part, we discuss how the environment can influence choice. How choices are presented is called the "choice architecture". There is no overarching theory of how the environment influences purchasing and consumption, for alcohol or any other products. Evidence for alcohol purchasing is limited so we draw on evidence from food consumption to paint as clear a picture as possible. (Note that we do not discuss changes to the environment that would require legislative changes such as taxation, restricting alcohol availability, opening times or advertising).

Theories of individual behaviour

The table below sets out the five individual behavioural theories reviewed in this section.

Theory	Type	Summary
Expectancy Theory	Alcohol-specific behavioural theory	These theories suggest that an individual's drinking behaviour is the outcome of the balance of positive and negative *expectations* of drinking or positive and negative *emotions* from drinking respectively. While there is some evidence to support both as explanatory theories. Interventions based on them have yet to be proven effective.
Motivation Theory	Alcohol-specific behavioural theory	
Health Belief Model (HBM)	General theory of health behaviours	HBM and TPB are two models which suggest that action is the result of beliefs or intentions which are formed by underlying attitudes and psychological control over our behaviour. The HBM and TPB can respectively predict and explain beliefs about alcohol and intentions to drink but are less successful in predicting actual behaviour.
Theory of Planned Behaviour (TPB)	General theory of behaviour	
Capability, Opportunity, Motivation – Behaviour (COM-B)	Model of how behavioural change techniques can be applied	COM-B incorporates key psychological aspects of the TPB and HBM while also giving appropriate weight to environmental influences. COM-B is a means of categorising behavioural change techniques rather than a theory of behaviour. Therefore, it has not been tested in the same way as other theories.

Explanatory theories specific to drinking behaviour

The following two theories are specific to alcohol consumption, they are Expectancy Theory and Motivation Theory. Both theories suggest that an individual's drinking behaviour is the

outcome of the balance of positive and negative expectations of drinking and emotions from drinking respectively.

Expectancy Theory: Expectancy theory posits that positive and negative expectations of alcohol consumption can moderate consumption. People will drink more to reinforce positive outcome expectancies (e.g. social assertion, arousal, general positive feelings) or will drink less to avoid expected negative outcomes (e.g. impaired cognitive or motor function, feelings of depression)[22].

Expectancy Theory was initially validated through surveys of individuals which assessed how strongly their drinking behaviour was related to their expectations of consuming alcohol[23].

Studies have found relationships between expectancies and alcohol consumption. For example, a recent study with a large sample size found that students who expected greater social assertiveness from drinking, tended to consume more[24]. While among alcohol-dependent inpatients, greater expectations of tension-reduction from drinking was linked to higher consumption However, the authors conclude that this is only a partial validation of the expectancy model of consumption and note that the size of these effects on consumption are small.

Additionally, the explanatory power of Expectancy Theory is relatively low. The theory can predict that a person with certain expectations will tend to drink more than average but will not accurately predict *how much* a given person will drink[25]. A further empirical test of expectancy theory is how well changing people's expectancies can change their consumption. An experiment found that priming people with more positive expectancies of drinking could increase consumption over the following 1-2 hours[26]. However, as outlined in the interventions section of this report - there is little evidence over the longer term to suggest that changing or "challenging" alcohol expectancies can reduce consumption.

Motivation Theory: Motivation Theory suggests that people primarily drink in order to enhance positive emotions and to cope with negative emotions[27].

For example, people drink to enhance sensations from drinking or to have more positive social or emotional experiences. People may also drink to reduce tension or to cope with negative feelings.

Like Expectancy Theory, this model has been validated using surveys and tested by intervening to manipulate some elements of the model. Surveys have found that reported alcohol use and the likelihood of drinking problems are related to survey measures of positive and negative emotions[28]. Interventions have also been developed to target those at higher risk of alcohol misuse based on personality. We could only find interventions aimed at adolescents, college students or problem drinkers in the literature. These interventions show some promise but there are not enough studies to draw robust conclusions (see interventions).

