

# Interventions to Improve Public Support for Public Health Policy: A Systematic Review

Rachel Coleman

MSc By Research

University of York

Health Sciences

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## Abstract

This thesis explores corporate determinants of health and how transnational corporations oppose evidence based policy measures aimed at reducing harm. Alcohol was explored as an example where there is considerable population harm and where transnational corporations attempt to influence health policies. The Lima and Galea (2018) framework was used to consider how the alcohol industry influences population health to protect profits. Public support for policy measures was shown to influence likelihood of adoption of evidence based policy to improve population health. Studies of support for alcohol policy measures were explored in detail, and provided a rationale for exploring interventions to promote public support for alcohol policy measures. However, scoping searches found only one evaluation of an intervention to improve public support for alcohol policy measures, therefore the work was broadened to include all public health policy measures.

A systematic review was conducted to take stock of the evidence on the effectiveness of different approaches to influencing public support for a range of public health policy measures. Components of interventions demonstrating evidence of effect were explored in a narrative synthesis, and effectiveness data for included studies was pooled using both random and fixed effects meta-analyses where appropriate. In summary, interventions of this type are shown to elicit small but significant improvements in public support for public health policy measures.

Implications for future research are to build on the findings of this review to develop interventions to improve public support for public health policy measures , with a focus on 'real world' settings and engagement of key stakeholders to deliver the intervention to the general public. This could contribute to improving public support for evidence based policy measures, increasing the likelihood of adoption and implementation of these policies which will improve population health and reduce harms due to noncommunicable diseases.

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## Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as references.

## Chapter 1: Introduction

This chapter presents an overview of corporate determinants of health and adopts a framework for exploring how policy measures can reduce non-communicable diseases (NCDs) caused by products produced by transnational corporations, and how corporations challenge and avoid regulation to minimise impact on profits. Public support for policy measures is considered and demonstrated to be an important part of policymakers' decision making. Ways of improving public support for evidence based policy measures is identified as an important area of research to pursue. Alcohol policy is explored as a particular example of an area where industry products and activities contribute to NCDs, and corporations attempt to avoid and minimise regulation. Ways of improving public support for alcohol policy measures are discussed, and the chapter concludes that interventions to improve public support for public health and climate change policy measures should be studied to determine 'what works' in intervening in public support in this way.

### **Corporate Determinants of Health**

#### Corporations influence society and public health

Transnational corporations dominate global trade and investment, and can influence society in positive and negative ways (Baum et al., 2016). Positive corporate activities might include creation of jobs, good employment packages and contributions to taxation (Millar, 2013). However, particular corporations are more likely to influence health adversely, due to production or promotion of harmful products such as high calorie foods/sugary drinks, tobacco and alcohol, and pollution associated with production (Jahiel, 2008; Millar, 2013; Moodie et al., 2013; Kickbusch, Allen and Franz, 2016; Parra et al., 2018), and it is vital to continue to assess the impact of transnational corporations in society to prevent this (Baum et al., 2016; Lima and Galea, 2018).

Commercial determinants of health are defined as strategies or approaches used by corporations to promote products and choices that are detrimental to public health (Kickbusch et al., 2016).

Corporation-induced diseases are defined by Jahiel (2008) as diseases of consumers, workers or community residents who have been exposed to disease agents contained in corporate products. Transnational corporations through the production and exposure to harmful products are major drivers of NCDs, resulting in approximately a third of deaths. 12% of global disability-adjusted life years worldwide are attributable to consumption of unhealthy commodities and increased exposure to these commodities through corporate activity (Lima and Galea, 2018; Moodie et al., 2013).

In 2013 The Global Action Plan for Prevention and Control of Non-Communicable Diseases set out voluntary global targets and outlined the need to create “health-promoting environments” to reduce risk factors (WHO, 2013). Subsequently, in the “Time to Deliver” report the WHO has been encouraged to make a “serious change in approach to non-communicable diseases” if the global target of reducing one third of pre-mature deaths from NCDs by 2030 is to be met (Nishtar et al., 2018). Public health policies can be an effective approach to reducing the prevalence of harmful behaviours. For alcohol, one of the most effective and cost-effective policies are those aimed at reducing the affordability and accessibility of alcohol (Babor, 2010). Similarly, for tobacco policies including increasing taxation of cigarettes and prohibiting smoking in public places have been shown to be effective (Callinan et al., 2010). Restrictive policies, which limit access to health harming products, can be expected to be met with opposition by the affected industry, and potentially also by the public (Shelley, Ogedegbe and Elbel, 2014). Failure by governments to adopt and implement known effective policy measures to combat the harmful effects of health behaviours will result in increased burden of ill health and other negative social outcomes.

#### Ways of understanding corporate determinants of health

Several frameworks have been developed which help us to understand the various ways in which the activities of corporations influence health. These cover all aspects of society such as workforce, social conditions, economic mediators and consumption patterns, as well as taking into account corporate citizenship, lobbying and promotion of products and choices which are detrimental to population health in favour of profitability (Jahiel, 2008; Kickbusch et al., 2016; Baum et al., 2016; Lima and Galea, 2018).

Baum et al. (2016) developed a framework for assessing the impact of corporations on public health which allowed for the possibility of recognising positive and negative impacts on health. They considered the domains of the workforce, social conditions, environment, consumption patterns and economic mediators of health impact (Baum et al., 2016). Lima and Galea (2018) built on the work by Baum et al. (2016) to develop a comprehensive framework which incorporates all aspects of corporate action (see Figure 1) – including interference with scientific research and how corporations engage with public discourse around regulation of harmful commodities. They use corporate power as a lens to understand the influence corporations have on population health, with particular attention to the political, legal and knowledge environments. As well as environmental considerations, this framework takes into account preference shaping with regards to capturing the media, corporate social responsibility (CSR), marketing and targeting vulnerable populations. I have

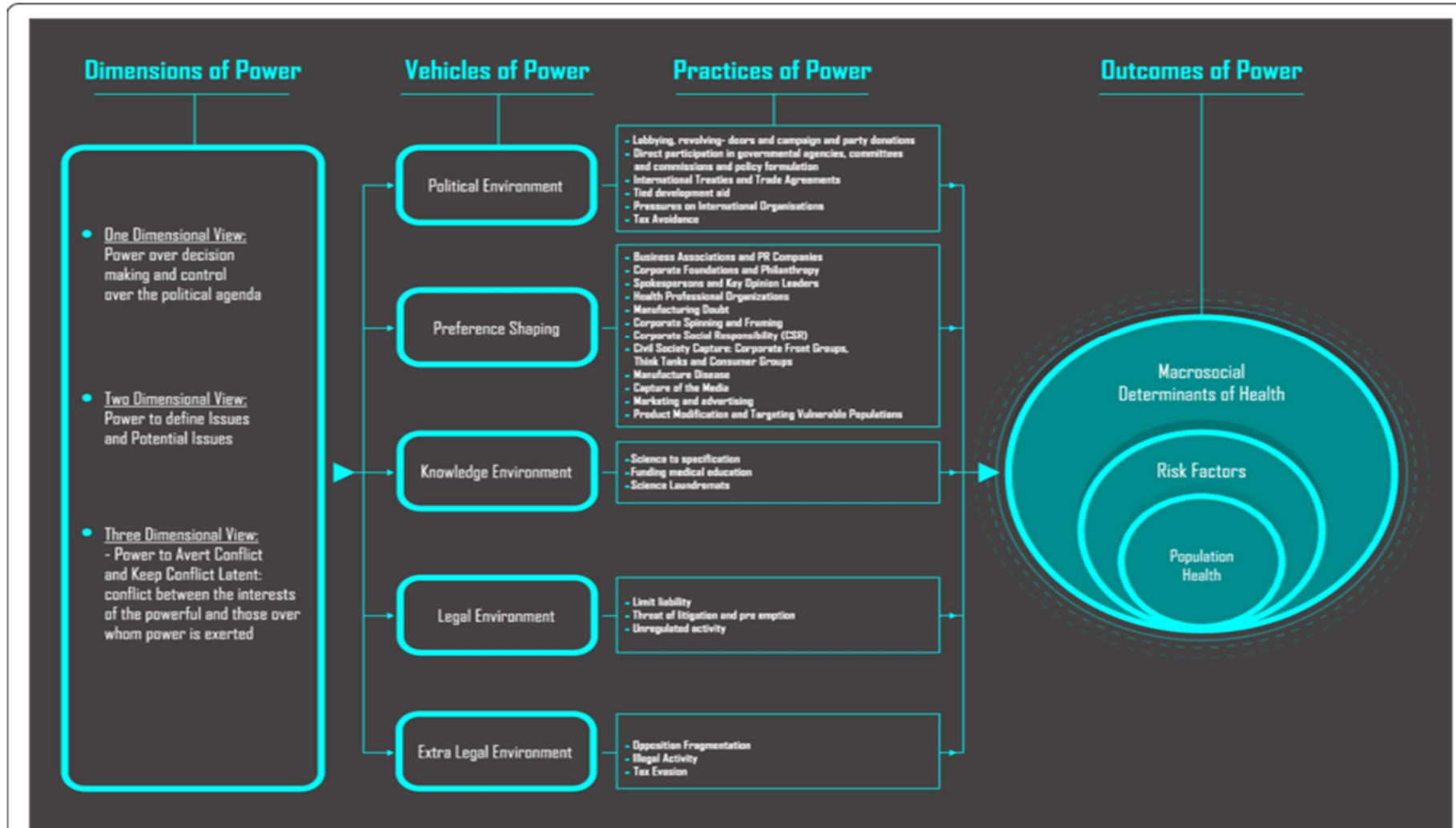
chosen to use this framework for this thesis as it is comprehensive and focuses on public discourse and corporate efforts to influence the preferences of the general public with regards to their products and activities. This framework is used to organise the thinking in the rest of this chapter and Chapter 2, with regards to how corporate activities influence population health.

#### Corporate opposition to evidence based policy measures

Policy measures to regulate harmful commodities such as tobacco, food/sugary drinks and alcohol are essential to reduce public health harms and are more effective at reducing burden at a population level than individual behaviour based interventions (Moodie et al., 2013; Parra et al., 2018). However, selling these products is highly profitable for transnational corporations and efforts to prevent NCDs caused by exposure to these products can undermine the business interests of these corporations (Kickbusch et al., 2016). Corporations advocate 'self-regulation' when it comes to public health harms, but there is little evidence for the effectiveness of this strategy and government regulation through evidence- based public health policy is more likely to be effective in protecting health of the population (Moodie et al., 2013).

Corporations strive for control of the political and knowledge environments in order to prevent or avoid government regulation of harmful products in numerous ways (Jahiel, 2008; Kickbusch et al., 2016; Lima and Galea, 2018; Millar, 2013; Moodie et al., 2013). Corporations lobby policymakers for a place at the table of decision making in order to influence or delay evidence based policy implementation; engage in corporate social responsibility (CSR) activities to deflect attention; attempt to throw doubt on scientific evidence which shows harm and frame health issues resulting from their products as down to freedom of choice or individual responsibility (Jahiel, 2008; Kickbusch et al., 2016; Lima and Galea, 2018; Millar, 2013). These political and preference shaping strategies have been demonstrated to be consistent across corporations which produce and promote a range of unhealthy commodities, with the food/sugary drinks and alcohol industries using similar tactics to the tobacco industry (Jahiel, 2008; Lima and Galea, 2018; Millar, 2013; Moodie et al., 2013; Petticrew et al., 2018).

Figure 1. Lima & Galea's Framework for Understanding Corporate Influence on Population Health



As outlined in the framework in Figure 1, corporations use a range of techniques to shape preferences for their particular products. They also emphasise the role of personal responsibility in consumption and give this primacy over government interventions such as restrictive policy measures to reduce consumption and harms related to their products (Lima and Galea, 2018). This emphasis on personal responsibility taps into a particular public desire to have freedom to make choices without government interference. For example, the automobile industry highlights the responsibility of the driver, rather than their responsibility to manufacture vehicles which are safe to drive (Lima and Galea, 2018). This approach has been used by several corporations which produce and promote use of potentially harmful products (more detail in Chapter 2, with alcohol as an example).

Transnational corporations manufacture doubt in understanding of scientific evidence, which was done successfully by tobacco companies for many years by using targeted science to ‘muddy’ understanding of the risks of smoking. As mentioned above, CSR strategies are effective in projecting a positive image of the corporation or brand, and by extending marketing reach of products. For example, Stella Artois have a partnership with Water.org (Hennessy, 2019), donating billions of dollars and also pledging that if you purchase their product you can “Buy a Lady a Drink” – i.e. if you buy a bottle of beer, you are contributing to buying clean water for women in poverty. This campaign is effective as it encourages purchase of their product, whilst projecting an image of a company which supports people living in poverty without clean water. This contributes to preference shaping in public support for policy measures by creating an image of a product and brand which is positive, and potentially therefore should not be restricted.

### **Why Public Support Matters**

Public support can be pivotal for policy change, as public support is an important factor which is considered by policymakers, particularly in the case of salient (noticeable or important) policy issues (Burstein, 2003; Shapiro, 2011), and which can thus have an impact on policy decisions and implementation (Scully et al., 2017; Ialomiteanu et al., 2014). It is therefore in the interest of transnational corporations to attempt to shape preferences for policy measures which may impact profitability (Lima and Galea, 2018), which they do in a number of ways (as outlined above).

There are several factors which influence public policy and the impact of public support varies depending on the issue at hand. It has been suggested, for example, that “no one believes that public opinion always determines public policy, few believe it never does” (Burstein, 2003).

Therefore, public support is likely to be important to some degree in how policy decisions are made and implemented. Key evidence reviews (Shapiro, 2011; Burstein, 2003) in political science (outlined in more detail below) have identified salience of the policy issue as one of the key mediators of whether public support influences policymaking, as well as political climate and involvement of interest organisations. Generally speaking, a policy issue is salient if the general public deem a policy issue to be important (and something they care about).

Within the political science literature, I identified two prominent reviews of the impact of public support on policymaking via scoping searches and discussions with colleagues with political science expertise (Burstein, 2010; Shapiro, 2011), both of which explore the relationship between public opinion and policymaking. The most recent review (Shapiro, 2011) explored the assumption that public opinion had a strong impact on policymaking, and whether that assumption had been borne out. They concluded that the relationship between public support and influence on policymaking is “amazingly robust”, highlighting that even when other factors which influence policymaking are controlled for, public opinion still has a significant impact on policy decisions (Shapiro, 2011). One key mediator for this (and which appears throughout the political science literature) is the salience of the policy in question, which affects the “attentiveness and responsiveness” of policymakers to a particular issue (Shapiro, 2011; Burstein, 2003; Burstein, 2010). The more prominent, important and noticeable (or salient) a particular policy issue is, the more likely it is to matter to members of the public, and therefore make it onto national political agendas, particularly around election times (Shapiro, 2011).

The other key review (Burstein, 2010) identifies that the public opinion literature shows that public opinion has a “strong effect” on policymaking, but encourages attention to other potential factors which influence policymaking, and what that means for the democratic process. Although public opinion has been demonstrated to be important in influencing policymaking decisions (as above), there are some caveats to consider. Firstly, the studies referenced above all focussed on American policymaking, and although they used research from other “liberal, democratic” nations, the particular political climate of other countries may need to be considered

Both of these reviews in the political science literature also highlight that the relationship between public opinion and policymaking may be subject to more covert influences, as political elites can help to shape public opinion in the first place (Burstein, 2010; Shapiro, 2011). They both also point out that the reason there may be so much evidence of responsiveness to salient policy issues is because

there is more likely to be research done on salient issues, as there is more interest in those issues from researchers and governments (Shapiro, 2011; Burstein, 2010).

As outlined above, there are some limitations in the literature on public support and its impact on policymaking. The focus of the literature is on liberal, democratic nations, and the landscape of public support may be shaped by political elites in the first place (and therefore the types of policy measures which are studied). It is also acknowledged that the relationship between public support and policymaking is not a 'clear cut' one, however this is, to some degree, to be expected. Public policy and policymaking decisions, and how the general public perceive and make sense of these are influenced by other factors such as activity of vested interests, political climate, mass media and relevant events (Burstein, 2010). Despite these limitations, there remains a consensus that public support is crucial for policy change (Macdonald, Stockwell and Luo, 2011; Pechey et al., 2014), particularly for salient policy issues (Shapiro, 2011; Burstein, 2003).

In the literature, the terms 'public opinion' and 'public support' tend to be used interchangeably to denote whether the general public is in favour of a particular policy measure or not. In this thesis, I made the decision to use the term 'public support', as this is more reflective of whether the general public support the adoption and implementation of a particular policy. However, papers will be referred to which use either term.

### **Alcohol: An example of a public health policy issue which is affected by Corporate Determinants of Health**

In Chapter 2, alcohol is used as a case study of corporate determinants of health and is explored as an example of a policy area, using the framework proposed by Lima and Galea (2018) to organise information. I have a particular interest in alcohol policy, as alcohol harms cause significant burden through NCDs and societal impact (Burton et al., 2017; Jones et al., 2008; Phillips, Coulton and Drummond, 2016). Alcohol is also a product which is promoted and manufactured by transnational corporations, who have a particular interest in perpetuating the profitability of alcohol as a commodity. Chapter 2 explores alcohol as a public health issue, influence of industry activities using the framework proposed by Lima and Galea (2018), and provides a summary of the literature on public support for alcohol policy measures, and which individual characteristics are predictive of policy support.



## Chapter 2: Alcohol Policy - An Example of Corporate Influence on Public Health

Chapter 1 explored corporate determinants of health, and the importance of public support in adoption and implementation of evidence based policy measures to reduce the burden of NCDs. Also outlined are the attempts of transnational corporations to shape preferences for products and also policy measures which impact their profits. This chapter uses alcohol policy as a case study of corporate determinants of health, exploring the burden of alcohol harms, industry “preference shaping” with regards to alcohol and attempts to shape the political and policy environment around alcohol to ensure profitability (Lima and Galea, 2018). What follows is a more detailed example of corporate influence, using alcohol policy and the alcohol industry to illustrate these concepts through the prism of the framework proposed by Lima and Galea (2018).

### **Background**

Alcohol was responsible for £21 billion of alcohol attributable costs in the UK in 2009 as well as significant non-monetary costs to individuals and families (Burton et al., 2017). An alcohol attributable cost is any contribution of alcohol to healthcare required for particular health conditions (ranging from liver cirrhosis to breast cancer) (Jones et al., 2008; Phillips et al., 2016). Public Health England published an evidence review of alcohol burden and the effectiveness and cost effectiveness of alcohol control policies in 2016 and stated that alcohol misuse is the biggest factor attributable to early mortality, ill-health and disability for those aged 15-49 years (Burton et al., 2017). The review highlights the importance of policies to reduce affordability of alcohol as being the most effective and cost effective approaches to disease prevention and health improvement. Other effective policies to reduce harms caused by alcohol are regulatory and involve managing the availability and marketing of alcohol (Anderson, 2009; Babor, 2010). It is crucial that governments adopt and implement effective policy measures to combat the harmful effects of alcohol in society (Babor, 2010). In “No Ordinary Commodity”, Babor (2010) emphasises the particular challenge faced by public health advocates in the field of alcohol policy because of the tension between health and social values such as individual freedom. Babor (2010) also highlights the capacity of the alcohol industry to influence public policy, as the industry’s combined wealth “exceeds the gross national product of most non-industrialised countries” and affords them the capacity to participate in democratic process, and shape discourse on alcohol policy issues within the public and policymaking arenas (Babor, 2010).

### **Alcohol Industry Influence on Public Support for Policy Measures (Preference Shaping)**

An exploration of public support for alcohol policy and related issues must consider the potential influence of the alcohol industry on public perceptions and policymaking. The alcohol industry comprises businesses, interested in increasing profits, and therefore increasing how much alcohol is purchased (Jones, Wyatt and Daube, 2016). Profitability may be affected adversely by restrictive alcohol policies such as increasing price and reducing availability as those which have been shown to be the most likely to be effective (Babor, 2010). Therefore the industry supports low impact policy measures such as educational campaigns, and opposes high impact policy measures such as pricing and taxation (Babor and Robaina, 2013). It is in the interests of the alcohol industry or any corporate sector for public opinion to align with their perspectives on public policy, generally meaning lower levels of regulation. Public health researchers and advocates are therefore in direct competition with messaging from the alcohol industry, and any attempt to improve public support for effective alcohol policy must take into account competing messages from the alcohol industry.

Attempts by the alcohol industry to influence alcohol policy occurs within the wider context of preference shaping tactics. What follows is an overview of industry tactics, as they contribute to preference shaping and influence policy support (Lima and Galea, 2018).

### Corporate Social Responsibility (CSR) & Social Aspects Organisations (SAPROs)

It has been suggested that the alcohol industry uses CSR campaigns to project an image of concern for alcohol related harms, and to give members of the public the impression that something is being done, whilst having little real impact on alcohol related harms or benefit to public health (Babor, 2010; Casswell, 2013). A recent systematic review synthesised the findings of studies of alcohol industry CSR initiatives, and is important in understanding how the alcohol industry uses CSR by identifying key themes (Mialon and McCambridge, 2018). Five key types of alcohol industry CSR initiatives were identified: alcohol information and education provision; drink driving prevention; research involvement; policy involvement and the creation of social aspects organisations. The key conclusion to be drawn from this review is that there is no robust evidence for the effectiveness of CSR initiatives in reducing harmful drinking. Instead, CSR initiatives are used to influence framing of the nature of alcohol-related issues in line with industry interests. This is done by framing alcohol and alcohol related problems as the responsibility of individuals. This directly contradicts public health understanding of alcohol harms as something which are contributed to by the alcohol industry, and require population level policy measures for harm reduction. The CSR literature is still early in development, and this review highlights a need for further work to minimise the impact of

alcohol industry CSR in impeding introduction of effective public policies. The findings illustrate a need to improve public support for evidence based alcohol policy, in spite of industry efforts, and to contribute to development of a literature that can inform communications and interventions with the general public.. CSR activities also have the potential to help market products and expand sales.; Pantani et al. (2017) conducted a content analysis of CSR activities in Latin America and the Caribbean and found that 55.8% had marketing potential, and that those activities with marketing potential were more likely to reach a larger audience than actions classified without marketing potential.

SAPROs have become established globally to “combine the resources of major alcohol companies to provide a more concerted approach to their CSR and lobbying activities”. DrinkWise is the SAPRO in Australia, and evaluations of their “responsible drinking” campaigns (Jones, Hall and Kypry, 2017; Pettigrew et al., 2016; Jones et al., 2016) have shown diversity in participant perceptions of industry messaging, showing that the terminology used in industry developed adverts is ambiguous, for example, whether “drink properly” meant drinking in a sophisticated manner or not drinking to excess. This illustrates industry attempts to appear to be addressing potential harms caused by alcohol, but ultimately remaining vague when communicating with the general public through their campaigns.

#### Corporate Spinning and Framing

The alcohol industry promotes the concept of moderate drinking and personal responsibility; phrases such as “drink responsibly” in DrinkAware materials and on alcohol labels show that one should drink (rather than not consume alcohol), however that it is the responsibility of the individual to manage their drinking (without specifying how much). They advance the theory of the “moderate drinker” as the ideal, indicating that those who aren’t able to consume alcohol moderately (i.e. by becoming intoxicated or developing an alcohol problem) bear personal responsibility for not being able to control themselves (Room, 2011). Messaging from the alcohol industry keeps the focus of responsibility squarely on the individual drinker rather than the substance itself or the actions of the industry (Casswell, 2013; Room, 2005; Carah and van Horen, 2011). This has clear implications for the policy debates (Anderson, 2009). For example, why introduce population level controls when certain individuals could simply drink less? Why should “moderate” drinkers be “punished” by more intrusive measures because others can’t control their own drinking?

A survey studying public awareness of DrinkWise (an Australian SAPRO) recruited 467 adult weekly drinkers to complete an online survey (Brennan et al., 2017). Authors reported that participants were more likely to think that DrinkWise was funded by the government, and subsequently placed more trust in them compared with genuine government messaging. It is not possible to explore perceptions beneath quantitative survey measures; however, this study is important in highlighting that members of the public are vulnerable to misunderstand the source of SAPRO campaigns, and have a lack of trust in government messaging. The findings of this study are interesting when considered alongside the findings of Somerville et al. (2015) who highlighted the general public's lack of trust in messages from the UK government when it came to policymaking. It appears that the industry is less trusted than the government, though there could be cross-national differences. Could providing more information about the source of policy messaging have an impact on how these messages are received and how much they are trusted by the public? Multiple sources of information have been found to be more believable, convincing and personally relevant than single sources (Jongenelis et al., 2016). These findings could be the starting point for a deeper qualitative exploration of how the public make sense of alcohol policy and how people are influenced by SAPRO campaigns and information sources; this could provide a better evidence base for informing effective ways of communicating alcohol policy information to the general public

### Marketing and Advertising

Estimates of annual industry advertising expenditure in the UK are around £200 million, and this pervasive marketing of alcohol can impede efforts to reduce alcohol related harm (Dunstone et al., 2017). Jernigan et al. (2017) conducted a systematic review of longitudinal studies of marketing and youth alcohol consumption and found a significant positive association between level of marketing exposure and level of youth alcohol consumption, as well as likelihood of early initiation of drinking. This demonstrates that exposure to marketing is key to how young people consume alcohol, however the possible effects on public support for alcohol policy measures remain to be studied.

Pettigrew et al. (2016) conducted a "reverse engineering" study to establish the strategic intent behind an industry developed advertisement, by using the perceptions of the young people it was targeted at. They found that the advertisement was likely to reinforce existing drinking behaviours and that young people did not think the advertisement was aimed at them. This is strategic ambiguity, a technique used by the alcohol industry to achieve multiple goals of appearing to tackle problematic alcohol use and being pro-health whilst maintaining and improving their market share (Babor, Robaina and Jernigan, 2015; Smith, Atkin and Roznowski, 2006; Dumbili, 2014). Smith et al.

(2006) did a quantitative study of strategic ambiguity in alcohol industry developed materials in the USA. They found that the alcohol industry attempted to appeal to different segments of the population, whilst having a “bottom line” output that could be viewed positively on a population level. This has implications for influencing public support for restrictive alcohol policy measures, as the industry can use ambiguous messaging to appear to be in support of restrictive measures, whilst reinforcing their “bottom line” to maintain profitability.

### Manufacturing Doubt

A systematic review by McCambridge, Mialon and Hawkins (2018) identified 20 reports studying alcohol industry involvement in policymaking. Studies were mainly qualitative, and focussed on industry attempts at framing the policy debate: presenting themselves as vital stakeholders, playing down the scale of alcohol harms whilst maintaining a responsible public image, and using rhetorical techniques to minimise the understood effectiveness of policy measures. Findings highlighted that alcohol industry actors are “highly strategic, rhetorically sophisticated and well organised in influencing national policymaking”. They also found that the alcohol industry attempts to shift understanding of, and possible solutions to, alcohol harms away from population level perspectives. This allows them to promote policy measures which target the individual drinker, directing attention away from those policy measures which might affect commercial interests.

### **Public Support for Alcohol Policy**

Prior to trying to refine measures to promote public support for alcohol policy, it is necessary to explore the evidence base, which can be further developed with future research. The research literature on public support for alcohol policy measures is mainly comprised of public opinion surveys, and examinations of trends and predictors of public opinion at a population level (Storvoll, Moan and Rise, 2015; Macdonald et al., 2011; Latimer et al., 2003; Ialomiteanu et al., 2014; Greenfield et al., 2014). A small body of qualitative work has developed in more recent years to explore and investigate attitudes, beliefs and perspectives on alcohol policy (Lonsdale, Hardcastle and Hagger, 2012; Somerville et al., 2015). Greater understanding of public perceptions of alcohol policy issues would contribute to developing this literature, and provide a grounding for intervening in public support for alcohol policy measures.

