

# A Bittersweet Tax:

## Persuasive Message Framing in Sugar-Sweetened Beverage Tax Campaigns

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## Abstract

Sugar-sweetened beverage (SSB) taxes present one potential solution to mitigate the global obesity epidemic and the proliferation of diet-related chronic diseases. In the United States, such taxes on drinks like sodas, energy drinks, and sweetened coffees and teas have proven to be quite politically divisive, pitting enshrined values of individual free choice against community public health. Though dozens of American cities and states have attempted to pass SSB taxes throughout the past decade, only a handful of cities have successfully implemented them. Since SSB taxes are typically achieved through ballot measures, it is imperative that those who support this important public health intervention learn how to frame these taxes in the most persuasive fashion. Lessons from past, successful and unsuccessful SSB tax campaigns provide an excellent starting point to devise and test the most effective messages.

In this thesis, using a nationally representative online survey (N=800) and a survey based experiment (N=691), I evaluate the effectiveness of various arguments for levying a per volume tax on sugar-sweetened beverages. These studies demonstrate that causal frames highlighting specific health and policy outcomes resulting from an SSB tax can drive support for this kind of tax. Voters want to be assured that the SSB tax revenue will be earmarked for a social good. For instance, the city of Berkeley in California has used the millions of dollars generated by its SSB tax to fund community and school-based health programs such as healthy eating educational programs and physical activity programs. A salient health frame describing the tangible, socially beneficial impacts of the tax is most conducive to maximizing public and political support—perhaps because these types of frames thwart the anti-tax argument that an SSB tax is just a mechanism for a city to raise general revenue. These findings have important implications for public health advocates considering strategies for framing and passing a tax on sugar-sweetened beverages locally, state-wide, or potentially even nationally.

## Introduction

*In this world, nothing can be said to be certain, except death and taxes.*

- Benjamin Franklin

Devising and executing a persuasive campaign is about asking and answering three fundamental questions: whom should we target? What should we say to them? How are we going to deliver that message? Message framing is an integral technique for shaping the perceptions of policies or candidates and their eventual outcomes. Indeed, public policy is a function of what people think *now* and where thoughtful, deliberate targeting can move them.

Frames, rhetoric, and tone all contribute to how people form opinions about policies. Designers of public health campaigns, specifically, are continually evaluating and re-evaluating the efficacy of the frames they use in their campaigns and materials. Sometimes their evaluations recommend policies that regulate individual choice. Since principles of liberty and freedom underpin the American ethos, it is no surprise that many citizens resist being told by the government about what they should and should not eat, drink, smoke, or do. The challenge for policy-makers then becomes how to introduce a potentially polarizing bill prescribing a personal behavior change. In general, public health advocates must then address questions such as: how much blame should they place on the consumer for engaging in a particular harmful behavior? What rhetoric should they use to justify a particular solution? One such example of a piece of legislation designed to disincentivize one sort of unhealthy behavior is a tax on sugar-sweetened beverages (SSBs).

Lawmakers and researchers have proposed several solutions to combat obesity with particular attention to decreasing the consumption of unhealthy foods. These solutions range from implementing stricter nutritional standards in schools to imposing taxes on sugar-sweetened

beverages to discourage their purchase. Since the overconsumption of sugar, in particular, imposes broad fiscal and physical costs on society as a whole, SSB taxation is often floated as an effective strategy to decrease sugary beverage consumption while simultaneously raising revenue for the jurisdiction levying the tax.

The SSB tax controversy pits individual choice against public health. Opponents of the tax argue the government has no right to selectively punish a legal product, though SSB tax proponents respond that the government already levies steep taxes on alcohol and cigarettes to promote reduced consumption in the name of public health. SSB taxes became especially sensationalized in the media after New York City Mayor Michael Bloomberg's 2012 attempt to cap the portion sizes of sugary beverages sold in food service establishments. Since then, a number of cities have voted on potential SSB tax legislation, with most failing as a result of intense lobbying by the industry's main trade group: the American Beverage Association (ABA).

Attention to careful and coordinated framing is crucial in developing a public campaign in support of an SSB tax. An organized campaign with widespread public support acts as a bulwark against the soda industry and its narrative that sugary drinks devoid of nutrients, yet full of empty calories, are harmless. Every day, people are exposed to ads marketing a variety of products and experiences. Advertising agencies and brands' *raison d'être* is to discover the best way to persuade people to buy their products. The literature on marketing and persuasion techniques is well-established, though there is a dearth of information when it comes to marketing policies and legislation. It would behoove policy-makers to take a page out of the soda industry's successful playbook and cultivate a salient "brand" identity for SSB taxes, which would maximize their likelihood of passing.

In this thesis, I utilize quantitative methods of political science, namely a nationally representative online survey and experiment, to elucidate which sorts of message frames and rhetoric are most effective in generating support for a tax on sugar-sweetened beverages. Through these two studies, I uncover fascinating information about which frames and rationales resonate with potential voters when it comes to imposing a tax on sugary drinks. Out of the eight message frames shown to survey respondents, I discover that two frames in particular predict the highest support for a tax on sugar-sweetened beverages. Both frames include rhetoric underscoring the tangible impacts an SSB tax would have on public health, such as funding community health programs and lowering SSB consumption. In fact, respondents did not relate as strongly to frames justifying an SSB tax on the grounds that sugary beverages are unhealthy or that they contribute to obesity and type 2 diabetes. Moreover, frames that blamed the soda industry for its predatory practices in marketing SSBs also did not resonate as much with respondents. I believe my results are a manifestation of the American tenet that public policies—and public health policies specifically—should not engage in moralizing and finger-wagging. Instead, policy-makers should enact policies that have data-driven, actionable outcomes. My research will be pivotal in guiding the campaign strategies of public health advocates considering proposing a tax on sugar-sweetened beverages in their cities or states.

## **Rise of Obesity and Chronic Metabolic Disease**

The United States of America has witnessed a steep rise in preventable diseases paralleling the widespread adoption of sugary beverages and processed foods into the standard American diet beginning in the 1950s. The country is at a public health crossroads: more than 100 million adults suffer from pre-diabetes or diabetes—nearly half the entire population of US



adults (CDC 2020). Cardiovascular disease is the leading global cause of death. In the US, about 647,000 Americans die from heart disease each year (CDC 2019). This number is higher than the mortalities from all forms of cancer and chronic lower respiratory diseases combined. The disheartening reality is that more Americans are sick than healthy.

Obesity and other diet-related diseases such as cardiovascular disease, type 2 diabetes, high blood pressure, stroke, and sleep apnea also have far-reaching social and economic implications beyond the obvious health consequences. Indeed, these hidden, indirect consequences of obesity are some of the most nefarious. The value of lost productivity due to obesity-attributable costs of absenteeism—a habitual pattern of absence from work—is estimated to be \$8.65 billion a year (Andreyeva, Luedicke, and Wang 2014). Studies have also investigated productivity losses due to both absenteeism and presenteeism—the problem of employees who are not fully functioning in the workplace because of an illness, injury, or other condition. Finkelstein et al. (2010) employed a cross-sectional research design illustrating how yearly productivity losses range from \$322 for overweight men to \$6,087 for grade III/morbidly obese men ( $BMI \geq 40$ ). In women, the estimates are even higher, ranging from \$797 for overweight women to \$6,694 for grade III/morbidly obese women. The aggregate cost of obesity is calculated to be \$73.1 billion each year (ibid).

The economic burden of obesity is substantial: Biener, Cawley, and Meyerhoefer (2017) estimate that medical care costs for obese adults are, on average, \$3,429 higher (in 2013 dollars) than the costs for non-obese adults. They also estimate that total medical costs for the full, non-institutionalized population of adults aged 18 and older in the US in 2013 were \$342.2 billion—an increase of 7.6 percentage points from the year 2005. While we typically associate obesity with chronic, life-threatening diseases like type 2 diabetes or heart disease, obesity and excess

sugar consumption can also lead to tooth decay and cognitive decline. In fact, Monte and Wands (2008, 1110) write “[r]eferring to [Alzheimer’s Disease] as [type 3 diabetes mellitus] is justified, because the fundamental molecular and biochemical abnormalities overlap with [type 1 diabetes mellitus] and [type 2 diabetes mellitus] rather than mimic the effects of either one.”

Indeed, obese individuals also report suffering from higher rates of depression than non-obese individuals. Luppino et al. (2010, 225) also discovered bidirectional associations between depression and obesity: “obese persons had a 55% increased risk of developing depression over time, whereas depressed persons had a 58% increased risk of becoming obese.” Suicidal behavior in the obese population is another troubling reality: Wagner et al. (2013, 975) find adjusted odds-ratios for suicide attempts showed significantly greater odds for class I obesity (OR, 3.49 [1.76-6.90] and class III obesity (OR, 12.43 [3.87-39.86] compared to the normal weight group.”

## **Sugar’s Role in America’s Declining Health**

There are a handful of studies that seem to exonerate sugar’s role in the obesity epidemic, arguing instead that caloric imbalances—regardless of the type or nutritional makeup of the food or drink—are responsible for America’s weight and health problems. Yet a closer look into these studies’ funding sources reveal that the soda industry regularly funds scientists willing to minimize sugar’s culpability while highlighting physical activity as the best way to mitigate the obesity epidemic. In 2008, the Corn Refiners Association undertook an extensive \$30 million public relations campaign to counter the bad publicity resulting from a series of studies linking high-fructose corn syrup (HFCS) to the rise of obesity and diabetes (Lipton 2014). Part of that money funded a \$41,000-a-month retainer for Dr. James M. Rippe, a Professor of biomedical

sciences at the University of Central Florida, who co-authored an article in the International Journal of Obesity disputing HFCS and other caloric sweeteners' role in increasing liver fat or contributing to insulin resistance—a syndrome that includes a group of problems like obesity, high blood pressure, high cholesterol, and type 2 diabetes (Klurfeld et al. 2013). Amazingly, the conflicts of interests are clearly declared in the paper:

Dr Rippe and Rippe Lifestyle Institute received research grants and consulting fees from a variety of companies and organizations. Including ConAgra, Kraft Foods, PepsiCo, Weight Watchers and the Corn Refiners Association. Dr Foreyt is a member of the scientific advisory panel of the corn refiners association.

Yet these indisputable conflicts of interest are typically absent from the headlines and news coverage of the study.

Although there is no single cause for the skyrocketing rates of obesity, an overwhelming amount of evidence points to sugar consumption as a leading contributor to the incidence of obesity, type 2 diabetes, tooth decay, and attention processing/behavioral issues (Elliot et al. 2002; Johnson et al. 2007). Foods high in sugar and low in fiber stimulate the pancreas to release insulin, a hormone responsible for decreasing glucose levels in the blood. When someone is constantly ingesting sugary foods, his blood sugar is perpetually high, and he is more likely to develop insulin resistance, a condition where the body's cells do not respond to insulin and cannot use glucose correctly. This buildup of glucose in the bloodstream can also lead to hyperglycemia, whose symptoms include “[i]ncreased thirst and/or hunger...Frequent urination...Headache...Blurred vision...Fatigue” (Hess-Fischl 2018).

In the 1970s and 80s, the low-fat ideology enveloped American food culture and society; food manufacturers began gratuitously adding sugar to unnecessarily sweet foods like baby food, ketchup, and yogurt. SnackWell's became the poster child for a fat-free, guilt-free snack. However, removing the fat from foods required an equally delicious substitution. Subsequently,

sugar and all of its biologically equivalent substances like HFCS, sucrose, dextrose, agave, and beet sugar replaced dietary fat. Indeed, Popkin and Hawkes (2016) discovered 68% of individual processed foods in American grocery stores contain added sugar.

Young children are particularly vulnerable to the physical and behavioral consequences of consuming sugar at every meal. A glimpse into the state of school lunches in America reveals how aggressive cost-cutting measures and poor nutritional standards short-change school children, particularly the poor and minority kids who receive free or reduced meals. School lunches are notoriously abysmal; the main entrées typically feature foods high in carbohydrates and added sugar. The Healthy, Hunger-Free Kids Act took effect in 2012 and was originally hailed as a significant improvement to nutrition standards with new mandates requiring a fruit and vegetable at every lunch and whole grains instead of refined grain. While this legislation was intended to ensure students receive adequate nutrition to fuel them for eight hours in a classroom, in reality, the act has emboldened the re-engineering of food products to meet federal standards, without concern for their actual nutrition content. Whole-grain doughnuts full of added sugar are technically allowed under the new rules. Though whole-grain may be an improvement over white flour, this does not change the fact that these foods are sugar bombs. In an article for the New York Times, reporter Kate Murphy (2015) studied these new regulations and found “a typical federally approved school lunch in the United States is a ‘reformulated’ Philly cheesesteak sandwich (low-fat, low-salt processed cheese and lean mystery meat on a whole grain bun) with steamed green beans, a potato wedge, canned peaches and an apple.” A recent phenomenon in schools is children throwing out their uneaten meals after being forced to put them on their trays by flawed public policy.

Sugar has been likened to kryptonite for young, developing brains. The link between diet quality and academic performance has been established (Florence, Asbridge, and Veugelaers 2008; Owen and Corfe 2017). Prinz, Roberts, and Hantman (1980) found that when hyperactive kids consume sugar, they act more restless and destructive. Similarly, Jones et al. (1992) also found that a high-sugar diet increased hyperactivity and inattention in some kids with ADHD. Doctors, child nutritionists, and behavioral experts alike have all suggested kids diagnosed with ADHD eat a high-protein, low-sugar diet to best manage their symptoms (Amen and Amen, n.d.). Consequently, the benefits of cutting back on sugar are demonstrable, not only for weight and physical health purposes but emotional and social reasons, as well.

## **SSB Tax Overview**

Before proceeding, I want to take a moment to define some of the more technical terms of the paper. The colloquial term “soda tax” is actually just one category of items included in a comprehensive sugary beverage tax. The broader category of beverages subject to the tax I focus on throughout my research is called “sugar-sweetened beverages” or SSBs. For the purpose of this thesis, SSBs are defined as all nonalcoholic beverages with any added caloric sweetener, including those intended to be mixed into an alcoholic drink. According to the CDC (2017), sugar-sweetened beverages are any liquids that are sweetened with various forms of added sugars like brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, lactose, malt syrup, maltose, molasses, raw sugar, and sucrose. The definition of SSB generally includes sugary sodas, sports drinks, fruit drinks, pre-sweetened teas and coffees, enhanced waters, and energy drinks. Common SSB products include regular Coca-Cola, Vitaminwater, Gatorade, bottled Starbucks Frappuccinos, Red Bull, Sunny D, and Capri Sun.

Current SSB taxes in a handful of US cities generally exempt baby formula and 100% fruit juice from being taxed. Sugary beverages with alcohol are also typically spared since alcohol is already taxed separately virtually everywhere.

Only one city in the United States levies a tax on artificially-sweetened beverages (ASBs), in addition to sugar-sweetened beverages. Philadelphia's excise tax of 1.5 cents-per-ounce applies to the distribution of SSBs like the ones mentioned above and ASBs including, "stevia, aspartame, sucralose, neotame, acesulfame potassium (Ace-K), saccharin, and advantame" (City of Philadelphia 2016). According to the city's website, "Pre-packaged beverages made with "natural" sweeteners, such as agave, honey, or stevia, are also covered by the tax. The tax also covers any syrups or concentrates that are used to make a beverage, that includes any sweetener as an ingredient. Examples include soda syrup and drink mix powder" (City of Philadelphia 2020). Philadelphia also taxes popular beverages like Coke Zero, Diet Snapple, and Vitaminwater Zero. While the consumption of ASBs is certainly another potential health concern to investigate, I will be focusing exclusively on SSBs for my research since the vast majority of passed and proposed taxes apply only to SSBs. Therefore, for the purposes of this paper, the terms "SSB" and "sugary beverage" will be used interchangeably, meaning any sugar-sweetened beverage.

Additionally, a tax on sugar-sweetened beverages is a popular example of an effective Pigovian tax. Pigovian and sin taxes are liberal policy proposals for products considered indulgent or frivolous, such as alcohol, cigarettes, or pollution. Such taxes seek to combat the social and fiscal costs to society that these behaviors generate.

A Pigovian (also spelled Pigouvian) tax is simply a government cost imposed on anything that causes a socially harmful, negative externality. Arthur Pigou, a British economist,

developed the concept of Pigovian taxation in the early 20th century, arguing market activities that cause negative externalities (i.e., costs imposed on others that are not taken into account by the person who actually does them) justify government intervention. These taxes should theoretically discourage that behavior. Pigovian taxes are often likened to “sin” taxes, which are designed to discourage internalities (i.e., costs borne by the individual rather than society as a whole). Ideally, Pigovian taxes would equal the cost such behaviors impose on society. Taxes on sugar-sweetened beverages fall into both categories of Pigovian and sin taxation since excessive soda consumption harms the consumer’s own health and affects society’s productivity and well-being as a whole.

### **SSB Taxes as Nudges**

Ballot measures are the preferred political strategy for passing SSB taxes instead of stand-alone legislation taken up by the city council or in the city’s budget. Contrary to most legislation that is proposed and passed by elected representatives, ballot measures are an example of direct democracy where eligible citizens vote directly for or against the legislation. Ballot measures, thus, necessitate ample public support and utilize grassroots techniques such as canvassing, lobbying, and fundraising. A ballot measure campaign is advantageous since it “provid[es] considerable public education on the problems associated with sugary drink consumption, even if the tax does not pass. Using a ballot measure also eliminates the political dealmaking of the legislative process and ensures that advocates retain control over language” (Miao, Adler, and Krieger 2018, 20). However, the resources and manpower involved in educating the public and whipping up votes for a ballot measure are expensive and require “more ground-level organizing, a stronger coalition, and more grassroots engagement” (ibid).