General behavioural theories

The previous two theories are specific to alcohol consumption. The following theories are general behavioural theories that have been applied to alcohol consumption.

The Health Belief Model: The Health Belief Model (HBM) was developed in the 1950s and is among the first and perhaps most widely studied behavioural theory developed specifically

for health behaviours[29] [30]. According to the HBM, a behaviour such as whether we attend a cancer screening appointment is driven by how we weigh up the benefits and barriers of screening; how susceptible we think we are to this cancer and the harm it would cause us; any cues such as internal symptoms or external health campaigns which prompt us and finally, our self-efficacy (our confidence in our ability to take action).

Application to alcohol consumption: Empirical studies of the HBM typically measure beliefs via survey questions and then see how well these predict health behaviours (e.g. attending cancer screening). A 2010 meta-analysis found that for general health behaviours the HBM did not have strong predictive power, the effects of susceptibility and harm in particular were weak and inconsistent[31]. An earlier meta-analysis found more promising evidence when looking at retrospective behaviour, but weak evidence when predicting future behaviour[32].

A further study looked at how well health beliefs correlated with alcohol consumption in particular[33]. In short it found that while the HBM could say whether a person with a given set of beliefs is likely to consume more or less than average, it is not accurate at predicting *how much* that person is likely to drink[34].

Overall these studies question the validity of the HBM as a predictive model of health behaviours. While some of the variables in the HBM are likely to be very important for some, overall the model does not have enough explanatory power to make it a relevant model for informing interventions.

Theory of Planned Behaviour: The Theory of Planned Behaviour (TPB) is the most widely cited theory of human behaviour[35]. The theory says that an individual's attitude toward a behaviour, their belief about what others do and their control over their behaviour shape intentions and hence actions. For example, if a person feels that smoking is bad, that all their friends and family think smoking is bad and are in control of their actions, they are unlikely to have any intention to, or actually smoke. However, if this person was to have low control over their behaviour, they will be more likely to be a smoker.

The theory has been applied to health behaviours and can help explain why some people have healthier diets than others or attend screening appointments while others don't[36]. It's important to note that TPB is better able to predict intentions than actions[37].

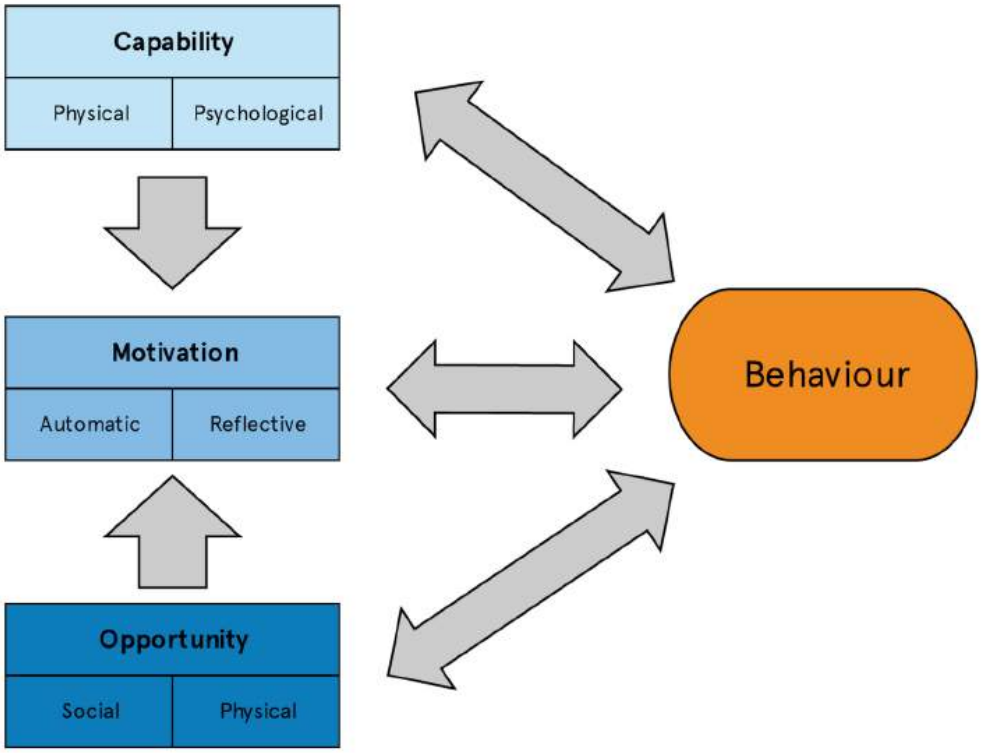
Applications to alcohol consumption: A 2016 review analysed 40 studies which applied the TPB to alcohol consumption[38]. Consistent with other TPB research, the review found TPB to be good at predicting intentions but not behaviours. Although intentions and behaviours can be linked, they are not always consistent. Therefore, the TPB model may not be suitable for developing interventions due to several reasons, including:

- TPB primarily aims to predict intentions rather than actions[39].
- Habits and contextual factors are not directly incorporated into the theory.
- There are only two of forty studies (in the 2016 review) which use insights from TPB to develop actual interventions.

Capability, Opportunity, Motivation - Behaviour (COM-B): The COM-B model is based on a very simple idea drawn from U.S. criminal law. That to carry out an action, one must have capability, opportunity and motivation. It should be noted that COM-B was developed as a means of categorising how Behaviour Change Techniques (BCTs) act to influence behaviour rather than as an explanatory theory of behaviour. However, for the purpose of

this literature review - to inform approaches to changing behaviour - this distinction is less relevant. Figure 1 provides an overview of the COM-B model. This includes the sub-components of each element of capability, opportunity and motivation and demonstrates the interrelationships between each element.

Figure 1: The COM-B Framework



Since COM-B is a framework for designing and categorising interventions rather than a theory of how people actually behave, there are not empirical tests of the theory. It should be noted that COM-B incorporates elements of TPB and HBM. However, a key addition is physical opportunity. While the HBM incorporates "cues to action", COM-B explicitly places physical opportunity on a par with psychological factors which are dominant in both TPB and HBM.

Choice Architecture: the environment and behaviour change

We know that our immediate environment influences our food and drink choices and consumption. This has led to research into how changes to how choices are presented - the "choice architecture" - can influence behaviour. For example, placing alcohol on end-of-aisle displays in supermarkets increases sales[40]. This research has not yet led to an overarching theory of how the environment influences consumer behaviour. However, the amount of research and the consistency of some findings makes it possible to categorise these influences and hence understand the key environmental drivers of behaviour. The typology developed by the Behaviour and Health Research Unit in Cambridge (see Figure 2) is used to categorise such changes[41].

Figure 2: Typology for changing environments to change behaviour

Type of change		Illustrative alcohol example
Placement	Availability	Increasing the number of non-alcoholic options available
	Positioning	Placing the drinks menu further from customers
Properties	Presentation	Health warning on product packaging
	Serving size	Reducing the standard glass of wine serving size
	Information	Alcohol units on products
	Functioning	Serving beer in individual glasses rather than pitchers

The vast majority of trials testing the impact of changes to these factors have to date focussed on diet. In a review of 440 studies on diet, physical activity, alcohol and tobacco; just 7% looked at alcohol consumption. Of these, most were studies of how the ambience of a venue (typically music) influences consumption. Therefore, we cannot say which type of environmental influence is most important. Note that in the section on environment-focussed behavioural interventions we draw on broader evidence (e.g. not just randomised trials).

In Figure 3, we set out the evidence of the relative impact of changes to environmental influences on food choice and consumption[42]. While we cannot say that these findings apply to alcohol, we feel that the there are enough similarities to warrant including in this report.

Figure 3: Evidence on the relative impact of changes to environmental influences on food choice and consumption

What we know about environmental influences and food consumption

A review of healthy eating interventions found that reducing plate and portion size and making healthier options more convenient were most effective. Nutritional labelling was least effective.[42]

The conclusion of this review is that changes are more effective when they are "action-focussed" – i.e. affect how a person actually consumes rather than focussed on influencing how customers feel or think about their choice. The table below summarises the relative impact of different interventions.