A review of analyses of the impact of public opinion on alcohol policy in the US highlighted that public support for alcohol policy was an emerging area of research, primarily based on private household opinion polls (Greenfield, Johnson and Giesbrecht, 2004). The review was non-systematic,

and draws on previous analyses and datasets, as well as other research which has been conducted. The review addresses attitudes towards drinking and drunkenness, differences in public opinion depending on the particular alcohol policy issue, typical questions/items addressed in surveys and trends in levels of policy support. The authors conclude that further research is needed in this area, and highlight that qualitative work is needed to support public health efforts to improve public support and so help ensure effective policies are adopted and implemented. Although the review references several key analyses, and is highly detailed, criteria for selection of published and unpublished datasets are unexplained. In the 15 years since Greenfield et al. (2004), the literature on public opinion on alcohol policy is still primarily made up of surveys.

#### Factors which influence public support for alcohol policy – gender, age and drinking status

Whilst reviewing the literature, three key variables have emerged as important in influencing whether individuals support evidence based (more intrusive) alcohol policy measures. Those who are older, female and consume less alcohol tend to have higher levels of support for evidence based policy compared with those who are younger, male and consume more alcohol. More detailed examples of this follows in this section.

The Canadian Addictions Survey (Macdonald et al., 2011) randomly selected over 10000 residents to explore the relationship between individual drinking, perceived seriousness of alcohol problems and endorsement of a range of alcohol policies. A low response rate (47%) means it is not likely to be representative of the general population, but the study found that only those who abstain from alcohol endorsed increased alcohol taxation, and that the higher quantity of alcohol consumed by individuals the greater the likelihood of them opposing alcohol taxes. Those who consumed alcohol at higher levels had significantly less serious perceptions of alcohol problems. As the authors point out, it is likely that heavier drinkers are underrepresented in this survey as they may be less likely to engage with this type of research. Nevertheless, this study provides important information about support for alcohol policy measures and the impact of drinking status in resistance to evidence based policy measures. There appears to be a preference in Canada for policy measures such as information interventions or treatment for substance abuse, compared with population level policy measures such as increased taxation.

Another Canadian study examined 15 year trends in levels of public support for alcohol control policies in Ontario (1996-2011) (Ialomiteanu et al. (2014)). Telephone surveys incorporated seven alcohol policy outcomes for adult participants to respond to, which ranged from taxation of alcohol,

opening hours of stores which sell alcohol, and quantity and location of alcohol outlets (Ialomiteanu et al., 2014). They asked the seven items across different years to examine trends, asking whether alcohol control should be increased compared with the “current measure” in place that particular year. An overall increase in support was found for either the policy measure in place at that time (the current measure) or increased alcohol controls, and that those who supported alcohol control policies were more likely to be female, non-binge drinkers and older (Ialomiteanu et al., 2014). In the paper, all results are reported as either support for the current policy (status quo) and/or increased controls, compared with decreased support for the policy measure (Ialomiteanu et al., 2014). One of the limitations of this study is that support for the status quo and increased alcohol controls as a single measure. It would have been preferable to separate out support for the status quo and support for increased controls, as that would have given more information as to whether members of the public simply wanted the policy measure in question to stay the same or whether they were actually opting for an increase in alcohol controls. Survey data does not lend itself to this level of exploration, and would be best explored further using qualitative methods. The authors do recommend that further research is needed to explore how much the general public know about alcohol policy, and that focus groups should be considered to obtain qualitative accounts of participant perspectives on alcohol policy topics. Again, there is the limitation of the survey methodology which potentially excludes some groups within the population (and possibly those who drink at higher levels).

The surveys outlined above demonstrate the significance of drinking status, age and gender in which members of the general public support effective (and restrictive) alcohol policy measures (Ialomiteanu et al., 2014; Greenfield et al., 2004; Macdonald et al., 2011). Storvoll et al. (2015) built on this work by developing a model to explore the relationship between “proximal predictors” (such as belief in effectiveness of policies, belief in harm caused by drinking, and personal experience of harms); “distal predictors” (such as age, gender, harms from others drinking) and public support for restrictive/effective alcohol policy measures. They hypothesised that the closer the predictors came to attitudes conceptually the more likely they were to be important in predicting public support for alcohol policy measures. Data was modelled from a web survey of 1,956 Norwegian adults, which incorporated measures of attitudes towards restrictive policy measures (they used four statements based around restrictive pricing and availability); demographics; harms experienced from others drinking; own drinking status; belief in harm caused by drinking and belief in effectiveness of restrictive alcohol policies. They found a high level of variability in public support for alcohol policy measures, and demonstrated that beliefs in effectiveness of restrictive measures and the harm

caused by drinking were the two strongest predictors of public support for restrictive alcohol policy measures ( $\beta=0.398$ ,  $\beta=0.238$  respectively). As demonstrated in other studies, they found that support for restrictive measures decreased with increased consumption and increased with age, and support was stronger amongst women than men. This study provides evidence of the importance of beliefs about policy measures and alcohol harms in how the general public choose to support a policy measure or not, and explains 41% of the variance in attitudes towards restrictive alcohol policies was explained.

#### Focus Group Studies of attitudes, beliefs and perspectives towards alcohol policy

Two focus group studies have been conducted to explore attitudes, beliefs and perspectives which underpin public support for alcohol policy (Lonsdale et al., 2012; Somerville et al., 2015). Lonsdale et al. (2012) focussed specifically on minimum unit pricing (MUP), and recruited participants from community groups across the UK. They used the focus groups to develop insights into attitudes and beliefs with respect to MUP, and found overall opposition to MUP and scepticism about its effectiveness (Lonsdale et al., 2012). Participants stated their concerns that MUP would unfairly punish 'sensible' drinkers, and that MUP might exacerbate other social problems such as increased crime rates or drug use. Authors highlighted the usefulness of their findings in informing policymakers and how they might introduce MUP and improve its acceptability (for example by introducing policy measures alongside media campaigns). A key recommendation for future research (provided by the authors) is to build on their findings about scepticism on effectiveness and to "seek to identify education interventions that improve public opinion most effectively and serve to allay misconceptions" (Lonsdale et al., 2012).

A more recent UK focus group study examined attitudes towards pricing policies to change health related behaviours i.e. smoking and excessive consumption of alcohol and food (Somerville et al., 2015). They recruited participants using a research agency and used the focus group method which is appropriate for examining attitudes and beliefs about health, with the aim of triggering debate and expression of opinion using a set of particular topics. They used visual and textual stimuli such as videos and images relating to alcohol, cigarettes and food to stimulate discussion. They reported three key beliefs of focus group participants: that pricing makes no difference to behaviour; that the government introduces pricing policies to generate income rather than to change behaviour; and that the government (and messaging from it) is not trustworthy. Authors recommend future qualitative work to consider how beliefs may shape responses to pricing policies, and how provision of evidence in different ways may shape support for pricing policies (Somerville et al., 2015).



### Public Support is Subject to Change

Pechey et al. (2014) conducted a discrete choice experiment to explore acceptability of policy measures and the effect of providing information on policy effectiveness on policy support. They recruited 1202 English adults to participate in face to face interviews which were carried out in their homes by a market research company. When they provided participants with information about expected outcomes of policy measures, acceptability of three policy measures increased significantly (MUP, outlet reduction and advertising regulations). Acceptability of MUP increased from 43% to 63%, and was the largest increase for any policy measure. However, for both those who received and did not receive information on policy measure outcomes, advertising regulations was the most popular policy measure. They also found that individuals drinking behaviour influenced preferences, with around 90% of non-drinkers choosing all interventions over the status quo, and with more moderate than heavy drinkers favouring policy measures over the status quo. Authors recommend that policy makers who are aiming to improve public support for “hitherto unpopular but promising policies” should give greater prominence to the benefits of the outcomes of that particular policy measures. One of the limitations of this study is that participants are asked only to imagine these possibilities, but are not choosing them in a “real world” scenario where the policies will actually be implemented. This study adds to the existing evidence base by highlighting that public acceptability of alcohol policy measures is subject to change depending on understanding of the effectiveness of the policy measure in question. Survey literature is useful in measuring levels of acceptability, and individual characteristics which may predict support for a particular policy measure over another, however surveys cannot adequately address the question of changing acceptability of policy measures and what might contribute to these changes. This work highlights that experiments which provide information on policy measure effectiveness to individuals may be a useful avenue to explore, and little has been done in this field other than the study by Pechey et al. (2014).

### Summary of Evidence for Public Support for Alcohol Policy

In summary, there is evidence which shows that drinking status, age and gender have an impact on support for policy measures, with heavier drinkers, men and younger people being less likely to support intrusive policy measures (Storvoll et al., 2015; Pechey et al., 2014; Macdonald et al., 2011; Ialomiteanu et al., 2014). It has also been demonstrated that beliefs, attitudes and knowledge about effectiveness of alcohol policy measures, and the harms caused by alcohol are important in determining whether people support effective and intrusive policy measures (Storvoll et al., 2015; Pechey et al., 2014). How people perceive alcohol, their own drinking and problematic drinking or

stereotypes of problematic drinkers are potentially complex issues, and such perceptions may impact on how they perceive alcohol policy issues, and which policies they choose to support (Greenfield et al., 2014; Giesbrecht and Livingston, 2014). The quantitative literature (outlined above) is comprised of evidence reviews and surveys. There are some limitations of using this kind of methodology to measure public support for alcohol policy measures. The review detailed above is non-systematic, so although it provides a good narrative of the existing analyses, it does not allow exploration of what underpins public support for alcohol policy measures (Greenfield et al., 2004). Survey literature has similar limitations, and although it is informative in measuring public support or acceptability with regards to particular policy measures, it is not useful in exploring the relationship between public support, perceptions of policy and acceptability of policy measures. Several of the studies referenced above conclude that future work is needed to develop understanding of perceptions of alcohol policy and related issues (Macdonald et al., 2011; Storvoll et al., 2015; Greenfield et al., 2004).

The qualitative evidence base for perceptions of alcohol policy is still developing, but findings provide clear directions for further work. Firstly, public support is not static and is receptive to interventions, and secondly, focus group studies have identified lack of belief that pricing policies work and potential misunderstanding of policy issues, views that pricing policies punish 'moderate' drinkers and may increase crime rates, and mistrust of government messaging (Wright et al., 2019; Somerville et al., 2015; Lonsdale et al., 2012). This evidence of beliefs and attitudes is essential in moving forward to a position of understanding of how to intervene in public support for alcohol policy measures. Thirdly, the existing qualitative work focuses specifically on pricing policies, which may be due to the current relevance of MUP. More work is needed to develop understanding of perceptions of other alcohol policy measures and how this may be used to contribute to messaging or interventions to improve public support for a broader range of alcohol policy measures. Finally, future qualitative studies are needed to examine how provision of evidence and information influences public support for the policies in question.

### **Rationale for Systematic Review**

This chapter has explored alcohol policy as an example of corporate influence on population health, using the framework developed by Lima and Galea (2018) to understand different strategies employed by transnational corporations, including influencing the knowledge, legal and political environments as well as preference shaping. The literature described here outlines the importance of public support in policymaking decisions, and provides some initial evidence that public support is

subject to change when individuals are presented with more information about potential effects of alcohol policy measures. The literature on intervening in public support for evidence based alcohol policy therefore warrants some exploration.

A scoping review of the literature was conducted to find studies of attempts to improve or intervene in public support for evidence based policy measures. Only one study which focussed on alcohol policy was found (Scully et al., 2017), which provides preliminary evidence that interventions in the form of narrative and inoculation messages can be successful in improving public support for more intrusive alcohol policy measures. However, given that only one study has been found which focusses on alcohol policy, it is necessary to broaden the focus of this thesis to public health and climate change policy. These are policy areas which have similarities with the alcohol policy field, as they relate specifically to potential restrictions on individual behaviour, and are also likely to be affected by the activities of transnational corporations.

My main focus will be to explore whether interventions to improve public support for public health and climate change policy are effective, and if so, what are some of the features of effective interventions. This will allow for greater understanding of intervening in public support for public health policy measures, and will provide a basis for developing interventions to improve alcohol policy more specifically.

Therefore, what follows in Chapters 3 and 4 is a systematic review of interventions to improve public support for public health and climate change policy measures. The systematic review includes a meta analysis of effectiveness data provided in studies of interventions to improve public support for public health policy measures. A narrative synthesis of theoretical underpinnings, components and content of effective interventions is also presented to assess 'what works' in terms of intervening in public support. The final chapter will explore the findings of the systematic review in relation to its implications for alcohol policy specifically.

**Thesis Aims**

Based on the gaps in the literature on intervening in public support for alcohol policy, a systematic review will be conducted which explores the evidence base for intervening in public support for public health and climate change policy measures. Therefore, the aims of this thesis are:

- To explore the literature on interventions to improve public support for public health and climate change policy measures
- To explore the features of interventions which are successful in improving public support
- To analyse effectiveness data for interventions of this type, and to conduct a meta analysis to pool data from studies
- To discuss the implications for intervening in alcohol policy

## Chapter 3: A Systematic Review of Interventions to Improve Public Support for Public Health Policy Measures - Methods

In previous chapters I have outlined the ways in which transnational corporations influence population health through manufacture and promotion of potentially harmful products. The WHO estimates that NCDs such as cardiovascular diseases, cancers and diabetes, are responsible for more than 40 million deaths a year (WHO, 2014). It is well known that smoking, alcohol and unhealthy diet, including the consumption of sugary or processed food and drink, are risk factors for NCDs (WHO, 2014). Such risk factors may also be implicated in communicable diseases and in aggregate terms make large contributions to the global burden of disease (G. B. D. Alcohol Collaborators, 2018; GBD 2016 SDG Collaborators, 2017).

Public opinion generally, and the extent of public support for particular policy measures, are considered by policy makers. This may be important for how policy makers view the need for change, which in turn can impact on policy decisions made, and their subsequent implementation (Ialomiteanu et al., 2014).

This study was designed to look broadly at the research literature on interventions to improve public support for evidence based policy measures. As well as examining public health research, the study focus was extended to include climate change policies, as the climate change arena is similarly affected by attempts by corporate vested interests to influence public policies (Pulver, 2007). However, no studies of interventions to improve public support for climate change policy measures were found and therefore this review focuses solely on public health policy.

### **Theoretical Frameworks**

A range of potential theoretical frameworks may be used to approach the development of an intervention to improve public support. It is anticipated that key theoretical approaches which may be used will incorporate elements of narrative persuasion, framing and inoculation techniques. In the systematic review I will categorise the studies according to the theoretical approaches used to inform the interventions and assess whether any of them appear more or less effective.

Framing involves communicating a particular meaning in any medium, and identifying that meaning or set of meanings as more important than another (Janiszewski, 2011; Koon, Hawkins and Mayhew, 2016; Scheufele, 1999). Frames are essentially different versions or formulations of the same message, and the influence of the frame is determined by which information is highlighted and

which is omitted - “any alteration to a message that influences perspective can be considered a frame” (Janiszewski, 2011). Members of the public are often exposed to competing frames when it comes to salient policy issues, which has implications for the ways in which frames should be formulated to be most impactful (Burststein, 2003; Shapiro, 2011).

Generally speaking, attributing external responsibility for an individual’s health problem engenders sympathy towards the individual, increased willingness to help and greater support for public health oriented policy solutions. Attributing internal responsibility for health problems (i.e. blaming the individual) engenders anger towards the individual, and potentially increased support for punitive or non-public health oriented policy measures (Chong and Druckman, 2007). Even very small differences in labelling a problem as a disease such as substance use disorder vs an individual’s problematic use - using the term substance abuser can affect perceptions of individual responsibility for particular health problems (Chong and Druckman, 2007; Janiszewski, 2011).

Inoculation theory is a sub-category of framing and is based around the fact that messages can be provided to individuals, but that they might be subjected to competing messages particularly in fields where there are interests from public health and potential industries and therefore involves an attempt to protect individuals from future attempts at persuasion by warning them about competing messages and exposing them to and refuting anticipated opposing arguments (Pfau, 1997; Banas and Rains, 2010). Exposure to weakened versions of opposing arguments can encourage development of counterarguments which can protect against the effects of strong opposing arguments when faced in the future (Pfau, 1997; Banas and Rains, 2010).

Narrative persuasion involves the use of stories to allow for individuals to engage and connect with characters who live in challenging environments (which may differ significantly from their own), and can contain implicit and explicit messages about a particular topic being addressed (Shen, Sheer and Li, 2015; Appel and Richter, 2007). There is evidence which demonstrates that narrative messages can be more effective than didactic messages in communicating health information and improving public support for public health policies (Shen et al., 2015; Kreuter et al., 2007; Appel and Richter, 2007).

## **Aim**

The aim of this systematic review was to explore the effectiveness of interventions to increase public support for evidence based public health policy measures, to counteract influence from corporate interests.

## **Research Questions**

The research questions for this review were developed with a focus on extracting detailed data on intervention development (e.g. theoretical underpinnings and process data), consideration of acceptability and delivery of the intervention (such as intervention users) and specific intervention components (such as medium used, and intervention groups). This approach was taken to allow for understanding of what works in terms of intervening in public support, and to provide detailed data for the purposes of future research and intervention development. The research questions are as follows:

What is the effectiveness of interventions designed to increase public support for public health policy measures in competitive messaging environments, and how is effectiveness influenced by content of interventions?

1. What are the components of interventions?
  - a. What is the theoretical basis of the intervention?
    - i. How has underlying theory been used in intervention development?
  - b. What are the contents and components of effective interventions?
2. Are interventions effective in improving public support for public health policy measures, when considered using meta analysis?

## **PRISMA Reporting**

This systematic review was carried out according to PRISMA guidelines, using PRISMA-P protocol structure (Moher et al., 2015) and the PRISMA reporting system (Moher et al., 2011). PRISMA is “an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses” (Moher et al., 2015) and therefore guarantees good quality and thorough reporting in this review.

## Eligibility Criteria

Using the PICOS approach (Wieseler and McGauran, 2010), studies were included if they:

- Targeted the general adult population (18+), or sub-groups within the general population – as the object of interest in this review is public support for evidence based policy measures. Those aged 18 and over are able to vote and deemed to be adults in most countries, and therefore will have more influence over policymaking compared with children or teenagers.
- Involved any intervention aimed at increasing public support for policy measures in relation to public health or climate change in a competitive messaging environment. This criterion was purposely broad to include any intervention types so all could be examined for the purposes of this systematic review.
- Contained a non-intervention comparator group – this allows comparison of the intervention against a non-intervention control in order to ascertain the effects of the interventions, rather than relative effectiveness compared with another intervention.
- Had outcomes which measured public support for evidence based public health and climate change policy measures. Again, this criterion was left broad so that studies of interest would not be excluded. As long as the study included some measure of public support for public health and climate change policy measures, it was included.
- Were randomised or non-randomised controlled trials only – this was important to ensure the gold standard of effectiveness data which could be used in meta analysis
- Were formal research reports in peer-reviewed journals - this demonstrates the study has been through a peer-review process which demonstrates a level of quality
- Were published in the English language only – resources for translation were not available for this systematic review

Studies were excluded if they:

- Targeted policy actors specifically, as interventions with this group would be expected to involve distinct characteristics beyond the scope of the present study. Studies of policy actors would likely be targeted, and not incorporate the broader general public which is of interest in this study.
- Involved interventions which seek to stimulate health behaviour change rather than support for policy measures. This distinction was important, as many studies exist of interventions to elicit behaviour change in relation to public health or climate change issues. However, the object of study here is interventions to improve *public support* for policy measures, not whether interventions elicit desired behaviour change for health reasons.



- Did not measure and report public support outcome data comparing intervention and comparison groups. Any studies which did not measure (or report) public support outcome data were excluded as it would not be possible to determine efficacy of the intervention.

## **Search Strategy**

### Information Sources

Electronic searches were conducted in October 2018 using MEDLINE (OVID interface, 1946 onwards), EMBASE (OVID Interface 1974 onwards), CINAHL Complete (EBSCO interface), PsycINFO (Ovid interface, 1806 onwards), Web of Science (Clarivate Analytics interface, 1900 onwards), GreenFILE (EBSCO interface).

### Search Items

The search strategy was developed around the constructs of “public support or opinion”, “health or climate change policies” and “interventions” using medical subject headings (MeSH) and key words, and by conducting initial scoping searches using key studies as ‘quality assurance’. Once the MEDLINE search was completed, the strategy was refined to include the syntax and subject headings required by each subsequent database (see Appendix A for full electronic search strategy). The population searched for was the general public, the intervention was any attempt to improve public support for evidence based public health policy measures, the comparator was any control group and the outcomes were any measure of public support in both groups.

### Contacting Authors

Authors of included papers and experts in the field were contacted to identify relevant studies which hadn’t been identified in database searches, and to obtain supplementary data where required. In addition to this, transcripts of interventions were requested from authors where possible. The aim of this was to provide a sense of the types of interventions and the actual stories used if possible.

### Backwards and Forwards Searching

To collect further data, backward searching of included reference lists and forward searching of citations of included references were performed.

## **Study Records**

The outputs of the searches were exported to, and managed using EndNote (Clarivate Analytics, version X8.20). Duplicates of studies were removed prior to screening.

### **Selection Process**

Two researchers (Rachel Coleman and Rebecca Clifford) independently screened titles and abstracts of studies identified from the database searches against the inclusion criteria. Rebecca Clifford was a foundation year doctor on an academic placement. Full texts of studies were obtained and assessed for eligibility by two researchers independently. Studies deemed to meet the inclusion criteria were discussed, with any disagreements being discussed with the review supervisor.

### **Data Extraction Process**

Using pre-agreed identical forms (see Appendix B), two researchers independently extracted data from each study. To ensure reliability, at least 20% of studies had data extraction conducted by both researchers.

### **Data Items for Extraction**

The following data items were extracted from included studies, with the aim of gleaning as much useful information as possible from each paper. Therefore, data did not have to be explicit to be extracted – for example, if a theoretical approach was outlined implicitly in the text, it was recorded. In addition, study authors were contacted for complete outcome data and intervention transcripts wherever possible.

**Policy:** public health or climate change policy measure of interest in the study. As much detail as possible on policy measures was collected, including the policy content of the intervention and the salience of the policy measure to the general public.

**Population:** baseline characteristics, including average age, gender, ethnicity and sociodemographic information, and any additional information reported.

**Intervention:** number of interventions delivered; intervention type; theoretical basis underpinning the intervention (including key references); consideration of potential intervention users/delivery; intervention aims along with the media/communication techniques used to deliver the intervention and any other reported intervention features. As much detail as possible on intervention characteristics was extracted to ensure depth of data collection and the potential to understand the characteristics of efficacious interventions. Where possible, full transcripts of intervention text was requested from study authors.

**Control:** details of comparison group, whether they received any intervention or not

**Outcomes:** method used for measuring public support for policy; change in public support per intervention group; process data linking exposure to the content of the intervention and public support.

**Methods:** study design; how participants were approached to participate; method of randomization; study duration; follow up duration; trial size, sample size and power calculation; funding source and statistical analysis performed.

**Corporate Competition:** methods used to address competition from corporate industry or vested interests.

**Salience:** has salience (i.e. importance to the public) of the policy measure been considered?

### **Outcomes**

The primary outcome of interest was defined as any measure of public support for a public health or climate change policy measure (typically quantified using a Likert scale). For example, participants in both control and intervention groups stating their level of support from 1 (strongly support) to 7 (strongly oppose) for one or several policy measures. This could include any public health policy measure, for example, marketing restrictions on products, taxation on potentially harmful products or provision of healthcare for those suffering from NCDs.

### **Risk of Bias**

The Cochrane Risk of Bias Assessment tool (Appendix B) was used to assess internal validity of the study (Higgins et al., 2011). The assessment covers six domains of bias including selection, performance, detection, attrition, reporting and other biases (Higgins et al., 2011). Using this tool allows the extent of bias in studies to be taken into consideration when conducting meta analysis and other data synthesis, and presented as part of review findings to inform readers (Higgins et al., 2011). This was completed for all included full texts, 10% of assessments were carried out by two researchers (Rachel Coleman and Rebecca Clifford) and checked for inter-rater reliability.

In addition to a detailed risk of bias table for each study, I also reported a summary risk of bias for each study, which indicates whether risk of bias is 'low', 'unclear', or 'high' for each study. Those studies which had at least one domain scored as 'high' were given a summary assessment of 'high', if studies had no domains scored 'high' but at least one as 'unclear', the summary assessment is 'unclear', and if the study had only 'low' risk of bias domain scores the summary assessment is 'low'.

## **Data Synthesis**

The broad scope of this review and the permissive selection criteria employed means this review was likely to result in heterogeneous primary studies. This is judged appropriate given the stage of development of this literature, with no prior systematic reviews having been undertaken, however this resulted in some challenges in synthesising data.

Research Question 1 required establishing which components were present for effective interventions, and involved narrative synthesis of the features of these interventions. This will facilitate future intervention development. In order to do this, studies were grouped depending on whether they showed any evidence of intervention effect compared with a non-intervention control group. Studies were deemed to demonstrate evidence of effect if any intervention arm showed significant improvements in public support for a public health policy measure at any time point (baseline or follow up). In Chapter 3, the narrative synthesis results are reported as studies of effective or ineffective interventions based on this criterion.

In order to answer Question 2 (to show overall effect size of interventions of this type), two meta analyses and two sub group analyses (taking into account risk of bias and policy area) were conducted using Review Manager 5.0 (RevMan), to provide a pooled estimate of the effect of interventions compared with a non-intervention control. The studies included in the review varied in the number of intervention groups, often incorporating a range of intervention elements (e.g. a condition with each separate intervention component, and one condition which incorporated all components). Where there was an intervention group which incorporated all components of the intervention, the effect estimate for that group was used for the meta analysis. Where there was no single intervention group being compared against a control group as the principal object of study, the effect estimates for multiple intervention groups were combined for inclusion in the meta analysis using standard formulae, and random or fixed effects models where appropriate (Shuster, 2011). Similarly, for studies which had several policy support outcome measures reported, the key outcomes were combined for incorporation in the meta analysis. If the mean and standard deviation of the intervention effect was not available in the paper, this was calculated from the data available (mean difference, standard error, confidence intervals and p values) using the standardised formulas in the Cochrane Handbook (Shuster, 2011).

To assess the existence of publication bias, a test of asymmetry was conducted, with funnel plots created using RevMan. In addition to this, a logistic regression was conducted to determine the

relationship between study effect size and standard error (related to study size). This will allow the results to show potential for publication bias (i.e. smaller studies with null results less likely to be published) (Rothstein, Sutton and Borenstein, 2005).

Data for the narrative synthesis and meta analysis were handled differently (as outlined above). Those studies deemed as showing evidence of effect in the narrative synthesis results only had to show evidence of intervention effects at either time one (immediately following the intervention) or at follow up or a second time point. The meta analysis data (as shown in Table 2) was, where possible, collapsed down into one pooled estimate of effect for each study (see Appendix C, Table 1 for detailed table of calculations). This included all intervention groups whether they showed evidence of effect or not, and only took into account data at Time 1 (immediately following the intervention). The data was handled differently to allow for components of effective interventions to be considered qualitatively and in detail in the narrative synthesis, whilst providing a 'true' pooled estimate of intervention effect by incorporating all intervention groups compared with one control group.