As mentioned in the previous section, many cities have begun to adopt conditions that require a two-thirds supermajority vote for tax legislation with dedicated revenue. Studies show people find SSB taxes more politically palatable when they are told the tax revenue will be used to fund public health programs such as healthy food access programs and education, diabetes prevention programs, and physical activity/recreation programs (Jou et al. 2014; Barry, Niederdeppe, and Gollust 2013). However, this poses a dilemma where dedicating the funds would garner more public support, but potentially not enough to surpass the two-thirds vote threshold. With the obstacle of gathering enough public support in mind, the next section explains more about public preferences and the role interest groups play in the policy-making process.

While SSB taxes offer a promising start to ameliorate the obesity epidemic and restore America's health, I want to emphasize that they are not a panacea. If the United States genuinely cares about the physical and mental well-being of its citizens, then taxes on sugary beverages should be paired with subsidies on nutritionally rich, whole foods. Other potential policy considerations could include strengthening nutrition standards in schools, expanding the USDA's Fresh Fruit and Vegetable Program, and/or improving access to affordable, healthy foods through the Supplemental Nutrition Assistance Program (SNAP).

Indeed, SSB taxes are just one piece in solving the obesity puzzle. In the words of behavioral economists Richard H. Thaler and Cass R. Sunstein, an SSB tax acts as a “nudge” for consumers to choose healthier dietary options, beginning with their beverage choices. Central to their discussion on choice architecture is the seemingly paradoxical concept of libertarian paternalism which they define as:

...a relatively weak, soft, and nonintrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened. If people want to smoke cigarettes, to eat a



lot of candy, to choose an unsuitable health care plan, or to fail to save for retirement, libertarian paternalists will not force them to do otherwise — or even make things hard for them... A nudge, as we will use the term, is any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. (Thaler and Sunstein 2009, 5-6)

Taxes on sugar-sweetened beverages certainly fall under this category of libertarian paternalist public policies. People will still be free to drink as much and as many sugary beverages as they desire, but the salience of the extra cost of an added tax will nudge consumers toward purchasing more non-taxed products like water. When a consumer spends an extra few dollars on tax for a sugar-sweetened beverage, that additional cost is particularly salient in his/her mind.<sup>1</sup> On the contrary, the societal (and fiscal) costs of obesity and diet-related health diseases are less salient. Shoppers do not typically consider how their sugary drink purchase fuels the obesity epidemic. Accordingly, consumers are less enthusiastic about the individual costs these taxes impose, and legislation attempting to create them has been incredibly difficult thus far. Therein lies the puzzle of my thesis: how can policy-makers and health advocates convince voters that voting for an SSB tax is the best course of action to decrease SSB demand and mitigate the costs and consequences of obesity and other diet-related health diseases?

The data are clear—taxes on sugar-sweetened beverages work (Falbe et al. 2016; Gortmaker et al. 2015). Not only do they generate enormous amounts of money to ameliorate the consequences of obesity and type 2 diabetes, but they also reduce consumption and save billions of dollars in healthcare costs. Case studies of cities that have passed one to two cents per ounce taxes on SSBs illustrate the success of these taxes. Since Berkeley levied the first tax on sugar-sweetened beverages in the nation in 2015, SSB consumption rates have dropped precipitously. In the three years since its implementation, the city has seen a 52.3% reduction in SSB

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<sup>1</sup> Though an SSB tax only costs the distributor an extra one to two cents per ounce, the distributors pass that added cost onto the retailers, who then pass it on to the consumers, effectively raising the price often by dollar increments.

consumption and an accompanying 25.1% increase in water consumption (Lee et al. 2019). Both of these values are significant at the standard 5% level.

However, the biggest obstacle to passing such a tax is generating ample public support. This is especially true in light of Big Soda's fastidious efforts to fight any legislation that threatens its profits or advertising capabilities. The following section will illuminate the current state of SSB taxation in the US.

### **SSB Taxation in the United States**

At the time of this publication, seven U.S. local governments have passed laws levying a volumetric excise tax on SSBs: Boulder, Colorado; Philadelphia, Pennsylvania; Seattle, Washington; along with Albany, Berkeley, Oakland, and San Francisco in California. The Navajo Nation also imposes an SSB tax (Tax Policy Center, n.d.). The U.S. has not been successful in passing SSB legislation beyond local jurisdictions. The tax rates vary slightly; most cities levy a penny per ounce tax, although Boulder, Philadelphia, and Seattle levy 2 cents, 1.5 cents, and 1.75 cents per ounce taxes, respectively. The tax applies to any non-alcoholic sugar-sweetened beverages, including non-diet sodas, energy drinks, sports drinks, and fountain soda concentrates. The city of Philadelphia is the only jurisdiction that, in addition to SSBs, also taxes artificially-sweetened beverages (ASBs) made with zero-calorie sweeteners such as aspartame, sucralose, or stevia. Table 1 outlines these various taxes.

**Table 1: SSB Excise Taxes Implemented as of March 2020**

City	Date passed	Type of legislation	Tax rate	Eligible drinks
Albany, CA	November 2016	Ballot measure	1 cent per ounce	SSBs
Berkeley, CA	January 2015	Ballot measure	1 cent per ounce	SSBs
Boulder, CO	November 2016	Ballot measure	2 cents per ounce	SSBs
Oakland, CA	November 2016	Ballot measure	1 cent per ounce	SSBs
Philadelphia, PA	June 2016	City Council	1.5 cents per ounce	SSBs + ASBs
San Francisco, CA	November 2016	Ballot measure	1 cent per ounce	SSBs
Seattle, WA	June 2017	City Council	1.75 cents per ounce	SSBs

Specific excise taxes are the preferred method for taxing SSBs instead of an ad valorem sales tax. Ad valorem taxes are taxes imposed on the basis of the monetary value of the taxed item. Investopedia defines a sales tax as “a consumption tax imposed by the government on the sale of goods and services. A conventional sales tax is levied at the point of sale, collected by the retailer, and passed on to the government” (Kagan 2019). As of January 1, 2014, 34 states and Washington, D.C., levy a sales tax on sugary beverages sold in food stores, although these taxes are too low to have any meaningful impact on consumer behavior or in mitigating obesity<sup>2</sup> (Chriqui, Chaloupka, and Eidson 2014; Chriqui et al. 2013). In contrast, specific excise taxes are

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<sup>2</sup> 39 states and D.C. also levy a sales tax on regular, sugar-sweetened beverages sold in vending machines.

set taxes (instead of fixed percentages used in ad valorem taxes) included in the shelf price of an item; these taxes are indirect, meaning they are levied on the distributor, which passes it to the retailer and then on to the customer. Excise taxes levied on SSB distributors provide a jurisdictional basis for the taxes, meaning anyone living within the borders are subject to the tax. This is in contrast to an excise tax levied on the manufacturers, which would only affect a small number of localities where the manufacturing occurs (Miao, Adler, and Krieger 2018).

Ironically, the long-term success of the SSB tax would be to generate little to no income since the paramount goal here is to influence behavior and reduce SSB consumption. Simply put, if the tax works how it is intended to, then the higher price on sugary beverages will dissuade buyers from choosing sodas or substantially decrease the amount of soda they regularly consume. Theoretically, a high enough tax rate would lead to a threshold effect whereby people would substitute sugary beverages with water or nothing. That said, a goal of zero SSB consumption is unrealistic. Adjusting macro-level behavior to a small but significant market change can be a long process. So, in the years following the implementation of a sugary beverage tax, success generally depends on how much revenue it generates, as well as how much the tax reduces SSB consumption. In Berkeley, for example, the tax has generated \$6.6 million since its implementation in March 2015. These funds are allocated into the City Council's General Funds, where the money is used to fund community grants and public health organizations dedicated to reducing SSB consumption and improving citizens' health. Causal inspection suggests an inverse relationship between taxes and consumption. In other words, as taxes on SSBs go up, consumption goes down. Falbe et al. (2016) employed a repeated cross-sectional design to discover that Berkeley's penny-per-ounce excise tax reduced SSB consumption by 21% and

increased water consumption by 63% in the four months after its implementation. SSB reduction was especially pronounced in low-income and minority communities.

In Philadelphia, however, the city has struggled to combat the effects of cross-shopping, which reduces the efficacy of the SSB tax. Cross-shopping occurs when customers travel to nearby jurisdictions to purchase non-taxed sugary drinks. This phenomenon offsets the impact of the tax. Seiler, Tuchman, and Yao (2019) found the 34% price increase in artificially and sugar-sweetened beverages led to a 46% reduction in the quantity of taxed drinks within Philadelphia proper. However, when they accounted for cross-shopping in stores up to six miles outside of the city, this reduction fell to only 22%.

There are currently no states in the US with an SSB tax, despite numerous failed attempts. A simple search through the UConn Rudd Center for Food Policy and Obesity's legislative database shows that 259 bills involving sugary beverage regulation were introduced to state legislatures between 2010 and 2019. Every single bill that would impose a tax on sugary beverages either failed directly, died in committee, or was deferred for further study. State legislatures have also begun to pass bills requiring supermajority support for new taxes and fees that go toward dedicated funds. In California, Proposition 26, which passed in 2010, makes it nearly impossible for any city or the state to pass an SSB tax with legislative earmarking without the necessary supermajority (Ballotpedia 2010).

The status quo piecemeal method of enacting SSB taxes in cities means affected citizens can purchase untaxed sugary beverages in nearby towns or cities. This is the main reason why Philadelphia's SSB tax has achieved such lackluster results. One solution to this is to impose a nationwide SSB excise tax, which would eliminate the ability to cross-border shop. Economists Allcott, Lockwood, and Taubinsky (2019) find that an optimal federal tax rate of about 1.5 cents

per ounce would be sufficient enough to offset the negative externalities and internalities of SSB consumption. Such a tax would generate between \$2.4 billion and \$6.8 billion per year, which could be used toward social welfare programs (ibid).

## Industry Response

The soft drink industry—Big Soda—is a multi-billion dollar enterprise comprising a vast network of manufacturers, retailers, marketers, lobbyists, and scientists. The US carbonated soft drink market brought in over \$164 billion in revenue in 2019 and is expected to grow by 0.9% annually (Statista 2019). Nutrition professor Marion Nestle of New York University authored the seminal book on the history, nutrition, and politics of sugary beverages—aptly titled *Soda Politics*. In her book, Nestle (2015) outlines four tactics the soda industry uses to deflect its role in the obesity crisis: 1) emphasizing its devotion to health and wellness which includes diverting attention to physical activity's role in decreasing obesity rates, 2) heavy marketing and advertising of its products, 3) building allies through philanthropy efforts and partnering with health groups to bolster its public image, and 4) taking strong action to protect corporate interests. Big Soda has a robust public relations system despite the charges of abetting the global obesity epidemic and causing sugar addictions.

From a marketing standpoint, Big Soda has done a phenomenal job cultivating some of the world's most iconic and recognizable brands, such as Coke, Pepsi, and Gatorade. In the US, Big Soda is dominated by three companies: Coca-Cola, Pepsi-Co, and Dr Pepper Snapple: Coca-Cola commands 42.8% of the US carbonated soft drink market, Pepsi comes in second at 25.6%, and Dr Pepper Snapple enjoys a 17.9% market share (Beverage Digest 2019).

Big Soda is defined by its aggressive and wildly successful advertising campaigns. According to the US Securities and Exchange Commission (2018) annual reports, Coca-Cola spent \$4 billion on advertising in 2018 alone. Coca-Cola's 2014 launch of its "Share a Coke" campaign introduced personalized Coke bottles to the market. The campaign has since evolved to include more flavors and names. This marketing scheme became wildly popular with millions of Americans flocking to stores in search of a can of Coke with their name on it.

While the "Share a Coke" campaign is a seemingly innocuous example of Big Soda's sophisticated marketing, the industry also engages in nefarious practices to boost profits and rebut its role in the obesity epidemic. The soda industry regularly funds scientists and doctors to release spurious reports finding no link between SSB consumption and weight gain (Nestle 2015). In their analysis of financial conflicts of interest and reporting bias, Bes-Rastrollo et al. (2013) found that 83.3% of published systematic reviews in the SSB field with a food industry conflict of interest found no positive relationship between SSBs and weight gain. Moreover, the soda industry and its principal trade association, the American Beverage Association (ABA), give millions of dollars annually to front groups appearing to represent the best interests of the community, all the while espousing junk science and decrying the "nanny state" (Simon 2013). These "astroturf" (a term for fake grassroots) organizations present purposefully misleading narratives that prey on consumer anxieties and discredit science while preserving the soda industry's clean image (ibid).

The soda industry regularly recruits low-income black and Hispanic people to work for these astroturf street teams, holding signs and passing out flyers opposing proposals to tax sugary beverages. These tactics shield the industry from bad publicity and frame the fight as a battle between more than just industry versus consumer. When El Monte, California was considering

an SSB tax initiative in 2012, the ABA recruited black and Hispanic people from the city's large minority population to carry signs highlighting "the higher cost of sports drinks, baby formulas, and horchata and agua fresca (the latter two consumed largely by Hispanic residents)" (Nestle 2015, 368). The implications of Big Soda's intentional efforts to target minorities are particularly troubling, considering blacks are 1.4 times more likely to be overweight and twice as likely to be diagnosed with diabetes as whites (US Department of Health and Human Services Office of Minority Health 2017a). Hispanic Americans are 1.2 times more likely to be overweight than white Americans and twice as likely to suffer from diabetes (US Department of Health and Human Services Office of Minority Health 2017b). Big Soda's relationship with minorities has historically been exploitative. Soda companies bombard low-income, minority communities with advertisements (Harris et al. 2015). They cultivate salient brand identities with highly recognizable products and foment sugar addictions. Then, they blame the individuals themselves for being obese or sick (Nestle 2015).

One statement from the ABA (2015) acknowledged obesity, but attributed the epidemic to an imbalance of caloric input and output (i.e., "people should be exercising more") or simply due to their genetics (i.e., "it's not our fault"), rather than the consumption of sugary beverages:

How could such a small portion of calories possibly be solely responsible for obesity. It simply defies logic. In reality, no single food, beverage or ingredient is a unique contributor to obesity. Obesity is a complex problem that is caused by a variety of factors including overall diet, physical activity and genetics. Wrongly demonizing one source of calories misleads people who are trying to achieve a balanced lifestyle and diverts us from real solutions.

The non-white market is very lucrative for Big Soda: among men and women, non-Hispanic blacks and Hispanics consume a higher mean percentage of total daily calories from sugar-sweetened beverages compared with non-Hispanic whites and Asians (Rosinger et al. 2017). An analysis of self-reported soda drinking habits by Mintel shows that while 55% of



whites say they drink regular sodas (i.e., sugar-sweetened), nearly 70% of African Americans and Hispanics do (Nestle 2015, 186).

Big Soda is acutely aware of the charges against it and has a carefully outlined playbook of responses to any possible accusations (Nestle 2015). The soda industry's response to charges that it causes obesity is one that emphasizes personal responsibility and freedom of choice. The ABA even has an entire webpage dedicated to its initiatives and advocacy work, maintaining the position that taxes and regulations harm consumers and businesses while encroaching on consumer choice. Despite the overwhelming evidence that sugar is one of the most addictive substances—even more addictive than cocaine, in fact (Ahmed, Guillem, and Vandaele 2013)—the soda industry argues that sodas belong in a well-balanced diet and diverts attention to promoting physical activity instead of diet change to combat obesity. These vapid attempts to address its role in the obesity epidemic, combined with a seemingly unlimited lobbying budget, has allowed Big Soda to escape responsibility for the world's largest health epidemic.

A number of studies with different research methods have found associations of SSB consumption with negative health outcomes: Temporal and epidemiological data illustrates the close parallels between the upsurge in obesity and SSB intake (Hu and Malik 2010), experimental evidence shows increased body weight after sustained soft drink consumption (De Castro 1993; DiMeglio and Mattes 2000; Ebbeling et al. 2006; James et al. 2004; Raben et al. 2002; Tordoff and Alleva 1990), and longitudinal studies show positive associations between soft drink consumption and overall energy intake (Kvaavik, Andersen, and Klepp 2005; Mrdjenovic and Levitsky 2003; Schulze et al. 2004). The literature on sugar addiction is well-established, and so is the literature on diet change being the most important factor in weight loss (Heilbronn et al. 2006). Despite the overwhelming evidence that SSB (over-)consumption is not

something we can simply exercise away, Big Soda continues to mislead consumers about the addictive nature of sugary drinks, blaming individuals for being addicted, lazy, and overweight.

The soda industry also preys on the vulnerability of its consumers by aggressively marketing its products to children, minorities, and poor people (Nestle 2015). Black and Hispanic youth, in particular, are subject to an increased risk of obesity, diabetes, hypertension, and other diet-related diseases (Hales et al. 2017). According to data from the UConn Rudd Center for Food Policy and Obesity, beverage companies spent a stunning \$866 million on advertising sugary and energy drinks in the year 2013 alone (Harris et al. 2015). The three largest beverage companies, Coca-Cola, Dr Pepper Snapple, and PepsiCo, were responsible for 70% of advertising spending on sugary and energy drinks in 2013 (ibid). Advertisements for these drinks constituted two-thirds of all beverage advertisements viewed by children (ibid). Beverage advertising has transcended the classic mediums of television and print to dominate social media now as well. Soda companies employ celebrities and popular music to increase their brand presence; they also host promotions and contests to engage younger users across various social media platforms such as Facebook, Twitter, YouTube, and Instagram (ibid).