Type of change		Impact on behaviour
Changes to influence how consumers ***act***	Plate and portion size changes	Most effective
	Convenience enhancements (e.g. making healthier foods the default choice)	
Changes to influence how consumers ***feel***	Sensory cues (e.g. describing healthier food as more attractive)	
	Healthy eating prods (e.g. "would you like to take a half portion")	
Changes to influence how consumers ***think***	Visibility – making healthy (unhealthy) options more (or less) prominent	
	Evaluative nutritional labelling (e.g. red stickers on unhealthy options)	
	Descriptive nutritional labelling – calorie or nutritional information.	Least effective

We cannot assume that the same findings would apply to alcohol consumption. However, food and alcohol drink choices whether in a supermarket or bar/restaurant are similar. Both can be impulsive with immediate "wants" outweighing long term "shoulds".

Interventions to reduce consumption

In this section we review interventions to reduce alcohol consumption. We begin with an overview of the relative effectiveness of regulatory and non-regulatory approaches. We then focus on non-regulatory approaches - those most relevant to Drinkaware's work and goals.

Overview of regulatory and non-regulatory approaches

It should be noted that harder, legislative interventions are most effective at reducing consumption. A review of effectiveness and cost effectiveness of various interventions to reduce consumption in England drew the following conclusions[43].

Figure 4: Effectiveness and cost-effectiveness of regulatory and non-regulatory approaches in reducing consumption

Intervention	Type	Conclusion
Taxation and price regulation	Regulatory	Effective and cost-effective
Regulating marketing	Regulatory	Effective and cost-effective
Temporal availability (opening hours)	Regulatory	Effective and cost-effective
Individual behaviour change interventions for at-risk drinkers	Non-regulatory	Effective
Interventions in and around drinking environments	Non-regulatory	At best lead to small reductions in alcohol related harm
Information and education	Non-regulatory	No long-lasting changes but raise awareness

In this review the focus is on non-regulatory interventions only, since they are most relevant to this literature review and the focus of Drinkaware's efforts. The next section discusses individual interventions. This is followed by a section on environment focussed interventions which includes interventions in and around drinking environments and information and education.

Individual-focussed behaviour change interventions

This section will discuss behavioural change interventions which aim to reduce consumption over the medium to long term. These interventions are typically face-to-face interventions where outcomes are reported alcohol consumption at one or more follow-up points between one-month and one-year post intervention.

It should be noted that there is some overlap between these interventions. In particular, Identification and Brief Advice (IBA) interventions can include elements of feedback, motivational interviewing and protective behavioural strategies. Figure 5 summarises the types of interventions reviewed in this section (please see Annexe 1 for the Cochrane reviews which were analysed for this report).

Figure 5: Overview of individual-focused behaviour change interventions and evidence of impact

Intervention	Summary	Evidence of impact
Protective Behavioural Strategies	Refers to strategies that people may naturally use such as non-alcohol drinks between alcoholic ones. Interventions encouraging people to use them have been tested.	Those who naturally use them consume less. Mixed evidence that interventions to promote use can moderate drinking.
Motivational Interviewing	Interventions that encourage people commit to changing behaviour and work through ambivalence or other barriers.	Review of interventions with young people finds reduction in overall consumption at 4 months but no effect on alcohol misuse (e.g. binge drinking)
Expectancy Challenge	Challenging a person's expectations about drinking (e.g. moderating positive expectations) in order to reduce consumption.	Reviews have yet to find more than short-term effects.
Feedback	Providing feedback to people about their drinking.	Evidence that feedback alone can reduce short term consumption (up to 4 months) but not long term (4-12 months).
Personality-targeted interventions	Incorporating elements of Cognitive Behavioural Therapy (CBT) and Motivational Enhancement Therapy (MET) in an intervention to moderate effect of personality traits on consumption.	Lack of evidence and currently only tested with adolescents and young people. Some evidence of effects on teenage drinking.
Brief Interventions (typically IBA)	Broad set of interventions: typically short face-to-face intervention identifying heavy drinking and giving advice about reducing consumption.	Review of face-to-face interventions with heavy drinkers found average reduction of 1 pint per week 12 months later. Review of digitally-delivered brief interventions found these to have similar effects to face-to-face interventions.