**PROSPERO Registration**

Registration Number: CRD42018116952

Available At: [https://www.crd.york.ac.uk/prospero/display\\_record.php?ID=CRD42018116952](https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42018116952)

## Chapter 4: A Systematic Review of Interventions to Improve Public Support for Public Health Policy Measures - Results

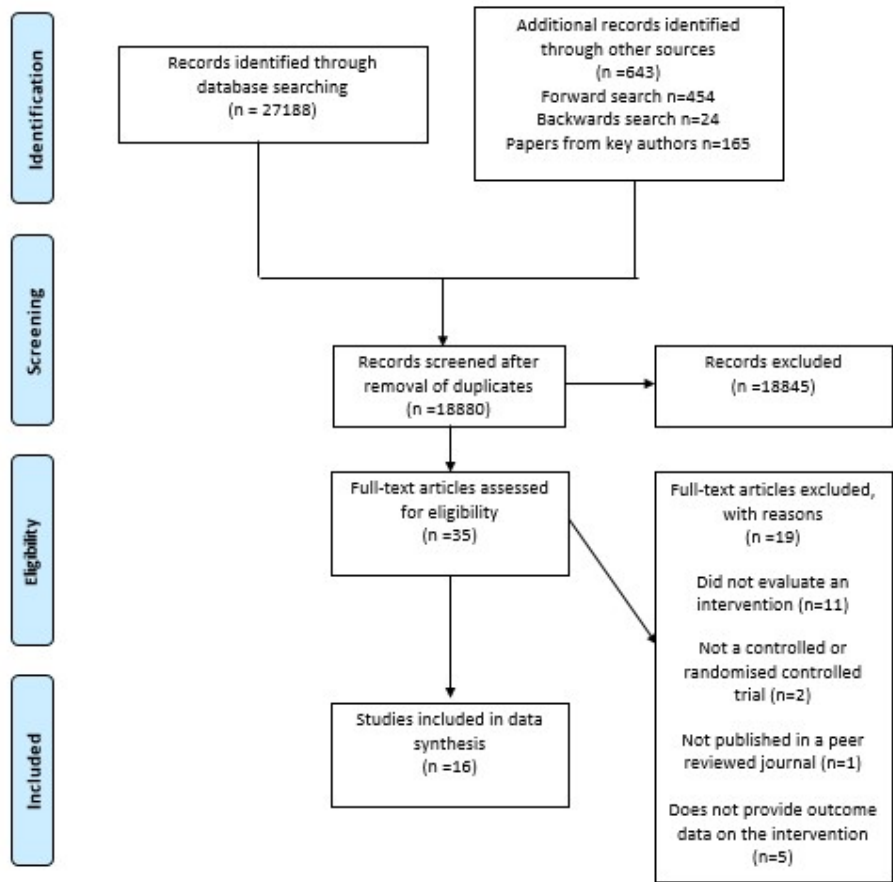
In Chapter 3 I described the methods I used to conduct a systematic review of interventions to improve public support for public health policy measures. This chapter presents the results of the review, using PRISMA reporting guidelines (Moher et al., 2015; Moher et al., 2011). Firstly, summarising key findings and types of interventions used in the included studies, then providing a narrative synthesis of intervention components, followed by results of the meta analysis to show overall evidence of effect.

The PRISMA diagram in Figure 2 outlines the results of the searching, screening and eligibility assessment carried out for this review, resulting in the inclusion of 16 papers for analysis. Tables 1 and 2 provide an overview of included studies, interventions, policy issues addressed, results reported by study authors and risk of bias for each study. Table 3 reports a detailed risk of bias assessment for each included study. Table 1 also details evidence of intervention effectiveness for each included study – studies were deemed to show evidence of intervention effects if there was a statistically significant improvement in public support in the intervention group compared with a non-intervention control group.

The findings for Research Question 1 are presented in a detailed narrative synthesis of features of interventions showing evidence of effect. This includes theoretical underpinnings, policy area, salience of the policy issue, media used in intervention delivery, details of any process data or evaluation reported by authors, attempts to compete with vested interests and consideration of potential users/delivery of the intervention. Intervention transcripts (Appendix D) were obtained where possible to provide insight into the types of interventions being delivered in the included studies.

This is followed by details of meta-analyses conducted to provide a pooled estimate of effects of interventions. Table 2 reports calculated data for meta analysis, and Appendix C, Table 1 outlines the data extracted from each study for meta-analysis, and conversion calculations for pooling conducted as required. Two main meta-analyses are reported (one for continuous data, one for binary data), and subgroup analyses to explore the impact of policy area and risk of bias.

Figure 2. PRISMA Diagram



As above, 16 papers were included in this review, nine of which focussed solely on increasing public support for obesity policies. Other policy areas included gun control, smoking, naloxone provision, opioid addiction, alcohol and medically unnecessary abortions. All of the studies were randomised controlled trials, as no controlled trials were found. The majority of studies included in this review recruited participants via online survey panels, except for Niederdeppe et al. (2014b) , whose participants viewed written statements on a laptop in a shopping centre, and Frederick et al. (2016) who recruited students and did not state whether they viewed the written news article online or otherwise. Participants would receive online access to a link, through which those in the intervention group could view a message (usually written) which aimed to improve public support for a given public health policy measure (see Appendix D for example intervention transcripts). Control group participants typically viewed no message/intervention, or a control message, then all

study groups rated their support for a particular policy measure (from strongly oppose to strongly support).

Table 1 provides detail on intervention medium, policy area, participants, and study conditions for each study. The studies were almost all conducted in the USA (n=15), with one being conducted in Australia. In terms of numbers of participants and numbers of intervention conditions, the studies were highly heterogeneous. Total participants randomised ranged from 211 to 6000, with an average of 2128 participants; and number of study conditions (excluding non-intervention control group) ranged from 1 to 8, with 5 conditions the most common number (mode). All 16 studies had an even split of male and female participants (no less than 40% for each). Detailed results tables can be found in Appendix C, and more detailed reports on intervention medium and policy area can be found under Components of Effective Interventions below.



Table 1. Overview of Included Studies

Author, Year & Country	Intervention Medium	Policy Area	No. randomised (N)	Study Conditions <sup>a</sup> (as labelled by authors)	Evidence of Effect (significant improvement in public support) compared with non-intervention control
Gollust, Niederdeppe and Barry (2013) USA	Text	Obesity Prevention	2494	(1) Magnitude statement about childhood obesity, no consequences (2) Magnitude of problem & consequences (3) Condition 2 + health care costs (4) Condition 2 + weight based bullying (5) Condition 2 + military readiness	Y  Improvement in public support in condition 5 for conservatives
McGinty et al. (2013) USA	Text	Gun control policy	1959	(1) Story 1 – mass shooting event (2) Story 2 – mass shooting event + gun restrictions for persons with serious mental illness (3) Story 3 - Mass shooting event + ban on high capacity magazines	Y  Stories 1 and 3 improved public support for two policy measures, Story 2 improved for just one policy
Barry et al. (2014) USA	Video	Obesity Prevention	1677	(1) Hypertension consequence (2) Bullying consequence (3) Parental responsibility	N
Niederdeppe et al. (2014b) USA	Text	Obesity Policies	500	(1) High personal responsibility message (2) Moderate personal responsibility message (3) No personal responsibility message	N
Niederdeppe, Gollust and Barry (2014a) USA	Text	Childhood obesity prevention (soda tax)	5147	Two pro-tax frames, two anti-tax frames, inoculation as counterframing strategy (1) No exposure T1, strong anti-tax frame T2 (2) Strong pro-tax frame T1, no exposure T2 (3) Strong pro-tax frame T1, strong anti-tax frame T2 (4) Both pro & anti T1, strong anti-tax frame T2 (5) Both pro & anti T1 & T2 (6) Inoculation T1, strong anti-tax frame T2 (7) Inoculation T1, both pro & anti tax frames T2	Y  Improved public support in Group 6
Allen et al. (2014) USA	TV advertisements (4), radio (2), text (1)	Ban on point of sale (POS) tobacco promotion	863	(1) Exposure (intervention)	Y  Exposure group improved public support

Bachhuber et al. (2015) USA	Text	Naloxone provision	1685	(1) factual information only, (2) factual information plus preemptive refutation, (3) sympathetic narrative only, (4) sympathetic narrative plus factual information, (5) all three messages in combination	Y  All intervention groups improved public support for 3-5 policy measures
Niederdeppe, Heley and Barry (2015a) USA	Text	Obesity (soda), Smoking, Prescription Painkiller Policies	5007 (t1) 3901 (t2)	(1) Inoculation with industry anti-policy message at T1 (2) Inoculation with industry anti-policy message at T2 (3) Narrative with industry anti-policy message at T1 (4) Narrative with industry anti-policy message at T2	Y  Inoculation & Narrative messages at T1 both improved public support
Niederdeppe, Roh and Shapiro (2015b) USA	Text	Obesity Policies	718	(1) Empathy, Democrat, Low Individual Responsibility (2) Rational, Democrat, Low Individual Responsibility (3) Empathy, Republican, Low Individual Responsibility (4) Rational, Republican, Low Individual Responsibility (5) Empathy, Democrat, High Individual Responsibility (6) Rational, Democrat, High Individual Responsibility (7) Empathy, Republican, High Individual Responsibility (8) Rational, Republican, High Individual Responsibility	N
Frederick et al. (2016) <sup>3</sup> USA	Text	Obesity Prevention	1750	(1) Fat-Negative (unhealthy + controllable + discrimination justified) (2) Fat-Positive (healthy + uncontrollable + discrimination unacceptable)	Y  'Fat positive' messages improved public support
Kennedy-Hendricks et al. (2016) USA	Text	Opioid pain reliever addiction during pregnancy	1620	(1) High SES base narrative (2) Low SES base narrative (3) Low SES woman facing barriers to treatment (4) High SES woman with successfully treated addiction (5) Low SES woman with successfully treated addiction	Y  Groups 1 and 2 improved public support for one of 4 policy measures. Results not reported for groups 3-5.

Ortiz, Zimmerman and Adler Jr (2016) USA	Text	Food industry related obesity prevention policies	2580	(1) Taste-engineering frame (2) Consumer knowledge value (3) Consumer safety value (4) 2+3 (5) 1+2+3	Y  Groups 1, 4 and 5 improved public support
Scully et al. (2017) Australia	Radio	Sugary drinks/alcohol health policies	6000	(1) standard pro-policy arguments (Standard) (2) Standard + Inoculation (I) (3) Standard + Narrative (N) (4) Standard + I + N	Y  All 4 groups improved public support at T2, not at T1
Skurka (2017) USA	Text	Obesity policies	653	(1) Age frame: child (2) Age frame: adult (3) Social comparison frame: control (4) Social comparison frame: race (5) Social comparison frame: geography	N
White et al. (2017) USA	Text	Medically unnecessary abortions	1183	(1) Intervention	Y  Intervention group significantly reduced support for punitive policies
McGlynn and McGlone (2018) USA	Text followed by full colour health message	Obesity Policies	211	1) Individual choices message frame + human agency message 2) Individual choices message frame + disease agency message 3) Societal factors message frame + human agency message 4) Societal factors message frame + disease agency message	Y  Group 4 improved public support

a. Excluding non-intervention control group

The 'evidence of effect' column in Table 1 distinguishes the studies which demonstrate some effectiveness in comparison to the control group. Of the 16 included studies, 12 showed evidence of intervention effects, by demonstrating a statistically significant increase in public support in one of the intervention groups compared with a non-intervention control group.

Other intervention effects have also been considered, for studies which demonstrated intervention effects compared with an intervention control group, or subgroup effects. For example, Niederdeppe et al. (2015b) reported statistically significant improvements in public support for the "high individual responsibility" condition compared with "no individual responsibility", however did not report any significant improvements compared with the control group. Niederdeppe et al. (2014b) reported statistically significant subgroup effects in those with conservative political views compared with moderates and liberals, but not in comparison to any control group. Barry et al. (2014) and Skurka (2017) did not report any statistically significant intervention effects.

Table 2 presents the outcome measures used in each study, details of any follow up assessments, results reported by authors, data used in the meta analysis, some details of intervention design, and a summary risk of bias assessment. All of the studies measured public support for public health policy measures using rating scales from 1-5 (n=7 studies) or 1-7 (n=9 studies). Three studies repeated the measures of public support at follow up (up to two weeks following intervention), and the remaining 13 studies only measured public support at one time point (immediately following intervention). The summary risk of bias assessment rates studies as 'high' if there is one area at which the study is assessed as high risk, 'unclear' if there is one area at which the study is assessed as unclear risk, and 'low' if the study is assessed as low risk for all areas of bias. Most of the studies were assessed as unclear (n=11), with three assessed as low and two as high risk of bias.

**Table 2. Results Reported in Each Study, and Intervention Component Details**

Author, Year & Country	Measure of Public Support for Policy Issue	Times of measurement following intervention	Effect of interventions (Compared with non intervention control) (including SE/ CI)	Calculated Data for Meta Analysis	Theoretical Underpinning Reported	Explicit Consideration of Vested Interests	Explicit Consideration of potential intervention delivery	Risk of Bias <sup>a</sup>
Gollust et al. (2013) USA	1-7 scale (direction not specified)	Immediate	Regression coefficient (S.E.) reported by political ideology. Liberals = 0.05 (0.18) Moderates = 0.05 (0.14) Conservatives = 0.22 (0.17)	Std Mean Difference (S.E.) = 0.1 (0.091837)	Framing Theory	No	No	Unclear
McGinty et al. (2013) USA	1-5 scale (1 = strongly oppose, 5 = strongly support)	Immediate	O.R. (95% C.I.) reported for two policies, three intervention (Story) groups. Story 1, Policy 1 = 1.55 (1.06-2.27) Story 1, Policy 2 = 1.43 (1.03-2.00) Story 2, Policy 1 = 1.29 (0.87-1.90) Story 2, Policy 2 = 1.75 (1.24-2.47) Story 3, Policy 1 = 1.49 (1.01-2.19) Story 3, Policy 2 = 2.39 (1.70-3.37)	Log O.R. (S.E.) = 0.494696 (0.07508)	None	No	No	Unclear
Barry et al. (2014) USA	1-7 scale (direction not specified)	Immediate	No data reported separately, only p value in text for all 10 policy measures ( $p > 0.05$ ) showing no difference in public support for intervention groups	Not possible to pool – not suitable for meta analysis	None	No	No	High
Niederdeppe et al. (2014b) USA	1-5 scale (1 = strongly oppose, 5 = strongly support)	Immediate	Public Support reported as mean (S.D.) for ‘no personal responsibility’ condition = 3.77 (0.83)	Std Mean Difference (S.E.) = 0.2 (0.112245)	Narrative Persuasion	No	No	Unclear
Niederdeppe et al. (2014a)	1-7 scale (1=strongly oppose, 7	Immediate and 7-10	Regression Coefficient T1 (S.E.) = 0.25 (0.12) Regression Coefficient T2 (S.E.) = -0.16 (0.13)	Std Mean Difference	Framing Theory,	Yes	No	Unclear

USA	= strongly support)	days after		(S.E.) = 0.25 (0.12)	Inoculation Theory			
Allen et al. (2014) USA	1-5 Scale (1 = strongly favour, 5 – strongly oppose)	Immediate	O.R. (95% C.I.) = 1.77 (1.15, 2.73)	Log O.R. (S.E.) = 0.57098 (0.221083)	None	Yes	No	Unclear
Bachhuber et al. (2015) USA	1-7 scale (1 = strongly oppose, 7 = strongly favour)	Immediate	Percentages for each Policy (C=control, I=intervention) Policy 1: C=63.2%, I = 85.7% Policy 2: C=24.4%, I = 64.3% Policy 3: C=52.4%, I=69.2% Policy 4: C=4.16%, I=69.1% Policy 5: C=38.5%, I=43.2%	Log O.R. (S.E.) = 0.955511 (0.084779)	None	No	No	Low
Niederdeppe et al. (2015a) USA	1-7 scale (1 = strongly oppose, 7 = strongly support)	Immediate and 1 week after	Policy support for two intervention groups reported as Regression Coefficient (p) at T1 and T2  T1 Pro-Policy Inoculation =0.12 (0.015) T1 Pro-Policy Narrative = 0.22 (<0.001)  T2 Pro-Policy Inoculation = 0.08 (0.129) T2 Pro-Policy Narrative = 0.16 (0.004)	Std Mean Difference (S.E.) = 0.16 (0.038265)	Narrative Persuasion, Inoculation Theory	Yes	No	Unclear
Niederdeppe et al. (2015b) USA	1-5 scale (1 = strongly oppose, 5 = strongly support)	Immediate	Regression Coefficient (p) reported = 0.13 (0.03)	Std Mean Difference (S.E.) = 0.13 (0.059905)	Narrative Persuasion  Attribution Theory	No	No	Unclear
Frederick et al. (2016) <sup>3</sup> USA	1-5 scale (1 = strongly disagree, 5 = strongly agree)	Immediate	Graph, demonstrates evidence of effect (using Cohen's d) but unable to report specifics as graph not possible to read clearly	Not possible to pool – unsuitable for meta analysis	Framing Theory  Attribution Theory	No	No	High

Kennedy-Hendricks et al. (2016) USA	1-7 scale (direction unclear)	Immediate	Regression Coefficient (95% C.I.) Reported for Low SES and High SES conditions, for 4 policy measures  Policy 1 Low SES = 0.04 (-0.26, 0.34) Policy 1 High SES = 0.27 (-0.06, 0.59) Policy 2 Low SES = 0.16 (-0.17, 0.49) Policy 2 High SES = -0.02 (-0.35, 0.30) Policy 3 Low SES = -0.28 (-0.60, 0.05) Policy 3 High SES = -0.02 (-0.34, 0.30) Policy 4 Low SES = 0.32 (0.00, 0.64) Policy 4 High SES = 0.40, (0.08, 0.71)	Std Mean Difference (S.E.) = 0.11 (0.056122)	Framing Theory  Attribution Theory	No	No	Unclear
Ortiz et al. (2016) USA	1-5 scale (1 = strongly oppose, 5 = strongly support)	Immediate	O.R. (95% C.I.) = 1.38 (1.09, 1.75)	Log O.R. (S.E.) = 0.322083 (0.121119)	Framing Theory	Yes	No	Low
Scully et al. (2017) Australia	1-7 scale (1 = strongly disagree, 7 = strongly agree)	Immediate and two weeks after	Regression coefficient (95% C.I., p) reported for public support for two conditions, and also summary condition (inoculation & narrative) at T1 and T2. Summary condition reported here:  Time 1 = 0.10 (-0.04, 0.25, p=0.157) Time 2 = 0.28 (0.07, 0.49, p=0.009)	Std Mean Difference (S.E.) = -0.06 (0.096939)	Inoculation Theory, Narrative Persuasion	Yes	No	Unclear
Skurka (2017) USA	1-7 scale (1 = strongly oppose, 7 = strongly support)	Immediate	Policy support for 11 policies reported as summary figure for race and geography frames as M (S.D.)  Control = 5.24 (1.15) Race = 5.31 (1.08) Geography = 5.07 (1.32)	Std Mean Difference (S.E.) = 0.1 (0.07066)	Attribution theory, Framing Theory	No	No	High
White et al. (2017) USA	5 point scale from strongly support to strongly oppose	Immediate	Percentages reported – intervention condition increased support from 54% to 62%	Log O.R. (S.E.) = 0.350657 (0.085784)	None	No	No	Low

McGlynn and McGlone (2018) USA	1-7 scale (direction unclear)	Immediate	Reported Cohen's d $F(1, 205) = 6.22, p = .01, d = .34.$	Not possible to pool – unsuitable for meta-analysis	Attribution Theory, Framing Theory	No	No	Unclear
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<sup>a</sup> - see Table 3 for full risk of bias assessment



As detailed in Chapter 3, the data for the meta analysis and narrative synthesis were handled differently – those studies deemed as showing evidence of effect in the narrative synthesis results only had to show evidence of intervention effects at either time - one (immediately following the intervention) or at follow up or a second time point. The meta analysis data (as shown in Appendix C, Table 1) was, where possible, collapsed down into one pooled estimate of effect for each study. This included all intervention groups whether they showed evidence of effect or not, and only took into account data at Time 1 (immediately following the intervention). Therefore, the results for the narrative synthesis and the meta analysis present different ways of looking at the data in the included studies. Results for both elements are presented below.

### **Components of Effective Interventions**

Research Question 1 asks what the components are of effective interventions, and requires in depth narrative synthesis of the findings. The key findings from the included studies with regards to process data, theoretical underpinnings and communication strategies, policy area, salience, media, vested interests and potential intervention are outlined below.

#### Process Data or Evaluation Reported

None of the studies included in this review made explicit reference to process data or evaluation to link exposure to intervention content and unpick the active ingredients of an intervention.

#### Theoretical Underpinnings and Communication Strategies

Eight of the 12 studies identifying evidence of effects detailed the theoretical basis of their intervention (Gollust et al., 2013; Frederick et al., 2016; Kennedy-Hendricks et al., 2016; McGlynn and McGlone, 2018; Niederdeppe et al., 2015a; Niederdeppe et al., 2014a; Ortiz et al., 2016; Scully et al., 2017). Four studies did not state the theoretical basis for their intervention (Allen et al., 2014; Bachhuber et al., 2015; McGinty et al., 2013; White et al., 2017).

Three key theories were identified as underpinning the design of interventions which showed some effect on public support for a particular policy measure. Framing Theory (with Attribution Theory alongside in some cases), Narrative Persuasion and Inoculation Theory were used, in some cases together. Framing Theory alone was used by two studies (Ortiz et al., 2016; Gollust et al., 2013), with three studies using Attribution Theory alongside Framing Theory (Frederick et al., 2016; McGlynn and McGlone, 2018; Kennedy-Hendricks et al., 2016), and one study using Inoculation Theory and Framing Theory (Niederdeppe et al., 2014a). Inoculation Theory was also used alongside

Narrative Persuasion in two studies (Niederdeppe et al., 2015a; Scully et al., 2017). Detail on how these theories were used are described below.

### *Framing Theory*

Framing theory was used in developing six of the interventions which demonstrated evidence of effect compared with non-intervention controls, five of which focussed on obesity policies (McGlynn and McGlone, 2018; Frederick et al., 2016; Niederdeppe et al., 2014a; Gollust et al., 2013; Ortiz et al., 2016) and one on opioid addiction policies (Kennedy-Hendricks et al., 2016). Skurka (2019) also conducted an obesity framing study which showed no intervention effect. In three of the studies demonstrating evidence of intervention effects, authors make reference to use of attribution theory alongside framing theory (McGlynn and McGlone, 2018; Kennedy-Hendricks et al., 2016; Frederick et al., 2016).

Frederick et al. (2016) detailed how news reports frame fatness depending on the agenda and perspective of those composing the message. They describe three key types of framing in obesity policy – ‘fat negative’ which includes highlighting the public health implications of obesity, personal responsibility and stigmatisation of obese individuals. ‘Fat positive’ frames highlight the possibility of being healthy at any size and/or ‘fat rights’ which frames obesity as a diversity issue and denounces weight based discrimination. These frames are then used in developing the two key intervention groups in their study which are based around fat negative vs fat positive framing. This study demonstrated that framing obesity in a ‘fat positive’ way significantly reduced public support for price raising and compensatory policies, whereas ‘fat negative’ frames did not alter public support significantly from the control group. Gollust et al. (2013) outlined the importance of emphasising the diversity of consequences of obesity, “to expand the perceived seriousness of childhood obesity to segments of the population who may otherwise be disinclined to see the issue as a social problem”. They used strategic frames (magnitude statements about childhood obesity; magnitude of the obesity problem; health care costs; bullying consequences; impact on military readiness) in their intervention arms to influence judgements about responsibility and support for policy solutions.

The studies by McGlynn and McGlone (2018), Kennedy-Hendricks et al. (2016) and Niederdeppe, Gollust and Barry (2014) all used framing theory alongside attribution theory or inoculation theory. McGlynn and McGlone (2018) outlined the importance of framing and attribution theory in influencing beliefs about what causes a problem and influencing interpretation and perceptions of a

given situation, and highlighted the issues with internal attributions for health or disease problems, i.e. holding the individual responsible for their weight issue. Their intervention arms which were constructed around individual choices, societal factors and human vs disease agency. Similarly, Kennedy-Hendricks et al. (2016) used framing theory and attribution theory to focus their intervention arms on high vs low SES individuals facing addiction problems, facing barriers to treatment and successfully completing treatment. They found that public support for punitive and public health policy measures was mediated by the socioeconomic status of the individual in the narrative, however, depicting a low SES woman experiencing barriers to treatment for opioid addiction reduced support for punitive policies. Niederdeppe et al. (2015a) detailed how exposure to competing frames might affect perceptions of policy issues, and the importance of considering how to communicate messages to the public, particularly when opposing arguments are framed in what is perceived to be a strong way. They used this understanding alongside inoculation theory (see below) to develop message conditions which incorporated inoculation, narrative messages and anti-policy messages at two time points.

Ortiz et al. (2016) showed evidence of intervention effects, which focussed on food industry related obesity prevention policies. It was slightly different to the above framing studies in that they used cognitive engineering, engineering of the food environment, physiological engineering and contextualised values to develop a “taste engineering frame” in their study. These core tenets of the intervention were based on using the same theoretical approaches as the food industry, but to promote evaluative ideas on how the food industry shape how we consume and make choices about food. They highlighted that the food industry shapes the conditions in which food choices are made to encourage overconsumption, inundate the public with advertising to induce overconsumption, and develop food products to exploit the biological need for energy and nutrients to induce overconsumption (e.g. adding salt and sugar to foods such as bread and milk).

### *Inoculation Theory*

Inoculation Theory was used in three studies, all of which demonstrated evidence of intervention effects compared with non-intervention controls (Scully et al., 2017; Niederdeppe et al., 2015a; Niederdeppe et al., 2014a). All three studies focussed on obesity policies, however Niederdeppe et al. (2015a) also focussed on smoking and prescription painkiller policies, and Scully et al. (2017) also focussed on alcohol policy. All three studies also used inoculation theory in conjunction with narrative persuasion (Scully et al., 2017; Niederdeppe et al., 2015a) or framing theory (Niederdeppe et al., 2014a).

Niederdeppe et al. (2015a) used a combination of narrative persuasion theory and inoculation theory to develop their intervention arms, and combined the different interventions with industry anti-policy messages at two time points to establish the impact on public support for obesity policy measures when presented with conflicting information and the effect of the narrative and inoculation messages. The inoculation intervention arms directly addressed the arguments which might typically come from industry sources – e.g. by highlighting how industries stand to benefit from opposing public health policies, and that the industry in question will try to persuade individuals to support their interests. Similarly, Niederdeppe et al. (2014a) used understanding of inoculation theory and framing theory to develop intervention conditions which took into account the importance of considering how to communicate messages to the public, particularly when opposing arguments are framed in what is perceived to be a strong way. They also used inoculation messages to highlight how soda companies stand to benefit from weak policies, and encourage the individual to acknowledge this issue and use it in the future when considering anti policy arguments.

Scully et al. (2017) used narrative persuasion and inoculation theory to develop their intervention arms, along with anti-policy arguments from industry sources to establish the impact of those approaches on support for sugary drinks and alcohol health policies. They used narrative messages with inoculation components to increase the individual’s perception of threat from industry messages and to increase counter-arguing to persuasive attacks on pro-policy messages when encountered following the initial message. They developed these approaches from existing literature on persuasion, public opinion, competitive framing and communications strategies (McGuire, 1964; Compton and Pfau, 2005; Banas and Rains, 2010; Wood, 2007; Kreuter et al., 2007; Busselle and Bilandzic, 2008; Green, 2006; Jensen et al., 2011; Appel and Richter, 2007; Shen et al., 2015; Braddock and Dillard, 2016).

### *Narrative Persuasion*

Narrative persuasion theory was used in developing two of the interventions showing evidence of effect, and two of the interventions which showed no effects. All four studies focussed on public support for obesity policies.

Niederdeppe et al. (2015a) (who demonstrated evidence of effect) used narrative persuasion theory and inoculation theory to develop their intervention arms (see above for more detail on use of inoculation theory). They combined the different interventions with industry anti-policy messages at T1 and T2 to establish the impact on public support for obesity policy measures when presented

with conflicting information and the effect of the narrative and inoculation messages. Scully et al. (2017) also used narrative persuasion and inoculation theory to develop their intervention arms, along with anti-policy arguments from industry sources to establish the impact of those approaches on support for sugary drinks and alcohol health policies.

Niederdeppe et al. (2015b) demonstrated some evidence of intervention effectiveness compared with another intervention arm (and not compared with the control group). This paper used narrative persuasion theory along with attribution theory to develop their intervention arms which focussed on empathy vs rational messages, political persuasion (republican vs democrat) and levels of individual responsibility. They used stories to elicit empathy to those experiencing issues relating to obesity, to encourage identification with the issues that individuals experienced and to reduce attribution of the issues to the individual and increase public support for obesity policies.