Moreover, in an analysis of Nielsen data, Harris et al. (2015) finds the three largest beverage conglomerates in the US (Coca-Cola, Pepsi Co, and Dr Pepper Snapple) were responsible for 70% of Spanish-language advertising spending in 2013. These companies spent \$16 to \$21 million each on advertisements to Hispanic audiences (ibid). The fourth-largest Spanish-language advertiser was SK Energy Shots, followed by Sunny Delight Beverages (makers of the eponymous Sunny-D) and Innovation Ventures (5-Hour Energy), which each spent \$4 to 5 million (ibid). Ad exposure to sugary drinks and energy shots rose by “23% and 32% for Hispanic preschoolers and children, respectively” from 2010 to 2013 (ibid., p.80).

Beverage companies spend more than any other food-related company targeting youth (ibid). Recently, these companies have shifted their focus to multicultural youth—promoting sports and music events, sponsoring scholarship funds, and aggressively marketing their products in TV, print, and online ads with famous Hispanic and black celebrities such as Pitbull for Dr Pepper Snapple and Beyoncé for PepsiCo. The rise of the Internet and social media has opened new avenues for beverage companies to appeal to youth. Digital marketing campaigns are more accessible to people who stream media content on their computers rather than their televisions. Hashtags and social media algorithms promote advertisements “going viral,” especially if they contain a deeper message (e.g., Coca-Cola’s recycling campaign) or are controversial (e.g., Kendall Jenner’s infamous Pepsi commercial).

Harris et al. (2014, 93) illuminate the beverage industry’s sophisticated social media presence:

Sugary drink brands create posts and messages to engage their followers daily and encourage them to share these branded messages with their friends. Engagement devices such as hashtags, favorites, retweets, regrams, and revines further increase these brands’ social media reach. Our analysis of tweets showed that some brands tweeted as much as 60 times per day and most of the top brands had high retweet rates of 50% or more. Brands’ content is also well-integrated across all social media platforms, so users simply click a link on one platform to be directed to another to increase engagement with the brand and introduce users to the newest social media platforms. Our examination of social media posts for sugary drink and energy drink brands found many examples of messages likely designed to appeal to a teen audience, including teen-targeted posts for Sun Drop, Mtn Dew, Fanta, and Gatorade, as well as black-targeted Sprite posts.

Clearly, beverage companies are highly-skilled at outreach and engagement, especially towards younger and non-white viewers. The harsh reality is that these masterful tactics work—obesity rates are demonstrably higher in Hispanic and black communities; the prevalence of obesity is 47% for Hispanics and 46.8% for blacks compared to 37.9% for whites (Hales et al. 2017). The health statistics for Hispanic and black youth are particularly troubling; the

prevalence of obesity is twice as high in Hispanic boys than non-Hispanic white boys—28% to 14.6% (ibid). Collapsing both genders, 22% of non-Hispanic black youth, 25.8% of Hispanic youth, 14.1% of non-Hispanic whites, and 11.0% of non-Hispanic Asians are obese (ibid). In other words, one in four Hispanic children is obese. Childhood obesity, particularly in low-income, black, and Hispanic communities, is extremely dangerous. Research shows obese children are more likely to stay obese into adulthood, meaning they will be living longer with the health consequences of obesity, such as type 2 diabetes and cardiovascular disease (Sahoo et al. 2015). Numerous comorbid diseases are associated with childhood obesity, including both physical diseases and mental diseases such as low self-esteem and depression (ibid).

As I mentioned before, sugary beverage taxes are not a panacea. However, Big Soda has been successful thus far in marketing its products to vulnerable youth and minorities who conveniently suffer disproportionately from obesity and other diet-related health diseases. Big Soda has a standard soundbite in its playbook disparaging soda taxes as regressive. Yet, one can easily argue—empirically—that obesity and its diseases are also regressive, impacting the poorest and most vulnerable people the most. Therefore, my thesis seeks to understand which pro-tax arguments have the potential to resonate the most with citizens, despite Big Soda's well-endowed coffers and advertising prowess. Without some attempts at intervention, whether that be taxation, warning labels, or size restrictions on sugary drinks, America will need to address the rising obesity rates and the accompanying societal and financial costs.

The soda industry's worst nightmare may very well be SSB taxes since they demonstrably decrease revenue and expose the industry's complicity in the various diet-related health crises in the US. Altogether, the ABA, Coca-Cola, and PepsiCo have spent over \$67

million<sup>3</sup> to defeat local and state SSB tax proposals (Center for Science in the Public Interest 2016). When Berkeley and San Francisco were considering SSB taxes in 2014, Big Soda spent a hefty \$10.4 million, outspending health advocates at a ratio of 18:1 (Stuhldreher 2014). This translates to an expense of \$122 for every “no” vote. While San Francisco’s Proposition E to impose a 2 cents tax on sugary beverages ultimately failed, Berkeley’s Measure D passed with an overwhelming 76.17% in support (Ballotpedia 2014). A political consultant on Berkeley’s Yes on D campaign attributed the success to how the campaign: 1) built together a broad coalition of health experts and community leaders, 2) proposed the measure as a general tax requiring a simple majority, rather than the supermajority needed for a specific tax, 3) recruited volunteers for a door-to-door grassroots campaign, 4) recruited every elected official and candidate for office to support the measure, 5) partnered with the League of Women Voters and the Berkeley NAACP to turn out voters, and 6) exposed Big Soda for funding the No on D campaign (Nestle 2015). The Berkeley example illustrates how a grass-roots, organized campaign with vigorous public support can successfully defeat an industry-backed, multi-million dollar campaign.

## **Literature Review**

Sugary beverage taxes and their accompanying public opinions are fascinating domains to research, integrating concepts from political science, psychology, economics, communications, and philosophy. Taxation is always a rich subject to study, especially when we consider the role special interests play in manipulating the system or how certain taxes pose heavier burdens on the poor. When considering theories of rule and law, the concept of taxation

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<sup>3</sup> This is a conservative number since a few states do not require lobbyists to report their expenditures.

is a puzzling, complex phenomenon—a necessary evil in the functioning of a successful democracy.

Taxes are a solution to a pervasive collective action problem preoccupying all levels of government: that is, financing public goods. It is in each individual's interest to pay the minimum amount in taxes and still reap the proverbial benefits, yet the money to consistently provide those goods and services must be raised somehow. Since America already taxes specific items commonly thought to be unhealthy, frivolous, or gluttonous, such as cigarettes and alcohol, the anti-tax side must argue that these sin taxes are equally unacceptable. Politically, taxation is a polarizing issue. Favoring tax increases, particularly on the middle-class, is the surest way to turn off potential voters in an election. Moreover, many conservatives and libertarians believe taxation is antithetical to the American ethos. Indeed, oppressive taxation by the British precipitated the American Revolutionary War. Taxation, in general, is a fraught topic—however, taxes on America's favorite beverages are particularly and especially controversial.

In this literature review, I will draw from the literature on political communication and psychology with special emphasis on the power of emotions and the technique of framing. This review will provide valuable guidance in designing a campaign to encourage public support for a tax on sugary drinks.

## **Impact of Frames and Emotions on Political Attitudes**

### **Framing**

In line with recent literature highlighting the role of psychological theories such as heuristics, biases, emotions, and group attachments in “rational” decision-making, the

importance of framing cannot be understated. Framing is fundamental to understanding persuasion. “The major premise of framing theory,” Chong and Druckman (2007, 104) explain, “is that an issue can be viewed from a variety of perspectives and be construed as having implications for multiple values or considerations. Framing refers to the process by which people develop a particular conceptualization of an issue or reorient their thinking about an issue.”

Frames are often used to sway public opinion; an oft-cited example of a “frame in thought” is a controversial rally which proponents may frame as a free-speech issue and insist on their right to march, while opponents might frame that same rally as a public safety threat (ibid). Indeed, frames can be normative, implying a particular policy orientation or mindset. In addition to the economic mechanisms causing consumer behavior change from a tax, the way a tax policy is strategically framed in the public discourse also has implications for consumption habits.

Daniel Kahneman and Amos Tversky’s empirical breakthrough with the development of Prospect Theory in 1979 is a prime example of framing’s potency to affect real-world behavior. A key contribution Prospect Theory offers to social scientists is how framing an issue as a potential gain versus a potential cost (even when the semantics and outcomes are identical) has significant implications for decision-making. In their investigation into this irrational phenomenon, Kahneman and Tversky found people are more risk acceptant when they are in the domain of loss and more risk-averse when they are in the domain of gain. To illustrate this concept, I offer a simple example. First, suppose you are tasked with choosing whether you would rather have a 100% chance of receiving \$94.99 or a 95% chance of receiving \$100. If you were acting rationally—in the theoretical sense, that is—Expected Utility Theory would lead you to choose the latter option since the expected utility is \$95 ( $.95 * 100$ ), which is slightly higher than \$94.99. In fact, Kahneman and Tversky noticed most people were eschewing the riskier, yet

higher potential payout for the certain option of \$95. The fascinating part happens when this hypothetical situation is framed the equivalent, but opposite way. When respondents were forced to choose whether they would rather have a 95% chance of losing \$100 or a 100% chance of losing \$94.99, most opted for the first option, even though they would lose more money (\$95), on average, than if they chose the sure bet of losing \$94.99.

“Frames in communication” are of particular interest to my research on messaging. Like a frame in thought, a frame in communication is “a central organizing idea or story line that provides meaning to an unfolding strip of events, weaving a connection among them. The frame suggests what the controversy is about, the essence of an issue” (Gamson and Modigliani 1987, 143). Iyengar (1991) distinguishes between episodic frames, which focus on the individual/single event, and thematic frames, which focus on the broader issue and trends at large. In application, an episodic frame related to a person’s deservingness to receive welfare might focus on that person’s work ethic, while a thematic frame might focus on the societal, racial, and economic disparities related to finding economic opportunities (Chong and Druckman 2007). The frames I utilize in my survey fall into the “thematic frames” category since the rhetoric they employ serves as a broader commentary on society’s health and wellbeing. Frames can be incredibly persuasive to uninformed people who look to the media for information and knowledge (Bartels 1996).

How campaigns frame potential policy proposals is a burgeoning area for social science research. The consensus among SSB tax advocates is to emphasize how the tax revenue can be earmarked for social and public goods like expanded nutrition and obesity-related programs in the community (Jou et al. 2014). Similarly, in a probability-based survey of 1,206 respondents, Barry, Niederdeppe, and Gollust (2013, 159) discovered people agree the most with the



“argument that sugar-sweetened beverages were the single largest contributor to the obesity epidemic (49%) and that taxing them would raise revenue to be used for obesity prevention (41%).” Research from a variety of disciplines supports the notion that frames act as powerful cognitive shortcuts or “heuristics” that can influence how an individual views a certain policy even when the outcome is identical (Fiske and Taylor 2017; Kahneman and Tversky 1979).

A person’s partisan identification and political ideology are significant factors in how information is absorbed (Campbell et al. 1960). Certainly, the broader category of taxation evokes predictable responses from certain political groups. Indeed, Democrats are more likely to support raising taxes to fund government spending on more liberal policies, while Republicans believe the government should take a more reserved role and restrict taxation to what is absolutely necessary. In Barry, Niederdeppe, and Gollust’s (2013, 159) study, they found respondents’ support of the tax rationales were stratified by party affiliation, “the proportion agreeing with pro-tax messages differed by party affiliation for all arguments except the most popular one, that sugar-sweetened beverages were the single largest contributor to obesity.” That said, attentive policy-makers can craft deliberate frames with hopes of persuading individuals at the margins.

Evidently, framing is an important tool for policy-makers to influence and shift public opinion toward their preferred policies. While economic theories presume that consumer behavior change is a result of changes in a product’s price, and therefore a customer’s willingness to purchase it, there is also another mechanism at work: how a policy is framed in the public discourse. SSB tax rationales have been found to have variable public responses depending on the justification (Gollust et al. 2017).

## **Affective Intelligence and Emotions**

Emotions are powerful schemas that shape the way people approach politics. Over the past few decades, researchers from a number of social science subfields, including social psychology and political science, have found compelling evidence that emotions are a critical orienting mechanism in the brain (see Loewenstein, Baumeister, and Vohs 2007; Marcus 2002). In political science specifically, we are witnessing a shift away from the traditional Rational Choice Theory de-emphasizing the role of emotions in rational human decision-making and toward an approach that embraces the role emotions play in political considerations and decisions.

Previous social science research has focused primarily on generally understanding how emotional appeals elicit certain feelings in television viewers. However, in political science, this research has been mostly limited to candidate and campaign ads, rather than ads related to policy proposals (see Neuman et al. 2007; Brader 2006). This thesis adds a new perspective to the field by analyzing how messages appealing to emotions and affects can impact the public image of a tangible piece of legislation. Erisen, Lodge, and Taber (2014) propose the concept of an emotional “running tally” of affective tags (emotion-laden sentiments). In essence, when an individual encounters a candidate on the debate stage or is exposed to a policy proposal, for example, he codes that encounter with an affective tag that says, “I like this” or “I do not like this.” Eventually, these affective tags accumulate, replacing the intricate, semantic details of the speech or the policy intricacies. Now the individual needs only to rely on the sum of his affective tags—his emotions or gut reactions—to determine how he feels about a candidate or policy. This concept is the basis of Hot Cognition Theory, which challenges traditional assumptions about how people choose which candidates or policies to support. Rather than weighing every

dimension carefully and comprehensively, humans use heuristics (mental short-cuts) and emotions to create these emotional tallies that yield net positive or negative feelings and guide one's vote choice (Lodge and Taber 2005).

In their book, *Affective Intelligence and Political Judgement*, Marcus, Neuman, and MacKuen (2000) introduce the theory of Affective Intelligence, which at its most basic level states that emotions attached to politics are dynamic in that they have both state (contemporary) and trait (permanent) characteristics. By priming certain emotions, actors in the political sphere can galvanize predictable responses in citizens. Furthermore, Marcus and his colleagues introduce the concept of a surveillance system that monitors the environment for “novel and threatening stimuli” (53). Surveillance acts as a subconscious emotional process that has far-reaching effects on habit change and behavior. The authors argue that in addition to provoking behavior change, the surveillance system also invokes greater attentiveness, thoughtfulness, and an increased desire for learning. Applying the surveillance system to politics presents a prime opportunity for persuasion. When an individual is exposed to anxious conditions, three things can occur simultaneously: one, people no longer rely on their political habits, two, there is an increased motivation to learn more information, and three, people can be persuaded to adopt alternative views resulting from their increased open-mindedness (Marcus, Neuman, and MacKuen 2000). In sum, an anxious voter is more pliable to engaging with substitute views.

Subsequent research by Ted Brader (2005, 2006) applies the theory of affective intelligence to evaluate how distinct emotional cues such as enthusiasm, fear, and anxiety provoke certain responses in citizens and either encourage or discourage information-seeking. In general, enthusiasm is more closely related to reinforcing previously held views over persuasion; Brader argues enthusiasm is an appropriate cue for “rallying the faithful” where the faithful

enjoy greater political knowledge. On the other hand, fear and anxiety cues should alarm inattentive citizens and pave the way for persuasion. For these negative affective appraisals—specifically anxiety and aversion—the consensus is that emotional cues stimulating anxiety are more conducive to compromise and cooperation over those that stimulate anger or aversion (MacKuen et al. 2010, 442).

Though I did not structure my survey frames to explicitly prime certain emotions in the way Brader (2005, 2006) or Valentino et al. (2008) did in their studies, several of the message frames I utilize in my survey nevertheless elicit anxiety, articulating how the soda industry uses deceptive and predatory marketing practices to increase sales of sugary drinks or how soda leads to nefarious health outcomes such as obesity and type 2 diabetes. A few of the messages evoke enthusiasm about the potential health benefits that would result from an SSB tax, namely, that the tax revenue would be put back into the community to fund health programs or that the tax will lower sugary drink consumption. When someone reads a frame describing all the tangible, positive implications a tax would have on one's community, emotional appeals theory predicts that they would become more amenable to the proposal (Brader 2005).

Arguments that emphasize the alarming nature of the obesity epidemic and childhood obesity specifically should stoke anxiety in the respondent, which theories of affective intelligence argue will make them engage with “critical consideration of the alternatives” (Marcus, Neuman, and MacKuen 2000, 63). A tax on sugar-sweetened beverages as one strategy to combat the obesity epidemic can be thought of as one of these “alternatives.” Without framing the arguments or priming these emotions—meaning without giving any context about the direness of the obesity epidemic or excessive sugar consumption—people may not be willing to support seemingly arbitrary policies like SSB taxes without adequate background. Indeed, it

behooves us to empirically measure what effect these message frames laden with emotions have on respondents. Consequently, public health advocates and policy-makers will have a more informed sense of how to structure their campaign for an SSB tax in order to generate as much public support as possible.

In my survey, I present several pro and anti-SSB tax frames, each emphasizing a particular argument about why such a tax should or should not exist. While these specific frames will be described in depth in the forthcoming research design, many of the pro-tax frames highlight the positive effects of an SSB tax, namely decreasing sugary beverage consumption and using the tax revenue to fund obesity and diabetes prevention programs. In contrast, the anti-SSB tax frames focus on encroachments to individual freedom and the regressive nature of SSB taxes. These message frames have important implications for SSB tax policy-making. In designing their campaigns for an SSB tax, policy-makers should pay careful attention to the rhetoric and tone used in their messaging strategies to maximize support for this tax.