Protective Behavioural Strategies: Protective behavioural strategies describe a broad set of approaches which people may use to moderate their alcohol intake (e.g. spacing alcoholic with non-alcoholic drinks). The use of these has been widely studied among U.S. college students[44]. The evidence suggests – perhaps unsurprisingly - that students who naturally employ these strategies consume less alcohol. However, studies that test whether interventions aiming to increase use of PBS can in turn reduce consumption find mixed evidence. Two out of four studies in one review found evidence of reduced consumption[45].

Expectancy Challenge Interventions: As outlined earlier, Expectancy Theory suggests that alcohol consumption is driven primarily by a person's expected outcomes from drinking. It follows from this that changing a person's expectations can influence their consumption, these are called "expectancy challenge" interventions. A review of such interventions found no evidence of any long-term effects[46]. Challenging expectations can increase/ decrease consumption within a lab setting. A more recent review of such interventions among U.S. college students found that Expectancy Challenge Interventions can reduce consumption over a short to medium term follow-up period (roughly one month) but no effects were seen six months post-intervention[47].

Feedback: Giving feedback on behaviour can be a strong lever to prompt change. A meta-analysis found that digital personalised-normative-feedback for students (e.g. you drink more than 72% of students on campus) reduced reported consumption at follow-up by three drinks per week on average[48]. The follow-up periods were medium term, only one of seven studies had a follow-up period of more than three months. A Cochrane review however found that over longer follow-up periods (four months or more) there was little or no effect of social-norms feedback on alcohol consumption or alcohol misuse. 70 studies involving college and university students were included.

Motivational Interviewing: Motivational Interviewing (MI) is a behavioural technique to encourage people to commit to changing behaviour and work through ambivalence or other barriers[49]. MI refers not only to behavioural techniques but also to a way of relating to a person. The five key aspects of MI are; an empathetic approach, reflective listening, developing discrepancy, avoiding argument and supporting efficacy to change[50] [51]. A Cochrane review looked at 77 studies where MI was the core intervention component (often along with some form of feedback) aiming to reduce excessive drinking and alcohol related problems among young people (under 25)[52]. Typically, sessions took between 30 minutes and one hour. The review found that on average those receiving MI reduced consumption by 1.2 drinks per week (13.7 to 12.5) compared to those who received no intervention or a non-MI alternative. However, they find no meaningful impact on alcohol-related problems and note that the quality of evidence is low.

Personality-targeted Interventions: Motivational models of alcohol consumption have led to interventions targeting higher risk groups with interventions focussed on personality traits that predispose them to higher consumption.

No systematic review of such interventions was found and all studies found involved adolescents, college students or problem drinkers. One such intervention took secondary school students (13-14 years) who had a high-risk profile based on one of four personality measures: anxiety sensitivity, hopelessness, impulsivity, and sensation seeking[53]. Limited detail is given on the intervention itself, but it was delivered by teachers (who had been trained) in school over two 90-minute sessions. This intervention incorporated elements of Cognitive Behavioural Therapy (CBT) and Motivational Enhancement Therapy (MET). These interventions focussed not on alcohol and drug use but on personality-specific behaviours[54]. At six-month follow-up, students who received this intervention were less likely to report binge drinking (13% compared 18%). While at 24-month follow-up there was still a difference, but this was smaller (38% versus 41%).

Identification and Brief Advice: Identification and Brief Advice (IBA) describes short interventions with an individual, typically a few minutes face-to-face whereby their high level of drinking is identified (e.g. through an AUDIT-C) and then they are given some advice on how to reduce consumption. The advice can include information on the risks of alcohol consumption and some simple advice on how to reduce consumption (e.g. quench thirst with a non-alcoholic drink, avoid buying rounds of drinks, set goals and limits).