Niederdeppe et al. (2015a) demonstrated some subgroup effects of the intervention, but no main effects compared with control or another intervention group. They used narrative persuasion theory to develop their intervention messages which focussed on levels of personal responsibility for obesity (no personal responsibility vs moderate vs high) compared with a control group. They used stories to encourage acknowledgement of societal causes for obesity, and therefore improve levels of support for obesity policies.

#### Results by Policy Area

The 12 studies with results indicating evidence of effectiveness covered a range of policy areas; five focussed on obesity policies alone (Gollust et al., 2013; Niederdeppe et al., 2014a; Frederick et al., 2016; Ortiz et al., 2016; McGlynn and McGlone, 2018), one on obesity, smoking and prescription painkiller policies (Niederdeppe et al., 2015a), one on obesity and alcohol policies (Scully et al., 2017), one on smoking policies alone (Allen et al., 2014), one on naloxone provision (Bachhuber et al., 2015), one on medically unnecessary abortions (White et al., 2017), one on opioid pain reliever addiction in pregnancy (Kennedy-Hendricks et al., 2016), and one on gun control (McGinty et al., 2013). See Appendix C, Table 3 for detail of policy measures studied.

Four studies demonstrated no effects compared with non-intervention controls, all of which were studies of obesity policies alone. Obesity policies were addressed in over half of the studies altogether (n=10), so this may simply be a reflection of a greater number of obesity focussed studies rather than ineffectiveness of improving public support for obesity policies.

### Saliency

Saliency has been highlighted as one of the important aspects in the psychological mechanisms behind public support (Burstein, 2003; Burstein, 2010; Shapiro, 2011). Of the 12 studies of effective interventions, three highlighted the importance of changing saliency of beliefs about soda companies/industry (Niederdeppe et al., 2014a), saliency of food products which is increased by the food industry to promote overconsumption (Ortiz et al., 2016), and the saliency of issues which members of the public feel strongly about, such as provision of abortion care in conservative US states (White et al., 2017). One study showing no effects considered or explicitly mentioned saliency (Skurka, 2017).

The saliency of the policy issue in relation to public beliefs, and saliency of beliefs about companies who stand to benefit from weaker policy issues on a particular area, are key considerations when developing an intervention to improve public support for public health policy issues. The majority of interventions in this review (both effective and ineffective) did not directly address saliency, however this may have been implicit in the paper and in the fact that the authors were attempting to improve public support for that policy issue at all.

### Media Used

Of the 12 studies which found an effect on public support, nine were written statements alone (Gollust et al., 2013; McGinty et al., 2013; Niederdeppe et al., 2014a; Bachhuber et al., 2015; Niederdeppe et al., 2015a; Frederick et al., 2016; Kennedy-Hendricks et al., 2016; Ortiz et al., 2016; White et al., 2017); one was of written statements in addition to radio advertisements and television advertisements (Allen et al., 2014); one was a written statement followed by a full colour health message (McGlynn and McGlone, 2018); and one was a radio message (Scully et al., 2017). Three of the four studies demonstrating no effect also used written messages (Niederdeppe et al., 2014b; Niederdeppe et al., 2015b; Skurka, 2017), and one study used a video message (Barry et al., 2014). The choice of written media for the majority of interventions may be due to the method of recruitment as the majority of studies used online survey panels.

### Attempts to Compete with Vested Interests

Five of the studies showing an effect on public support attempted to address competing messages from vested interests, one focused on smoking policies (specifically point of sale tobacco promotion) (Allen et al., 2014), three of the studies focused solely on obesity policies (Ortiz et al., 2016;

Niederdeppe et al., 2015a; Niederdeppe et al., 2014a) and one focused on sugar tax and alcohol policies (Scully et al., 2017). The Niederdeppe et al. (2015a), Niederdeppe et al. (2014a) and Scully et al. (2017) papers all addressed vested interests by explicitly referring to incorporating inoculation components into their intervention, to pre-emptively refute potential future competing messages from vested interests. Allen et al. (2014) and Ortiz et al. (2016) addressed vested interests in a similar way, but did not overtly refer to inoculation components. Allen, Davis et al. (2014) exposed participants to a series of TV, radio and written messages, and in their intervention condition included reference to the implications of placement of POS tobacco promotions and the potential impact on children who may view them. Ortiz et al. (2016) made direct reference to using the same theoretical engineering frameworks as the food industry uses in an attempt to counteract the impact of industry messages. The studies in this review address policy issues which could be affected by competing messages from vested interests (obesity policies, gun control, prescription painkiller addiction etc), and therefore even those papers which do not explicitly mention addressing competition from vested interests do implicitly address this.

#### Potential Users/Delivery of the Intervention

I was hoping to extract information on how the intervention might be delivered (and by whom) if applied in a real world setting, and how that influenced the development of the intervention. I anticipated that those who might deliver the intervention would be included in intervention development to determine levels of acceptability and feasibility in a 'real world' context. None of the included studies considered potential users of an intervention, and in fact little mention was made of the 'real world' implications or delivery of such an intervention.

#### Intervention Transcripts

Full or partial transcripts were available for eight of the included studies which demonstrated some evidence of intervention effects (Allen et al., 2014; Bachhuber et al., 2015; Gollust et al., 2013; Kennedy-Hendricks et al., 2016; McGinty et al., 2013; Niederdeppe et al., 2015a; Niederdeppe et al., 2014a; Scully et al., 2017; Frederick et al., 2016; White et al., 2017). Three of the intervention transcripts are summarised below, (see Appendix D for details of all transcripts).

The transcript of the intervention by Allen et al. (2014) was of four television advertisements, two radio advertisements and a poster (see Appendix D). They exposed participants in their study to all of the messages at once. In both the radio and poster advertisements, they started with a statement about facts about smoking to set the scene, then asked "where does it all start?" and

used that statement to lead into text about children being bombarded with advertising in stores, highlighting that this affects all of “us” who “pay” the price for the activities of the tobacco industry (Allen et al., 2014).

Niederdeppe et al. (2015a) studied a range of intervention options: magnitude of the problem, pro-policy inoculation, pro-policy narrative, and anti-policy industry messages; and they had separate transcripts for all of these in three policy domains – smoking, obesity and prescription painkillers (Appendix D). They found significant effects for magnitude of the problem alongside narrative and inoculation components at follow up. They refer to the ways in which the industry might try to persuade the individual that the policy in question isn’t necessary - “soda companies will try to convince you that these policies are arbitrary because they single out soda...” (Niederdeppe et al., 2015a). They point out that the industry knows about the harms associated with their products, wilfully ignores this, and makes and breaks promises to monitor their own products – “why should we trust tobacco companies to keep young people from using their product? They’ve lied before, their own documents say so” (Niederdeppe et al., 2015a). The intervention transcripts finish with a statement about the role “we” all play in reducing the harms of the substance/issue in question, and the importance of policy measures to “go a long way towards improving the health of American kids and families” (Niederdeppe et al., 2015a).

The intervention studied by Scully et al. (2017) was a radio interview incorporating standard pro-policy messages, inoculation and narrative components to improve public support for taxation on sugary drinks and alcohol, and removal of sponsorship in sports. They found enduring effects for inoculation and narrative strategies in improving public support for evidence based policy measures. The Scully et al. (2017) transcript of standard pro-policy and inoculation components started with a statement about the size and seriousness of alcohol as a health issue. They go on to provide some information about the impact of harmful alcohol consumption and the costs in Australia, this is followed by a pro-policy argument which details the issues with affordable, available alcohol products and why the alcohol policy in question is being suggested. The radio interview then goes on to use inoculation components in addition to pro-policy arguments to highlight that the alcohol industry will oppose effective policies by “[trying to] convince us that a volume-based tax won’t work because those who are dependent on alcohol will continue to drink regardless” (Scully et al., 2017). They point out that alcohol is “no ordinary product”, the harms experienced as a result of alcohol, and the benefits of using a volume based tax to help tackle the problem without impinging on peoples perceived liberties – “Nobody is telling anyone that they can’t drink” (Scully et al., 2017).



**Risk of Bias**

Table 3 reports the full risk of bias assessment for each study included in the review. The quality of studies was generally good, with most studies having an overall risk of bias which was low or unclear. Those with an unclear risk of bias tended to be due to unclear reporting of sequence generation in the papers. Three studies had a high overall risk of bias (Frederick et al., 2016; Skurka, 2017; Barry et al., 2014) which was due in all three cases to lack of reporting of baseline characteristics of participants.

Table 3. Risk of Bias Assessment for included studies\*

Author & Year	Sequence Generation	Allocation Concealment	Baseline Characteristics	Incomplete Outcome Data	Blinding	Protection from contamination	Selective Outcome Reporting	Summary Risk of Bias
Gollust et al. (2013)	?	✓	✓	?	✓	✓	✓	?
McGinty et al. (2013)	?	✓	✓	✓	✓	✓	✓	?
Barry et al. (2014)	?	✓	X	?	✓	✓	✓	X
Niederdeppe et al. (2014b)	?	?	?	✓	?	?	✓	?
Niederdeppe et al. (2014a)	?	✓	?	?	✓	✓	?	?
Allen et al. (2014)	?	✓	?	✓	✓	✓	✓	?
Bachhuber et al. (2015)	✓	✓	✓	✓	✓	✓	✓	✓
Niederdeppe, Heley et al. (2015)	?	✓	✓	✓	✓	✓	✓	?
Niederdeppe et al. (2015b)	?	✓	✓	✓	✓	✓	✓	?
Frederick et al. (2016)	?	?	X	?	?	?	✓	X
Kennedy-Hendricks et al. (2016)	?	✓	✓	✓	✓	✓	✓	?
Ortiz et al. (2016)	✓	✓	✓	✓	✓	✓	✓	✓
(Scully et al., 2017)	?	✓	✓	✓	✓	✓	✓	?
Skurka (2017)	?	✓	X	✓	✓	✓	✓	X
White et al. (2017)	✓	✓	✓	✓	✓	✓	✓	✓

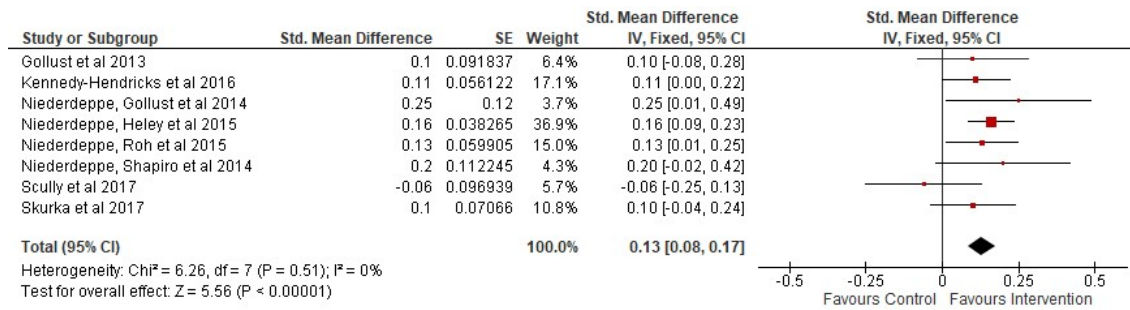
\* ✓ =Low, X=High,?=Unclear

### **Overall Evidence of effect**

Research Question 2 asked whether interventions to improve public support for evidence based policy measures were effective when considered using meta-analysis. Following on from the findings of the first research question, which explored features and content of interventions which were effective in improving public support for evidence based public health policy measures, two meta-analyses were conducted to provide a pooled estimate of intervention effect estimates for studies with continuous data (Figure 3) and binary data (Figure 5). Continuous data was reported in scales of either 1-5 or 1-7, binary data was either reported as support or opposition to a policy area, and in some cases continuous scales were converted into binary data for reporting purposes (see Appendix C Table 1 for more detail). Table 2 shows study results and calculated data for meta analysis, and Appendix C, Table 1 details the data extraction and calculations conducted in preparation for meta analyses. All conversions and calculations stated in the table were calculated using standard formulae (Shuster, 2011). Only three of the studies included in the review had a follow up measure beyond the end of the intervention (range 7 days to 2 weeks), therefore for the purposes of pooling, results reported immediately following intervention (baseline) were used in all cases for meta-analysis.

Three studies could not be included in either meta-analysis due to insufficient data reporting. Barry et al. (2014) reported public support for 10 policy measures as outcomes for their intervention, however this was reported in the text as a significant improvement, with only a p value reported. Frederick et al. (2016) used 16 policy items as their outcome measures, which they collapsed into three types and reported as such. However, the results were reported on a graph, with confidence intervals only shown on a graph, and p values reported in the text were not exact so therefore unsuitable for meta analysis. McGlynn and McGlone (2018) reported outcomes for public support for 7 policy measures, which they reported as a summary measure for all seven using Cohen's d. Confidence intervals and p values were unavailable and therefore could not be incorporated into a meta analysis. Authors for the studies by Barry et al. (2014) and Frederick et al. (2016) were contacted for more data as part of the search strategy, but this was not able to be provided. The authors of the paper by McGlynn and McGlone (2018) were not contacted, as the problems with the data were only realised once meta-analysis had commenced, and time constraints meant this contact could not be made.

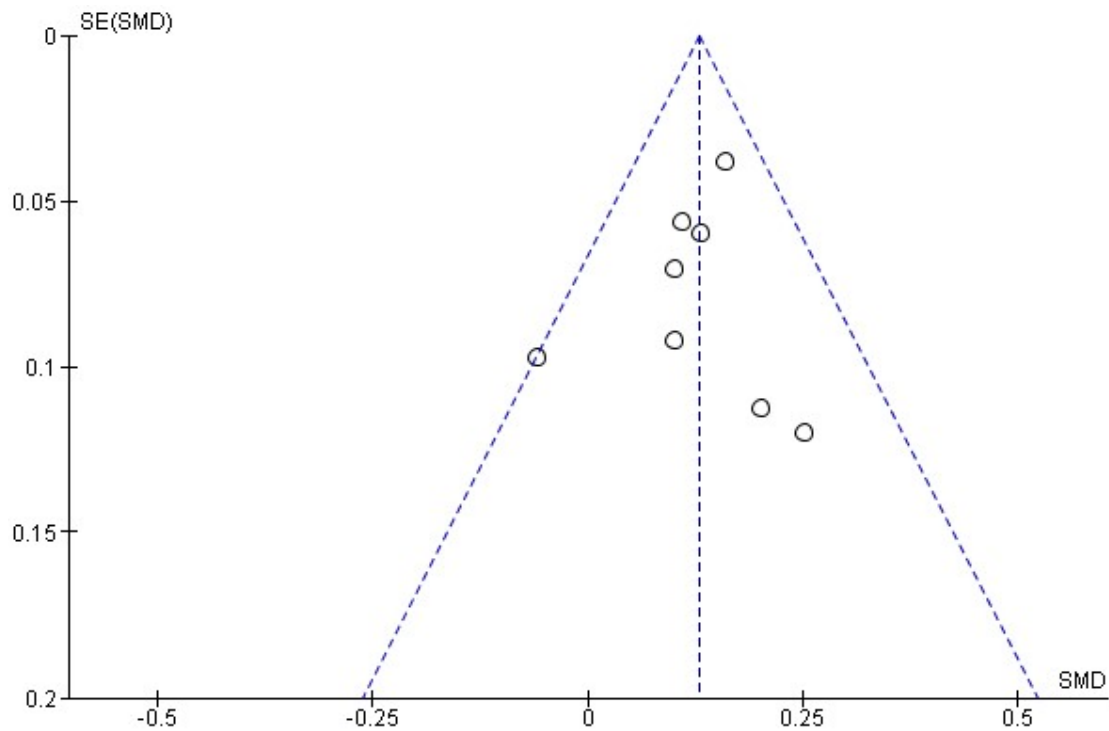
Figure 3. Meta analysis of intervention effects estimates with continuous outcomes



\* measured both 1-5 and 1-7 Likert scales

In order to assess the extent of likely publication bias, a test of asymmetry was conducted for studies with continuous data (see funnel plot in Figure 4). In addition to this, a logistic regression was conducted to determine the relationship between study effect size and standard error (study size);  $\beta=0.5$ ,  $p=0.7$ . This demonstrates a moderate correlation which is not statistically significant, probably due to low power in the analysis as only eight studies were able to be included. This shows potential for publication bias (i.e. smaller studies with null results less likely to be published).

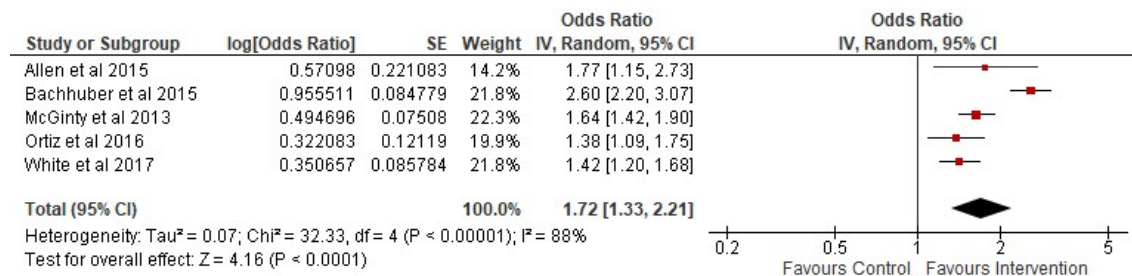
Figure 4. Funnel Plot for Studies of Continuous Data



The pooled effect estimates for continuous and binary data both show improvements in public support for policy measures as a result of the intervention. The pooled standardised mean difference is 0.13 (95% CI: 0.08-0.17) (Figure 3), and the pooled Odds Ratio is 1.72 (95% CI: 1.33-2.21) (Figure 5). The meta analysis for the continuous data shows no heterogeneity between the studies ( $I^2=0\%$ ), however the studies in the meta analysis of binary data were highly heterogeneous ( $I^2=88\%$ ). Given the number of studies in the meta analysis ( $n=5$ ) it was not possible to explore this further, therefore a random effects model was used.

As detailed above, outcome data at baseline or immediately following intervention was used for the meta analyses as only three studies had outcome data for more than one time point, immediately following intervention and 7-14 days later (Niederdeppe et al., 2014a; Niederdeppe et al., 2015a; Scully et al., 2017). Scully et al. (2017) showed a modest increase in intervention effects over time, with a summary regression coefficient immediately following intervention of 0.10 ( $p=0.157$ ) and 0.28 ( $p=0.009$ ) at two weeks post intervention. Niederdeppe et al. (2014a) and Niederdeppe et al. (2015a) both showed decay in effect size over time. Niederdeppe et al. (2014a) reported a regression coefficient immediately following intervention of 0.25 ( $SE=0.12$ ), and -0.16 ( $SE=0.13$ ) at 7-10 days post intervention. Niederdeppe et al. (2015a) reported regression coefficients of 0.12 ( $p=0.015$ ) for the inoculation group and 0.22 ( $p<0.001$ ) for the narrative group immediately following intervention, and 0.08 ( $p=0.129$ ) and 0.16 ( $p=0.004$ ) respectively at 1 week post intervention (see Table 2 for results data).

Figure 5. Meta analysis of intervention effect estimates on binary outcomes

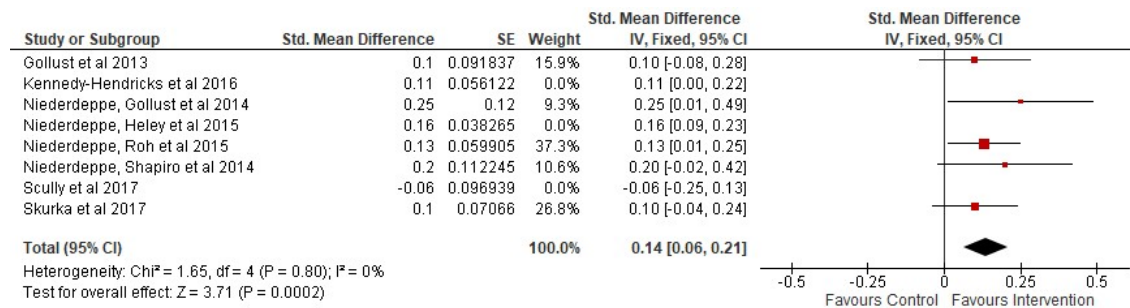


Given the low number of studies in the binary meta analysis, it was not sensible to conduct any tests of asymmetry.

### Subgroup Analyses

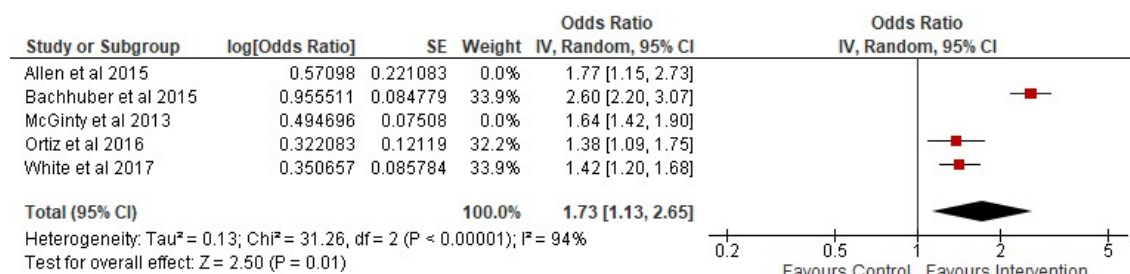
It was possible to pool the effects of studies using continuous outcome data which focussed on improving public support for obesity measures only (Figure 6), which demonstrated a similar result 0.14 (95% CI: 0.06-0.21) to the overall meta analysis for continuous studies which was 0.13 (95% CI: 0.08-0.17) (Figure 3). It wasn't possible to do a subgroup analysis based on policy area for studies providing binary data as each of the five studies focused on different policy measures.

Figure 6. Subgroup analysis of intervention effect estimates with continuous outcomes (obesity policies only)



It was possible to pool the effects of studies with binary data which had low risk of bias, shown in Figure 7. The pooled Odds Ratio is 1.73 (95% CI: 1.13-2.65) (Figure 7), which is similar to the overall pooled Odds Ratio for studies all presenting binary data, which was 1.72 (95% CI: 1.33-2.21). The meta analysis for the studies with binary data were highly heterogeneous (I<sup>2</sup>=94%). Given the number of studies in the meta analysis (n=3) it was not possible to explore this further, therefore a random effects model was used to incorporate the heterogeneity into the analysis. None of the studies of continuous data had low risk of bias, so a pooled effect for studies with low risk of bias was not possible.

Figure 7. Subgroup analysis of intervention effect estimates for binary outcome data – studies with low risk of bias only



## Chapter 5: Discussion

This thesis aimed to explore interventions to improve public support for public health policy measures. In the introductory chapter, the impact of transnational corporations on public health was outlined. Public health attempts to introduce policy measures to reduce the impact of NCDs caused by alcohol, sugar, fatty foods or tobacco are often opposed by these corporations as restriction of availability and affordability of their products has a detrimental impact on profits. Public support is a key part of encouraging policymakers to introduce and implement evidence based public health policy (see Chapter 1).

Alcohol policy was explored as a particular example of a policy area where products are harmful and where the alcohol industry employs a range of strategies to reduce public support for restrictive policy measures (limiting affordability and availability), and to encourage less restrictive, and less effective measures such as educational campaigns (Chapter 2).

It is, therefore, important to explore the possibility of developing interventions to improve public support for evidence based policy measures. I conducted a systematic review to pull together existing evidence on the efficacy and features of interventions to improve public support for public health policy measures. The systematic review aimed to determine whether interventions to improve public support for evidence based public health policy measures are effective, and to examine features of effective interventions. I searched for randomised controlled trials of interventions to improve public support for public health policy measures; a range of public health policy areas were included.

### **Systematic Review**

#### Summary of Findings

All but one of the included studies were based in the USA, and almost all recruited participants using online survey panels and written statements to intervene in public support for public health policy measures.

#### *Types of Interventions*

The inclusion criteria for this review were broad in order to explore studies of any attempt to intervene in public support for a public health policy measure. Interventions which had been evaluated were mostly written messages or pieces of text which were delivered via an online survey panel. Participants then rated their support for the policy immediately after receiving the

intervention, and in two cases rated their support again at a follow up after a day or at least a few days.

There were no evaluations of real world administration of interventions to improve public support, indicating the paucity of literature on improving public support in a 'real world' setting. However, the findings of this review provide some insights into efficacy of interventions in a setting which uses online survey panels.

The narrative findings of the review synthesises the components of interventions to improve public support, and the meta analysis pooled all studies where possible to obtain an overall estimate for effect size of interventions to improve public support for evidence based public health policy.

#### *Intervention Components – Intervention Transcripts*

Full or partial transcripts were available for eight of the included studies (see Appendix D), however, transcripts for those studies which did not demonstrate evidence of effect were not sought. This is a weakness of this review as it may be useful to explore both transcripts of those interventions which show evidence of effect as well as those which do not. I discuss some of the intervention content and key themes below.

A key theme in the transcripts was provision of information about harms of the product in question (or how the proposed policy measure might reduce harm). This is in line with findings in the literature outlined in Chapters 1 and 2, which highlight that providing members of the public with information about harms and how policies can reduce harms can improve support for previously unpopular policy measures (Pechey et al., 2014).

In those interventions which aimed to use inoculation techniques to “protect” from future competing messages from vested interests, attempts were made in the text of the transcripts to address the potential for this directly. For example, by highlighting that “we” (as the general public) pay the price for industry activities when it comes to promotion of smoking products to young people (Allen et al., 2014), or by pointing out that particular companies might “try to convince you” that their product isn’t harmful or shouldn’t be restricted (Niederdeppe et al., 2015a).



In addition to this, many of the transcripts attempted to encourage the participants that “we” as the general public are responsible for making sure we help those people who are disadvantaged, and highlighted the influence of environment, industry and government influences.

Another key theme in the transcripts is that there is a great deal of variation in length of interventions (see Appendix D). This supports one of the key findings of this thesis which is that the rationale for and process of intervention development isn't clear, and the stages between theory and intervention development should be studied in a more robust way (see more below).

#### *Intervention Components – Policy Area & Medium*

Included studies aimed to improve public support for a range of policy measures including gun control, smoking, obesity, opioid painkillers and abortion. However, the majority of studies focussed on obesity policy. Detailed information on the specific policy measures used in the studies can be found in Appendix C, Table 3. Typically, policy measures tended to focus on restricting availability, increasing taxation on and limiting marketing of products such as alcohol, tobacco or sugary drinks. In the case of abortion policies, White et al. (2017) aimed to reduce support for two restrictive abortion policies: admitting privileges for specific medics only, and restrictions on ambulatory admissions to abortion clinics – i.e. strict criteria for being permitted an abortion. This study was set in Texas, USA and highlights the importance of considering the specific policy measures being studied as these policy measures would not be applicable in other, less conservative states or in other countries.

#### *Intervention Components – Theoretical Underpinnings*

The approaches used to guide the interventions in this review, as expected, were grounded in framing, narrative, attribution and inoculation theory which highlight the challenges individuals face when dealing with issues such as obesity or addiction, as well as pointing out the responsibility of governments, industries and environments in tackling these issues. Some studies also sought to ‘inoculate’ individuals against future messages from vested interests by exposing them to a weakened version of an industry message to protect from the effects of such messages in the future.

A real strength of this review is the detail of the theoretical approaches which were used. This can inform future intervention development.

### *Intervention Components – Salience*

Salience was identified in the introductory chapters as an important mediator of whether public support influences policymaking (Burstein, 2003; Shapiro, 2011). Due to this, it was anticipated that when examining studies of interventions to improve public support for evidence based policy that salience of the policy measure would be a key consideration in the development and implementation of an effective intervention. However, only three of the studies which demonstrated evidence of effect highlighted salience at any point in their publication (Niederdeppe et al., 2015b; Niederdeppe et al., 2014a; Ortiz et al., 2016). Of those three, only two were studies of interventions which showed some evidence of effect, and it was only possible to obtain one of those transcripts (Niederdeppe et al., 2014a). The transcript for this intervention did not directly mention salience, however focussed on issues which might be salient to members of the general public, such as additional tax monies to pay for areas for children to play, and the dangers posed to child health by promotion of sugary drinks.