### **Lessons from Past SSB Tax Campaigns**

To illustrate the power of frames and framing, I offer two case studies of cities that adopted SSB tax legislation, one with established success centered around a salient health frame (Berkeley) and one with modest success that utilized non-health, revenue frames (Philadelphia).

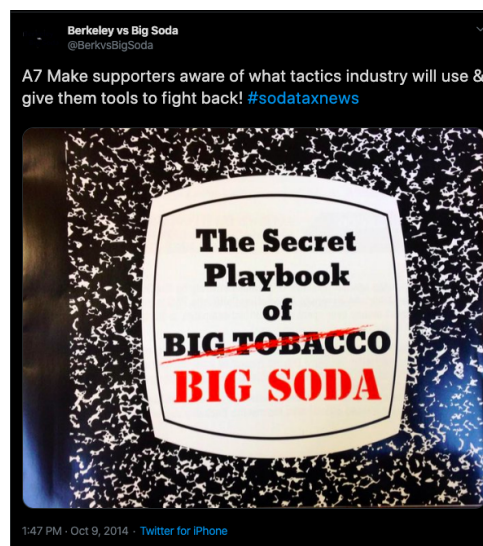
#### **Berkeley, California**

The first city is Berkeley, California: a liberal city located on the east shore of the San Francisco Bay. In 2014, Berkeley became the first US city to implement a tax on sugary beverages. Measure D supporters assembled a vast and diverse network of health organizations,

community and education organizations, political organizations, grocers and restaurants, and unanimous endorsement from the City Council and the School Board. The Yes on D campaign employed grassroots techniques to amass community support. At the polls, the results were astounding. Despite the ABA sinking \$2.4 million on anti-tax propaganda, Berkeley's voters passed Measure D establishing a penny-per-ounce tax with more than 76% in support (Ballotpedia 2014).

Berkeley's success can be attributed to its effective framing and campaigning strategies. The pro-tax campaign, called Berkeley vs. Big Soda, created a savvy social media plan that highlighted the soda industry's rapacious practices and its disregard for basic facts about health and sugary beverage consumption (Somji et al. 2016). The pro-tax campaign also emphasized the similarities between Big Tobacco and Big Soda to elicit the familiar image of the naïve consumer at the mercy of the evil, profit-seeking corporation. Figure 1 is a screenshot of a campaign mailer the campaign tweeted comparing the similar tactics the two industries use to rebut their role in cancer and obesity.

**Figure 1: Tweet by Berkeley's Pro-Tax Campaign**



An analysis of media content and engagement during the campaign by Somji et al. (2016) shows that Berkeley’s pro-tax campaign focused on the health harms caused by consuming sugary drinks (22% of arguments on Twitter and Facebook centered around this frame). One quote from a mailer read, “the drinking of soda and other sugar laced beverages is a leading cause of diabetes among young people” (ibid, 6). Moreover, the researchers found that adults and children of color were depicted in half of the pro-tax campaign materials (ibid, 9). Through these ads, it is clear the pro-tax campaign made it a priority to increase minority turnout on Election Day.

Figure 2 shows creatives from a real Healthy Berkeley ad campaign. The tops of the ads begin with an encouraging, collective invitation to drink water—an effort to establish a social norm of drinking water instead of sugary beverages. The images include pictures of diverse, healthy-looking Berkeley residents holding reusable water bottles and smiling. The bottom of the ad presents a warning that sugary drinks can lead to type 2 diabetes, obesity, and tooth decay.

**Figure 2: Healthy Berkeley Campaign Materials**



As discussed in the previous section, since 2010’s adoption of Prop 26, California now requires a supermajority vote to pass special taxes dedicated to funding specific purposes.

Though Measure D coincidentally did surpass this threshold with 76% in support, the city council had previously chosen to design the tax as a general tax where the revenue goes straight into the Berkeley general fund. That said, an analysis of the tax implementation found that “the funds have largely been spent on public health to date” (Bennet 2019, 4). According to the Healthy Berkeley website, which is the organization that administers the SSB tax revenue, the City Council has allocated \$5 million since 2015 from the General Fund to fund a variety of community-based programs aimed at reducing SSB consumption and promoting healthier alternatives (Healthy Berkeley 2015). From its implementation in 2015 through the fiscal year 2019, the tax has raised over \$6.6 million in revenue.

That said, since this tax passed as a general measure without the necessary supermajority support, and thus the dedicated funding, not every dollar goes toward SSB prevention and health programming. A companion report to the Sugar-Sweetened Beverage Product Panel of Experts (SSBPPE) submitted to the mayor and City Council reads,

It is true that more revenue from this measure has been deposited into the general fund than has been allocated to support the SSB programs. While it is entirely appropriate for the SSBPPE to ask that the general fund allocation for these programs be increased, it is also important to remember that it is not a dollar for dollar revenue/expense relationship between the SSB revenue and the allocation of funds to support the work of the SSBPPE, as would be the case were it a special tax. Likewise, it is difficult to know if the actual revenue collected through this tax is unallocated as stated in the report. (Williams-Ridley 2019)

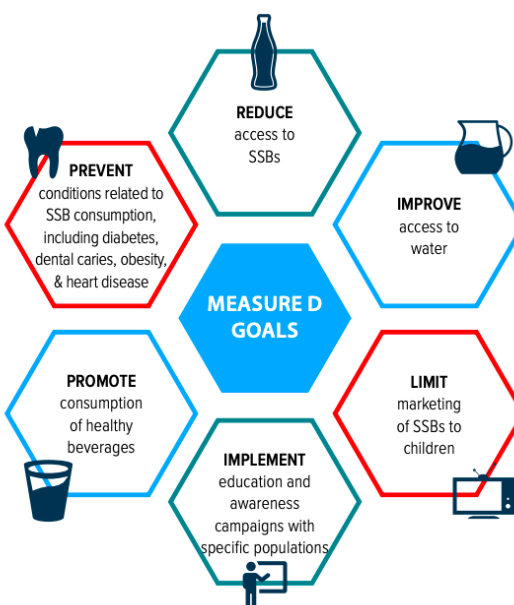
The Healthy Berkeley program recipients include cooking and gardening programs, youth organizations, educational programs, and comprehensive behavior change programs.

Figure 3 from a Healthy Berkeley Program evaluation of the first year of the SSB tax exhibits the program’s goals in more detail. One grantee is the Berkeley Unified School District which uses the money to provide healthy cooking and eating classes at 17 schools, as well as designing new curricula for classrooms and after-school programs. Another grantee is the YMCA – Central Bay



Area Diabetes Prevention Program, which has used the funds to offer an evidence-based diabetes prevention program to 99 Berkeley residents, free of charge. Recent grants for fiscal years 2020 and 2021 include five new community agency recipients. One of these is the Bay Area Community Resources' Healthy Options at Point of Sale (HOPS) project which trains members to "increase knowledge of healthy eating, food justice, and the role of the retail food environment in contributing to diet-related diseases" as well as working to decrease the placement and marketing of SSBs at store checkouts.<sup>4</sup>

**Figure 3: Healthy Berkeley Program Goals**



Berkeley's success can, in part, be attributed to its fastidiousness in funding impressive and competent programs that have demonstrable success. Though the tax was not originally outlined as a special tax imposed with specific purposes, it has nevertheless reached thousands of people and has had an enormous impact on the SSB consumption rates in Berkeley residents

<sup>4</sup> See <http://www.healthyberkeley.com/funded-organizations-fy2020-and-fy2021-4> for the full list of new grant recipients for fiscal years 2020 and 2021.

(Silver et al. 2017; Lee et al. 2019). This is not to mention the positive physical and mental health effects resulting from the decreased SSB consumption and increased knowledge and practice of healthy habits. Indeed, Berkeley's decision to use the tax revenue to fund health and education programs that directly address the city's health crises could explain the overwhelming support the tax received on Election Day and continues to receive today.

### **Philadelphia, Pennsylvania**

In contrast, the rationale Philadelphia mayor Jim Kenney used for justifying the city's more comprehensive sugar and artificially sweetened beverage tax did not center around using the tax revenue to address the very health issues soda and other sugary drinks cause. Rather, Mayor Kenney explicitly framed the bill as a means to provide the necessary funding for universal pre-Kindergarten. In other words, the Philadelphia Beverage Tax was crafted for the sole reason of raising revenue for pre-K and other community development programs that were not necessarily health-related.

Instead of emphasizing the health benefits the city would enjoy from universally reduced sugar consumption, Kenney was quite transparent in explaining that the money would go towards funding non-health programs the city historically could not afford. Kane and Malik (2019, 42) differentiate between Kenney and the previous Philadelphia mayor, Michael Nutter's strategies for framing the tax, "Mayor Kenney and his administration initially focused the Tax's frame entirely upon the transparent funding of programs to enhance the Philadelphia community and provide universal prekindergarten to all children in Philadelphia. This appeared to be a calculated move. Mayor Nutter twice failed to pass an SSB tax in Philadelphia when employing health improvement and budget deficit resolution frames."

In fact, Kenney's strategy for framing the SSB tax as a non-health intervention upended the traditional pro-SSB tax advocate's playbook, which argues for SSB taxes in the name of public health. While Kenney echoed Berkeley's sentiments that the money would fund tangible community programs, he strayed from using the normative health messages Berkeley utilized in its campaign materials. Kenney acknowledged in an interview that, "If you want to tax something and people know where the money's going to go, then it's easier for them to get behind it" (Cohen 2016). Moreover, he noted that his explicit revenue frame, rather than a health frame, was the reason why the tax passed, "Twice before [a health frame] was used in Philadelphia and it was not successful. It was used in New York and it was not effective," said Kenney, adding that while the health benefits of a tax are not "less important," they are less tangible" (ibid). Kenney and his advisors strongly believed the chances the tax would pass were much higher if it was framed not as an intrusion on the residents' personal eating and drinking behaviors, but as a way to finance universal pre-K and other important city expenditures. Kenney's non-health frame also welcomed debate on the merits of universal pre-K, shifting the conversation to focus on how SSB taxes could fund evidence-based education policies, rather than deter individuals from drinking what they want.

By employing a non-health frame and being very transparent that the tax revenue would fund pre-K, Kenney effectively side-stepped the "nanny state" charges that New York City mayor Michael Bloomberg faced when he proposed his soda ban in 2012. Since Bloomberg framed his signature Portion Cap amendment as a strategy to address the city's increasing prevalence of obesity, the soda industry launched its own campaign accusing Bloomberg of trying to police American diets (see Figure 4). Because Kenney deliberately chose not to connect his tax to the public health discourse, the ABA had to change its playbook, too. Instead of

stressing its conventional angle that soda taxes represent the government infringing on Americans' private lives, the ABA ran television ads focused on how the city's budget surplus from the past year could fund pre-K instead of a new beverage tax (Brennan 2019).

**Figure 4: Center for Consumer Freedom Bloomberg Ad**



In June 2016, the city council voted 13-4 to approve a 1.5 cents-per-ounce tax on sugary and diet drinks after a long and vicious battle between industry lobbyists and SSB tax advocates. The American Beverage Association spent over \$10.6 million fighting the tax in Philadelphia (Nadolny 2016). The pro side—backed by Mayor Kenney, Mayor Michael Bloomberg, the American Heart Association, and the American Federation of Teachers—spent only \$2.5 million campaigning for the tax (Martinez-Belkin 2016). Cawley et al. (2018) found that the tax reduced SSB purchases by 8.9 ounces per shopping trip in Philadelphia and that it also reduced adults' frequency of regular soda consumption by 10.4 times per month. The authors also found evidence of cross-border shopping wherein Philadelphia residents shopped for SSBs outside of

Philadelphia. However, they explain, "...the tax did not seem to change whether Philadelphia residents shopped outside of the city, but Philadelphia residents who already shopped outside of the city were more likely to continue doing so after the implementation of the tax" (16). The percentage of Philadelphia residents who already reported shopping outside of the city rose by 29 percentage points once the tax went into effect (ibid, 15).

One important point to reiterate is that the beverage tax passed by a city council vote, not as a ballot measure voted on by the public, as was the case in Berkeley. Indeed, while Kenney's explicit non-health frame ultimately led to the successful passage of the Philadelphia Beverage Tax, it is unclear how this frame would have fared if mass public support was necessary. That said, one public opinion poll (N=1,000) administered by Temple University's Institute for Survey Research and BeHeardPhilly (2016) found nearly 59% of respondents favored the tax proposal, and 84% said it was very important for all children to attend pre-K.

## **Hypotheses**

The research question I seek to answer through my survey experiments is which pro-SSB tax frame(s) is/are most effective in generating support for a tax on sugar-sweetened beverages, and how can public health officials and advocates best communicate these frames in their campaigns?

My general theoretical framework suggests that exposure to SSB tax frames with specific rhetoric and emotion affects support for these taxes. I will use theories of framing, affective intelligence, and emotions to formulate my hypotheses. In my first survey, I expose participants to eight pro-SSB tax message frames with the goal of discovering which ones resonate the most with my sample. Table 2 displays the message frames shown to all respondents. The results from

this first survey will give me a preliminary idea about how to structure the research design for my second survey experiment, where I expose respondents to the two message frames that received the largest coefficients in the regression on support for SSB taxes. Specifically, I am interested in empirically determining which message frame is the best predictor of SSB tax support. The results will be useful for policy-makers and pro-tax advocates in designing their tax campaign and general political strategy.

**Table 2: Summary of Message Frames**

	Frame
1	Revenue from a tax on sugar-sweetened beverages can be used to fund health and obesity-related programs.
2	Sugar-sweetened beverage consumption is associated with obesity and health problems like type 2 diabetes.
3	Sugar-sweetened beverages contain an extremely large amount of sugar and calories.
4	Taxing sugar-sweetened beverages can lead to lower consumption.
5	The soda industry uses deceptive practices to increase sales at the expense of people's health.
6	The soda industry takes advantage of minorities and children with their advertising and marketing.
7	The health consequences of consuming sugar-sweetened beverages hurt poor people more than a tax on sugar-sweetened beverages.
8	Taxing sugar-sweetened beverages will reduce consumption just like taxing cigarettes did.

Moreover, research indicates that public and political support are highest when an SSB tax is framed as a mechanism to raise money for social and public goods (Jou et al. 2014) and when SSB taxes are linked to specific health outcomes (Gollust et al. 2017). The framing strategies used in the Berkeley and Philadelphia SSB tax campaigns also offer illuminating findings about what sorts of rhetoric and frames are most effective in shoring up support for SSB taxes. In Berkeley's case, the pro-tax campaign highlighted the benefits of the tax revenue and framed the tax as a means of improving residents' health. In Philadelphia, however, Mayor Kenney framed the tax as a funding source for universal pre-K and other budget items; he deliberately avoided linking the tax as a way to combat rising rates of obesity and other health-related diseases. Indeed, there is some precedent in this strategy. In interviews with Richmond, California voters considering an SSB tax back in 2012, Jou and colleagues (2014, 851) found "voters reluctant to support a measure seen as proposed and promoted by outsiders ("do-

gooders” from “outside the community” telling them they were “obese and needed to get rid of sodas”).”

With these examples in mind, I formulate my first hypothesis:

H<sub>1</sub>: The most effective frames in generating support for a tax on SSBs will be those that associate SSB taxes with concrete policy or behavioral outcomes. Namely, frames one, four, and eight linking SSB taxes to tangible health outcomes, such as funding obesity/public health programs or lowering SSB consumption will resonate the most with respondents. Respondents who find these frames believable are more likely to vote in favor of SSB taxes.

While taxes on sugary drinks may not be the epitome of a politically polarized issue, support and opposition for interventionist public health policies generally segregate by partisanship and ideology. Even without salient partisan cues, motivated reasoning theory suggests that in the presence of discrepant information, individuals will seek to confirm or maintain their previous views (Strickland, Taber, and Lodge 2011). This theory posits that people have affective responses to new information based on their prior beliefs and attitudes. In my surveys, the underlying message in each frame should activate motivated reasoning processes. Thus, I hypothesize that support for SSB taxes is moderated by an individual’s party identification, ideology, and attitude toward government spending for public health policies.

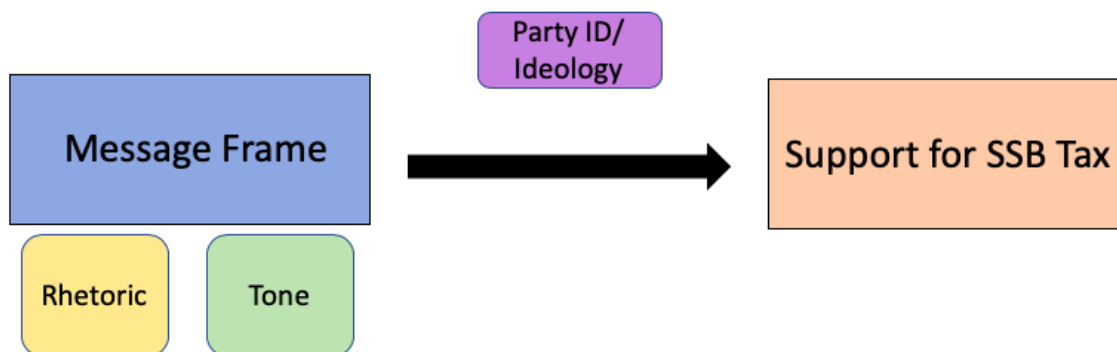
I propose that the relationship between the message frame and support for an SSB tax will be moderated by one’s attitude toward interventionist government action in public health issues. In other words, if someone strongly feels the government has an obligation to safeguard the physical and emotional health of its citizens, the frame should have a stronger effect on their support for this tax. On the other hand, if a person takes the position that the government should play a minimal to non-existent role in the health choices of Americans, then these tax frames should have a very small effect on generating support for this tax since they are predisposed to

not like them. Since party ID is a strong predictor of how much government intervention a person favors, I thus formulate my second hypothesis:

H<sub>2</sub>: There will be a strong association between support for sugar-sweetened beverage taxes and partisan affiliation/ideology. Namely, Democrats (liberals) will be more likely to support a tax on SSBs both before and after exposure to the pro-SSB tax frames. In contrast, Republicans (conservatives) will resist the pro-SSB tax arguments, maintaining their longstanding opinions against interventionist government policies and taxation.