A Cochrane review of brief interventions in primary care concludes that there is “moderate-quality evidence that brief interventions can reduce alcohol consumption in hazardous and harmful drinkers compared to minimal or no intervention. Longer counselling duration probably has little additional effect”[55].

A further Cochrane review looked at the effect of brief personalised interventions delivered digitally. It found moderate-quality evidence that advice delivered digitally could not only reduce alcohol consumption but was also about as effective as advice delivered face-to-face[56]. Positive effects were seen one, six and 12 months after advice and reduction in consumption was estimated to be equivalent to 1.5 pints of beer each week.

Summary of person-focussed interventions
There is no "off the shelf" person-focussed behavioural intervention which has been shown to work consistently and better than others. However, we believe that some key components drive the effectiveness of these interventions. These components are meaningful feedback about consumption, recommending easy steps to change and helping people to overcome behavioural barriers.

Environment-focussed behaviour change interventions

This section reviews the evidence around interventions in the drinking environment. These include information and social messaging along with changes to how alcohol is served.

Information: A review of various approaches to reducing alcohol consumption in the UK concluded that information and education were important to inform consumers and increase support for more stringent measures. However, it finds little high-quality evidence that such interventions alone are cost effective[57].

An international review found that people overestimate the size of a standard drink or unit of alcohol[58]. These studies found that participants with greater knowledge of standard drinks guidelines were more accurate. However, this does not necessarily mean that these people were more likely to drink within official recommended guideline amounts (the studies did not look at this outcome). Indeed, a study in Australia found that higher consumption was correlated with better recollection of the standard drink labelling on products[59].

Another recent review found that standard drink labelling in Australia (where it has been in place since 1995) has been effective in increasing awareness of what a standard drink is, and is the preferred labelling format among consumers[60]. However, the review also concludes that it is unlikely that the impact of standard drink labelling on awareness and knowledge has translated into positive behavioural change.

A paper investigated whether the publication of revised alcohol guidelines in the UK in January 2016 led to a change in behaviour[61]. This was tested through surveys which explored whether greater exposure to the new guidelines changed respondents' attitudes. While they find some evidence of changes in survey reports of people tracking units consumed, the authors conclude that these effects are small and transient, suggesting that there was little effect on behaviour. The authors conclude that guidelines "do not implement themselves" and that they must be supported by evidence-based strategies to help people implement them.

Social messaging: In this section we review the evidence that social messaging can moderate alcohol consumption.

A 2013 review looked at social messaging to reduce alcohol consumption and related harm, the review only found six eligible studies. These messages promoted moderate drinking (e.g. "be under your own influence" or discouraged drink driving (e.g. "Thanks for being a sober driver"). The quality of the evidence is poor and as such the authors cannot assess the

effectiveness of such messaging. One study found that responsible drinking messages led to greater consumption[62]. In this study the specific message came from a 2012 UK Drinkaware Trust campaign - "Why let the good times go bad".

One social marketing campaign which has shown some promising evidence is "Dry January"[63]. A study found that those who successfully complete Dry January reduced their subsequent alcohol consumption with no evidence of "rebound effects" from people binge drinking in February. This could be because the wellbeing benefits of reducing consumption are realised during a period of abstinence. This intervention also taps into the "fresh start effect" whereby we are more likely to make a positive behavioural change at the start of year, a school term or on our birthday[64].

Training of bar staff: A Cochrane review looked at server setting interventions which aimed to reduce alcohol related harm (measured by injuries, aggressiveness, drink driving and road fatalities)[65]. The majority of these interventions were server training - e.g. raising awareness of alcohol service laws and recognition of drunkenness.

The conclusion from this review is that the quality of evidence is generally weak and that there is no reliable evidence that interventions reduced alcohol related injury or alcohol consumption (in studies which measured this outcome).