It is possible that the existence of an attempt to improve public support for a particular policy measure implies that the issue is salient (otherwise, why address it at all), however salience is an important feature which should be considered in development of future interventions.

### *Intervention Components – Consideration of Potential Intervention Delivery*

When mapping out the expected features of interventions in the systematic review protocol, considering potential users and delivery of the intervention was anticipated to be a key element of intervention development. However, none of the included studies reported whether or how they considered potential users or eventual delivery of the intervention in a ‘real world’ setting. This is an important gap in the literature – where the studies which show evidence of effect demonstrate efficacy rather than effectiveness, and consideration must be given in future research to implementation of interventions.

### *Intervention Components – Competition with Vested Interests*

Five studies which showed evidence of effect explicitly attempted to address competing messages from vested interests. Three of these studies explicitly incorporated inoculation components to pre-emptively refute potential messaging from vested interests (Niederdeppe et al., 2015a; Niederdeppe et al., 2014a; Scully et al., 2017). Two other studies attempted to address vested interests by either directly attacking industry techniques such as point of sale tobacco advertising (Allen et al., 2014) or by using the same theoretical engineering frameworks as the food industry to counteract the impact

of messaging (Ortiz et al., 2016). The studies which do not explicitly state an attempt address vested interests are doing so implicitly – as all the policy areas studied are known to be affected by corporate determinants of health (obesity, smoking, gun control etc). Examples of inoculation messaging can be found in the full intervention transcripts in Appendix D.

There is some attempt in the literature included in the review to explore the impact of anti-policy messaging from vested interests, however, as above this is not the case in all studies and needs to be considered in depth when looking to further develop this literature.

#### *Outcome Measures*

Only studies which measured and reported outcome data (a measure of public support for a public health policy measure) were included in the review. Although all of the studies used scales to measure public support, several reported results as a binary measure. Those studies which converted the scales into binary measures used a variety of ways – for example, some used a score of 4-7 to categorise results as in favour of the policy, whereas some used 3-7. This needs to be considered when evaluating the findings of the binary meta analysis, as some studies will show that an individual who rated their support for a particular policy measure as “3” as an indication that they are in favour of the policy, whereas some studies deem a score of “3” to show no support for the policy measure.

Three studies repeated the measures between 7 and 14 days post intervention (Scully et al., 2017; Niederdeppe et al., 2015a; Niederdeppe et al., 2014a). They asked participants to rate their support for the same policy measures to determine whether the effects of the intervention endured over the short follow up period or not. The follow up measures were important in determining evidence of effect, and sometimes showed significant effects of the intervention at follow up where they had not been evident immediately following the intervention delivery (Scully et al., 2017). However, none of the studies explored any follow up longer than two weeks, and did not justify the reason for the length of follow up. This demonstrates an attempt to measure the effectiveness of the intervention over time, and introduces a ‘real world’ element as the participants would carry on with their normal lives in between measurements, potentially receiving messaging from vested interests or marketing. Building this understanding should be another consideration when looking at developing and evaluating interventions which will work in a real world setting.

### *Meta analysis*

Pooling of the data extracted during the review provided evidence of intervention effects in improving public support for public health policy measures. The meta analysis for continuous data resulted in a pooled standardised mean difference of 0.13 (95% CI: 0.08-0.17), which demonstrates a significant but small effect of the intervention (Magnusson, 2014). The meta analysis for binary data resulted in a pooled odds ratio of 1.72 (95% CI: 1.33-2.21), which similarly shows a significant but small effect of the intervention in improving public support. I discuss in more detail methodological considerations below.

The broad inclusion criteria in this review resulted in an 'apples and oranges' review, which was necessary as this is the first review in this area. This resulted in a heterogeneous group of studies included in the review. Of the studies with binary outcome data, all five were of a different policy area, resulting in a high level of heterogeneity. The studies with continuous outcome data showed very low levels of heterogeneity – however, most of the studies with continuous outcome data were conducted by one particular research group in the USA, and generally focussed on obesity policy.

Some indication of publication bias was found in the included studies however the number of studies was low for this test and the results were not statistically significant. This might mean however, that studies with negative results have not been published and so the overall pooled estimate of effect is biased upwards.

### Quality of the Evidence

#### *Internal Validity & Study Design*

The inclusion criteria for the review permitted randomised controlled and controlled trials, however only randomised controlled trials were found. All but one of the studies used online survey panels to recruit participants, and used electronic randomisation techniques, thus blinding participants from any alternative study conditions. This provides a 'gold standard' with regards to study design and the internal validity of the studies. However, given that the interventions are delivered online and public support is mostly measured immediately following the intervention, there may be a lack of generalisability to real policy contexts, and external validity.

Most of the included studies had more than one intervention group, which had implications for analysing data in the meta analysis (see above). The different intervention groups tended to use different approaches to improve public support, for example, whether to focus on an individual from

a low or high socioeconomic background, whether to use inoculation components, or whether to highlight industry or government responsibility. This range of approaches has been useful in synthesising the results of this review and provides useful insights to potential theoretical approaches which could be used in future intervention development.

#### *Risk of Bias*

Most included studies had an 'unclear' risk of bias, primarily due to the sequence generation assessment. Most reports did not detail how randomisation was conducted, however it was implied that this was done electronically given the recruitment medium of online survey panels. Most studies were well conducted but in very controlled settings (and not taking into account a 'real world' context). This has some implications for how the results can be interpreted, and indicates that the findings of the review should be considered tentatively until future research can be conducted.

#### *External Validity*

Ten of the 16 included studies reported a representative sample in their papers (see Appendix C, Table 3). Only three of the studies considered effects of the intervention over time by using follow up measures, but these were only up to two weeks following intervention delivery.

Given that these study types provide an artificial setting, they may not be predictive of changing public support in a real world setting. However, the findings of this review provide proof of concept that these interventions may be effective, and provides some information on promising approaches with regards to theoretical basis and intervention features. If future research focuses on developing these interventions in a clear and thoughtful way, interventions of this type may well be effective in a real world setting. This work should consider real effects of the intervention over time, and how the intervention might be delivered to reach members of the general public.

### Strengths and Weaknesses of Review Methods

#### *Search Strategy*

The strengths of this search strategy (see Appendix A) is that the electronic searching was detailed and thorough, using all relevant databases. All screening of titles, abstracts and full texts was conducted by two researchers which strengthens the results of the search. In addition to this, all authors of included studies were contacted to ascertain whether they had any additional studies or knew of any publications which could also be included in the review.

One of the key limitations of the search strategy was not searching grey literature, which may have contributed to the publication bias findings reported in the results chapter and discussed above. Any future reviews should look at searching grey literature where possible.

### *Narrative Synthesis*

In order to synthesise the components of effective interventions, it was necessary to choose a method of determining which studies showed sufficient evidence of intervention effects. This is because most studies did not have one intervention group or one policy measure, so it wasn't possible to easily determine a study of an 'effective' intervention compared to one showing no evidence of effect.

Therefore, studies were deemed to show evidence of intervention effects if one of the intervention groups demonstrated a statistically significant improvement in public support compared with a non-intervention control group. This was a rough way of showing which studies reported statistically significant improvements in public support compared with control groups. A weakness of using this approach is that it doesn't consider the effect size and studies with multiple intervention groups only had to show an improvement in one intervention arm in order to be deemed to show evidence of effect. Another weakness is that it doesn't take into account low power in studies which did not show evidence of intervention effects. The strength of this review is that the meta analysis took all intervention arms into consideration, and provides the pooled estimate for all data, so this bias is not present in the meta analysis.

### *Meta Analysis*

As reported in the results chapter, the studies included in this review had a range of intervention groups – some studies had just one intervention group, whereas others had eight groups which all received different interventions. For example Allen et al. (2014) simply had one intervention group and one non-intervention control group – this allowed the results reported in their study to be inputted straight into RevMan once the log odds ratio and standard error had been calculated (see Table 2). However, Bachhuber et al. (2015) had five intervention groups and one non-intervention control group. It would not be possible to plot all five intervention groups on the forest plot as that would lead to double counting of the non-intervention control group. Therefore, a decision was made to collapse the findings into one intervention group, which was done by calculating odds ratios for all of the intervention groups, using RevMan to pool them and provide one pooled odds ratio for

that particular study. This was done in all studies where there were several intervention groups (see Appendix C, Table 3). The strength of this approach is it increases the power of the meta analysis by including more participants and more data in the analysis. However, the weakness of this approach is that it doesn't allow for the nuances of the different intervention groups to be taken into account. For example, Bachhuber et al. (2015) had five intervention groups with a mixture of three approaches: factual information, sympathetic narrative or pre-emptive refutation, but by collapsing the groups into one pooled odds ratio this detail is lost.

In some studies, the primary outcome measure was not public support, and therefore results sometimes weren't reported in the published article. In these cases, authors were contacted directly for outcome data to allow studies to be included in the meta analysis wherever possible. When authors did not respond, studies were not able to be included in the meta analyses (Barry et al., 2014; Frederick et al., 2016; McGlynn and McGlone, 2018). This creates a weakness in the meta analysis, as there could be a number of reasons authors did not respond (no longer at that institution, change of email address etc), and although this was addressed where possible by checking most recent institutions of authors and giving as much time as possible to respond, it resulted in some studies not being included in the meta analysis.

#### *Narrative Synthesis and Meta Analysis Approach*

There are, however, weaknesses to approaching the research questions and analysis differently in this way. Firstly, the findings may at first glance seem different when looking at the forest plots compared with the studies included as 'effective interventions' for the narrative synthesis. For example, Scully et al. (2017) shows no evidence of effect on the forest plot, as it did not show statistically significant improvements in public support immediately following the intervention. However, this study is included in the narrative synthesis because they demonstrated intervention effects at the two week follow up point. The benefit of approaching the narrative synthesis in this way is that it allows for a richness of data and detailed exploration of "what works".

One of the strengths of approaching the meta analysis by pooling all intervention groups is that this increases statistical power and so precision due to increased participant numbers. However, combining groups in this way inevitably loses some of the nuances between the intervention groups which are reported in the papers (as above).

Overall, approaching the questions differently in this way provides a comprehensive way of exploring the findings of the systematic review, despite some weaknesses to this approach which are outlined above.

#### *Inclusion Criteria*

This review was highly complex, and required meticulous attention to the inclusion and exclusion criteria. In many cases making these decisions was very clear cut, however some studies were 'borderline' exclusions. Bertolotti and Catellani (2015), for example, conducted a study of whether individuals' identification with national or supranational entities made a difference to their agreement with climate change policy measures. This study was excluded because it was not a study of an intervention to improve public support, but rather a study of congruence between individual identity and support for climate change policies. Two studies were excluded based on a lack of public support outcome measures (Wen et al., 2015; van der Linden, Clarke and Maibach, 2015). In the first (van der Linden et al., 2015) the public support outcome was not reported separately from seven other items which included attitudes and beliefs, and in the second (Wen et al., 2015) the focus was on public acceptability, but did not provide any public support outcome data.

Uncontrolled studies of interventions to increase public support for public health or climate change policy measures were excluded. This decision was made to ensure the data extracted assessed effectiveness of interventions compared with groups which had received no intervention. In addition, only including studies which had a non-intervention control group was important to determine the effects of the intervention on levels of public support, but not comparative or relative effects. If only studies are included that have a non-intervention control group we can be confident that the comparison being made is the same in all of the included studies. However, exploration of the impact of different approaches to improving public support would be of interest and potentially beneficial in future intervention development. This review also did not look at grey literature as part of the search strategy, which could be addressed in future work.

#### *Data Extraction*

Data extraction forms used for this review (see Appendix B) were highly detailed, and developed using the MRC Framework for Developing and Evaluating Complex Interventions (Craig and Petticrew, 2013) as a guide for the type of data which was sought. In addition to using this framework, space was allowed for additional information which could be found whilst extracting



data. This meant that data extraction was a lengthy process, but allowed for very detailed data and therefore synthesis of data as the output of this review.

The researchers conducting the data extraction searched the papers in a very detailed manner to find the data. For example, where data was sought for theoretical underpinnings, this required the researcher in some cases to deduce whether a theoretical approach had been used as in some cases this was not mentioned in detail in the background section of the paper, but was referred to at a later point, or became apparent when reviewing study transcripts.

#### Implications of the Systematic Review (Future Research)

This review provides some evidence, from highly controlled settings, that public support for evidence based public health policy measures can be increased by a small but significant amount. It also provides an opportunity to explore the data in a detailed way by presenting components and features of interventions as a narrative synthesis. This is the first review of its kind, and therefore this makes an original contribution to the literature.

The findings of the narrative synthesis in this review provide useful insights into ‘what works’ in terms of intervening to improve public support for evidence based public health policy measures. The paragraphs below pick out some of the key findings, and implications for alcohol policy research.

As discussed above, the systematic review found quantitative evidence of the efficacy of interventions to improve public support for public health policy measures. However, all of the studies of promising interventions were conducted online using survey panels, and the interventions were viewed in this way – the majority of which comprised all or mostly text (Gollust et al., 2013; McGinty et al., 2013; Allen et al., 2014; Niederdeppe et al., 2014a; Bachhuber et al., 2015; Niederdeppe et al., 2015a; Frederick et al., 2016; Ortiz et al., 2016; Kennedy-Hendricks et al., 2016; White et al., 2017; McGlynn and McGlone, 2018), with the exception of Scully et al. (2017) who delivered their intervention via radio message. The focus of these studies was not on how the intervention was delivered, as they are efficacy rather than effectiveness studies. This has potential implications for future work, as although the evidence demonstrates that interventions of this type are efficacious, the issue of how best to communicate with the general public has not yet been resolved. None of the studies in the systematic review considered potential intervention users or delivery, or exploring the views of those who had experience in communicating with the public in this way. This should be developed further to understand the most effective ways to communicate

with the general public, in a way that contributes to the effectiveness of these interventions in a 'real world' setting. This suggests the value of deeper understanding of public perceptions, as does Chapter 1, and of input from potential intervention users or experts in the field (such as public health advocates) who have experience of communicating with the public in this way.

As discussed in Chapter 1, and highlighted in the inoculation literature, salience of the policy measure is an important psychological mediator of how impactful public support is on policymaking. Only three of the studies of effective interventions considered or explicitly mentioned salience of the policy measure in the paper (Scully et al., 2017; Ortiz et al., 2016; Niederdeppe et al., 2014a). This indicates a gap in the existing interventions literature, and suggests salience of particular policy measures should be explored further in future research.

The findings here provide a foundation on which to develop the literature on improving public support for public health policy measures. We now know the key theoretical approaches to consider in competing with messaging from vested interests to improve public support for public health policy measures. However, we know little about the benefits of other components of interventions as the studies included in this review do not go into detail about development of interventions. For example, almost all of the interventions used the same medium (written statements), so the review is unable to shed light on the benefits of one medium over another in terms of increasing public support for particular policy measures.

Future research should consider approaching organisations which already communicate with the general public with regards to public health, who might potentially use or administer interventions of this nature. NGOs have a wealth of knowledge and experience in this area, and this could be drawn upon to further develop understanding of these types of interventions. In addition to this, it is important that any intervention is acceptable to those who might use it – otherwise it may not be administered in the way planned.

Another consideration of future research should include policymakers in the field in question, potentially using qualitative methods to explore the views of policymakers with regards to how they consider public support in their decision making. This should also be considered and brought into the intervention development process.

As outlined in Chapters 1 and 2, I have a particular interest in improving public support for evidence based alcohol policy measures, which is discussed in detail later in this Chapter.

### **Corporate Determinants of Health**

In Chapter 1, corporate influence on population health was explored, and the framework proposed by Lima and Galea (2018) was used to understand the various ways corporations exert power to promote their products and increase profits and the impact this has on population health. Key domains focussed on were legal environment, political environment, knowledge environment and preference shaping. A focus of this review has been on interventions to combat corporate attempts to shape preferences with regards to public health policies which limit availability and affordability of potentially harmful products.

### **Public Support**

This review provides some initial evidence that it is possible to alter (increase) public support for evidence based policy measures, and collates theoretical approaches which may be beneficial in competing with corporate opposition to evidence based policy measures. In particular, inoculation theory has emerged as a useful approach to protecting from future messaging from corporations to reduce public support for policy measures.

The findings of this review provide a basis and rationale for continuing to attempt to intervene in public support. What the studies in this review do not consider, however, is taking any of the interventions further into a 'real world' setting (as outlined above). Although the studies included here demonstrate efficacy of interventions in a highly controlled setting, they do not consider the potential implications for rolling out these interventions for use. Other key weaknesses (which could be remedied by doing 'real world' research) are lack of follow up measures and an unclear approach to intervention development.

### **Implications for Alcohol Policy**

The systematic review looked more generally at interventions to improve public support for evidence based public health policy measures, with a view to using the findings to inform development of interventions to improve public support for alcohol policy measures. This section and the one below will discuss the implications of this review for alcohol policy and alcohol research. This review found only one study which focused on improving public support for alcohol policy measures (Scully et al., 2017). They found that inclusion of narrative and inoculation components in

public health messaging helped to strengthen public resistance to anti-policy messages in both policy domains two weeks after hearing the public health message as a radio broadcast. This highlights some potential for influencing public support for evidence-based alcohol policy measures. It also highlights that the literature on intervening in public support for alcohol policy is scarce, and provides a rationale for developing this further.

As outlined in Chapter 2, public support for more intrusive alcohol policy measures tends to be low, with age, gender and drinking status as predictive factors for policy support (older, female, abstainers are more likely to support more intrusive policy measures). Future research and development of practice should focus on targeting those specific groups, and using the expertise of NGOs who work in the field of communicating about alcohol policy to develop more effective interventions.

The types of studies and interventions found in this review has implications for future work around improving public support for evidence based policy in general (see above), and for alcohol policy more specifically. Future development of interventions should consider that they are competing with “pervasive and creative alcohol advertising that emphasizes the positive social outcomes of drinking” (Jongenelis et al., 2016). Dunstone et al. (2017) highlighted the imbalance in alcohol related information available in the media, and particularly the “vast amount of pro-alcohol content disseminated by the alcohol industry”.

## **Implications for Alcohol Policy Research**

### Implications of the Systematic Review

Implications of the review findings for developing interventions to improve public support for public health policy measures in general is discussed above. There are some implications to consider specifically with regards to developing interventions to improve public support for evidence based alcohol policy measures. It is not currently known whether it is more effective or efficacious to refer to specific alcohol policies in order to improve public support for alcohol policy measures. However, over half of the studies of promising interventions in the systematic review referred to a specific policy measure in their intervention (Allen et al., 2014; Bachhuber et al., 2015; McGinty et al., 2013; Niederdeppe et al., 2014a; Niederdeppe et al., 2015a; Scully et al., 2017; White et al., 2017).

At present, there is evidence of efficacy of interventions to improve public support for public health policy measures. The findings of the systematic review should be explored further in an alcohol

policy specific context, as there is only one study of an intervention to improve public support for alcohol policy measures. Particular consideration should be given to theoretical underpinnings and how they may inform development of alcohol policy specific content, involvement of potential intervention users and consideration of intervention delivery. Development of understanding of public perceptions of alcohol policy, and input from potential users on intervention development and delivery, will contribute to strengthening the evidence base for interventions of this type in the alcohol policy field.

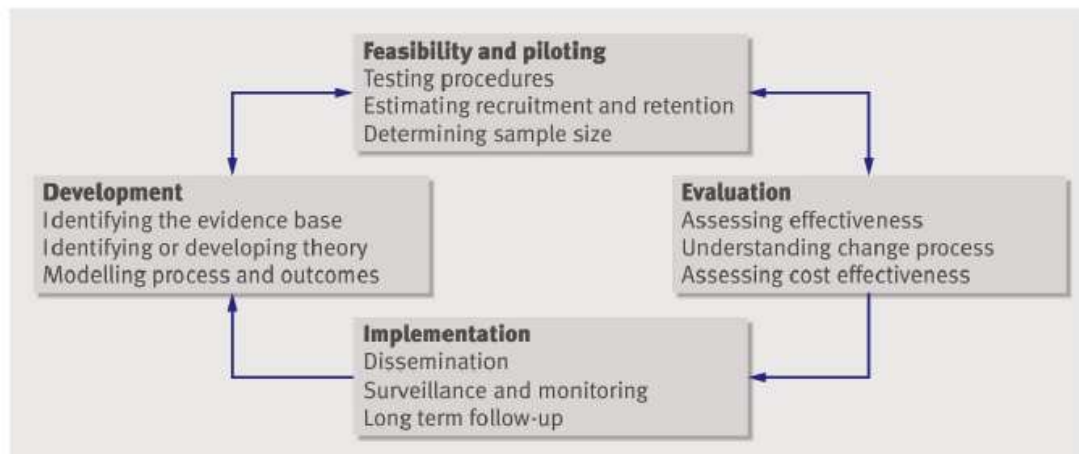
The following subsections outline specific areas which future research should focus on, starting with use of the MRC Framework for Developing and Evaluating Complex Interventions as a potential guide to develop interventions to improve public support for alcohol policy measures.

#### MRC Framework for Developing and Evaluating Complex Interventions

The MRC Framework for Developing and Evaluating Complex Interventions was first developed in 2000, and revised in 2008 (Campbell et al., 2000; Craig and Petticrew, 2013). The first version of the framework outlined a phased linear approach to complex intervention development, similar to that used in phases of drug development. The revised framework in 2008 advocated a cyclical approach to intervention development, still using phases but with more detailed attention to the evaluation phase of development (Craig and Petticrew, 2013). Both versions of the framework have been successfully used to develop a variety of treatments, services and public health interventions across disciplines such as: palliative care (Higginson et al., 2006), oncology (Murchie et al., 2007), mental health (Barley et al., 2012), hypertension (Bobrow et al., 2018) and diabetes (Eiser et al., 2013).

The strength of the MRC Framework lies in its phased approach to intervention development, which places emphasis on the theory and evidence underpinning the intervention as a basis for developing the intervention components (Sturt, Whitlock and Hearnshaw, 2006; Bobrow et al., 2018). The four phases in the MRC Framework 2008 (shown in Figure 8) are: Development, Feasibility and Piloting, Evaluation and Implementation (Craig and Petticrew, 2013). Using this framework to improve and build on development of interventions to improve public support for alcohol policy will fill the gap in the current literature. The key gap is lack of explicit and robust intervention development, and this framework will fill that gap and allow for thorough intervention development. The phased approach will improve the external validity of the intervention through using piloting and evaluation as part of a cyclical intervention development process.

Figure 8. MRC Framework for Developing and Evaluating Complex Interventions



Key areas and research questions which should be approached are outlined in more detail below.

### *Intervention Development*

This review highlights the gaps in the research, in particular in terms of intervention development. A strength of this review is the rich and detailed information on theoretical approaches which was found and can be used as a basis for using the MRC Framework (Figure 8) to take intervention development further. Future research should use established intervention development frameworks (such as the MRC Framework), using the theoretical findings reported here, and a process of piloting and evaluating. Development of the intervention (essentially the transcripts) is not clearly explained in any of the included papers, and the process of getting from the theoretical underpinnings to the actual intervention needs to be explored and developed in a more robust way.

Potential methods to take intervention development further are engaging with potential intervention stakeholders to understand how they might elicit change in public support, calling on existing experience and knowledge through interviews and focus groups. In addition, particular groups within the population could be targeted using the existing literature to explore deeper perceptions of alcohol policy, and then build these findings into the intervention itself. Chapter 2 outlined that women, abstainers and older people were more likely to support intrusive policy measures. Therefore, initial research questions might ask how to improve support in men, drinkers and younger people. These groups could be approached using qualitative settings such as focus groups, discussion forums or interviews. Views of these individuals could be taken into account

alongside potential intervention users (such as NGOs or public health advocates) to develop an intervention which can then be piloted and regularly revisited as per the MRC Framework (Figure 8).

#### *Intervention Medium*

One of the key gaps in the literature in this review is around intervention medium – almost all of the studies in the review used written messages but it is unclear whether this improves efficacy or was simply convenient as participants were recruited online. Exploration of effective media could be incorporated into the research suggested above. A research question might simply ask which media are most effective in improving public support for alcohol policy, or allow individuals to be most receptive to opinion change? If focus groups were being conducted, for example, part of the session could involve presenting alcohol policy information in various formats and exploring how individuals respond to them. Similarly, potential intervention users could be asked on their experience of effective media in communicating with the general public and delivering interventions of this type. A few ‘top’ approaches could then be tested out as part of piloting as per the MRC Framework (Figure 8). Transcripts which were found as part of this review (Appendix D) could potentially be useful in developing initial interventions to present, by adapting them for alcohol policy.

#### *Potential Intervention Delivery*

Those who might be interested in delivering or using this intervention to shape public opinion might be those organisations which would develop or adopt a campaign to improve public support for public health policy measures, such as healthcare providers, advocacy organisations or NGOs. In this case it was expected that some mention of advocacy organisations or NGOs would be part of the intervention development process. This has clear implications for future research, and provides a rationale for engaging with those who might deliver an intervention of this type. Engaging in this way would provide data on how they intervene in other issues currently, and how acceptable an intervention of this sort would be. As outlined above, potential users of the intervention could be approached to share their knowledge and expertise on how to improve public support for alcohol policy measures, and how they communicate with the general public and deliver interventions to elicit opinion change. Qualitative studies could be used such as interviews or focus groups, or an ‘expert group’ could be developed to provide advice and input on intervention versions throughout the development process.

### *'Real World' Studies*

As outlined above, the studies in this review were almost all conducted via online survey panels, where participants would access a link where they would read or view the intervention and then answer questions about support for particular policy measures. The benefit of this approach is it provides controlled evidence of immediate effects of the intervention on public support in control and intervention groups. However, the weakness of this approach is that it doesn't take into account how an intervention like this might be delivered in a 'real world' setting, and it doesn't necessarily consider a current policy issue. This has implications for developing the literature by developing an intervention to be delivered in a real world setting, and considering a longer period of time to establish longevity of intervention effects in the face of competing messages from vested interests.

Studies to improve the external validity of the interventions could use longitudinal methods to ascertain whether interventions are effective at improving public support for alcohol policy measures, and measuring whether the improvement endures over time. Interventions could be delivered via social media, television or radio advertisements so that individuals receive the messages as part of their day to day activities, and then taking a cross sectional measure of public support at several timepoints.

### **Conclusion**

This thesis has outlined how corporations influence and damage population health using the framework proposed by Lima and Galea (2018) by shaping population preferences and attempting to prevent adoption and implementation of evidence based policy measures which affect profitability. Shifting public opinion is a potential route to encouraging adoption and implementation of evidence based public health policy measures, and the literature explored in Chapter 1 details the importance of public support in policymaking decisions, particularly for salient policy issues.

Chapter 2 explored alcohol policy as an example of an area of public health policy, which requires introduction of evidence based policy measures to reduce burden of alcohol related harms, but is also faced with competition and opposition from transnational corporations. However, there is a paucity of literature on intervening in public support for alcohol policy, with only one study found. A systematic review was therefore conducted which included any public health policy measure, in order to collate and analyse data on intervening in this way.



This review found that, in highly controlled settings, inoculation, narrative and framing approaches can be effective at eliciting small but significant improvements in public support for a range of public health policy measures, particularly alongside providing individuals with more information on the potential impact (in improving population health) of introducing evidence based policy measures. The review also provides rich data on types of interventions which have been studied, including intervention transcripts where possible.

This review and thesis provide a foundation for future research into developing interventions to improve public support for public health policy, and alcohol policy specifically. This discussion chapter outlines some suggestions, as well as the possibility of using the MRC Framework to guide research in a robust way (which has been used in development of other interventions).