Figure 5 shows the general causal model for the survey where party ID/ideology is a moderating variable on the relationship between message frame and support for an SSB tax.

**Figure 5: Causal Model of Framing Effects on Support for SSB Tax**



### Survey Methodology

#### Research Design

To investigate my research question about which sorts of messages and frames are most effective in generating support for an SSB tax, I conducted an online nationally representative survey of American adults (N=800) distributed through YouGov. I collected the data over the course of three days, from November 23rd to November 25th of 2019. Before going into the field, the survey was pilot tested for usability and pre-tested on friends and family. YouGov



interviewed 825 respondents who were then matched down to a sample of 800 to produce the final dataset. The respondents were matched to a sampling frame on gender, age, race, and education based on the full 2017 US Census Bureau's American Community Survey (ACS) 1-year sample with selection within strata by weighted sampling with replacement.

The survey began with a number of questions intended to gauge the respondent's level of political participation, level of concern for various public health issues, and attitude toward interventionist public health policies. This information will be valuable for creating scales and control variables in the forthcoming data analysis. The survey and associated methods I used were found by the University of Michigan Institutional Review Board (IRB) of Health and Behavioral Sciences in July 2019 to be exempt from additional review (HUM00164695).

The second portion of the survey prompted respondents to express their attitudes towards various public health policies. These questions included a range of interventionist policies from requiring restaurants to list calorie counts on their menus to taxing sugary drinks. I consider requiring calorie counts on menus to be a mildly interventionist policy since it does not technically cost the consumer anything. On the other hand, policies such as sugary drink taxes and size caps undeniably obstruct the consumer's free will and cost him or her more money. The conversation around government intervention in public health domains is fraught, but it is also nuanced—many people may support calorie counts on menus but oppose SSB taxes. Thus, these questions offered valuable information about where people may draw the line on government intervention to combat public health crises.

I then posed an informed ballot question that randomized the order of a common pro and con-SSB tax argument.<sup>5</sup> The pro-SSB tax argument highlighted how such a tax would curb rising rates of obesity and type 2 diabetes and how the tax revenue could fund community health programs. In contrast, the con-SSB tax argument echoed the conservative sentiment that such taxes reflect unjust government intrusion into citizens' personal lives and will not be effective in solving obesity. Based on these two arguments, I probed respondents to state whether they would vote in favor of or against a tax on sugar-sweetened beverages.

The preceding question battery asked respondents to rate how believable they found randomly ordered pro and anti-SSB tax message frames. I used this question battery to operationalize my dependent variable of support for the SSB tax, where the response "Very believable" on the pro-SSB tax frames corresponds to the highest level of support for this tax. Likewise, an answer of "Not at all believable" on the anti-SSB tax frames indicates high support for the tax.

Next, I asked a series of personality questions to obtain a more robust picture of my sample's characteristics and attitudes. These questions included asking respondents what they worried most about, how much they used social media, how they described themselves, and if they considered themselves overweight. These questions allowed me to create distinct personality profiles for each respondent, which I then used to make inferences about their support for SSB taxes.

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<sup>5</sup> "Sugar-sweetened beverage" is the accepted terminology when referring to these sorts of taxes. To ensure respondents understood what I meant by sugar-sweetened beverages, I tried to be as explicit as possible by including common SSBs in the description: "like non-diet sodas, sports and energy drinks, and flavored waters."

The final battery consisted of a number of demographic questions such as highest level of education, gender, age, race and ethnicity, religiosity, and party ID. The complete survey questionnaire can be found in Appendix A.

## **Message Testing**

The purpose of this study is to test a variety of message frames about why a tax on SSBs should exist and to gauge people's attitudes towards those messages. There is some debate about how best to test the efficacy of message frames. One method is to expose respondents to frames and ask them how convincing they find the messages. The problem with this language of "convincing" is that the survey researcher is effectively asking their respondents to do the analysis for them. In my case, I am interested in the independent impact of people's assessments of the believability of each message frame on their support or opposition toward a soda tax. Therefore, I chose to use believability scales as the response option to the message frames since finding out whether or not people think the message frames are true is at the heart of my research question. People can tell if message frames are believable or not, but asking them how convincing the frames are requires them to engage in a higher-level thinking process where they are asked to make causal judgments. "Convincing" implies trying to move respondents, while "believable" is just whether the respondent believes the statement is true or not. Asking about believability will illustrate which messages have the greatest impact on respondents, and in effect, illustrate which message frames are most likely to work.

## **YouGov Methodology**

YouGov is an international research data and analytics group with a proprietary panel of over 8 million people globally; the US panel has 2 million respondents alone. According to its website, the panel represents all ages, socio-economic groups, and other demographic types, which allows for the creation of nationally representative online samples. Panelists are regularly invited by email to participate in surveys and accumulate points to be redeemed for gift cards.

Unlike some survey research firms that rely on probability-based sampling such as Pew Research Center, YouGov uses a non-probability-based methodology. One advantage of YouGov's large opt-in panels is the ability to choose representative subsamples of the population based on matching demographics to the Current Population Survey (CPS) and the American Community Survey (ACS), both high-quality samples conducted by the US Census Bureau. YouGov consistently outperforms its competitors on accuracy and is frequently used in social science research.

## **Survey Results**

### **Demographics**

In this section, I will first undertake a rich descriptive review of how people think about America's declining health and the possible solutions. The categories are broken down by both traditional demographics such as age, race, and education, as well as fundamental political variables like party identification and ideology, and psychological variables. This review will provide a detailed picture of the current status and perceptions of public health in America. Moreover, analysis into this rich survey data will also provide insight into the groups of people

SSB tax proponents should target when developing a campaign strategy and what some possible message frames might be.

In this section, I describe the demographics of my survey's sample of 800 American adults. All proportions are weighted to known 2017 ACS population targets. Table 3 provides select descriptive statistics of the respondents. The survey has a gender distribution of 48.7% male and 51.3% female. The average age is 49.8 years old. The sample is predominantly White (64.1%) and over-represents Democrats (41%). 28% possess a college or post-grad degree, 46.6% are married, and 33.5% work full-time. A comprehensive document of the survey topline results can be found in Appendix B.

**Table 3: Descriptive Statistics of Survey Respondents (N=800)**

	Weighted n	Weighted %
<b>Age</b>		
18-29	154.9	19.4
30-44	205.5	25.7
45-54	104.6	13.1
55-64	156.4	19.6
65+	178.5	22.3
<b>Gender</b>		
Male	389.2	48.7
Female	410.8	51.4
<b>Race</b>		
White	512.9	64.4
Black	95.8	11.5
Hispanic	125.2	16.2
Asian	31.4	2.8
Native American	10.9	2.0
Mixed	16.0	2.4
Other	6.7	0.6
Middle Eastern	1.1	0.3
<b>Education</b>		
No HS	66.5	8.3
HS graduate	252.1	31.5
Some college	171.0	21.4
2-year	86.3	10.8
4-year	141.5	17.7
Post-grad	82.7	10.3
<b>Party ID</b>		
Democrat	290.6	41.0
Republican	209.9	29.6
Independent	208.8	29.4
<b>Family Income</b>		
Less than \$50, 000	320.3	40.0
\$50,000-\$100,000	224.5	28.1
Over \$100,000	133.3	16.7
Prefer not to say	121.8	15.2
<b>Marital Status</b>		
Married	372.9	46.6
Separated	20.8	2.6
Divorced	99.3	12.4
Widowed	34.5	4.3
Never married	225.8	28.2
Domestic/civil partnership	46.7	5.8

For consistency, I compared the results of a number of common survey questions from my survey with similar ones from larger sample surveys conducted that same week from YouGov, FiveThirtyEight, Gallup, and RealClear Politics (RCP). From my survey, 41% said they approved of Trump's job performance (combined strongly approve and somewhat approved), while 53% disapproved (combined strongly disapprove and somewhat disapproved).

6% said they did not know. These results were consistent with several national polls asking the same question on November 23rd or a couple days after: YouGov (42% approve/51% disapprove), FiveThirtyEight (42% approve/54% disapprove), Gallup (43% approve/54% disapprove), and RealClearPolitics Average (44% approve/53 disapprove)<sup>6</sup>. Likewise, 35% of respondents said the country is going in the right direction, while 57% said the country is going off on the wrong track. This is also consistent with other national studies which have right direction in the low to mid-thirties and wrong track in the upper-fifties.<sup>7</sup>

## Survey Results and Discussion

I also generated crosstabs for each question and demographic variable. The toplines can be found in Appendix B. Though Republicans and Democrats equally rate childhood obesity as a “very big problem” (36.2% Democrat and 35.2% Republican), their views diverge when it comes to supporting public policies that would address these issues. Across the board, Republicans are, on average, 30.1 percentage points less likely to say they would support government spending on various public health initiatives ranging from the more ambiguous “healthier food in schools” initiative to the more recognizable policy of “food assistance benefits.” Compared to Democrats, Republicans are also overwhelmingly less likely to vote for interventionist public health ballot measures such as SSB taxes, requiring chain restaurants to list calorie counts on menus, banning TV advertising of unhealthy food during children’s programming, and limiting the size of sugary drinks with an average difference of 22.3 percentage points. This is a fascinating finding that demonstrates just how polarized Democrats and Republicans become on an issue when the

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<sup>6</sup> See [https://www.realclearpolitics.com/epolls/other/president\\_trump\\_job\\_approval-6179.html](https://www.realclearpolitics.com/epolls/other/president_trump_job_approval-6179.html) for a number of national poll results measuring Trump job approval that week.

<sup>7</sup> See [https://www.realclearpolitics.com/epolls/other/direction\\_of\\_country-902.html#polls](https://www.realclearpolitics.com/epolls/other/direction_of_country-902.html#polls) for a number of national poll results measuring the country’s direction that week.

question is politically salient. The keyword in the question battery on public health interventions of “government spending” certainly acted as a cue for Republicans in making their choice.

These results are consistent with the classic Michigan Model originally posited in the seminal book on voting behavior in the US, *The American Voter* (Campbell et al. 1960). The Michigan Model theorizes that party identification is the strongest predictor of vote choice. Accordingly, those who identify as Republicans will adopt their party’s well-established stance on favoring small government and, thereby, vote against measures that would threaten this major tenet of the conservative movement. To investigate just how big a role party ID plays in one’s response to whether they would vote for certain public health interventions, I fit a generalized linear model specifically for complex survey data on support for SSB taxes with party ID as the sole predictor. As seen in Table 4, the coefficient for party ID is highly significant ( $p<0.01$ ). Substantively, this means as one goes from identifying as a strong Democrat to a strong Republican, her support for a tax on SSBs *declines* by 0.344 points where 0 indicates she is against an SSB tax and 1 means she is in favor of it.

**Table 4: Regression on Party ID**

	<i>Dependent variable:</i>
	Support for SSB Tax
Party ID with Leans	-0.344*** (0.042)
Constant	0.559*** (0.026)
Observations	771
Log Likelihood	-413.579
Akaike Inf. Crit.	831.157
<i>Note:</i>	* $p<0.1$ ; ** $p<0.05$ ; *** $p<0.01$



Survey research has established low support for SSB taxes, in general (Gollust, Barry, and Niederdeppe 2014). In my survey, I embedded three separate questions designed to measure support for an SSB tax throughout the questionnaire. The first question appeared in an early question battery—before any of the message frame “primes”—and asked respondents whether they would support a variety of public health ballot measures. The second question took the form of an informed ballot question proposing two common views—a randomly ordered pro- and anti-SSB tax argument—then prompted respondents to answer whether they would vote in favor of or against such a tax. Finally, the third question was a repeat of the first, but it appeared after the battery of SSB tax message frames. The distribution of responses (in favor, against, and undecided) were consistent across all three questions. While support for an SSB tax increased 4.4 percentage points from the pre-message frames question to the post-message frames question, this is not a significant increase ( $p=0.316$ , one-tailed test). To operationalize my main dependent variable of support for an SSB tax, I combined these three questions and scaled the responses on a 0 to 1 scale with 0 indicating one is against an SSB tax and 1 indicating one is in favor of an SSB tax. The scale achieved a Cronbach’s alpha coefficient of 0.93, which is a strong measure of reliability.

My research question is not involved with trying to change attitudes towards SSB taxes, and instead is an attempt to discover which message frames might resonate with potential voters. That said it is worth noting that support for SSB taxes received considerably low support: 41.8% of Democrats and 21% of Republicans are in favor of a tax on SSBs asked in the informed ballot question.

To address my overarching research question about which message frames generate the most support for a tax on SSBs, I first began by scaling the responses to the frames where “not

believable at all” was coded as 0 and “very believable” was coded as 1. I discussed why I chose to use believability as the terminology for the responses on page 50. Table 5 shows the result of eight generalized linear regressions, each with one message frame and a control for party ID.

The frames corresponding to each number are outlined in Table 2. Since the literature has established how party identification is the best single predictor of voting behavior, I included a seven-point scale for party ID as a control in each regression (see e.g., Bartels 2000; Campbell et al. 1960). Again, the party ID scale goes from strong Democrat to strong Republican and includes those who lean toward both parties.

**Table 5: Summary of Regressions on Message Frames**

	<i>Dependent variable</i>							
	Support for SSB Tax							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Message Frame	0.597*** (0.035)	0.406*** (0.042)	0.322*** (0.052)	0.577*** (0.042)	0.447*** (0.045)	0.480*** (0.043)	0.404*** (0.045)	0.595*** (0.037)
Party ID with Leans	-0.135*** (0.040)	-0.283*** (0.041)	-0.316*** (0.041)	-0.194*** (0.040)	-0.219*** (0.042)	-0.193*** (0.043)	-0.230*** (0.043)	-0.207*** (0.037)
Constant	0.129*** (0.031)	0.221*** (0.040)	0.283*** (0.046)	0.197*** (0.032)	0.221*** (0.040)	0.202*** (0.039)	0.260*** (0.039)	0.222*** (0.028)
Observations	771	771	771	771	771	771	771	771

*Note:*

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Substantively, the results of the eight linear regressions indicate that as a frame goes from least believable to most believable, support for a tax on sugar-sweetened beverages increases by the corresponding coefficient on the message frame. For example, the first message frame that revenue from a tax on sugar-sweetened beverages can be used to fund health and obesity-related problems obtained a coefficient of 0.597. Indeed, this means that support for an SSB tax for someone who finds this frame very believable is 0.597 points higher than if they find the frame

not believable at all. This is an increase of over half of the entire scale. An increase of 0.50 means a person goes from being against the SSB tax to undecided, or equivalently, going from undecided to being in favor of the SSB tax.

Table 6 shows the results from a subsequent linear regression on the first message frame with controls for party ID and education. Education has a significant impact on support for SSB taxes ( $p < 0.01$ ): a person with a postgraduate degree is 0.123 points more likely to support a tax on SSBs, given they find message frame 1, that revenue from the tax can be used to fund health and obesity-related problems, highly believable.

**Table 6: Regression on Message Frame 1 with Controls**

	<i>Dependent variable:</i> Support for SSB Tax
Revenue from a tax on sugar-sweetened beverages can be used to fund health and obesity-related	0.593*** (0.036)
Party ID with Leans	-0.124*** (0.039)
Education	0.123*** (0.047)
Constant	0.069* (0.037)
Observations	771
Log Likelihood	-284.115
Akaike Inf. Crit.	576.229
<i>Note:</i>	* $p < 0.1$ ; ** $p < 0.05$ ; *** $p < 0.01$

Across all eight message frames, the frames that resonated the most with respondents are the first, fourth, and eighth. Each of these frames contains a concrete policy or behavioral outcome: the tax revenue will fund health programs and that the taxes will lead to lower consumption. It appears that people relate strongly to rationales linking the tax and its revenue to

tangible results that would improve public health. These findings are in line with Gollust et al. (2017, 51) that “messages that link SSB tax to specific health outcomes may be more effective.”

On the other hand, respondents related least to the frames that associated SSB consumption with a health-related illness like cancer and type 2 diabetes. Frame 7, that the health consequences of consuming SSBs hurt poor people more than a tax on SSBs, in particular, had a very low coefficient. The reasons for this can perhaps be explained by Philadelphia mayor Kenney’s decision to avoid using any health rationale for his city’s ASB and SSB tax. Again, Mayor Kenney believed the best route to passing a tax on artificial and sugar-sweetened beverages to raise money for universal pre-K and improvements to parks and schools was to highlight the very programs the tax would fund, instead of the personal and physical health consequences of soda consumption. Americans, especially, do not want the governments to make public policies based on judgments of their personal lives and the choices they make when it comes to what food they put in their bodies. The United States of America’s credo enshrines the values of liberty, privacy, and agency. Understandably, a “sin” tax on sugary drinks with a frame that discusses how bad these beverages are might not be a great strategy, especially for those who enjoy—or may be addicted to—sugary drinks.