There is more supportive evidence from a study in Sweden which looked at the effect of training bar staff not to serve intoxicated customers on violent assault rates. The study finds that introduction of this training was associated with a 3.1% reduction in night-time assaults[66].

Summary of environment-focussed interventions

There are two primary takeaways from this review. Firstly, high quality evidence is lacking. We know that much about the environment, in which we chose purchase and consume alcohol may affect our behaviour, but we don't know what behavioural interventions are most likely to reduce consumption. Secondly, while knowledge of standard drinks is necessary for alcohol guidelines to be understood there is no evidence that this knowledge and understanding alone moderates consumption. Evidence-based strategies and resources could help consumers implement guidelines.

Conclusion

This review has outlined the behavioural theories, interventions and insights which are most relevant to Drinkaware's mission to prevent and reduce alcohol misuse in Ireland.

Annexe 1: Search Strategy and Cochrane Reviews

This annexe includes a brief overview of the search strategy used for this review, some comments on the literature found and a table showing the Cochrane reviews used in this study.

Search Strategy

The search strategy for this review is briefly outlined below:

- *Determinants of alcohol consumption:* Google scholar searches for "determinants/factors correlated with alcohol consumption" (and variants thereof).
- *Relevant behavioural theories*: We have started with searches related to Theory of Planned Behaviour and alcohol/health. We also use a review paper on behavioural theories relevant to addictive behaviours[67]. Literature related to determinants of alcohol consumption (in particular; Ham and Hope, 2003)[68] led to Motivational and Expectancy based theories of alcohol consumption.
- *Behavioural interventions:* The Cochrane Library was searched for "alcohol". All interventions which were behavioural and where subjects were not addicted to alcohol (or another substance) or suffering a mental illness were included. Further studies were identified through reading the literature found through the searches outlined above.
- *Environmental changes to affect behaviour:* A Cochrane review along with studies produced by Theresa Marteau's research group at Cambridge were the starting point for finding relevant studies.

Comment on the literature

Two aspects of the literature reviewed in this report are notable. Firstly, the relative lack of literature on environmental interventions to influence alcohol consumption (compared to food for example). Secondly, the large volume of studies from the U.S using student participants.

We attribute the first of these points to three main factors:

- *Policy relevance of behavioural interventions:* Given that alcohol is a much more highly regulated product than food (availability, taxation, eligibility to purchase) the policy levers being used to influence consumption have generally been legislative. With food/drink there is less of a policy appetite towards regulation of purchasing or taxation (the sugary drinks levy in the UK is an exception). Therefore, the impact of non-regulatory "nudge" type approaches has been of greater interest.
- *A few key academics:* Fields of research often develop around specific research programmes. In the area of food research a few key academics have driven much of the research. Pierre Chandon at INSEAD is one such researcher.
- *Interest in behavioural "nudges" is relatively recent:* Interest in the area of environmental impacts on behaviour is relatively recent (5-10 years). Evidence takes a time to build, in 5-10 years there should be a lot more alcohol research published.

The volume of research from the U.S. using students can be attributed to two factors. Firstly, as with many areas of research, students are convenient study participants. Secondly, there is a policy interest in the campus drinking in the U.S. not least because of the higher legal drinking age.

Cochrane Reviews

The table below combines the most relevant Cochrane reviews and includes the authors' conclusions from each study along with the hyperlink to each. Note that not all studies below were deemed relevant for inclusion in the report.

Summary of conclusions from Cochrane Reviews

Intervention	Authors conclusions	Paper title and link
Motivational Interviewing	The results of this review indicate that there are no substantive, meaningful benefits of MI interventions for preventing alcohol use, misuse or alcohol-related problems. Although we found some statistically significant effects, the effect sizes were too small, given the measurement scales used in the included studies, to be of relevance to policy or practice. Moreover, the statistically significant effects are not consistent for all misuse measures, and the quality of evidence is not strong, implying that any effects could be inflated by risk of bias.	Motivational interviewing (MI) for preventing alcohol misuse in young adults is not effective enough
Brief Alcohol Interventions	Authors' conclusions: We found moderate-quality evidence that brief interventions can reduce alcohol consumption in hazardous and harmful drinkers compared to minimal or no intervention. Longer counselling duration probably has little additional effect. Future studies should focus on identifying the components of interventions which are most closely associated with effectiveness.	Effectiveness of brief alcohol interventions in