A large programme of research in a 'real world' setting is required to build on this evidence base. Consideration of intervention delivery, target audiences and different approaches for different policy measures should all be taken into consideration.

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# Appendices

## Appendix A. Electronic Search Strategy

Ovid (Medline, Embase, PsycInfo):

1. public support.ab,ti.
2. public opinion.ab,ti.
3. public backing.ab,ti.
4. public acceptability.ab,ti.
5. public views.ab,ti.
6. public.ab,ti.
7. consumers.ab,ti.
8. "accepta\*".ab,ti.
9. "perception\*".ab,ti.
10. "attitude\*".ab,ti.
11. "belief\*".ab,ti.
12. understanding.ab,ti.
13. tolerance.ab,ti.
14. "emotion\*".ab,ti.
15. psychological determinants.ab,ti.
16. personality.ab,ti.
17. health beliefs.ab,ti.
18. society.ab,ti.
19. cultural identity.ab,ti.
20. morality.ab,ti.
21. social factors.ab,ti.
22. "communit\*".ab,ti.
23. "household\*".ab,ti.
24. health knowledge.ab,ti.
25. Public Opinion/
26. SOCIAL PERCEPTION/ or PERCEPTION/
27. ATTITUDE TO HEALTH/ or ATTITUDE/
28. COMPREHENSION/
29. EMOTIONS/
30. PERSONALITY/
31. Health Knowledge, Attitudes, Practice/
32. SOCIETIES/
33. Culture/ or Social Identification/
34. "opinion\*".ab,ti.
35. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34
36. health policy.ab,ti.
37. drug policy.ab,ti.
38. government policy.ab,ti.
39. economic policy.ab,ti.
40. social policy.ab,ti.
41. policy makers.ab,ti.
42. policy.ab,ti.
43. public policy.ab,ti.
44. public health.ab,ti.

45. alcohol policy.ab,ti.
46. alcohol.ab,ti.
47. tobacco policy.ab,ti.
48. tobacco.ab,ti.
49. climate change.ab,ti.
50. food industry.ab,ti.
51. sugary drinks.ab,ti.
52. "law\*".ab,ti.
53. "regulation\*".ab,ti.
54. national health policy.ab,ti.
55. "constraint\*".ab,ti.
56. "restrict\*".ab,ti.
57. "directive\*".ab,ti.
58. "guideline\*".ab,ti.
59. protocols.ab,ti.
60. standards.ab,ti.
61. service provision.ab,ti.
62. service utilisation.ab,ti.
63. Health Policy/
64. "Drug and Narcotic Control"/
65. POLICY MAKING/ or SMOKE-FREE POLICY/ or ORGANIZATIONAL POLICY/ or ENVIRONMENTAL POLICY/ or NUTRITION POLICY/ or FISCAL POLICY/ or POLICY/
66. Public Policy/
67. Public Health/
68. Health Promotion/ or Smoking Prevention/ or Smoking/
69. TOBACCO/
70. Climate Change/
71. Food Industry/
72. Beverages/ or Obesity/
73. GOVERNMENT REGULATION/
74. GUIDELINE/
75. 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74
76. advocacy.ab,ti.
77. activism.ab,ti.
78. "messag\*".ab,ti.
79. framing.ab,ti.
80. "communica\*".ab,ti.
81. "campaign\*".ab,ti.
82. "initiativ\*".ab,ti.
83. social marketing.ab,ti.
84. publicise.ab,ti.
85. language.ab,ti.
86. mass communication.ab,ti.
87. advice.ab,ti.
88. Communication/
89. Persuasive Communication/
90. "Marketing of Health Services"/ or Social Marketing/
91. Information Dissemination/
92. LANGUAGE/



93. Mass Media/  
 94. (intervention\* adj5 public).ab,ti.  
 95. 76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92 or 93 or 94  
 96. "control\* trial\*".ab,pt,ti.  
 97. "randomi\*".ab,pt,ti.  
 98. 96 or 97  
 99. 35 and 75 and 95 and 98

**CINAHL and GreenFile:**

- S5 S1 AND S2 AND S3 AND S4  
 S4 control\* trial\* or randomi\*  
 S3 advocacy or activism or messag\* or framing or communica\* or campaign or initiativ\* or social marketing or publicise or language or mass communication or advice or "intervention" N5 public  
 S2 health policy or drug policy or government policy or economic policy or social policy or policy makers or policy or public policy or public health or alcohol policy or alcohol or tobacco policy or tobacco or climate change or food industry or sugary drinks or law\* or regulation\* or national health policy or constraint\* or restrict\* or directive or guideline\* or protocols or standards or service provision or service utilisation  
 S1 public support or public opinion or public backing or public acceptability or public views or public or consumers or accepta\* or perception\* or attitude\* or belief\* or understanding or tolerance or emotion\* or psychological determinants or personality or health beliefs or society or cultural identity or morality or social factors or communit\* or household\* or health knowledge or opinion\*

**Web of Science:**

# 3	<a href="#">11,592</a>	#2 AND #1 <i>Indexes=SCI-EXPANDED, SSCI, A&amp;HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>	<a href="#">Edit</a> <input type="checkbox"/> <input type="checkbox"/>
# 2	<a href="#">1,065,536</a>	(TS=((control* trial*) OR (randomi*))) <i>Indexes=SCI-EXPANDED, SSCI, A&amp;HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>	<a href="#">Edit</a> <input type="checkbox"/> <input type="checkbox"/>
# 1	<a href="#">207,866</a>	(TS=((public support OR public opinion OR public backing OR public acceptability OR public views OR public OR consumers OR accepta* OR perception* OR attitude* OR belief* OR understanding OR tolerance OR emotion* OR psychological determinants OR personality OR health beliefs OR society OR cultural identity OR morality OR social factors OR communit* OR household* OR health knowledge OR opinion*) AND (health policy OR drug policy OR government policy OR economic policy OR social policy OR policy makers OR policy OR public policy OR public health OR alcohol policy OR alcohol OR tobacco policy OR climate change OR food industry OR sugary drinks OR law* OR regulation* OR national health policy OR constraint* OR restrict* OR directive* OR guideline* OR protocols OR standards OR service provision OR service utilisation) AND (advocacy OR	

activism OR messag\* OR framing OR communica\* OR campaign\*  
OR initiativ\* OR social marketing OR publicise OR language OR  
mass communication OR advice OR "intervention" NEAR/5  
public)))  
*Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI*  
*Timespan=All years*

## Appendix B. Data Extraction Form & Risk of Bias Assessment

<b>Study ID:</b>	<b>Report ID :</b>	Date form completed:
First author:	Year of study:	Data extractor:
Citation:		
Publication type:		
Country of study:		
Funding source of study:	Potential conflict of interest from funding? Y / N / unclear	

Study Characteristics			Page/ Para/ Figure #
<b>Type of study</b> (Review authors to add/remove designs based on criteria specified in protocol)	<input type="checkbox"/> Randomised Controlled Trial (RCT) <input type="checkbox"/> Cluster Randomised Controlled Trial (cluster RCT)	<input type="checkbox"/> Controlled Before and After (CBA) study <ul style="list-style-type: none"> <li>• Contemporaneous data collection</li> <li>• Comparable control site</li> <li>• At least 2 x intervention and 2 x control clusters</li> </ul>	
	<input type="checkbox"/> Interrupted Time Series (ITS) <ul style="list-style-type: none"> <li>• At least 3 time points before and 3 after the intervention</li> <li>• Clearly defined intervention point</li> </ul>	<input type="checkbox"/> Other design (specify):	
	<input type="checkbox"/> A process evaluation of an included study design	<i>Does the study design meet the criteria for inclusion?</i> Yes <input type="checkbox"/> No <input type="checkbox"/> → <b>Exclude</b> Unclear <input type="checkbox"/>	
	Description in text:		

Study intention	Descriptions as stated in the report/paper	Page/ Para/ Figure #
Aim of intervention	•	
Aim of study	•	
Start and end date of study		
Total study duration		
Theoretical basis		
Key references of theory		
Policy measures focused on (including content)		
Intervention Type/ Summary		
Key Findings from Study		

Methods	Descriptions as stated in the report/paper	Page/ Para/ Figure #
Method/s of recruitment of participants  <i>(How were potential participants approached and invited to participate? Where were participants recruited from? Does this differ from the intervention setting?)</i>		
Inclusion/exclusion criteria for participation in study	•	
Representativeness of sample: Are participants in the study likely to be representative of the target population?		
Total number of intervention groups		
Sample size calculation:  What assumptions were made?  Were these assumptions appropriate?	Estimated sample size -  <i>(Yes/No/Unclear)</i>	
Method of randomisation?  Allocation by individuals or cluster/groups		
Statistical methods used and appropriateness of these methods		
Does the study include a follow up period	Y/N	

<b>Participants</b> <i>Include if relevant</i>	<b>Include information for each group (i.e. intervention and controls) under study</b>	<b>Page/ Para/ Figure #</b>
<ul style="list-style-type: none"> <li>• What percentage of selected individuals agreed to participate?</li> </ul>		
<ul style="list-style-type: none"> <li>• Total number randomised (or total pop. at start of study for NRCTs)</li> </ul>		
<ul style="list-style-type: none"> <li>• Number allocated to each intervention group (no. of individuals)</li> </ul>		
<ul style="list-style-type: none"> <li>• For cluster trials, number of clusters, number of people per cluster</li> </ul>		
<ul style="list-style-type: none"> <li>• Where there any significant baseline imbalances?</li> </ul>	Yes <input type="checkbox"/> No <input type="checkbox"/>	
<ul style="list-style-type: none"> <li>• Number and reason for (and sociodemographic differences of) withdrawals and exclusions for each intervention group</li> </ul>		
<ul style="list-style-type: none"> <li>• What percentage of patients completed the study?</li> </ul>		
<ul style="list-style-type: none"> <li>• What percentage of participants received the allocated intervention or exposure of interest?</li> </ul>		
<ul style="list-style-type: none"> <li>• Is the analysis performed by intervention allocation status (intention to treat) rather than the actual intervention received? Have any attempts been made to impute missing data?</li> </ul>		
<ul style="list-style-type: none"> <li>• Age (median, mean and range if possible)</li> </ul>		
<ul style="list-style-type: none"> <li>• Sex</li> </ul>		
<ul style="list-style-type: none"> <li>• Race/Ethnicity</li> </ul>		

<ul style="list-style-type: none"> <li>Other sociodemographics (eg. Educational level, literacy level, soci-economic status, first language. Also consider possible proxies for these e.g. low baseline nutritional status )</li> </ul>		
<ul style="list-style-type: none"> <li>PROGRESS categories reported at baseline (indicate letters of those reported: Place of residence, race, occupation, gender, religion, education, SES, social capital)</li> </ul>		
<b>Subgroups</b>	<i>Enter a description of any participant subgroups from this paper to be analysed in the review.</i>	

**Intervention:**

<b>Group name:</b>	Intervention Group 1	Intervention Group 2	Intervention Group 3	Intervention Group 4	<b>Page/ Para/ Figure #</b>
Details of intervention or control condition <i>(Include if relevant in sufficient detail for replication)</i>					
<ul style="list-style-type: none"> <li>Setting eg <i>multicentre, university teaching hospitals, rural, metropolitan, school, workplace, community, GP clinic, etc.</i></li> </ul>					
<ul style="list-style-type: none"> <li>Content (list the strategies intended and delivered)</li> </ul>					
<ul style="list-style-type: none"> <li>Media &amp; Communication Strategies</li> </ul>					

• Delivery (eg. Stages (sequential or simultaneous), timing, frequency, duration, intensity, fidelity – process indicators)					
• Are potential users of the intervention considered	Y/N				
• Policy content of each intervention					
• Is the salience of the policy issue addressed?	Y/N				
• Has competition from corporate vested interests been addressed directly?	Y/N				
• Corporate content addressed					
• Co-interventions					
Duration of intervention					
Duration of follow-up					
Subgroups					
Process Data (linking specific content to outcome) reported?	Y/N Details	Y/N Details	Y/N Details	Y/N Details	



Control/comparison (what information is provided about what the control or comparison group received?)					
Any other characteristics?					

**Outcomes**

Question	Outcome 1	Page/ Para/ Figure #	Outcome 2	Page/ Para/ Figure #	Outcome 3	Page/ Para/ Figure #	Outcome 4	Page/ Para/ Figure #
Primary/ Secondary Outcome?								
Outcome definition (with diagnostic criteria if relevant)								
Type of outcome: Is this a modifiable variable (Community level, neighbourhood level, individual)								

level) or desired health outcome								
Time points measured								
Time points reported								
Is there adequate latency for the outcome to be observed?								
Is the measure repeated on the same individuals or redrawn from the population / community for each time point?								
Unit of measurement (if relevant)								
For scales – upper and lower limits and indicate whether high or low score is good								

How is the measure applied? Telephone survey, mail survey, in person by trained assessor, routinely collected data, other								
How is the outcome reported? Self or study assessor								
Is this outcome/tool validated?								
...And has it been used as validated?								
Is it a reliable outcome measure?								
Is there adequate power for this outcome?								

**Results:** page/para/fig

Comparison												
Outcome												
Subgroup												
Timepoint												
Post-intervention or change from baseline?												
<b>Results</b>	<b>Intervention 1</b>			<b>Intervention 2</b>			<b>Intervention 3</b>			<b>Intervention 4</b>		
As presented in study			No. participants			No. participants			No. participants			No. participants
No. missing participants and reasons												
Mean error or odds ratio												
Any other results reported												

Reanalysis required? (specify)	
Reanalysis possible?	
Reanalysed results	

**Other relevant information**

Were outcomes relating to harms/unintended effects of the intervention described? Include any data for these in the outcomes tables above	
Potential for author conflict <i>ie. evidence that author or data collectors would benefit if results favoured the intervention under study or the control</i>	
Key conclusions of the study authors	
Could the inclusion of this study potentially bias the generalisability of the review? Equity pointer: Remember to consider whether disadvantaged populations may have been excluded from the study.	

References to other relevant studies	
Additional notes by review authors	
Correspondence required for further study information (from whom, what and when)	

#### Risk of bias assessment

Domain	Review authors' judgement*	Description	Page/ Para/ Figure #
Was the allocation sequence adequately generated?	Yes / No / Unclear	<i>Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.</i>	
Was allocation adequately concealed?	Yes / No / Unclear	<i>Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment.</i>	

Were baseline outcome measurements similar?	Yes/No/Unclear	<i>Note whether baseline outcome measurements were reported and whether there were any important differences between groups. If there were important differences between groups, note whether appropriate adjusted analysis was performed to account for this.</i>	
Were baseline characteristics similar?	Yes/No/Unclear	<i>Note whether baseline characteristics were reported and whether there were any important differences between groups.</i>	
Were incomplete outcome data adequately addressed? <i>Assessments should be made for each main outcome (or class of outcomes).</i>	Yes /No / Unclear	<i>Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors.</i>	
Was knowledge of the allocated intervention adequately prevented during the study?  <i>Separate assessments should be made for relevant groups of people involved in the study i.e participants, outcome assessors, investigators, data assessors etc</i>	Yes / No / Unclear	<i>Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective, or whether blinding was appropriate.</i>  <ul style="list-style-type: none"> <li>• Participants – yes, no, unclear <i>[record supporting statement from study]</i>.</li> <li>• Investigators – yes, no, unclear <i>[record supporting statement from study]</i>.</li> <li>• Outcomes assessors – yes, no, unclear <i>[record supporting statement from study]</i>.</li> </ul> Data assessors – yes, no, unclear <i>[record supporting statement from study]</i> .	
Was the study adequately protected against contamination?	Yes/No/Unclear	<i>State whether and how the possibility of contamination was minimised by the study design/implementation.</i>	
Are reports of the study free of suggestion of selective outcome reporting?	Yes / No / Unclear	<i>State how the possibility of selective outcome reporting was examined by the review authors, and what was found.</i>	

<i>Assessments should be made for each main outcome (or class of outcomes).</i>			
Other sources of bias	Yes / No / Unclear	<i>State any important concerns about bias not addressed in the other domains in the tool.</i>	
ITS: Was the intervention independent of other changes?	Yes/No/Unclear	<i>Describe whether or not the intervention occurred independently of other changes over time and whether or not the outcomes may have been influenced by other confounding variables/historic events during the study period.</i>	
ITS: Was the shape of the intervention effect pre-specified?	Yes/No/Unclear	<i>State whether or not the point of analysis was the point of intervention. If not, describe whether a rationale for the shape of the intervention effect was given by the study authors.</i>	
ITS: Was the intervention unlikely to affect data collection?	Yes/No/Unclear	<i>Describe whether or not the intervention was likely to affect data collection and what the potential impact might have been.</i>	
ITS: Was knowledge of the allocated interventions adequately prevented during the study?  <i>Separate assessments should be made for relevant groups of people involved in the study i.e participants, outcome assessors, investigators, data assessors etc</i>	Yes/No/Unclear	<i>Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective, or whether blinding was appropriate.</i>  <ul style="list-style-type: none"> <li>• Participants – yes, no, unclear [record supporting statement from study].</li> <li>• Investigators – yes, no, unclear [record supporting statement from study].</li> <li>• Outcomes assessors – yes, no, unclear [record supporting statement from study].</li> </ul> Data assessors – yes, no, unclear [record supporting statement from study].	
ITS: Was incomplete outcome data adequately addressed?  <i>Assessments should be made for each main outcome (or class of outcomes).</i>	Yes/No/Unclear	<i>Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors.</i>	
ITS: Was the study free from selective reporting?	Yes/No/Unclear	<i>State how the possibility of selective outcome reporting was examined by the review authors, and what was found.</i>	



<b>ITS: Was the study free from other risks of bias?</b>	<b>Yes/No/Unclear</b>	<b><i>State any important concerns about bias not addressed in the other domains in the tool.</i></b>	
--	-----------------------	---	--

\* Note: For each section above 'Yes' indicates a 'low risk of bias'; 'No' indicates a 'high risk of bias'; 'Unclear' indicates an 'uncertain risk of bias'. When entering the data into RevMan, the options to choose from will be 'Low', 'High' and 'Unclear'

## Appendix C. Detailed Data Tables

**Appendix C Table 1. Data for Meta Analyses**

Author, Year & Country	Binary or Continuous Data?	Results Reported (including C.I.)	Conversion Required?	Data for Pooling
Gollust et al. (2013) USA	Continuous (1-7 scale reported as regression coefficient)	Liberals = 0.05 (0.18) Moderates = 0.05 (0.14) Conservatives = 0.22 (0.17)	Summary measure created by combining three conditions	Std Mean Difference (S.E.) = 0.1 (0.091837)
McGinty et al. (2013) USA	Binary (converted 1-5 scale into 0 or 1)	Story 1, Policy 1 = 1.55 (1.06-2.27) Story 1, Policy 2 = 1.43 (1.03-2.00) Story 2, Policy 1 = 1.29 (0.87-1.90) Story 2, Policy 2 = 1.75 (1.24-2.47) Story 3, Policy 1 = 1.49 (1.01-2.19) Story 3, Policy 2 = 2.39 (1.70-3.37)	Yes – three intervention groups and two policy outcomes pooled for O.R. (95% C.I.) = 1.64 (1.42, 1.90), then converted to log O.R. and S.E.	Log O.R. (S.E.) = 0.494696 (0.07508)
Barry et al. (2014) USA	Continuous scale, but data not reported	No data reported separately, only p value in text for all 10 policy measures (p > 0.05) showing no difference in public support for intervention groups	N/A	Not possible to pool – not suitable for meta analysis
Niederdeppe et al. (2014b) USA	Continuous (1-7 scale reported as ANOVA with M, S.D.)	Public Support reported as mean (S.D.) for 'no personal responsibility' condition = 3.77 (0.83)	Yes – converted M, S.D. into Std Mean Difference and S.E.	Std Mean Difference (S.E.) = 0.2 (0.112245)
Niederdeppe et al. (2014a) USA	Continuous (1-7 scale reported as regression coefficient)	Regression Coefficient T1 (S.E.) = 0.25 (0.12) Regression Coefficient T2 (S.E.) = -0.16 (0.13)	No – T1 result used for meta analysis	Std Mean Difference (S.E.) = 0.25 (0.12)
Allen et al. (2014) USA	Binary (converted 1-5 scale into 0 or 1 categorisation)	O.R. (95% C.I.) = 1.77 (1.15, 2.73)	Yes – log O.R. and S.E. calculated	Log O.R. (S.E.) = 0.57098 (0.221083)

Bachhuber et al. (2015) USA	Binary (converted 1-7 scale into binary)	Percentages for each Policy (C=control, I=intervention) Policy 1: C=63.2%, I = 85.7% Policy 2: C=24.4%, I = 64.3% Policy 3: C=52.4%, I=69.2% Policy 4: C=4.16%, I=69.1% Policy 5: C=38.5%, I=43.2%	Yes – converted % into O.R. for all policy measures, then collapsed all five O.R.s to create a pooled O.R (95% C.I.) = 2.60 (2.21, 3.07), then converted to Log O.R. and S.E.	Log O.R. (S.E.) = 0.955511 (0.084779)
Niederdeppe et al. (2015a) USA	Continuous (1-7 scale reported as regression coefficient)	T1 Pro-Policy Inoculation = 0.12 (0.015) T1 Pro-Policy Narrative = 0.22 (<0.001)  T2 Pro-Policy Inoculation = 0.08 (0.129) T2 Pro-Policy Narrative = 0.16 (0.004)	Yes – combined pro-policy inoculation and narrative condition at T1 for meta analysis, and calculated S.E. from p value.	Std Mean Difference (S.E.) = 0.16 (0.038265)
Niederdeppe et al. (2015b) USA	Continuous (1-5 scale reported as regression coefficient)	Regression Coefficient (p) reported = 0.13 (0.03)	Yes – calculated S.E. from p value	Std Mean Difference (S.E.) = 0.13 (0.059905)
Frederick et al. (2016) <sup>3</sup> USA	Continuous (1-5 scale reported as cohen's d)	Data reported on graph, demonstrating evidence of effect (using cohen's d) but unable to report specifics as graph not possible to read clearly, and p values not exact	N/A	Not possible to pool – unsuitable for meta analysis
Kennedy-Hendricks et al. (2016) USA	Continuous (1-7 scale reported as regression coefficient)	Policy 1 Low SES = 0.04 (-0.26, 0.34) Policy 1 High SES = 0.27 (-0.06, 0.59) Policy 2 Low SES = 0.16 (-0.17, 0.49) Policy 2 High SES = -0.02 (-0.35, 0.30) Policy 3 Low SES = -0.28 (-0.60, 0.05) Policy 3 High SES = -0.02 (-0.34, 0.30) Policy 4 Low SES = 0.32 (0.00, 0.64) Policy 4 High SES = 0.40, (0.08, 0.71)	Yes – outcomes reported separately for four policy items with no summary measure. Intervention groups combined and then policy outcomes combined to generate single figure for meta analysis	Std Mean Difference (S.E.) = 0.11 (0.056122)
Ortiz et al. (2016) USA	Binary (1-5 scale converted into binary)	O.R. (95% C.I.) = 1.38 (1.09, 1.75)	Used summary index for conditions and policy measures, as reported in the paper, then converted to Log O.R. and S.E.	Log O.R. (S.E.) = 0.322083 (0.12119)

Scully et al. (2017) Australia	Continuous (1-7 scale reported as regression coefficient)	Time 1 = 0.10 (-0.04, 0.25, p=0.157) Time 2 = 0.28 (0.07, 0.49, p=0.009)	Yes – used target policy measure at T1, calculated S.E. from p value	Std Mean Difference (S.E.) = -0.06 (0.096939)
Skurka (2017) USA	Continuous (7 point scale reported as M, S.D.)	Control = 5.24 (1.15) Race = 5.31 (1.08) Geography = 5.07 (1.32)	Yes – converted M, S.D. into Std Mean Difference and S.E.	Std Mean Difference (S.E.) = 0.1 (0.07066)
White et al. (2017) USA	Binary (5 point scale, percentages for support vs no support reported)	O.R. (95% C.I.) = 1.42 (1.20, 1.683)	Used percentages reported to calculate O.R. and C.I., then converted into Log O.R. and S.E.	Log O.R. (S.E.) = 0.350657 (0.085784)
McGlynn and McGlone (2018) USA	Continuous (7 point scale reported as cohen's d)	Reported cohen's d in text  F(1, 205) = 6.22, p = .01, d = .34.	Unable to calculate standard error as no p value or C.I. reported for measure of effect	Not possible to pool – unsuitable for meta-analysis

**Appendix C Table 2. Study Characteristics**

Author & Year	Selection Criteria	No. participants randomised (N)	Population Location	Gender %	Age %	Ethnicity %
Gollust et al. (2013)	Age 18+	2494	USA	49% male 51% female	Mean = 41.52	White – 65% (no other ethnicities reported)
McGinty et al. (2013)	None	1959	American Adults 18+	50% male 50% female	18-29 – 13.8% 30-44 – 20.8% 45-59 – 31.6% 60+ - 49.5%	White Non Hispanic – 76.8% Black, Non Hispanic – 9% Other, Non Hispanic – 4% 2+ Races, Non Hispanic – 2.3% Hispanic – 7.9%
Barry et al. (2014)	Age 18+	1677	USA	49% male 51% female	18-29 years 25% 30-44 years 32% 45-59 years 34% 60+ years 9%	White, non-Hispanic 65% Black, non-Hispanic 12% Other, non-Hispanic 4% 2+ race, non-Hispanic 16% Hispanic 3%
Niederdeppe et al. (2014b)	Those who took an average of <2 seconds to answer each question	500	American Adults 18+	43% male 57% female	18-83 years ( $M = 36.4, SD = 16.3$ )	80% non-Hispanic White
Niederdeppe et al. (2014a)	Survey Completion <60mins >10 seconds on the screen with the message Able to complete in English	5147	American Adults 18-64	52% male 48% female	18-24 – 7.2% 25-34 – 11.2% 35-44 – 17% 45-54 – 24.5% 55-64 – 40.1%	White, Non-Hispanic – 74.4% Black, Non-Hispanic – 10.1% Other, Non-Hispanic – 2% Hispanic – 10.8% 2+ Races, non Hispanic – 2.6%

Allen et al. (2014)	Age 18+, non-smokers, able to view the online video	863	New York	44.5% male 55.5% female	< 40 36.6% 40-64 46.9% 65+ 16.5%	White 68.8% Black 12.7% Hispanic 10.7%
Bachhuber et al. (2015)	Age 18+	1685	USA	52% male 48% female	18-24 12.3% 24-34 17.6% 35-44 16.3% 45-54 16.1% 55-64 20.5% 65+ 17.3%	White only 66.1% Black only 11.5% Other 22.5% Hispanic ethnicity 15.1%
Niederdeppe et al. (2015a)	None	5007 (t1) 3901 (t2)	American Adults 18+	Male 36.6% Female 63.4%	18-24 - 15.8% 25-34 - 23.9% 35-44 - 15.8% 45-54 - 13.6% 55-64 - 17.7% 65+ - 13.2%	White – 82.2% Black – 11.5% Hispanic/Latino – 9.4% Asian – 5.9% American Indian/Alaska Native – 2.2% Hawaiian or Other Pacific Islander – 1.1%
Niederdeppe et al. (2015b)	None	718	American Adults 18+	Male 47% Female 53%	Mean 48.26; SD (17.02)	White Non-Hispanic – 74% Black Non-Hispanic – 9% Other Non-Hispanic – 4% Hispanic – 9% 2+ Races Non-Hispanic – 4%
Frederick et al. (2016)	Age 18+	797	USA	45% male 55% female	M=37.2 (SD=12.7)	White – 81% Asian – 5% Hispanic – 4% Black – 6% Other – 4%
Kennedy-Hendricks et al. (2016)	Age 18+	1620	USA	48% male 52% female	18-24 – 12.2% 25-34 – 18.4% 35-44 – 15.9% 45-54 – 16.5% 55-64 – 19.7% 65+ - 17.4%	White only – 65.4% Black only – 11.4% Other – 23.1%  Hispanic – 15.2% Non-hispanic 84.8%