Empirically, it would seem a frame that rejects commenting on the health aspects of sugary drinks or SSB taxes, and instead focuses on the tangible benefits such a tax might have on society is most conducive to generating support for these taxes. This is a substantial finding. Indeed, in Berkeley, the pro-SSB tax campaign emphasized that the revenue generated by the tax would directly fund health promotion programs, which it did with demonstrable success (Falbe et al. 2016). Healthy Berkeley—a website run by the city’s Public Health Division that provides the

public with additional information about the distribution of the SSB tax revenue—offers this success story on its website:

“[An] African American [woman] in her 60s lived 40 years in Berkeley. She voted for Berkeley’s soda tax after some hesitation. She went to the doctor, and was told she has pre-diabetes. She was referred to the 16-week Diabetes Prevention Program at the YMCA. She went and learned how to eat differently. She asked: “How much does it cost?” The YMCA said “Nothing.” She asked “Why?” “Because the City (of Berkeley) is paying with the soda tax money (through the City’s General Fund)”. She went back to the doctor. Her blood sugar had gone down. And it is still down.” (Healthy Berkeley 2015).

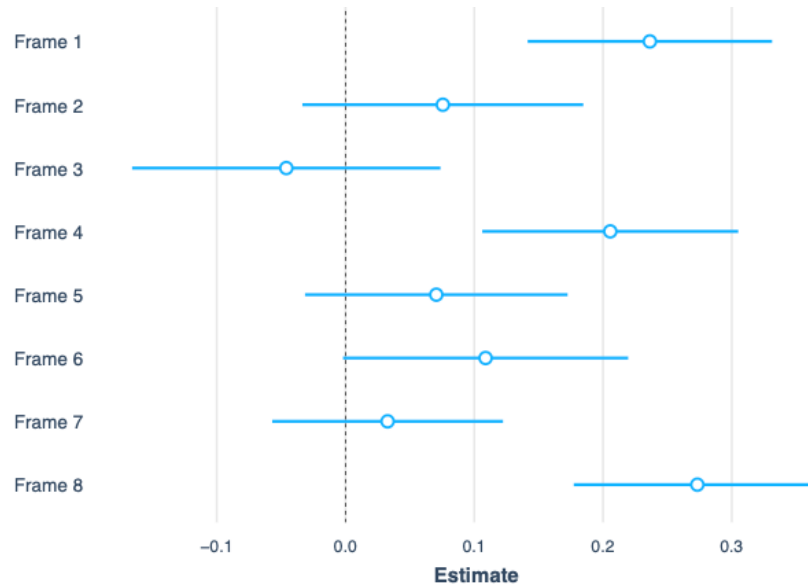
In contrast, Philadelphia has struggled to generate revenue with its SSB tax. One reason for this might be the rationale the government used to frame the tax. Philadelphia Mayor Jim Kenney explicitly described the tax as a measure to raise revenue for the city’s general fund, as opposed to a health initiative targeted at reducing obesity and the prevalence of type 2 diabetes, “The ancillary benefit to this will be healthy choices, but it's not the purpose. The purpose of imposing this 3-cents-an-ounce sugar-sweetened beverage tax is to allow people to get their kids educated and move them out of poverty into tax paying citizens” (PBS NewsHour 2016). Instead of dedicating the SSB tax revenue to fund obesity prevention, Philadelphia framed the tax as a way to obtain money for pre-Kindergarten education. In practice, the SSB tax only awards 29.3% of its revenue to local pre-K programs, the rest goes towards funding community schools and revitalizing parks, recreation centers, and libraries or is housed in the General Fund (Rhynhart 2019; McCrystal 2019).

A multiple linear regression analysis with each message frame as a predictor illustrates that frames 1, 4, and 8 were highly significant in predicting support for an SSB tax ( $p < 0.01$ ). Adding additional controls for gender and education maintain that frames 1, 4, and 8 still have the largest coefficients (see Table 7). Figure 6 illustrates the various frames’ coefficients and their corresponding 95% confidence intervals for the full model with all controls. Again, this is

persuasive evidence that message frames with rhetoric highlighting the causal, health-centered implications of an SSB tax generate the most support for such a tax.

**Table 7: Multiple Linear Regression on Message Frames with Controls**

	<i>Dependent variable:</i>
	Support for SSB Tax
Frame 1	0.236*** (0.048)
Frame 2	0.076 (0.056)
Frame 3	-0.046 (0.061)
Frame 4	0.206*** (0.051)
Frame 5	0.071 (0.052)
Frame 6	0.109* (0.056)
Frame 7	0.033 (0.046)
Frame 8	0.273*** (0.049)
Party ID with Leans	-0.064* (0.038)
Gender (Female)	-0.005 (0.025)
Education	0.107** (0.042)
Constant	-0.129** (0.057)
Observations	771
Log Likelihood	-199.880
Akaike Inf. Crit.	423.759
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

**Figure 6: Regression Coefficients of Message Frames**

For a robustness check, I then conducted a contrast test comparing the difference in regression coefficients between the significant, causal frames (1, 4, and 8) and the insignificant, non-causal frames (2, 3, 5, 6, 7) based on the results from the full multiple linear regression model with all controls. Formally stated, the null hypothesis is the equality of the average of the causal frame coefficients to the average of the non-causal frame coefficients:

$$H_0 : \frac{\beta_1 + \beta_4 + \beta_8}{3} - \frac{\beta_2 + \beta_3 + \beta_5 + \beta_6 + \beta_7}{5} = 0$$

In my analysis, I tested the difference between the two groups of coefficients using the `glht` command from the `multcomp` R package that performs a generalized linear hypothesis test. Table 8 shows the summary of the model. Substantively, the test illustrates that a respondent who finds the casual frames highlighting specific health and policy outcomes highly believable is 0.19 points more supportive of a tax on SSBs on the scale where 0 means he is against the tax, 0.5 means he is undecided, and 1.0 means he is in favor of the tax ( $p < 0.01$ ). In other words,

increasing each frame's coefficient by 1 (going from least to most believable), the effect on SSB tax support is 0.19 points higher for the frames with explicit references to health outcomes than those with more abstract rationales for why a tax on SSBs should exist. This is a substantial increase: a value of 0.5 indicates a person's support for an SSB tax changes from undecided to supportive (or, equally, against to undecided), and 0.19 is nearly half of 0.5. The 95% confidence interval for this test is [0.13, 0.24]. Thus, these results indicate policy-makers and pro-SSB tax advocates should emphasize the tangible, health-centered implications of an SSB tax in their campaign materials.

**Table 8: Contrast Test between Causal and Non-Causal Frames**

	Estimate	Std. Error	z value	Pr(> z )	
1==0	0.19008	0.02702	7.035	1.99e-12	***

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

### Alternative Predictors of SSB Tax Support

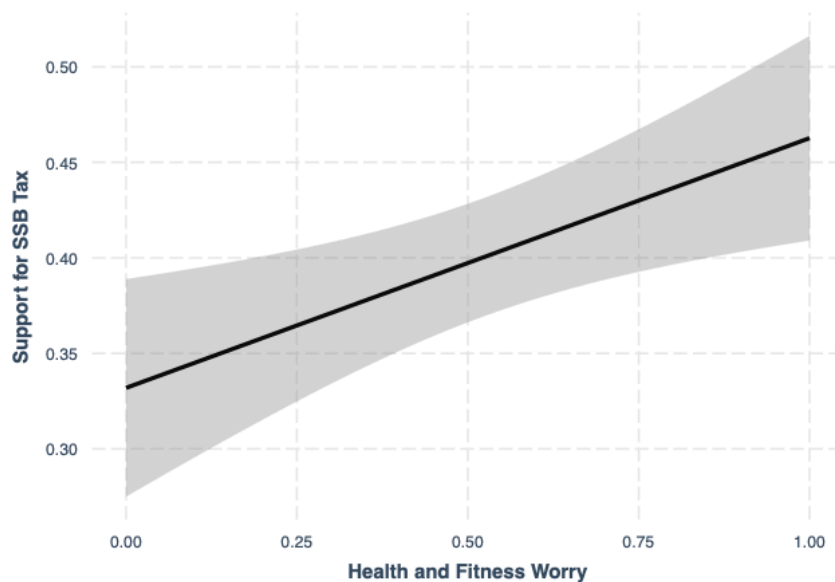
Beyond partisanship and other demographic identifiers like gender, race, and education, a person's personality and psychological orientation might also play a role in how supportive they might be toward taxing sugary drinks. For example, are people who say they worry a lot about their health and fitness more likely to support taxes on SSBs? Does an opinion toward taxation change if someone is overweight? In my next set of analyses, I utilized the psychological battery of questions to answer these types of questions.

To begin, I regressed support for SSB taxes on concern for health and fitness. An analysis with controls for party ID, gender, and education yielded a coefficient of 0.13 on the health and



fitness worry scale, meaning as a respondent goes from saying she is not worried at all to very worried about her health and fitness, her support for a tax on SSBs will increase 0.13 points on the scale where 0 means against the tax and 1 is in favor of it ( $p < 0.01$ ). Figure 7 illustrates this coefficient. Perhaps people who are more conscious of their dissatisfaction toward their physical health are more willing to support policies that would nudge them towards improving their diets. (However, among respondents who say they are overweight, support for an SSB tax is 0.02 points lower than support in those that are underweight or have a normal weight, though this did not reach statistical significance.)

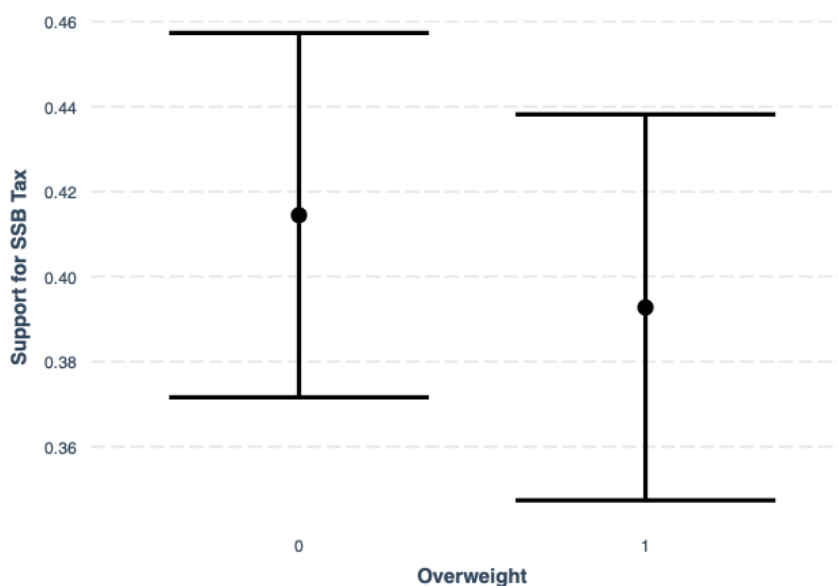
**Figure 7: Effect Plot of Health and Fitness Worry on Support for SSB Tax**



I also was curious about how SSB perceptions might vary for individuals who identify as overweight. In other words, if someone is overweight, will he/she be more supportive or less supportive of a policy whose ultimate goal is to reduce obesity? To investigate this question, I created a factor variable with two levels, under/normal weight (0) and overweight (1), which I used as a predictor for SSB tax support along with controls for party ID, gender, and education.

As illustrated by the overlapping confidence intervals in Figure 8, overweight individuals are no more or less likely to support a tax on SSBs. Again, party ID is the largest predictor of tax support, more than any other variable included in the regressions ( $p < 0.01$ ).

**Figure 8: Effect Plot of Identifying as Overweight on Support for SSB Tax**



### Regressions for SSB Support Questions as Separate Dependent Variables

The previous regressions used a combined scale of the three SSB support/opposition questions as the dependent variable. As aforementioned, this new scale consists of the averages across the three questions embedded in the survey prompting respondents to say whether they are in favor or against a tax on sugar-sweetened beverages. One of these questions appeared before respondents read the message frames, as not to prime them in any way. The other SSB support question appeared directly after the frames. I also included an informed ballot question (sometimes called a Smith-Jones question) before the frames that presented respondents with common pro and con arguments to enacting an SSB tax. Given those two arguments, I then

asked respondents if they would vote in favor of or against an SSB tax. All survey questions can be found in the survey questionnaire in Appendix A.

I re-ran the previous regressions first with the informed ballot question as the dependent variable, instead of the three-question combined SSB support scale to account for the information effect. The results are consistent with the combined dependent variable of SSB support. The coefficients for the linear regressions on each individual message frame with a control for party ID can be found in Table 9. As with the linear regressions on the combined SSB support scale, frames 1, 4, and 8 again have the largest coefficients. Substantively, these coefficients can be interpreted as the increase in support for an SSB tax when a frame goes from least to most believable. For example, someone who finds the first message frame very believable will be 0.605 points more supportive of an SSB tax.

**Table 9: Summary of Individual Regressions on Message Frame**

	<i>Dependent variable</i>							
	Support for SSB Tax							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Message Frame	0.605*** (0.041)	0.403*** (0.048)	0.322*** (0.056)	0.592*** (0.045)	0.478*** (0.049)	0.503*** (0.045)	0.422*** (0.048)	0.563*** (0.043)
Party ID with Leans	-0.144*** (0.045)	-0.294*** (0.045)	-0.326*** (0.044)	-0.202*** (0.044)	-0.222*** (0.045)	-0.197*** (0.047)	-0.237*** (0.046)	-0.226*** (0.043)
Constant	0.128*** (0.036)	0.229*** (0.047)	0.280*** (0.051)	0.193*** (0.036)	0.203*** (0.044)	0.191*** (0.041)	0.252*** (0.042)	0.245*** (0.034)
Observations	773	773	773	773	773	773	773	773

A subsequent multiple linear regression, with each frame as a predictor of SSB tax support measured only by the informed ballot question, demonstrates how frames 1, 4, and 8 are highly significant predictors for SSB tax support ( $p < 0.01$ ). Adding in controls for gender and education maintains the significance of these frames (see Table 10).

**Table 10: Multiple Linear Regression on Message Frames with Controls  
(Informed Ballot Question)**

	<i>Dependent variable:</i> Support for SSB Tax
Frame 1	0.236*** (0.048)
Frame 2	0.076 (0.056)
Frame 3	-0.046 (0.061)
Frame 4	0.206*** (0.051)
Frame 5	0.071 (0.052)
Frame 6	0.109* (0.056)
Frame 7	0.033 (0.046)
Frame 8	0.273*** (0.049)
Party ID with Leans	-0.064* (0.038)
Gender (Female)	-0.005 (0.025)
Education	0.107** (0.042)
Constant	-0.129** (0.057)
Observations	771
Log Likelihood	-199.880
Akaike Inf. Crit.	423.759
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

For brevity, I will not discuss the results of the regressions with the pre and post-message frame questions on support for an SSB tax, though the results illustrate similar coefficients to the informed ballot question and the combined SSB tax support scale. In sum, no matter which question acted as the dependent variable (including the combined question on SSB support),

frames 1, 4, and 8 were all the largest predictors of support for a tax on sugar-sweetened beverages.

## **Experiment Design and Results**

After fielding and analyzing my preliminary survey that exposed participants to all eight message frames, I then created a split-half experiment of the strongest two frames which I appended onto a separate national survey (N=691) that served as a teaching tool for a survey research class within the University of California - DC consortium. The survey was distributed by SurveyMonkey. The experiment probed respondents to answer an informed ballot question with the pro-tax argument randomly assigned to be one of two frames: one that articulated how the SSB tax revenue could fund community health programs, and another that argued how an SSB tax had the potential to lower consumption of SSBs. Both also included the phrase that these consequences would lead to better physical health outcomes and lower health care expenditures. These two frames achieved the largest coefficients in the regression analyses in the previous survey and were the only statistically significant frames in the multiple linear regression with all frames. (The eighth message frame that also was significant in the MLR analysis contained similar language to the fourth message frame, namely that an SSB tax would lower consumption in the same way cigarette taxes reduced the rates of smoking). Table 11 provides the wording of the two frames.

**Table 11: Summary of Message Frames in Experiment**

Frame	N
Revenue from the tax can be used to fund health and obesity-related programs including cooking and gardening programs, diabetes prevention, and health education programs. These programs have the potential to reduce body mass index (BMI), lower health care expenditures, and increase life expectancy.	354
The tax will lead to reduced consumption of sugary drinks. Reducing consumption has the potential to reduce body mass index (BMI), lower health care expenditures, and increase life expectancy.	337

The purpose of this experiment was to ascertain whether a significant difference exists between the efficacy of the two frames. In other words, is one message frame stronger than the other in generating support for a sugary beverage tax? Empirically, there does not seem to be a difference in SSB tax support based on which frame a respondent views. The weighted proportions for the SSB tax support question are illustrated in Table 12. An independent t-test measuring SSB tax support indicates there is no statistically significant difference between the two frames ( $p=0.4982$ ). In fact, across the two frames, the proportion of respondents who oppose the tax is higher than the proportion of them who support the tax. Frame efficacy aside, one finding resulting from this analysis demonstrates the overall unpopularity of SSB taxes. This finding poses a challenge for public health advocates and policy-makers considering proposing such a tax.