		primary care populations
Personalised digital interventions (digital IBA)	There is moderate-quality evidence that digital interventions may lower alcohol consumption, with an average reduction of up to three (UK) standard drinks per week compared to control participants. Substantial heterogeneity and risk of performance and publication bias may mean the reduction was lower. Low-quality evidence from fewer studies suggested there may be little or no difference in impact on alcohol consumption between digital and face-to-face interventions. The BCTs of behaviour substitution, problem solving and credible source were associated with the effectiveness of digital interventions to reduce alcohol consumption and warrant further investigation in an experimental context.	Personalised digital interventions for reducing hazardous and harmful alcohol consumption
Interventions in server settings	There is insufficient evidence from randomised controlled trials and well conducted controlled before and after studies to determine the effect of interventions administered in the alcohol server setting on injuries. Compliance with interventions appears to be a problem; hence mandated interventions may be more likely to show an effect. Randomised controlled trials, with adequate allocation concealment and blinding are required to improve the evidence base. Further well-conducted, non-randomised trials are also needed when random allocation is not feasible.	Are interventions that are implemented in alcohol server settings (e.g. bars and pubs) effective for preventing injuries?
Social norm based feedback	The results of this review indicate that no substantive meaningful benefits are associated with social norms interventions for prevention of alcohol misuse among college/university students. Although some significant effects were found, we interpret the effect sizes as too small, given the measurement scales used in the studies included in this review, to be of relevance for policy or practice. Moreover, the significant effects are not consistent for all misuse measures, heterogeneity was a problem in some analyses and bias cannot be discounted as a potential cause of these findings.	Social norms interventions are not effective enough on their own to reduce alcohol use or misuse among university or college students
Banning or restricting advertising for alcohol	Authors' conclusions: There is a lack of robust evidence for or against recommending the implementation of alcohol advertising restrictions. Advertising restrictions should be implemented within a high-quality, well-monitored research programme to ensure the evaluation over time of all relevant outcomes in order to build the evidence base.	Does banning or restricting advertising for alcohol result in less drinking of alcohol?
Psychosocial and developmental programmes in schools	This review identified studies that showed no effects of preventive interventions, as well as studies that demonstrated statistically significant effects. There was no easily discernible pattern in characteristics that would distinguish trials with positive results from those with no effects. Most commonly observed positive effects across programs were for drunkenness and binge drinking. Current evidence suggests that certain generic psychosocial and developmental prevention programs can be effective and could be considered as policy and practice	Psychosocial and Developmental Alcohol Misuse Prevention in Schools can be effective

	options. These include the Life Skills Training Program, the Unplugged program, and the Good Behaviour Game. A stronger focus of future research on intervention program content and delivery context is warranted.	
Personalised digital advice	There is moderate-quality evidence that digital interventions may lower alcohol consumption, with an average reduction of up to three (UK) standard drinks per week compared to control participants. Substantial heterogeneity and risk of performance and publication bias may mean the reduction was lower. Low-quality evidence from fewer studies suggested there may be little or no difference in impact on alcohol consumption between digital and face-to-face interventions. The BCTs of behaviour substitution, problem solving and credible source were associated with the effectiveness of digital interventions to reduce alcohol consumption and warrant further investigation in an experimental context. Reporting of theory use was very limited and often unclear when present. Over half of the interventions made no reference to any theories. Limited reporting of theory use was unrelated to heterogeneity in intervention effectiveness.	Does personalised advice via computer or mobile devices reduce heavy drinking?
Multi-component interventions for young people	There is some evidence that multi-component interventions for alcohol misuse prevention in young people can be effective. However, there is little evidence that interventions with multiple components are more effective than interventions with single components.	Universal multi-component alcohol misuse prevention for young people can be effective

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