Ortiz et al. (2016)	None	2580	American Adults 18+	45% male 55% female	18-29 – 23.5% 30-44 – 24.6% 45-60 – 31% 60+ - 20.9%	American Indian – 0.9% Asian – 4.7% African American – 3.4% Latino – 4.3% Non-Latino White – 86.8%
Scully et al. (2017)	Participants who hadn't worked in industries such as marketing, health promotion, market research, sugary drinks etc	6000	Australian Adults 18+	40.8% male 59.2% female	18-24 (7%) 25-34 (14.2%) 35-44 (14.1%) 45-54 (15.5%) 55-64 (21.5%) 65+ (27.2%)	Not reported
Skurka (2017)	95% or higher approval rating on previous MTurk (survey panel) tasks	653	American Adults 18+	40.1% male 59.3% female 0.5% transgender 0.2% other	M=37.16 (SD=12.65) Range 18-83	White – 81.6% Black – 9.5% Chinese – 3.1% American Indian – 3.1% Asian Indian – 2.3%
White et al. (2017)	None	1183	American Adults 18+	44% male 56% female	18-29 – 16% 30-45 – 28% 46-64 – 38% 65+ - 19%	White – 61% Black – 12% Hispanic – 22% Other – 4%
McGlynn and McGlone (2018)	Completion of 1000 previous panel tasks with 98% or higher rating	211	American Adults 18+	47% male 53% female	19-82 years (M=38.6, SD=12.48)  18-29 - 28.4% 30-39 - 30.3% 40-49 - 21.3% 50-59 - 11.8% 60+ - 8%	White Non Hispanic – 86.7% African American – 7.1% Hispanic – 4.7% Asian – 4.3% American Indian – 2.4% Pacific Islander/Hawaiian – 0.5%

**Appendix C Table 3. Interventions Summary**

Author & Year	Recruitment Medium	Intervention Medium	Policy Issue	Intervention Groups	Representative Sampling Y/N	Positive effects reported by authors Y/N	Intervention aims in addition to improving public support Y/N
Gollust et al. (2013)	Online survey panel	Written message Viewed online	Obesity Prevention	(1) No info about childhood obesity (2) Magnitude statement about childhood obesity, no consequences (3) Magnitude of problem & consequences (4) Condition 3 + health care costs (5) Condition 3 + weight based bullying (6) Condition 3 + military readiness	Y	Y	Y
McGinty et al. (2013)	Online survey panel	Written news story Viewed Online	Gun control policy	(1) Control (2) Story 1 – mass shooting event (3) Story 2 – mass shooting event + gun restrictions for persons with serious mental illness (4) Mass shooting event + ban on high capacity magazines	Y	Y	Y
Barry et al. (2014)	Online survey panel	Video Message Viewed online	Obesity Prevention	(1) Control (2) Hypertension consequence (3) Bullying consequence (4) Parental responsibility	Y	N	Y
Niederdeppe et al. (2014b)	Face to face – shopping centre	Written statement	Obesity Policies	(1) Control	N	Y	Y



		Viewed on laptop		(2) High personal responsibility message (3) Moderate personal responsibility message (4) No personal responsibility message			
Niederdeppe et al. (2014a)	Online survey research panel	Written Statement  Viewed Online	Obesity prevention (soda tax)	Two pro-tax frames, two anti-tax frames, inoculation as counterframing strategy (1) No exposure T1, no exposure T2 (2) No exposure T1, strong anti-tax frame T2 (3) Strong pro-tax frame T1, no exposure T2 (4) Strong pro-tax frame T1, strong anti-tax frame T2 (5) Both pro & anti T1, strong anti-tax frame T2 (6) Both pro & anti T1 & T2 (7) Inoculation T1, strong anti-tax frame T2 (8) Inoculation T1, both pro & anti tax frames T2	Y	Y	Y
Allen et al. (2014)	Online survey panel	TV advertisements (4), radio (2), written message (1)  Viewed online	Ban on point of sale (POS) tobacco promotion	(1) NO EXP (control) (2) EXP (intervention)	N	Y	Y
Bachhuber et al. (2015)	Online survey panel	Written message  Viewed online	Naloxone provision	(1) factual information only, (2) factual information plus preemptive refutation, (3) sympathetic narrative only, (4) sympathetic narrative plus factual information,	Y	Y	Y

				all three messages in combination”			
Niederdeppe et al. (2015a)	Online survey panel	Written Statement Viewed Online	Obesity (soda), Smoking, Prescription Painkiller Policies	(1) Control with industry anti-policy message at T1 (2) Control with industry anti-policy message at T2 (3) Inoculation with industry anti-policy message at T1 (4) Inoculation with industry anti-policy message at T2 (5) Narrative with industry anti-policy message at T1 (6) Narrative with industry anti-policy message at T2	N	Y	N
Niederdeppe et al. (2015b)	Online survey panel	Written Statement Viewed Online	Obesity Policies	(1) Empathy, Democrat, Low Individual Responsibility (2) Rational, Democrat, Low Individual Responsibility (3) Empathy, Republican, Low Individual Responsibility (4) Rational, Republican, Low Individual Responsibility (5) Empathy, Democrat, High Individual Responsibility (6) Rational, Democrat, High Individual Responsibility (7) Empathy, Republican, High Individual Responsibility (8) Rational, Republican, High Individual Responsibility (9) Control	Y	Y	Y
Frederick et al. (2016)	Online survey of Mechanical Turk workers	Written news article Viewed online	Obesity Prevention	(1) Fat-Negative (unhealthy + controllable + discrimination justified) (2) Fat-Positive (healthy + uncontrollable +	N	N	Y

				discrimination unacceptable) (3) Control			
Kennedy-Hendricks et al. (2016)	Online survey panel	Written message  Viewed online	Opioid pain reliever addiction during pregnancy	(1) Control (2) High SES base narrative (3) Low SES base narrative (4) Low SES woman facing barriers to treatment (5) High SES woman with successfully treated addiction (6) Low SES woman with successfully treated addiction	Y	Y	Y
Ortiz et al. (2016)	Online survey research panel	Written statements  Viewed online	Food industry related obesity prevention policies	(1) Control (2) Taste-engineering frame (3) Consumer knowledge value (4) Consumer safety value (5) 3+4 (6) 2+3+4	N	Y	N
Scully et al. (2017)	Online survey research panel	Radio Message	Sugary drinks/alcohol health policies	(1) Control (2) standard pro-policy arguments (Standard) (3) Standard + Inoculation (I) (4) Standard + Narrative (N) (5) Standard + I + N	Y	Y	N
Skurka (2017)	Online survey research panel	Written statements	Obesity policies	(1) Age frame: child (2) Age frame: adult (3) Social comparison frame: control (4) Social comparison frame: race (5) Social comparison frame: geography	N	Y	Y

White et al. (2017)	Online survey research panel	Written statement	Medically unnecessary abortions	(1) Intervention (2) Control	Y	Unclear	Y
McGlynn and McGlone (2018)	Online survey panel	Written statement followed by full colour health message  Viewed online	Obesity Policies	1) Individual choices message frame + human agency message 2) Individual choices message frame + disease agency message 3) Societal factors message frame + human agency message 4) Societal factors message frame + disease agency message 5) Control condition – no message frame + human agency message 6) Control condition – no message frame + disease agency message	N	Y	Y

**Appendix C Table 4. Theoretical Basis & Intervention Content**

Author & Year	Named Underpinning Theory	Explicit Consideration of Salience Y/N	Explicit Mention of Communications Strategies Y/N	No. of study contacts	Attempt to Address Vested Interests Y/N	Consideration of Intervention Users Y/N
Gollust et al. (2013)	Framing Theory	N	Y	1	N	N
McGinty et al. (2013)	None	N	N	1	N	N
Barry et al. (2014)	None	N	N	1	N	N
Niederdeppe et al. (2014b)	Narrative Persuasion	N	Y	1	N	N
Niederdeppe et al. (2014a)	Framing Theory, Inoculation Theory	Y	Y	2	Y	N
Allen et al. (2014)	None	N	N	1	Y	N
Bachhuber et al. (2015)	None	N	N	1	N	N
Niederdeppe et al. (2015a)	Narrative Persuasion, Inoculation Theory	N	Y	2	Y	N
Niederdeppe et al. (2015b)	Narrative Persuasion Attribution Theory	Y	N	1	N	N
Frederick et al. (2016)	Framing Theory Attribution Theory	N	Y	1	N	N
Kennedy-Hendricks et al. (2016)	Framing Theory	N	N	1	N	N

	Attribution Theory					
Ortiz et al. (2016)	Framing Theory	Y	Y	1	Y	N
Scully et al. (2017)	Inoculation Theory, Narrative Persuasion	N	N	2	Y	N
Skurka (2017)	Attribution theory, Framing Theory	Y	N	1	N	N
White et al. (2017)	None	Y	N	1	N	N
McGlynn and McGlone (2018)	Attribution Theory, Framing Theory	N	Y	1	N	N



## Appendix D. Intervention Transcripts

### Allen et al 2014 (exp intervention group receives all messages vs control) – poster is 86 words:

“Three of the four TV advertisements tell the story of a tobacco retailer who rejects POS tobacco promotions (and the money he would make by displaying it) because of his concern for neighbourhood kids. The tagline urges viewers to ‘Support local retailers that reduce tobacco advertisements.’ The fourth ad portrays a tobacco company sales representative talking about how marketing tobacco is like marketing anything else, ‘It’s about building a lifetime relationship. Branding 101.’ He enters a convenience store and says the tobacco poster for his company, which hangs at the height of a child’s eye, is ‘perfect placement.’ Radio and print advertisements focus on the number of lives lost annually to smoking and the cost of tobacco in the form of taxes at the state and national level. Advertisements tell listeners, ‘When the tobacco industry advertises in stores, it’s New Yorkers who pay. We all pay, smokers and non-smokers. Kids too.’ All advertising is described in greater detail in Table I.”

TV local POS AD 1: A representative from the fictional SmokeStack Tobacco Company (Agent No. 175) enters a convenience store owned by Carlos Sabio. He drops off Mr Sabio’s ‘first payment,’ and disregards Mr Sabio’s questions. With the help of a colleague, the agent hangs a tobacco ad at the level it can easily be seen by passing children. Declaring it ‘perfect’ he leaves. Mr Sabio tears the sign down, saying, ‘Not in my store!’ Tag line: Support local retailers who reduce or remove tobacco advertising. To learn more, go to ReduceRemove.com

TV local POS AD 2: A representative from fictional SmokeStack Tobacco (Agent No. 175) enters a convenience store owned by Carlos Sabio. He tells Mr Sabio ‘I will leave you this amount every month. All you gotta do is hang the sign. OK?’ Mr Sabio has some questions, but doesn’t get a chance to ask them. With the help of a colleague, the agent hangs a tobacco ad in a prominent spot, and leaves. Mr Sabio sees that two teens have noticed the sign, and are talking about it. Mr Sabio tears the sign down, saying, ‘Definitely the wrong spot!’ Tag line: Support local retailers who reduce or remove tobacco advertising. To learn more, go to ReduceRemove.com

TV local POS AD 3: Mr Sabio is in a meeting with representatives of fictional tobacco company SmokeStack Tobacco, including agent No. 175, at the company’s office. Agent No. 175 asks, ‘Something wrong with this sign? You want something more colorful? More pretty women? We’ve got lots of those’ Mr Sabio, looking worried says, ‘No, that’s not it.’

‘Bigger?’ Agent No. 175 asks, ‘we do bigger real well.’ ‘That’s not it either.’

‘I see; it’s the money is it? We can cut a deal.’ Mr Sabio says, ‘It’s the kids!’ and looking around and feeling that nobody in the room understands the point he is making says, ‘Wow, you guys just don’t get it!’ and then with sudden realization, ‘Or do you?’ Tag line: Support local retailers who reduce or remove tobacco advertising. To learn more, go to ReduceRemove.com

TV Drive Along ad (Sponsored by California Dept of Health Services): A tobacco industry representative is shown driving in his car. He tells the viewer, ‘It’s like marketing toothpaste, or anything; laundry detergent.’ The representative is shown entering a small convenience store and approaching the owner, hand outstretched. Voice of the representative is heard over the imagery: ‘If you get a customer young enough, they’re yours for life. That’s just the way it is.’ In store, the representative shakes the owners’ hand saying, ‘It’s Ray, right? Good to see you today Ray’ He



surveys the print ads placed on the front of the counter and tells the store owner, 'Hey look at that, the poster. It's perfect. It's perfect placement. Thanks for doing that. I appreciate it.'

The store owner looks ashamed as a young boy approaches the counter to buy something, and is face to face with the poster. The representative says, 'You see? This is what I'm talking about.' Boy reads poster. Representative: 'It's about building a lifetime relationship. Branding 101. You notice how the eye line is perfect? Huh?' And tapping his head he says, 'There's a method to this madness.' Tag line: Do you smell smoke?

Radio ads: One radio ad featured a female voice, the other a male voice. Both present the following text: 25 000 lives lost each year. Six billion dollars of our taxes to cover the costs caused by smoking.

Where does it all start? In stores across New York State. That's where kids get bombarded with tobacco marketing. The more they see the more likely they are to smoke. When the tobacco industry advertises in stores, it's New Yorkers who pay. We all pay—smokers and non-smokers. Kids too. What does the tobacco industry have in store for our kids? Find out at [TobaccofreeNYS.org](http://TobaccofreeNYS.org).

Print: Poster showing a young boy looking at a tobacco display in a retail setting.

Text of poster reads: 25 000 lives lost each year. \$6.3 billion of our annual taxes to cover the costs caused by smoking. And it starts in our stores. When the tobacco companies advertise in stores, it's New Yorkers who pay. And we all pay—smokers and non-smokers alike. The saddest part is that our kids pay too. They're the ones most influenced by tobacco marketing and in-store displays. The more kids see, the more likely they are to smoke. Find out what's in store for our kids at [TobaccofreeNYS.org](http://TobaccofreeNYS.org). "Participants were randomized to either an experimental (n=431) or control (n=432) condition. Participants in the experimental condition viewed seven anti-POS advertisements prior to completion of key survey questions including attitude toward POS ads, perceived impact of POS ads and support for a ban on POS tobacco promotion. This group will be referred to as the Exposed Group or 'EXP.' Participants in the control group viewed the same advertisements subsequent to providing responses to key survey measures. This group will be referred to as the Not Exposed Group or 'NOEXP.' The order of ad presentation was randomized in both conditions."

Four TV advertisements, two radio and one print

**Bachhuber et al 2015 factual + sympathetic narrative + pre-emptive refutation (903 words):**

The factual information message was 13 sentences in length, the pre-emptive refutation message was 8 sentences in length, the sympathetic narrative was 20 sentences in length and was longer than the factual information and pre-emptive refutation messages because effective stories require contextual information to humanize characters and offer a compelling storyline

In 2011, nearly 17,000 people died from prescription pain medication overdoses in the United States—equal to 46 deaths per day. Over the last decade, the number of prescription pain medication overdose deaths has increased by more than 300 percent. Government officials, medical experts, and community leaders have declared prescription pain medication overdoses a national crisis. Naloxone is a medicine that is very effective at saving lives by reversing life threatening overdoses of prescription pain medication. Naloxone can be given by injection or nasal spray. Medical experts believe naloxone is so safe that anyone can be trained to administer it, even friends and family members of people at risk of overdose and first responders like police officers and firefighters. If naloxone is mistakenly given to someone who is not having a prescription pain medication overdose, there are no bad side effects. Most overdoses occur among people who are at home with friends or family. If these friends or family members had naloxone, they could administer it to potentially save the life of a person overdosing. When someone overdosing is using prescription pain medication illegally, friends and family are often afraid to call the police because they don't want to be arrested and put in jail for being around someone using drugs illegally. Even if they do call, most police officers and firefighters do not have naloxone and have to wait for an ambulance to arrive. A person overdosing may die before getting the naloxone treatment he or she needs. Providing training and naloxone medication to friends and family members of people at risk of overdose and first responders like police officers and firefighters could save thousands of lives every year.

Prior to reading the randomized message(s), all participants read a brief definition of opioid analgesics—termed “prescription pain medication” throughout the survey to be more accessible to participants—which included a link to view a medication list

The pre-emptive refutation message read as follows:

Some people don't believe that the lives of people overdosing on prescription pain medication are worth saving. They say that using naloxone to save a person overdosing is pointless because the person will just continue using prescription pain medication and eventually overdose again. Some people also say that giving naloxone to people who are addicted to prescription pain medication will just cause them to use more, because they will think of naloxone as a “safety net” to save them from an overdose. But in fact, many people who overdose and are saved because of naloxone will see it as a wake-up call and enter treatment for their addiction. Letting someone die from an overdose that could be prevented is cruel and misguided, especially because naloxone is such a safe medication. Friends and family members of people addicted to prescription pain medication often feel helpless watching their loved one struggle, but providing naloxone to these friends and members is giving them the power to save a life. And providing naloxone to first responders like police officers and firefighters allows them to be better prepared to help when they arrive at the scene of an overdose. People saved from a prescription pain medication overdose can recover and go on to live long, productive, and healthy lives.

The sympathetic narrative read as follows:

Mother's Day has become a very difficult time for Mary since she lost her daughter, Erika, to an overdose of prescription pain medication two years ago. It all started after Erika was hit by a car while driving home from college. Left with back, hip, and knee injuries and severe pain, Erika turned to doctors for help. She started physical therapy and her doctor prescribed Percocet, Vicodin, and OxyContin—strong prescription pain medications—to help ease her pain. For the first few months, things were going well. Erika was recovering her ability to get around and was catching up on her school work. But then, Mary saw something change. Erika started taking more prescription pain medication. When her prescription ran out and the doctor would not give her another, she started getting old prescriptions from friends. Mary suspected that Erika had developed an addiction to prescription pain medication and tried to convince her to get help. At first Erika said she wasn't addicted and didn't need help, but after a few more months she admitted to her mother that she had a problem. Even though Erika was willing to get help, Mary couldn't find an addiction treatment program that was seeing new patients anywhere in her community. She finally found a clinic nearly two hours away that could treat Erika, but the first available appointment was several weeks away. Mary scheduled the appointment, but a few days later she came home from work and found Erika on the bathroom floor, barely breathing. Mary called 911, but by the time Erika got to the hospital it was too late and she was pronounced dead from an overdose of pain medication. Thinking back, Mary wishes she had known about naloxone, a medication she could have been trained to use in an emergency that helps people who are overdosing. Naloxone could have saved her daughter's life. Mary recently got trained to use naloxone and started a support and education group for parents who have children that are addicted to prescription pain medication. She has also been pushing for the local police and fire departments in her town to train first responders to carry naloxone medication in case they arrive at the scene of an overdose before paramedics. On top of her full-time job, Mary has been working tirelessly to prevent overdose deaths in her community because she believes no parent should have to go through losing a child the way she did.

**Gollust – health & healthcare costs arm (used framing) – 101 words**

Written message:

We've heard a lot lately about how more children are obese today than in previous generations. Rates of obesity have more than tripled among children and adolescents over the past 30 years

As obese children are more likely to become obese adults, they are at increased risk for type 2 diabetes, heart disease, arthritis, and several cancers. Research indicates that about 70% of obese children are at high risk for heart disease in adulthood. In addition, childhood obesity substantially increases health care costs. Childhood obesity costs the health care system \$14 billion per year, much of which comes from public funds.

**Kennedy-Hendricks (used framing) – High SES narrative – n.b. the high SES narrative was effective and the reason the study was grouped into Group 1, but for the SR we combined the effects of both – 232 words**

Written message:

The high SES base narrative was identical to the low SES base narrative (para below) with the exception of the following characteristics. The woman depicted in the high SES base narrative (1) was in her early thirties (and therefore, older at the age of her first pregnancy); (2) worked as the regional manager of a restaurant chain (higher paying job with greater prestige); (3) had a master's degree in business administration (higher educational attainment); (4) lived in a new house (an indicator of wealth); (5) was married when she became pregnant; and (6) drove a car as her means of transportation (rather than using public transportation).

Michelle is a woman in her early twenties who began working at a fast food restaurant after she dropped out of high school. She lives in a government-subsidized apartment. Two months ago, Michelle learned that she was pregnant. Last year, Michelle was hit by a car. The accident left her with back, hip, and knee injuries and she had to have surgery. After the surgery, she still had severe pain in her back and hips so her doctor prescribed OxyContin, a narcotic pain medication. Three months after her back surgery, she was still feeling a lot of pain so her doctor prescribed her a higher dose of OxyContin. Michelle began taking more pills to try to control the pain and sometimes ran out before her next refill. When she ran out, she felt anxious, became sweaty and nauseous, and had trouble sleeping. These symptoms lasted until she was able to get more pills. Her doctor refused to give her more pills before her next scheduled refill, so Michelle sometimes took the bus to other parts of town to get more pills from other doctors. Her family and friends noticed that Michelle's behavior had changed, and that she was borrowing money that she didn't repay. When Michelle's family found out that she was pregnant, they told her that they were worried about the pills she was taking and urged her to get help.

**McGinty – Mass Shooting Event and Ban on Large Capacity Magazines (most significant of the three stories p<0.001) – 325 words**

The gunman who opened fire in an Indianapolis park yesterday morning has been identified as Indianapolis resident Jake Robinson, age 30. According to police, the shooter has a history of serious mental illness. Mr. Robinson's motivation for opening fire in Smith Park in central Indianapolis is unclear. Witnesses said Mr. Robinson arrived at the park around 7:30 a.m. and appeared agitated, pacing up and down and talking to himself. At approximately 8:15 a.m., Mr. Robinson took a gun out of his bag and began to shoot. Three adults passing through the park on their way to work were shot and killed. Three more adults and two children were wounded. The police officer leading the investigation said that Jake Robinson used a semiautomatic weapon to shoot about 30 bullets in a row before he was tackled by a security guard from a nearby building. Little is known about Mr. Robinson, who lived alone and appears to have no immediate family. Mr. Robinson's cousin, who lives in South Carolina, said Mr. Robinson was hospitalized for mental illness last year. Yesterday's shooting in downtown Indianapolis left residents looking for solutions to the problem of gun violence. According to the Indianapolis Coalition against Violence—a group whose membership includes city lawmakers, law enforcement officials, researchers, advocacy groups, and citizens concerned about violence in Indianapolis—gun violence in the United States has reached epidemic proportions. "With more than 65,000 Americans shot in an attack last year, we have to do something to keep dangerous guns off our streets," said Kim Jones, the spokesperson for the group. One proposal currently being considered by Congress is a good start, Jones said. Congress is considering legislation to ban large ammunition clips, which are military-style high-capacity magazines that can shoot 30, 50, or 100 bullets without requiring the shooter to stop and reload. According to Kim Jones, "Getting this law in place is one way to protect the public from dangerous guns."

**Niederdeppe 2015 I&N (Used Narrative Persuasion & Inoculation Theory) – both narrative & inoculation arms showed significant effect on policy support, had messages for soda, cigarettes, prescription painkillers – Inoculation messages ranged from 411-435 words, narratives 723-741 words**

Magnitude of the Problem: Soda (148 words)

We would like you to read some information about sugary drinks and obesity. When we refer to sugary drinks, we are talking about non-diet sodas, energy drinks, and fruit drinks.

During the past 10 years, there has been a dramatic increase in obesity in the United States. More than 78 million adults in the United States – over 35 percent -- are now obese. And, nearly 13 million children are obese. Obesity is a leading cause of illness and early death in the US. Obesity also costs the United States billions of dollars each year; the annual cost of direct medical care alone is estimated to be over \$145 billion.

Sugary drinks have been linked to the deaths of 25,000 people every year from diabetes and other obesity-related diseases. Obesity frequently is a lifelong struggle – children and adolescents who are obese are very likely to be obese in adulthood.

Pro-Policy Inoculation: Soda (435 words)

Some cities and states are considering policies and laws designed to reduce the number of young people who become obese. These policies include requiring warning labels on all sugary drinks, prohibiting the sale of sugary drinks in schools, and restricting soda brand marketing to children.

It is no surprise that soda companies are the main opponents of these policies. These companies spend millions each year marketing products with no nutritional value to children. They will say and do almost anything to protect their profits, and they do it at the expense of Americans' health. They spend over 30 times more than public health advocates on lobbying and marketing efforts to oppose any and all policies that they see as a threat to their bottom line.

Big soda companies spend all of this money lobbying against any policies that would reduce the number of sodas that young people drink because they don't think people can make up their minds on their own. But we all have the freedom to think for ourselves about where we stand on policies that would reduce childhood obesity.

Soda companies will try to convince you that these policies are arbitrary because they single out soda and do not affect foods like donuts, cookies, and candy bars. They will say that they are an unacceptable intrusion of government into people's personal lives. They even say they are already monitoring the product themselves so there is no need for further action.

The truth is that soda companies know that these products have no nutritional value and contain unhealthy amounts of sugar - drinking a 20-ounce soda is equivalent to eating 16 packets of sugar. In fact, research suggests that sugary drinks are the single largest driver of obesity in the United States. Restricting soda marketing to children, prohibiting sugary drink sales in schools, and including warning labels on sugary drinks reduces the number of sodas young people drink and allows adults to continue to select these products if they choose. And why should we trust soda companies to stop young people from using their product? They've lied before, saying they would limit marketing to children, only to continue to promote their products in ways that are designed to appeal to kids. Their only goals are to sell as much soda and make as much money as possible.

We all have a role to play in reducing childhood obesity, but requiring warning labels on sugary drinks, prohibiting sales of these drinks in schools, and restricting soda brand marketing to children would go a long way toward improving the health of American kids and families.

Pro-policy Narrative: (741 words)

Cynthia is a mother of two who has had to navigate an increasingly common challenge—trying to prevent her daughter from gaining too much weight.

Hardworking and focused on her family, Cynthia typically spends her days caring for her family in Denver, from taking them to music lessons to helping with homework.

She first learned about her daughter’s weight problems at a routine doctor’s appointment. Cynthia noticed that her daughter had gained some weight recently but didn’t think much of it, since kids gain weight throughout their childhood. But Cynthia was shocked to learn from her pediatrician that her daughter’s weight had climbed much too high.

Without improvement, the doctor told Cynthia that her daughter would face a range of serious health risks like diabetes and high blood pressure. Cynthia never had soda or much junk food at home, but the doctor recommended exchanging juice for water or low-fat milk as a first step.

Despite her best efforts to encourage these healthier options at home, Cynthia found that her attempts to improve her daughter’s drink choices were mostly unsuccessful. She noticed that sodas were constantly available to her daughter outside of her home – in schools and at several stores she passed every day on her way back and forth from school. And her daughter saw what seemed like a never ending stream of soda advertising and promotion on television, the Internet, and in local stores.

Many parents face similar challenges, as soda companies spend millions each year marketing their products to children. Despite advertising these drinks as a harmless part of a balanced diet, soda companies know that these products have no nutritional value and contain unhealthy amounts of sugar - drinking a 20-ounce soda is equivalent to eating 16 packets of sugar. In fact, research suggests that sugary drinks are the single largest driver of obesity in the United States. In addition to television, websites, and magazines, soda companies advertise and sell their products directly to young people in the very place where they spend most of their time – schools. They fund groups that oppose laws requiring labels to provide accurate information about the health effects of soda or laws preventing soda from being sold in school cafeterias. These companies will say and do almost anything to protect their profits, and they do it at the expense of Americans’ health. Soda companies spend over 30 times more than public health advocates on lobbying and marketing efforts to oppose any and all policies that they see as a threat to their bottom line.

Cynthia had always believed that it was her responsibility to protect her health and the health of her family members, but she found it wasn’t easy to help her daughter lose the weight. Despite her efforts to instill healthy habits and provide healthy food and drinks at home, Cynthia’s daughter was bombarded with constant temptations at school, online, and in stores. With her weight continuing to grow, Cynthia and her daughter’s frustration grew.