**Table 12: Distribution of Responses to SSB Tax Support Question in Experiment**

	Total	Frame 1	Frame 2
<b>Support for SSB Tax</b>			
<b>Oppose</b>	45.6%	43.0%	48.2%
<b>Don't Know</b>	16.8%	17.5%	16.1%
<b>Support</b>	37.6%	39.5%	35.7%

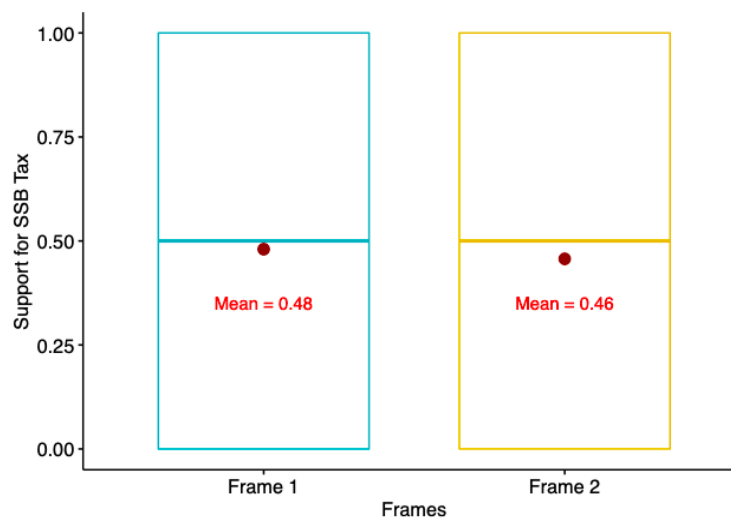
I then ran a full regression analysis on support for an SSB tax dependent on the message frame with additional controls for party identification, education, gender, and race (Table 13). Only party ID is a significant predictor of SSB tax support ( $p<0.05$ ); as one becomes more

liberal, support for the tax increases by about 0.14 points on the support scale where 0 represents opposition, 0.5 is a don't know vote, and 1 is support. Moreover, the frame respondents viewed did not substantially impact their opinion towards the policy. Figure 9 displays the similarities in the means for SSB tax support for both frames.

**Table 13: Regression on Message Frame with Controls in Experiment**

	<i>Dependent variable:</i>
	Support for SSB Tax
Frame 2	-0.071 (0.044)
Party ID with Leans	0.137** (0.054)
Education	0.039 (0.076)
Gender (Female)	0.005 (0.044)
Race (Non-White)	0.029 (0.048)
Constant	0.381*** (0.067)
Observations	640
Log Likelihood	-461.024
Akaike Inf. Crit.	934.048
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01

**Figure 9: Effect Boxplot of Message Frames on Support for SSB Tax in Experiment**



## Limitations

In evaluating my survey and experiment designs after collecting the data, a few limitations and improvements come to mind. One potential refinement would be to re-write the question gauging SSB tax support—my dependent variable—to be continuous. I originally wrote the question in the survey with four options—in favor, against, undecided, and don't know—which I re-coded and scaled to be between 0 and 1. I collapsed the undecided and don't know votes into one joint category representing the middle position. In the experiment, I eliminated the undecided option. In hindsight, it might have made more sense to ask respondents how much they would support an SSB tax on a scale from 0 to 100, thereby creating a purely continuous variable. Indeed, the regression coefficients would be interpreted as percentage point increases or decreases in support for SSB taxes, which seems much more intuitive than points on a scale.

Another limitation concerns my general research design framework. An ideal design would consist of each respondent receiving one of several randomly assigned frames with the same control throughout. Though I conducted a smaller scale version of this in my experiment,



budget constraints prevented me from comparing multiple frames each with sufficiently large sample sizes to one another.

## **Discussion**

Overall, there is support for both my hypotheses that the most effective frames in generating support for a tax on SSBs are ones that associate SSB taxes with concrete policy or behavioral outcomes, and that party ID is a compelling identity that significantly impacts support for public health policies. Moreover, my findings uncover persuasive evidence about the convincing nature of party ID on policy attitudes.

Based on the results from the survey, public health advocates planning future SSB tax campaigns should consider utilizing SSB tax rationales that emphasize the societal health benefits resulting from a tax on sugary drinks. Frames that describe how the tax revenue will be earmarked for programs aimed at reducing SSB consumption and, subsequently, the incidence of obesity and diabetes have the most promise for garnering support for SSB tax legislation. The importance of framing cannot be understated, especially considering the aggressive anti-tax campaigns that organizations like the ABA undertake in every city considering an SSB tax. In 2017, lawmakers in Cook County, Illinois, the home of Chicago, repealed their short-lived SSB tax after immense pressure from the soda industry in the form of ad buys and lobbying. Since the measure was originally proposed as a way to “plug a \$1.8 billion budget gap, and secondarily as a means to improve public health by discouraging the consumption of beverages linked to obesity and other conditions” it became difficult to defend on public health grounds, and ultimately was repealed after only two months (Dewey 2017).

In evaluating these two frames in the subsequent randomized experiment, there does not appear to be a significant difference between the efficacy of the frames. Overall, most respondents opposed a tax on SSBs, and neither frame significantly impacted vote choice. It is worth noting that support for SSB taxes received considerably low overall support: 41.8% of Democrats and 21% of Republicans are in favor of a tax on SSBs asked in the informed ballot question in the national survey. Likewise, 47.7 % of Democrats and 34.3% of Republicans indicated support for an SSB tax in the experiment. Since the key predictor in determining what drives attitudes about a tax on SSBs is a causal frame that highlights the tangible health effects of the tax, pro-tax advocates should emphasize how the tax will accomplish all these desirable, socially beneficial outcomes. Rather than attempting to convince voters that they should vote in favor of a soda tax which empirically has low support among both Democrats and Republicans, campaigners should instead focus on convincing voters that the arguments for passing an SSB tax are believable. If they can convince people of the fact that SSB taxes will lower sugary beverage consumption and simultaneously fund necessary public health policies, then support for the tax will increase.

In sum, the best path toward passing a tax on sugar-sweetened beverages is an intentional framing strategy that underscores the concrete health benefits of the tax, namely frames that describe how the tax will lower consumption and fund community health programs. Berkeley's success with its SSB tax is a testament to this argument. Creating a separate fund for administering the SSB tax revenue is a strong way to engender support for the tax. Taxpayers want the guarantee that their tax dollars will be put to good use. Therefore, close attention to framing and messaging should be high priorities for those proposing an SSB tax in their cities or states.

## Appendix

### Appendix A: Survey Questionnaire

Q1. Some people are registered to vote and others are not. Are you registered to vote in the precinct or ward where you now live, or aren't you?

- Yes, Registered to Vote
- No, Not Registered to Vote
- Don't know

Q2. What are the chances that you will vote in the November 2020 general election for president, Congress, and other offices—are you absolutely certain to vote, very likely to vote, are the chances 50-50, or don't you think you will vote?

- Absolutely certain
- Very likely
- 50-50
- Will not vote
- Don't know

Q3. Over the past year, do you feel the economy has gotten better, gotten worse, or stayed about the same?

- Gotten better
- Gotten worse
- Stayed the same
- Don't know

Q4. Some people seem to follow what's going on in politics most of the time, whether there's an election going on or not. Others aren't that interested. Would you say you follow what's going on in politics most of the time, some of the time, only now and then, or hardly at all?

- Most of the time
- Some of the time
- Only now and then
- Hardly at all
- Don't know

Q5. Now, thinking about things in the country, do you think things in the United States are generally going in the right direction, or do you feel things have gotten off on the wrong track?

- Right direction
- Wrong track
- Don't know

Q6. Overall, do you approve or disapprove of the way Donald Trump is handling his job as President?

- Approve
- Disapprove
- Don't know

Q7. Which of the following is the greatest problem facing the country today?

The cost of healthcare  
The health of our children  
A system that is rigged for the rich  
Crime  
Terrorism  
Immigration  
The cost of a college education

How much of a problem do you think each of the following public health issues are in the country today? For each one, please indicate whether you think it is a very big problem, a moderately big problem, a small problem, or not a problem at all. **ROTATE BETWEEN Q8 & Q15, ROTATE Q9-Q14**

Q8. Childhood obesity

Very big problem  
Moderately big problem  
Small problem  
Not a problem at all  
Don't know

Q9. Cancer

Very big problem  
Moderately big problem  
Small problem  
Not a problem at all  
Don't know

Q10. Mental illness

Very big problem  
Moderately big problem  
Small problem  
Not a problem at all  
Don't know

Q11. Cigarette smoking

Very big problem  
Moderately big problem  
Small problem  
Not a problem at all  
Don't know

Q12. Prescription drug abuse

Very big problem  
Moderately big problem  
Small problem  
Not a problem at all  
Don't know

Q13. Alcohol abuse

Very big problem

Moderately big problem  
 Small problem  
 Not a problem at all  
 Don't know

Q14. AIDS

Very big problem  
 Moderately big problem  
 Small problem  
 Not a problem at all  
 Don't know

Q15. Obesity

Very big problem  
 Moderately big problem  
 Small problem  
 Not a problem at all  
 Don't know

When it comes to government spending on public health, please indicate whether you would like to see more or less government spending in each area. **ROTATE Q16-Q19**

Q16. Programs that encourage people to exercise

More government spending  
 Less government spending  
 The same

Q17. Programs that encourage people to eat healthy

More government spending  
 Less government spending  
 The same

Q18. Healthier food in schools

More government spending  
 Less government spending  
 The same

Q19. Food assistance benefits

More government spending  
 Less government spending  
 The same

If there was a ballot measure in your community that would... **ROTATE Q20-Q23**

Q20. Raise taxes on sugary drinks like non-diet sodas, sports and energy drinks, and flavored waters, would you vote in favor or against it?

In favor  
 Against  
 Undecided  
 Don't know

Q21. Require chain restaurants to list calorie counts on menus, would you vote in favor or against it?

- In favor
- Against
- Undecided
- Don't know

Q22. Ban television advertising of unhealthy foods during children's programming, would you vote in favor or against it?

- In favor
- Against
- Undecided
- Don't know

Q23. Limit the size of sugary soft drinks sold in restaurants and convenience stores, would you vote in favor or against it?

- In favor
- Against
- Undecided
- Don't know

Here are some things that people are saying about taxes on sugar-sweetened beverages like non-diet sodas, sports and energy drinks, and flavored waters: **ROTATE**

**Some/Other** people say that a tax on sugar-sweetened beverages will curb rising rates of obesity and type 2 diabetes by reducing their consumption. The revenue from the tax could be put towards getting healthier food into schools and investing in better physical education programs.

**Other/Some** people say that a tax on sugar-sweetened beverages is the government interfering in our private lives. The tax would hurt poor people the most and it will not solve the obesity epidemic.

Q24. Having heard those two arguments, would you vote in favor of a tax on sugar-sweetened beverages, or against it?

- In favor
- Against
- Undecided
- Don't know

Below is a list of statements that some people have told us about taxes on sugar-sweetened beverages. Please read each statement carefully and indicate if you find the statement to be a very believable, somewhat believable, not too believable, or not at all believable. **ROTATE Q25-Q38**

Q25. Revenue from a tax on sugar-sweetened beverages can be used to fund health and obesity-related programs

- Very believable
- Somewhat believable
- Not too believable
- Not at all believable
- Don't know

- Q26. Sugar-sweetened beverage consumption is associated with obesity and health problems like type 2 diabetes
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q27. Sugar-sweetened beverages contain an extremely large amount of sugar and calories
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q28. Taxing sugar-sweetened beverages can lead to lower consumption
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q29. The soda industry uses deceptive practices to increase sales at the expense of people's health
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q30. The soda industry takes advantage of minorities and children with their advertising and marketing
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q31. The health consequences of consuming sugar-sweetened beverages hurt poor people more than a tax on sugar-sweetened beverages
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q32. Taxing sugar-sweetened beverages will reduce consumption just like taxing cigarettes did
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know

- Q33. Taxes on sugar-sweetened beverages will harm businesses and workers economically
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q34. Taxes on sugar-sweetened beverages will hurt poor people the most
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q35. The government is acting as a "nanny state" that restricts individuals' personal choice
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q36. Governments will not use the revenue from a tax on sugar-sweetened beverages in a responsible way
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q37. Sugar-sweetened beverage taxation will not reduce consumption since people can buy them elsewhere or substitute them for other drinks
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q38. Singling out sugar-sweetened beverages for taxation is unfair when other unhealthy foods are not regulated
- Very believable
  - Somewhat believable
  - Not too believable
  - Not at all believable
  - Don't know
- Q39. Having heard this additional information, would you vote in favor of a tax on sugar-sweetened beverages, or against it?
- In favor
  - Against
  - Undecided



Don't know

Q40. When making a purchase online, which of the following is most important to you in making your decisions?

**ROTATE PUNCHES**

Word of mouth

Advertisements on TV

Word of mouth from friends on social media

User reviews on the websites

I search for review content by other shoppers, including videos and blogs, online

I just search for it

Other: specify [open]

How worried are you about the following aspects of your life – very worried, somewhat worried, not too worried, not worried at all? **ROTATE Q41-Q46**

Q41. My financial situation

Very worried

Somewhat worried

Not too worried

Not worried at all

Don't know

Q42. My health and fitness

Very worried

Somewhat worried

Not too worried

Not worried at all

Don't know

Q43. My social life

Very worried

Somewhat worried

Not too worried

Not worried at all

Don't know

Q44. My career

Very worried

Somewhat worried

Not too worried

Not worried at all

Don't know

Q45. My romantic life

Very worried

Somewhat worried

Not too worried

Not worried at all

Don't know

Q46. My religious or spiritual life

- Very worried
- Somewhat worried
- Not too worried
- Not worried at all
- Don't know

Q47. Which of the following aspects of your life is your biggest concern? **ROTATE PUNCHES**

- My financial situation
- My health and fitness
- My social life
- My career
- My romantic life
- My religious or spiritual life

Q48. Which description comes closest to how you would describe yourself?

- I am always optimistic and rarely worry
- I worry at times, but don't usually sweat the little things
- I am neither positive nor do I worry
- I worry more than I would like to, even when I should not
- I worry a lot and even have anxiety

Q49. And, which description comes closest to how you would describe your social life?

- I am lonely and do not have a good network of friends
- I have a few friends, but am not very connected to them
- I have enough good friends, and am ok with my social life
- I have a good social life, and lots of friends
- I have a wonderful social life; I have many good friends and see them often

Q50. How often do you use social media?

- A couple times a day
- Once a day
- A couple times a week
- Once a week
- Once a month
- Never

**IF PUNCHES 1 THRU 5 IN Q50:**

Q51. Which of the following best describes your use of social media?

- I use social media actively. I post my thoughts and share my emotions
- I use social media passively. I like and share other people's posts

Q52. How easily would you say that you make friends?

- Very difficult for me to make new friends
- Somewhat challenging for me to make new friends, but I

sometimes do  
 Neither difficult nor easy to make friends  
 Somewhat easy for me to make new friends  
 Very easy for me to make new friends

Q53. How would you describe your mood when waking up on most mornings?

I wake up in a great and positive mood  
 I am generally happy when waking up, but not extremely so  
 I wake up a little bit worried or negative  
 I wake up in a very negative mood  
 Don't know

Q54. How would you describe yourself?

Very analytical and calculated in my decisions  
 Somewhat analytical and calculated in my decisions  
 Neither analytical nor impulsive/emotional in my decisions  
 Somewhat impulsive/emotional in my decisions ..  
 Very impulsive/I usually make decisions emotionally  
 Don't know

Q55. How would you describe your level of self-confidence?

Very low self-confidence with lots of insecurities  
 Somewhat low self-confidence with some insecurities  
 Somewhat self-confident with few insecurities  
 Very self-confident with very few insecurities or none at all  
 Don't know

Q59. And lastly, just a few demographic questions simply for statistical purposes. Again, all of your answers will be kept strictly confidential. Generally speaking, do you consider yourself a Republican, a Democrat, an Independent, or something else?

Republican	<b>SKIP to Q61</b>
Democrat	<b>SKIP to Q61</b>
Independent	<b>GO to Q60</b>

Q60. Do you think of yourself as closer to the Republican Party or to the Democratic Party?

Republican  
 Democrat  
 Neither/ Just Independent/Don't know

Q61. What is the highest level of education you completed?

Elementary school only  
 Some high school / Did not finish  
 Completed high school  
 Some college but didn't finish  
 Two year college degree / A.A. / A.S.  
 Four year college degree / B.A. / B.S.  
 Some graduate work  
 Completed masters or professional degree  
 Advanced graduate work or Ph.D

Don't know

Q62. Are you currently married, widowed, divorced, separated, or have you never been married?

- Married
- Widowed
- Divorced
- Separated
- Never been married
- Don't know

Q63. Would you consider yourself a born-again or evangelical Christian, or not?

- Yes
- No
- Don't know

Q64. What is your year of birth?

Q65. Would you describe yourself as?

- White
- African American or Black
- Asian, or South Asian or Pacific Islander
- Hispanic or Latino **SKIP to Q66**
- Native American or American Indian
- Other (Specify)
- Don't know

Q66. Are you of Hispanic or Latino origin or background?

- Yes
- No

Q67. Gender

- Male
- Female

Q68. Right now, do you feel that you are overweight, underweight, or just about the right weight for you?

- Overweight
- Underweight
- Just about right
- Don't know

**IF PUNCH 1 in Q68...**

Q69. Do you feel that you are very overweight, somewhat overweight, or only a little overweight?