Fortunately, Cynthia and her daughter found help when, as part of a district wide program, the parent teacher association decided to work with the school board to have soda machines removed from district schools. With less temptation during the school day, Cynthia’s daughter was able to find a healthier balance in the drinks she consumed at home and school. Cynthia and her daughter



also learned more about nutrition, including limiting the number of sugary drinks in her diet. As Cynthia's daughter began drinking fewer soft drinks, Cynthia noticed that she began adopting other healthy habits too. Seeing these changes made Cynthia a believer that a person's environment can have an important influence on physical and emotional health.

Cynthia's story is not unique. Obesity is a leading cause of illness and early death in the US. Sugary drinks have been linked to the deaths of 25,000 people every year from diabetes and other obesity-related diseases. As was the case with Cynthia, powerful marketing and promotion by the soda industry make reducing or avoiding soft drink consumption challenging for young people and their families.

While Cynthia acknowledges the part she and her daughter have to play in her daughter's struggles with weight, we all have a role to play in reducing childhood obesity. Requiring warning labels on sugary drinks, prohibiting sales of these drinks in schools, and restricting soda brand marketing to children would go a long way toward improving the health of American kids and families.

#### Anti-Policy Industry: Soda (457 words)

The headlines are hard to ignore, America needs to lose weight. Obesity is caused by genetics, diet, and exercise. This serious and complex problem cannot be solved by focusing on a small piece of the total diet. Sugary drinks account for only 6% of the calories in the average American's diet. We have to look at the bigger picture.

Some lawmakers have proposed new, more prominent warning labels on sugary drinks. But America's beverage companies have already put calorie labels on the front of every can and bottle we produce. We are already making it easier for consumers to choose the drink that's right for them. New labels would just confuse people and would give them a false sense of security that by not drinking soda, they're not putting themselves or their children at risk.

Marketing bans have also been suggested. America's beverage companies understand the responsibilities associated with marketing to children. That's why we already pledged not to advertise any products other than juice, water, and milk to audiences under the age of 12. We use marketing to promote healthy choices for children and their parents. These responsible practices recognize the central role that parents must play in making choices for their own children.

Finally, some have proposed restrictions on sodas in schools. Soda bans are arbitrary, confusing, and unnecessary. When too much emphasis is given to a single food, people get confused when trying to make healthy choices. In many schools, foods like candy bars and chocolate milk are allowed to be sold while sodas are not. Singling out just a few products won't help boost health; balanced eating and exercise will.

If we want to curb childhood obesity, we must all take responsibility. The beverage industry takes its commitment to solving childhood obesity very seriously. We have already delivered on our commitment to change the beverage landscape in America's schools by removing full-calorie soft drinks and replacing them with lower calorie options. We have slashed beverage calories in schools by 88 percent since 2004. Increased education and calorie information on vending machines have also made it easier for people to choose options that are right for them and their families.

Healthy living is a choice—in fact, it is many choices. Instead of concentrating on one food or beverage, the government should focus on reducing childhood obesity through methods that provide Americans with more information about the choices they make every day, allowing them to lead healthy, balanced and active lifestyles. Whether it's at a restaurant or in a grocery store, it's

never the government's job to decide what you should eat and drink-- people can decide for themselves. Consumers should have the freedom to choose what they eat, drink and serve their families.

### **Cigarettes:**

#### **Magnitude of the Problem: Cigarettes (125 words)**

We would like you to read some information about cigarettes.

During the past 10 years, there have been slow, inconsistent decreases in smoking rates in the United States. More than 42 million adults in the United States – over 18 percent - smoke cigarettes regularly. And, nearly 3 million high school students smoke cigarettes. Smoking costs the United States billions of dollars each year; the annual cost of direct medical care alone is estimated to be over \$130 billion.

Tobacco is a leading cause of illness and early death in the US. Cigarette smoking is responsible for more than 480,000 premature deaths every year — about 1 in 5. Smoking frequently is a lifelong struggle – children and adolescents who smoke are very likely to smoke in adulthood.

#### **Pro-Policy Inoculation: Cigarettes (417 words)**

Some cities and states are considering policies and laws designed to reduce the number of young people who smoke cigarettes. These policies include prohibiting stores located near schools from selling tobacco, requiring tobacco manufacturers to place large, graphic warning labels on the front of every cigarette package, and requiring cigarette companies to eliminate menthol in cigarettes.

It is no surprise that tobacco companies are the main opponents of these policies. These companies spend billions each year marketing addictive, deadly products to children. They will say and do almost anything to protect their profits, and they do it at the expense of Americans' health. They spend over 30 times more than public health advocates on lobbying efforts to oppose any and all policies that they see as a threat to their bottom line.

Big tobacco spends all of this money lobbying against any policies that would reduce smoking among young people because they don't think people can make up their minds on their own. But we all have the freedom to think for ourselves about where we stand on policies that would reduce youth smoking.

Tobacco companies will try to convince you that these policies are unnecessary because underage tobacco use is a complex issue for which there is no one solution. They will say that these policies involve the government in people's personal lives. They even say they can monitor the product themselves so there is no need for further action.

The truth is that we know what works to reduce youth smoking. Tobacco companies continue to market, promote, and produce cigarettes in ways that are designed to appeal to young people. Eliminating menthol, prohibiting tobacco sales near schools, and including graphic warning labels on cigarette packages reduces youth smoking and allows adult smokers to continue to do so if they choose. And why should we trust tobacco companies to stop young people from using their product? They've lied before, their own documents say so. Despite pledging to keep cigarettes out of the hands of young people, nearly 3 million high school students continue to smoke. Their only goals are to sell as many cigarettes and make as much money as possible.

We all have a role to play in reducing youth cigarette use, but prohibiting stores located near schools from selling tobacco, requiring tobacco manufacturers to place large, graphic warning labels on the front of cigarette packages, and eliminating menthol in cigarettes would go a long way toward improving the health of American kids and families.

Pro-Policy Narrative: Cigarettes (733 words)

Cynthia is a mother of two who has had to navigate a common challenge—trying to prevent her daughter from smoking cigarettes.

Hardworking and focused on her family, Cynthia typically spends her days caring for her family in Denver, from taking them to music lessons to helping with homework.

She first learned about her daughter’s cigarette smoking one night while doing laundry. Cynthia knew all of her daughter’s friends and their parents and felt that they were nice kids from supportive and happy families. So she was shocked that night to smell smoke on several of her daughter’s shirts.

After bringing it up, her daughter confessed to smoking after school with her friends. At first she didn’t like the taste or smell of cigarettes, but one day she tried the kind with menthol, which were much easier to smoke because they didn’t hurt her throat. She started smoking menthol cigarettes more frequently. Concerned about her daughter’s health and the risk of her continuing to smoke, Cynthia pleaded with her daughter about the dangers of smoking and forbid her from spending time with friends who smoked.

Despite her best efforts at home, Cynthia found that keeping her daughter from smoking was a challenge due to the widespread availability of cigarettes, constant marketing and in store promotions aimed at young people, and the appeal of added ingredients like menthol.

Many parents face similar challenges as tobacco companies spend millions each year marketing their products to children. Despite saying that they want to reduce underage smoking, tobacco companies continue to market, promote, and produce cigarettes in ways that are designed to appeal to young people. Tobacco companies work hard to control the placement of tobacco in stores, to increase the visibility of their brands among young people through displays and promotions, and to stock the shelves of the stores frequently visited by children and teens with the cigarette brands that are popular with young consumers. They add menthol to cigarettes because it attracts younger smokers who see menthol cigarettes as easier to smoke and less harmful than non-menthol cigarettes. They fund groups that oppose laws including requiring labels that provide accurate information about the health effects of tobacco. They will say and do almost anything to protect their profits, and they do it at the expense of Americans’ health. They spend over 30 times more than public health advocates on lobbying efforts to oppose any and all policies that they see as a threat to their bottom line.

Cynthia had always believed that it was her responsibility to keep herself and her family healthy, but found it wasn’t easy to keep her daughter from smoking cigarettes. Despite Cynthia’s efforts to keep her daughter from spending time with friends who smoke, Cynthia’s daughter faced constant challenges and temptations to smoke at school, online, and in stores. With her daughter continuing to experiment with cigarettes, Cynthia’s frustration grew.

Fortunately, Cynthia and her daughter got help in their efforts when, as part of a city wide program, stores located near schools were restricted from selling flavored and menthol cigarettes. With less temptation after school and her friends unable to easily get menthol cigarettes, Cynthia noticed that her daughter rarely came home smelling like smoke. As the temptations around her to smoke

decreased, Cynthia's daughter was able to avoid developing a long-term habit. Seeing these changes in her daughter's behavior made Cynthia a believer that a person's environment can have an important influence on physical and emotional health.

Cynthia's story is not unique. Smoking is the leading cause of illness and early death in the US. Menthol cigarettes are highly addictive and smoking frequently becomes a lifelong issue. Over 90% of American adult smokers started smoking before the age of 20. As was the case with Cynthia and her daughter, powerful marketing and promotion by the tobacco industry, as well as their use of menthol to attract young people, make avoiding tobacco challenging for young people and their families.

While Cynthia acknowledges the part she and her daughter have to play in her daughter not smoking, we all have a role to play in reducing youth cigarette use. Prohibiting stores located near schools from selling tobacco, requiring tobacco manufacturers to place large, graphic warning labels on the front of cigarette packages, and eliminating menthol in cigarettes would go a long way toward improving the health of American kids and families.

#### Anti-Policy Industry: Cigarettes (457 words)

The headlines are hard to ignore, too many young people smoke cigarettes. Research tells us that there is no single reason why young people engage in risky behaviors like experimenting with tobacco products or alcohol. Experts point to a wide variety of social, environmental, and personal reasons. We have to look at the bigger picture.

Some lawmakers have proposed new, more prominent warning labels on cigarettes as one strategy to reduce underage smoking. But warning labels have appeared on all cigarettes sold in the United States for the last 40 years. Warning labels alone are not going to prevent young people from smoking. Despite almost universal awareness of the health risks associated with smoking cigarettes, some 3 million young people continue to smoke.

Restrictions on tobacco sales near schools have also been suggested. Research shows that efforts by America's tobacco companies to prevent underage access to cigarettes at retail stores are already working. Additional regulations limiting what you can and can't buy in stores are unfair, especially toward adults who have the right to choose to use a legal product. Retail bans would only succeed in arbitrarily deciding which retailers would be permitted to sell perfectly legal products.

Ingredient bans, including those on menthol, are similarly uninformed. Menthol cigarettes do not change the health risks of cigarette smoking. They do not make it easier to start smoking, they do not increase addiction to smoking, and they do not make it more difficult to quit smoking. In other words, a menthol cigarette is just another cigarette - and should be treated no differently. Menthol cigarettes simply give adult smokers a taste choice.

If we want to curb underage smoking, we must all take responsibility. The tobacco industry takes its commitment to reduce underage smoking very seriously. We have already delivered on our commitment to restrict underage access to cigarettes in stores. Thanks to measures like these, illegal tobacco sales to minors are at historic lows. We have supported organizations that provide young people with the support they need to make healthy decisions, as well as programs that help parents discuss how to avoid smoking with their kids. These programs have also made it easier to prevent youth smoking.

The choice of whether or not to smoke is a personal decision. Whether at a convenience store or pharmacy, it's never the government's job to regulate adult choices. There are ways to balance our

efforts to reduce youth smoking without infringing on the personal decision of adults choosing to use a legal product. Instead of penalizing adults who choose to smoke, the government should focus on reducing youth smoking through helping parents to talk to their children about risky behavior and by supporting young people's ability to make healthy decisions

### **Prescription Pain Medication:**

#### Magnitude of the Problem: Prescription Pain Medication (188 words)

We would like you to read some information about prescription painkillers. When we refer to prescription painkillers, we are talking about narcotic medications like Vicodin and Oxycontin prescribed by a doctor to treat pain. We are not referring to "over-the-counter" pain relievers such as aspirin, Tylenol, or Advil that can be bought in drug stores or grocery stores without a doctor's prescription.

During the past 10 years, there has been a dramatic increase in prescription painkiller addiction and abuse in the United States. Nearly 35 million adults in the United States – 15 percent -- have used prescription painkillers for non-medical reasons. And, over 2 million teens have used prescription painkillers recreationally. Prescription painkiller abuse costs the United States billions of dollars each year; the annual cost of direct medical care alone is estimated to be \$73 billion.

Prescription painkiller abuse is a leading cause of injury and early death in the US. Painkiller overdoses were responsible for nearly 17,000 deaths - more than heroin and cocaine combined. Drug abuse frequently is a lifelong struggle - most of people with a drug addiction in adulthood began before age 18.

#### Pro-Policy Inoculation: Prescription Pain Medication (411 words)

Some cities and states are considering policies and laws designed to reduce prescription painkiller addiction and abuse. These policies include prohibiting pharmaceutical companies from funding medical education aimed at promoting these products, better medication labeling to highlight the risks of addiction, and prohibiting pharmaceutical companies from marketing efforts such as handing out free samples to doctors.

It is no surprise that pharmaceutical companies are the main opponents of these policies. These companies spend billions each year marketing products to doctors and patients that are highly addictive and susceptible to overdose. The pharmaceutical industry will say and do almost anything to protect their profits, and they do it at the expense of Americans' health. They spend almost 20 times more on promotion and product marketing than they spend on research to develop more effective, safer products.

Big pharma spends all of this money lobbying against policies that would reduce use of prescription painkillers because they don't think people can make up their minds on their own. But we all have the freedom to think for ourselves about where we stand on policies that would reduce prescription painkiller addiction and overdose.

Pharmaceutical companies will try to convince you that these policies are not needed because prescription painkillers are safe if taken as prescribed and that patients can rely on their physicians to avoid becoming addicted. They will say that these policies will keep patients in serious pain from getting the pain relief they need.

The truth is that many patients who take these medications become addicted through no fault of their own even when following the advice of their doctors. Aggressive pharmaceutical company

marketing has resulted in physicians keeping people on these medications for too long and at unsafe doses. Prohibiting big pharma from funding medical education, handing out free samples to doctors, and better labeling these products to highlight the risks of addiction would reduce prescription painkiller abuse while allowing doctors to prescribe these medications when they think they are needed. And why should we trust pharmaceutical companies to stop people from abusing their product? Their only goals are to sell as many drugs as they can and make as much money as possible.

We all have a role to play in reducing prescription painkiller addiction and abuse, but prohibiting pharmaceutical companies from funding medical education, improving labels to highlight the risks of addiction, and prohibiting free samples to doctors would go a long way toward improving the health of American families.

Pro-Policy Narrative: Prescription Pain Medication (723 words)

Cynthia is a mother of two and grandmother of six who has survived an increasingly common struggle — trying to overcome an addiction to prescription painkillers.

Hardworking and focused on her family, Cynthia typically spends her days caring for her family and grandchildren in Denver, from taking them to music lessons to helping with homework.

She first began using prescription pain medications following a car accident that left her with back, hip and knee injuries. After back surgery, she still had severe pain, so her doctor prescribed Oxycontin, a narcotic pain medication. Her doctor did not mention other options such as physical therapy to help relieve her pain.

A few months after her surgery, Cynthia was still feeling a lot of pain so her doctor prescribed a higher dose of OxyContin. She began taking more pills to control the pain. When she ran out of pills, she would feel anxious and nauseous and would have difficulty sleeping until she was able to get more pills.

Despite her best efforts, Cynthia found that she was unable to stop using the pain medication and her addiction began affecting other aspects of her life. Her family and friends noticed a change in Cynthia and she found herself selling some valuable possessions to pay for more pills. Her husband grew increasingly frustrated with her erratic behavior and her marriage suffered. Her children knew that she was struggling, but they didn't know how to help.

Many patients face similar experiences as prescription painkillers are prescribed in higher and higher numbers. Through aggressive marketing by pharmaceutical companies, doctors have increasingly prescribed these narcotic medicines to treat patients' chronic pain over much longer periods of time than they use to. The message from the pharmaceutical industry to doctors is that these medications are safe and effective. Doctors have increased their prescribing of them as a result, assuming that they were not harmful to patients. And, sales for prescription painkillers have risen dramatically along with pharmaceutical company profits. Despite their claims to doctors, pharmaceutical companies have long been aware of the possibility of patients getting addicted and the high risk of overdose from these medications. Still, even knowing the risk of addiction and overdose death, pharmaceutical companies push prescription pain medication to treat all sorts of pain — everything from backaches to arthritis. In fact, pharmaceutical companies spend almost 20 times more on promotion and marketing than they do on researching and developing better, safer products.

Cynthia had always believed that it was her responsibility to keep herself and her family healthy, but she found herself addicted to pain medication after doing nothing more than following her doctor's medical advice. To increase profits, pharmaceutical companies have launched sales campaigns suggesting their products were safer than they truly were—downplaying the risks of addiction, withdrawal, and overdose. They provide free samples of these medicines to doctors and offer incentives to their sales representatives to convince doctors to prescribe them. They heavily advertise these medicines to doctors in major medical journals, through thousands of medical training programs, and by funding groups that publish medication guidelines pushing doctors to use them.

Fortunately, Cynthia's family was able to help her get the treatment she needed. However, it was not until she hit rock bottom that her family was able to intervene. One day they found her unconscious on the floor, hours after she was supposed to attend her granddaughter's soccer game. After this close call, Cynthia realized she couldn't overcome this problem on her own. Her family helped her get into a detox program and then longer-term treatment. She has been in treatment and off pain medication for three years now, has repaired her relationship with her husband, and is back to enjoying time with her children and grandchildren.

Cynthia's story is not unique. Prescription painkiller abuse is a leading cause of addiction and overdose death in the US. As in Cynthia's case, powerful narcotic prescription painkillers are often the first treatment offered to people who go to their doctors reporting pain.

While Cynthia acknowledges her part in her struggles, we all have a role to play in reducing prescription painkiller addiction and overdose. Prohibiting pharmaceutical companies from funding medical education, improving labels to highlight the risks of addiction, and prohibiting free samples to doctors would go a long way toward improving the health of American families.

#### Anti-Policy Industry: Prescription Pain Medication (447 words)

The headlines are hard to ignore, prescription painkiller abuse has become a national crisis. Research tells us that there is no single reason why people engage in risky behaviors like abusing medication or alcohol. Experts point to a wide variety of social, environmental, and personal reasons. We have to look at the bigger picture.

Some lawmakers have proposed warning labels on prescription painkillers. More labels will not prevent prescription painkiller abuse. These medicines are safe if taken as prescribed. Only a small percentage of patients prescribed painkillers ever become addicted. The problem is with people stealing pills from their relatives' medicine cabinets. Patients are the ones who must be responsible for keeping prescriptions safe and disposing unused medicine correctly.

Restrictions prohibiting pharmaceutical marketing to doctors - like offering free samples - have also been suggested. Pain patients have a right to legally prescribed medications that make them feel better. What these patients really need is protection from over-regulating what doctors can and cannot do. Unreasonable regulations that interfere with the doctor-patient relationship are unfair, especially for adults who need these products prescribed by their doctors to manage their pain.

Prohibiting pharmaceutical companies from funding medical education is similarly uninformed. We all agree that responsible prescribing is very important. Restricting physician education about pain management by pharmaceutical companies is arbitrary because the industry sponsors education about all kinds of health problems and medications that can help. These restrictions would also prohibit doctors from getting important information they need to help their patients. We need to

assess the sources of the problem without interfering with medical practice, physician education, and pain management.

If we want to curb prescription painkiller abuse, we must all take responsibility. The pharmaceutical industry takes its commitment to solving the problem of prescription painkiller abuse very seriously. We have been proactive on the issue, voluntarily initiating programs like seminars for police and pharmacists on how to recognize and respond to prescription drug abuse. We have also reformulated pills to make them more difficult to abuse. Our efforts have made these medicines even safer while protecting the rights, needs, and freedom of patients in serious pain to choose effective medications.

Patients in serious pain deserve access to effective treatments. Whether in the doctor's office or the pharmacy, it's never the government's job to regulate adult choices. There are ways to balance our efforts to reduce prescription painkiller abuse without hurting doctors' ability to help their patients. Instead of punishing pain patients who could benefit from effective medicines, the government should focus on reducing prescription painkiller abuse through other methods. Patients in serious pain should have the freedom to use prescribed medicines that will bring them relief.



**Niederdeppe 2014 ICF (Used competitive framing & inoculation) – inoculation arm of the study had a significant effect on public support – 279 words**

**Strong Pro-Tax Frame 1: Single Largest Driver (142 words)**

Some cities and states are considering a penny-per-ounce tax on sugary drinks like non-diet sodas, energy drinks, and fruit drinks. Supporters of a tax say that sugary drinks may be the single largest driver of obesity in the United States. More children are obese today than in previous generations. Rates of obesity have more than tripled among children and teens over the past 30 years. And children and teens drink twice as much soda and other sugary drinks as they did 30 years ago. Supporters of a tax say drinking a 20-ounce soda is equivalent to eating 16 packets of sugar. That's 240 empty calories in a single bottle. When people consume sugary drinks, they do not feel full, so they tend to eat more food. Children who drink sugary beverages also prefer foods with higher calories, leading to worse overall nutrition.

**Strong Pro-Tax Frame 2: Prevention Funding (128 words)**

Some cities and states are considering a penny-per-ounce tax on sugary drinks like non-diet sodas, energy drinks, and fruit drinks. Supporters of a tax say it would provide substantial new revenue that could be used to combat obesity. One-third of children are overweight, and many of them are obese. These children are at risk for major health problems including type-2 diabetes and heart disease. They are also more likely to be bullied and teased. Supporters of a tax say the money raised could be used to fight obesity in many ways, including by improving school lunches, creating more parks and open spaces for children to play, and increasing the availability of fresh fruits and vegetables in all neighborhoods. The result will be healthier children, families, and whole communities.

**Strong Anti-Tax Frame 1: Arbitrary Target (147 words)**

Some cities and states are considering a penny-per-ounce tax on sugary drinks like non-diet sodas, energy drinks, and fruit drinks. Opponents of a tax say obesity is a matter of how many calories people consume, not where those calories come from. A tax on sugary drinks is arbitrary because it does not affect other unhealthy foods like donuts, cookies, and candy bars. Obesity is a complex problem that cannot be solved by focusing on just one small part of a person's diet. Sugary drinks account for only 7 percent of calories in the average American's diet. Science shows that obesity is caused by an imbalance between the calories we consume through food and drinks and those we burn through daily activities and exercise. Opponents of a tax say focusing on one type of product - sugary drinks - ignores the bigger problem and doesn't offer real solutions.

**Strong Anti-Tax Frame 2: Government Intrusion (132 words)**

Some cities and states are considering a penny-per-ounce tax on sugary drinks like non-diet sodas, energy drinks, and fruit drinks. Opponents of a tax say it is just a quick way for politicians to fill budget holes and an unacceptable intrusion of government into people's personal lives. Politicians promise that money raised by a tax on sugary drinks would be used to fight obesity, but more likely this money will be used instead for other projects and more irresponsible government spending. Along with serving politicians' interests in raising money, opponents say the tax is yet another way for the government to tell people what to do. It's one thing for the government to collect taxes - it's another for them to do it in an effort to control people's lifestyles and choices.

**Inoculation (Weak Anti-Tax Frame 1 + Strong Pro-Tax Frame) (279 words)**

Some cities and states are considering a penny-per-ounce tax on sugary drinks like non-diet sodas, energy drinks, and fruit drinks. The main opponents of taxes on sugary drinks are soda companies. These companies spend millions each year on sophisticated tactics to market products with no nutritional value to kids. Soda companies will say and do almost anything to protect their profits, and they do it at the expense of children's health. In 2009 alone, these companies spent 19 million dollars lobbying against taxes on sugary drinks since they know these taxes will affect their bottom line. Soda companies will try to convince you that a tax on sugary drinks is arbitrary because it does not affect foods like donuts, cookies, and candy bars. They will say that these taxes are just a quick way for politicians to fill budget holes. They will say that they are an unacceptable intrusion of government into people's personal choices. They will call them "food taxes" to try to confuse people. But sugary drinks are not food – they have no nutritional value. In fact, research suggests that sugary drinks are the single largest driver of obesity in the United States. Nobody is telling anyone what to drink. But, by adding a few pennies to the price of a soda, many people will choose differently. A tax on sugary drinks would also provide new money that could be used to combat obesity. Money raised by a tax on sugary drinks could be used to fight obesity in many ways, including by improving school lunches and creating more parks and open spaces for children to play. The result will be healthier children, families, and whole communities.

**Scully (used Inoculation & Narrative Persuasion) – at T1 only narrative was significant, but at T2 both were – radio interview**

Transcripts as PDFs on UOY shared drives:

<file:///userfs/rc1451/w2k/Downloads/Scully%20Data.pdf>

[file:///userfs/rc1451/w2k/Downloads/Scully%20transcripts%20\(2\).pdf](file:///userfs/rc1451/w2k/Downloads/Scully%20transcripts%20(2).pdf)

## Intervention Transcripts (Partial)

### Frederick (used framing) – fat negative condition was most significant – 775 words

We exposed participants to news articles reporting on a fictitious large-scale study, the Harvard Physicians Health Study, purportedly published in the Journal of the American Medical Association. We constructed news articles that were approximately 775 words and two pages single-spaced (Appendices C and D; online supplement). The articles used the same basic text, but varied in whether they presented research evidence and/or quotes from experts indicating:

that: 1) high body fat as inherently *unhealthy* or *healthy*; 2) body fat level is *controllable* or *uncontrollable*; 3) stigmatization and weight-based discrimination is acceptable (*discrimination justified*) or unacceptable (*discrimination-unacceptable*). These dimensions were based on previous examinations of the content of common frames in the news media (ref. 2).

In Experiment 1, college students were randomly assigned to one of the two extreme conditions, which we labeled as Fat-Negative (*unhealthy + controllable + discrimination justified*; 773 words; Appendix C) or Fat-Positive (*healthy + uncontrollable + discrimination unacceptable*; 777 words; Appendix D). Experiment 2 tested if Experiment 1's results were replicable in a broader adult sample. In Experiment 3, we randomly assigned participants to one of these extreme conditions or to a control condition (no article). In Experiment 4, we used a 2 (Unhealthy / Healthy) X 2 (Controllable / Uncontrollable) X 2 (Discrimination-Justified / Discrimination-Unacceptable) between-subjects experimental design, where we randomly assigned participants to one of the eight possible conditions that could be formed (e.g., *unhealthy+ uncontrollable + discrimination-unacceptable*). This enabled us to test the independent effects of each aspect of the frames and their interactions, compare the extreme conditions, and examine the specific interaction of interest (Research Question 1). Researchers were blinded to group allocation during the experiment.

In order to enhance the mundane realism of the stimuli, in Experiments 1-3 we added text stating that the articles were published in *The New York Times*. In Experiment 4, we designed the stimuli so that they appeared as if they were printed off the New York Times website. After reading the news articles, participants reported their attitudes.

### **White et al – 1 intervention group – info on abortion safety**

1. Statement describing abortions prior to introduction of ASC abortion. Abortions previously performed in outpatient clinics complications requiring hospitalisation was < 1 in 400, same rate as abortions performed in ASC.
2. Statement about physician practices prior to legislation- Drs performing abortions could send a patient to any hospital to receive treatment. No. Drs performing abortions fallen to 40% forcing some clinics to close

#### Statements:

Informational statements about the ASC requirement. Prior to the Texas legislature passing this law, abortions could be performed in an outpatient clinic. When abortions are performed in an outpatient clinic, the risk of a woman having a serious complication that requires hospitalization is less than one quarter of one percent (or less than 1 in 400 women). There is no difference in the complication rate between abortions performed in an outpatient clinic or an ambulatory surgical center. Informational statements about the hospital admitting privileges requirement. Prior to the Texas Legislature passing this law, doctors performing abortions could send a patient to any hospital to receive treatment, even if they did not have hospital admitting privileges. It can be difficult for doctors to get admitting privileges for reasons that are not related to their medical qualifications, and since this law went into effect, the number of doctors performing abortions in Texas has fallen by 40%, forcing some clinics to close.