- Very
- Somewhat
- Only a little
- Don't know

## Appendix B: Survey Toplines

N = 800

### Age

	Total
18-29	19.36
30-44	25.69
45-54	13.08
55-64	19.55
65-99	22.32

### Gender

	Total
Male	48.65
Female	51.35

### Race

	Total
White	64.12
Black	11.97
Hispanic	15.66
Asian	3.92
Native American	1.36
Mixed	2.00
Other	0.83
Middle Eastern	0.13

### Hispanic/Latino Origin or Background

	Total
Yes	97.08
No	2.92

### Education

	Total
No HS	8.31
HS graduate	31.51
Some college	21.37
2-year	10.79
4-year	17.68
Post-grad	10.34

### Marital Status

	Total
Married	46.60
Separated	2.60
Divorced	12.42
Widowed	4.32
Never married	28.22
Domestic/civil partnership	5.84

### Employment Status

	Total
Full-time	33.47
Part-time	12.57
Temporarily laid off	1.39
Unemployed	8.08
Retired	21.08
Permanently disabled	10.17
Homemaker	7.04
Student	4.69
Other	1.51

### Family Income

	Total
Less than \$50,000	40.04
\$50,000-\$100,000	28.07
Over \$100,000	16.67
Prefer not to say	15.22

## 3 point PID

	Total
Democrat	36.33
Republican	26.24
Independent	26.10
Other	3.77
Not sure	7.56

## 7 point PID

	Total
Strong Democrat	23.88
Not very strong Democrat	12.45
Lean Democrat	11.39
Independent	12.58
Lean Republican	9.19
Not very strong Republican	8.95
Strong Republican	17.28
Not sure	4.28

## Ideology

	Total
Very liberal	12.65
Liberal	18.97
Moderate	25.50
Conservative	20.37
Very conservative	13.89
Not sure	8.62

## Religion

	Total
Protestant	32.12
Roman Catholic	21.44
Mormon	2.72
Eastern or Greek Orthodox	0.66
Jewish	1.70
Muslim	1.93
Buddhist	0.76
Hindu	0.34
Atheist	5.94
Agnostic	7.27
Nothing in particular	21.24
Something else	3.88

## Church Attendance

	Total
More than once a week	8.66
Once a week	15.93
Once or twice a month	7.50
A few times a year	14.58
Seldom	20.31
Never	30.16
Don't know	2.86

## Born-again or Evangelical Christian

	Total
Yes	34.44
No	65.56

## Importance of Religion

	Total
Very important	37.65
Somewhat important	22.98
Not too important	15.70
Not at all important	23.67

## Frequency of Prayer

	Total
Several times a day	27.02
Once a day	13.84
A few times a week	12.16
Once a week	3.58
A few times a month	7.51
Seldom	11.41
Never	20.17
Don't know	4.32

Some people are registered to vote and others are not. Are you registered to vote in the precinct or ward where you now live, or aren't you?

	Total
Yes, Registered to Vote	86.83
No, Not Registered to Vote	10.73
Don't know	2.43

What are the chances that you will vote in the November 2020 general election for president, Congress, and other offices—are you absolutely certain to vote, very likely to vote, are the chances 50-50, or don't you think you will vote?

	Total
Absolutely certain	68.04
Very likely	11.72
50-50	10.72
Will not vote	5.95
Don't know	3.55

Over the past year, do you feel the economy has gotten better, gotten worse, or stayed about the same?

	Total
Gotten better	38.67
Gotten worse	27.77
Stayed the same	24.48
Don't know	9.08

Some people seem to follow what's going on in politics most of the time, whether there's an election going on or not. Others aren't that interested. Would you say you follow what's going on in politics most of the time, some of the time, only now and then, or hardly at all?

	Total
Most of the time	47.48
Some of the time	27.20
Only now and then	13.60
Hardly at all	6.91
Don't know	4.81

Now, thinking about things in the country, do you think things in the United States are generally going in the right direction, or do you feel things have gotten off on the wrong track?

	Total
Right direction	34.71
Wrong track	56.57
Don't know	8.71

Overall, do you approve or disapprove of the way Donald Trump is handling his job as President?

	Total
Strongly approve	24.50
Somewhat approve	16.46
Somewhat disapprove	9.49
Strongly disapprove	43.49
Not sure	6.06

Which of the following is the greatest problem facing the country today?

	Total
The cost of healthcare	17.12
The health of our children	4.52
A system that is rigged for the rich	25.88
Crime	7.68
Terrorism	6.43
Immigration	19.51
The cost of a college education	3.21
Others	15.65

How much of a problem do you think each of the following public health issues are in the country today? For each one, please indicate whether you think it is a very big problem, a moderately big problem, a small problem, or not a problem at all.

#### Obesity

	Total
Very big problem	37.94
Moderately big problem	41.63
Small problem	14.67
Not a problem at all	1.94
Don't know	3.82

#### Cancer

	Total
Very big problem	50.94
Moderately big problem	33.25
Small problem	10.72
Not a problem at all	1.56
Don't know	3.53



## Mental illness

	Total
Very big problem	49.63
Moderately big problem	33.63
Small problem	10.78
Not a problem at all	2.48
Don't know	3.48

## Cigarette smoking

	Total
Very big problem	26.82
Moderately big problem	31.70
Small problem	29.35
Not a problem at all	7.40
Don't know	4.74

## Prescription drug abuse

	Total
Very big problem	51.11
Moderately big problem	30.68
Small problem	12.90
Not a problem at all	2.27
Don't know	3.04

## Alcohol abuse

	Total
Very big problem	29.68
Moderately big problem	40.09
Small problem	21.24
Not a problem at all	4.30
Don't know	4.70

## AIDS

	Total
Very big problem	18.78
Moderately big problem	31.52
Small problem	36.65
Not a problem at all	5.27
Don't know	7.78

## Childhood obesity

	Total
Very big problem	33.51
Moderately big problem	38.87
Small problem	19.81
Not a problem at all	2.36
Don't know	5.45

When it comes to government spending on public health, please indicate whether you would like to see more or less government spending in each area.

## Programs that encourage people to exercise

	Total
More government spending	38.07
Less government spending	31.93
The same	30.00

## Programs that encourage people to eat healthy

	Total
More government spending	40.84
Less government spending	28.96
The same	30.20

## Healthier food in schools

	Total
More government spending	56.48
Less government spending	23.36
The same	20.16

## Food assistance benefits

	Total
More government spending	43.65
Less government spending	29.34
The same	27.02

If there was a ballot measure in your community that would...

Raise taxes on sugary drinks like non-diet sodas, sports and energy drinks, and flavored waters, would you vote in favor or against it?

	Total
In favor	29.43
Against	48.73
Undecided	16.03
Don't know	5.81

Require chain restaurants to list calorie counts on menus, would you vote in favor or against it?

	Total
In favor	53.71
Against	21.45
Undecided	16.73
Don't know	8.11

Ban television advertising of unhealthy foods during children's programming, would you vote in favor or against it?

	Total
In favor	40.47
Against	32.43
Undecided	19.13
Don't know	7.97

Limit the size of sugary soft drinks sold in restaurants and convenience stores, would you vote in favor or against it?

	Total
In favor	29.13
Against	44.08
Undecided	17.94
Don't know	8.86

Here are some things that people are saying about taxes on sugar-sweetened beverages like non-diet sodas, sports and energy drinks, and flavored waters:

Some/Other people say that a tax on sugar-sweetened beverages will curb rising rates of obesity and type 2 diabetes by reducing their consumption. The revenue from the tax could be put towards getting healthier food into schools and investing in better physical education programs.

Other/Some people say that a tax on sugar-sweetened beverages is the government interfering in our private lives. The tax would hurt poor people the most and it will not solve the obesity epidemic.

Having heard those two arguments, would you vote in favor of a tax on sugar-sweetened beverages, or against it?

	Total
In favor	30.97
Against	48.62
Undecided	14.98
Don't know	5.43

Below is a list of statements that some people have told us about taxes on sugar-sweetened beverages. Please read each statement carefully and indicate if you find the statement to be a very believable, somewhat believable, not too believable, or not at all believable.

Revenue from a tax on sugar-sweetened beverages can be used to fund health and obesity-related programs

	Total
Very believable	24.59
Somewhat believable	30.74
Not too believable	16.94
Not at all believable	19.19
Don't know	8.53

Sugar-sweetened beverage consumption is associated with obesity and health problems like type 2 diabetes

	Total
Very believable	47.50
Somewhat believable	29.78
Not too believable	11.35
Not at all believable	5.55
Don't know	5.82

Sugar-sweetened beverages contain an extremely large amount of sugar and calories

	Total
Very believable	55.73
Somewhat believable	25.81
Not too believable	8.34
Not at all believable	2.55
Don't know	7.56

Taxing sugar-sweetened beverages can lead to lower consumption

	Total
Very believable	19.21
Somewhat believable	27.76
Not too believable	24.28
Not at all believable	19.17
Don't know	9.58

The soda industry uses deceptive practices to increase sales at the expense of people's health

	Total
Very believable	31.37
Somewhat believable	27.08
Not too believable	20.11
Not at all believable	10.06
Don't know	11.38

The soda industry takes advantage of minorities and children with their advertising and marketing

	Total
Very believable	30.03
Somewhat believable	26.22
Not too believable	19.45
Not at all believable	14.41
Don't know	9.89

The health consequences of consuming sugar-sweetened beverages hurt poor people more than a tax on sugar-sweetened beverages

	Total
Very believable	31.08
Somewhat believable	23.61
Not too believable	17.29
Not at all believable	13.21
Don't know	14.81

Taxing sugar-sweetened beverages will reduce consumption just like taxing cigarettes did

	Total
Very believable	15.84
Somewhat believable	27.04
Not too believable	23.32
Not at all believable	25.02
Don't know	8.78

Taxes on sugar-sweetened beverages will harm businesses and workers economically

	Total
Very believable	24.09
Somewhat believable	29.08
Not too believable	25.10
Not at all believable	11.99
Don't know	9.73

Taxes on sugar-sweetened beverages will hurt poor people the most

	Total
Very believable	30.07
Somewhat believable	29.02
Not too believable	17.81
Not at all believable	13.37
Don't know	9.72

The government is acting as a "nanny state" that restricts individuals' personal choice

	Total
Very believable	42.60
Somewhat believable	24.39
Not too believable	14.13
Not at all believable	10.27
Don't know	8.61

Governments will not use the revenue from a tax on sugar-sweetened beverages in a responsible way

	Total
Very believable	48.02
Somewhat believable	26.29
Not too believable	9.78
Not at all believable	6.10
Don't know	9.82

Sugar-sweetened beverage taxation will not reduce consumption since people can buy them elsewhere or substitute them for other drinks

	Total
Very believable	36.38
Somewhat believable	35.41
Not too believable	13.06
Not at all believable	5.69
Don't know	9.46

Singling out sugar-sweetened beverages for taxation is unfair when other unhealthy foods are not regulated

	Total
Very believable	42.82
Somewhat believable	31.16
Not too believable	9.67
Not at all believable	8.53
Don't know	7.82

Having heard this additional information, would you vote in favor of a tax on sugar-sweetened beverages, or against it?

	Total
In favor	31.23
Against	48.85
Undecided	14.21
Don't know	5.70

When making a purchase online, which of the following is most important to you in making your decisions?

	Total
Word of mouth	7.75
Advertisements on TV	5.37
Word of mouth from friends on social media	6.43
User reviews on the websites	27.39
I search for review content by other shoppers, including videos and blogs, online	25.24
I just search for it	23.59
Other	4.23

How worried are you about the following aspects of your life – very worried, somewhat worried, not too worried, not worried at all?

My financial situation

	Total
Very worried	21.23
Somewhat worried	31.25
Not too worried	29.48
Not too worried at all	14.90
Don't know	3.13

## My health and fitness

	Total
Very worried	14.86
Somewhat worried	41.68
Not too worried	28.31
Not too worried at all	12.02
Don't know	3.13

## My social life

	Total
Very worried	8.90
Somewhat worried	18.13
Not too worried	31.97
Not too worried at all	37.89
Don't know	3.12

## My career

	Total
Very worried	12.38
Somewhat worried	20.74
Not too worried	25.38
Not too worried at all	35.85
Don't know	5.66

## My romantic life

	Total
Very worried	9.93
Somewhat worried	16.32
Not too worried	24.31
Not too worried at all	44.09
Don't know	5.34

## My religious or spiritual life

	Total
Very worried	7.94
Somewhat worried	12.72
Not too worried	25.99
Not too worried at all	48.93
Don't know	4.41



Which of the following aspects of your life is your biggest concern?

	Total
My financial situation	32.70
My health and fitness	37.50
My social life	6.40
My career	7.09
My romantic life	7.10
My religious or spiritual life	9.20

Which description comes closest to how you would describe yourself?

	Total
I am always optimistic and rarely worry	14.03
I worry at times, but don't usually sweat the little things	41.91
I am neither positive nor do I worry	9.94
I worry more than I would like to, even when I should not	22.60
I worry a lot and even have anxiety	11.51

And, which description comes closest to how you would describe your social life?

	Total
I am lonely and do not have a good network of friends	11.82
I have a few friends, but I'm not very connected to them	31.09
I have enough good friends, and I'm ok with my social life	45.28
I have a good social life, and lots of friends	7.87
I have a wonderful social life; I have many good friends and see them often	3.93

How often do you use social media?

	Total
A couple times a day	51.17
Once a day	14.67
A couple times a week	9.63
Once a week	5.32
Once a month	4.95
Never	14.25

Which of the following best describes your use of social media?

	Total
I use social media actively. I post my thoughts and share my emotions	32.4
I use social media passively. I like and share other people's posts	67.6

How easily would you say that you make friends?

	Total
Very difficult for me to make new friends	13.37
Somewhat challenging for me to make new friends, but I sometimes do	24.21
Neither difficult nor easy to make friends	27.45
Somewhat easy for me to make new friends	20.73
Very easy for me to make new friends	14.24

How would you describe your mood when waking up on most mornings?

	Total
I wake up in a great and positive mood	19.34
I am generally happy when waking up, but not extremely so	51.87
I wake up a little bit worried or negative	17.46
I wake up in a very negative mood	4.96
Don't know	6.37

How would you describe yourself?

	Total
Very analytical and calculated in my decisions	21.82
Somewhat analytical and calculated in my decisions	38.31
Neither analytical nor impulsive/emotional in my decisions	19.18
Somewhat impulsive/emotional in my decisions	13.11
Very impulsive/I usually make decisions emotionally	1.73
Don't know	5.85

How would you describe your level of self-confidence?

	Total
Very low self-confidence with lots of insecurities	9.59
Somewhat low self-confidence with some insecurities	21.72
Somewhat self-confident with few insecurities	41.98
Very self-confident with very few insecurities or none at all	22.31
Don't know	4.40

Right now, do you feel that you are overweight, underweight, or just about the right weight for you?

	Total
Overweight	48.89
Underweight	6.06
Just about right	42.09
Don't know	2.96

Do you feel that you are very overweight, somewhat overweight, or only a little overweight?

	Total
Very	28.33
Somewhat	49.49
Only a little	21.66
Don't know	0.52

## Appendix C. Experiment Split-Half Question

**SPLIT A.** There's been some talk recently about placing a tax on sugar-sweetened beverages like non-diet sodas, sweetened coffee and tea drinks, sports and energy drinks, and flavored waters. Which of the following comes closest to your point of view even if neither is exactly right?

### ROTATE

1. Some people say revenue from the tax can be used to fund health and obesity-related programs including cooking and gardening programs, diabetes prevention, and health education programs. These programs have the potential to reduce body mass index (BMI), lower health care expenditures, and increase life expectancy.
2. Other people say a tax on sugar-sweetened beverages is the government interfering in our private lives. They say the tax would hurt poor people the most and that it will not solve the obesity epidemic.

Having heard those two arguments, would you vote in favor of a tax on sugar-sweetened beverages, or against it?

- In favor
- Against
- Undecided
- Don't know

**SPLIT B.** There's been some talk recently about placing a tax on sugar-sweetened beverages like non-diet sodas, sweetened coffee and tea drinks, sports and energy drinks, and flavored waters. Which of the following comes closest to your point of view even if neither is exactly right?

### ROTATE

1. Some people say the tax will lead to reduced consumption of sugary drinks. Reducing consumption has the potential to reduce body mass index (BMI), lower health care expenditures, and increase life expectancy.
2. Other people say a tax on sugar-sweetened beverages is the government interfering in our private lives. They say the tax would hurt poor people the most and that it will not solve the obesity epidemic.

Having heard those two arguments, would you vote in favor of a tax on sugar-sweetened beverages, or against it?

- In favor
- Against
- Undecided
- Don't know

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## References for Figures

### **Figure 1: Tweet by Berkeley's Pro-Tax Campaign**

Berkeley vs. Big Soda. Twitter Post. October 9, 2014, 1:47 PM.  
<https://twitter.com/BerkvsBigSoda/status/520269331805241345>

### **Figure 2: Healthy Berkeley Campaign Materials**

Healthy Berkeley. Campaign Materials. <http://www.healthyberkeley.com/resources-1>

### **Figure 3: Healthy Berkeley Program Goals**

Healthy Berkeley. Program Goals, page 7. January 2018.  
[https://www.cityofberkeley.info/uploadedFiles/Health\\_Human\\_Services/Level\\_3\\_-\\_Public\\_Health/Volume%203\\_Executive%20Summary\\_final\\_rev\\_2018\\_0207.pdf](https://www.cityofberkeley.info/uploadedFiles/Health_Human_Services/Level_3_-_Public_Health/Volume%203_Executive%20Summary_final_rev_2018_0207.pdf)

### **Figure 4: Center for Consumer Freedom Bloomberg Ad**

New York Times. The Nanny Ad by the Center for Consumer Freedom. June 2, 2016.  
[https://www.huffpost.com/entry/nanny-bloomberg-ad-in-new\\_n\\_1568037](https://www.huffpost.com/entry/nanny-bloomberg-ad-in-new_n_1568037)