


RESEARCH ARTICLE

Low-income parents' perceptions of a sweetened beverage tax in Philadelphia

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Abstract

Objective: To characterise perceptions of the Philadelphia Beverage Tax among low-income parents. **Design:** We conducted semi-structured interviews and administered demographic questions via telephone. We based the interview guide and initial codebook on a conceptual model illustrating perceived fairness and effectiveness as essential for successfully adopting food policies. We performed thematic analysis using NVivo 12. **Setting:** We recruited from a primary care paediatrics clinic in Philadelphia, Pennsylvania from July to August 2020. **Participants:** Philadelphia parents/caregivers of 2- to 11-year-old children with Medicaid insurance. **Results:** Participants were predominantly African American (97%), female (100%), and had annual household incomes <\$50 000 (80%). Participants were 26- to 72-years old, with an average aged child of 5 years (range 7 months to 20 years). Themes emerged regarding tax perceptions, revenue use and behaviour change due to the tax. Using revenue for highly valued programmes and accountability of city government to use revenue as promised were critical elements in perceptions of tax fairness. Some parents avoided the tax through cross-border shopping and buying drink powders or concentrates, influencing perceptions of tax effectiveness. The tax signalled the health dangers of sweetened beverage consumption to most parents. **Conclusion:** Our findings bring to light four key takeaways for policymakers designing sweetened beverage taxes. (1) Dedication of tax revenue to programmes highly valued by parents and (2) transparency in revenue spending may improve acceptability. (3) State or national taxes may be more effective at decreasing consumption due to cross-border shopping. (4) Pairing taxes with health promotion campaigns may enhance behaviour change.

Key words: childhood obesity: food policy: low-income: sugar-sweetened beverage taxes: sugar-sweetened beverages

Background

Food policies supporting healthy habit formation early in life are critical, as obesity in childhood portends obesity and its accompanying health effects in adulthood⁽¹⁾. Taxing sweetened beverages is one public health tactic proposed to combat the childhood obesity epidemic. For young children, parents determine the extent to which these taxes influence the family food

environment, yet how beverage taxes are perceived by parents has not been examined^(2–4).

Tobacco taxation and the subsequent decline in smoking-associated diseases are a historical precedent for the potential health impact of excise taxes, or taxes on a specific good⁽⁵⁾. Similar to tobacco taxes, beverage taxes have also resulted in significant increased prices and decreased sales of taxed

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goods^(6–9). Although 39 countries have implemented sweetened beverage taxes, they have yet to be widely implemented in the United States in part due to lack of public support and food industry opposition^(10–12). One criticism of sweetened beverage taxes is that they disproportionately burden low-income individuals, as the increased cost represents a larger share of their income^(13,14). To achieve substantial public health benefits, taxes must be politically acceptable and widely implemented⁽¹⁵⁾.

In January 2017, Philadelphia enacted a beverage tax of 1.5 cents per ounce to the distribution of artificially- or sugar-sweetened beverages sold within the city. Philadelphia designated part of the tax revenue to fund programmes that benefit low-income families, specifically expanding universal pre-kindergarten (pre-K) and making improvements to city schools, parks and libraries. Approximately half of the tax revenue has been allocated to the city's general fund⁽¹⁶⁾.

Directing revenue to disproportionately burdened groups may mitigate the inequitable effects of sweetened beverage taxes and change perspectives of key stakeholders^(17,18). For example, the Philadelphia approach may lead to increased support for the tax among low-income parents, and may also increase positive attitudes towards the nutritional goals of the tax. The extent to which particular aspects of the tax can generate such dynamics remains unknown.

Prior work examining acceptability of sweetened beverage taxes has largely been conducted via internet and phone surveys among national samples of American adults, but these studies have not focused specifically on low-income individuals, parents or other groups who may either disproportionately be burdened or benefited by these taxes^(19–21). Philadelphia's tax provides an opportunity to understand how perceptions of food policies may interact with parents' choices around early childhood food environments, and how tax features designed to mitigate regressive aspects are perceived. This perspective can inform future food policy design to promote acceptability, equitability and effectiveness, particularly in the formative period of early childhood.

Methods

Study setting and participants

We recruited participants from a primary care paediatric clinic in Philadelphia that serves a low-income, primarily Medicaid-insured patient population (73 % of patients). English-speaking Philadelphia-residing parents and caregivers of 2- to 11-year-old children, with Medicaid insurance (as a marker of low income) were eligible. We sampled low-income parents of preschool- and elementary school-aged children because their children are the most likely to benefit from the programmes to which the tax revenue is directed. Due to the COVID-19 pandemic, recruitment and data collection occurred via telephone to adhere to social distancing recommendations.

We identified eligible participants through health records of patients seen at the study site during the preceding 3 months. We attempted to contact eligible participants up to three times.

Eligibility criteria were confirmed prior to informed consent. Interviews occurred from 6 July to 20 August 2020.

Two research team members trained in qualitative interview techniques, and supervised by a team member with extensive qualitative research experience, conducted the interviews. Participants received a \$30 Amazon gift card for participation. All study procedures were deemed exempt from review by the Children's Hospital of Philadelphia Institutional Review Board.

Conceptual model and data collection

Public acceptance of food policies aimed at combatting obesity has been associated with perceived fairness and effectiveness of the policy (Fig. 1)⁽²²⁾. The conceptual model guiding our work proposes that a policy's intrusiveness influences its perceived fairness and effectiveness. Intrusiveness is defined as the degree to which a policy influences an individual's freedom of choice. For example, a low intrusiveness intervention provides nutrition information compared to a high intrusiveness intervention restricting choice by what goods are available. The policy's perceived fairness and effectiveness in turn influence public acceptance⁽²²⁾. This model is informed by reactance theory, which states that insufficient acceptance of a food-related policy leads to less desired behaviour change among the target population, while acceptance of a policy results in more desired behaviour change⁽²²⁾. For Philadelphia's tax, the desired behaviour change from a public health perspective is decreased sweetened beverage purchasing and consumption.

We developed a semi-structured interview guide (Supplementary material 1) based on this conceptual model exploring awareness, perceptions and perceived behaviour change related to the tax⁽²²⁾. After assessing participants' awareness of the tax, we described the tax rate and revenue use to ensure a common baseline knowledge of the policy. Interviews were audio-recorded, de-identified and transcribed verbatim by a transcription service. Participants also completed a demographic questionnaire.

Analysis

We used NVivo 12 software for coding and analysis⁽²³⁾. We performed thematic analysis with constant comparison to code interviews⁽²⁴⁾. The initial outline for codes was based on the conceptual framework and interview guide, and we identified additional themes as they emerged. Four team members coded the first two transcripts together to develop the initial codebook. Three team members then proceeded with the remaining analysis. For the first eight transcripts, this three-member team coded two transcripts at a time and met weekly to examine inter-rater reliability, discuss and resolve coding disagreements, and refine the codebook. The remaining 22 transcripts were then divided among them, with overlap of two additional transcripts to ensure ongoing coding consistency. The team met biweekly during this process, continuing to hone the codebook as sub-themes emerged and choosing illustrative quotes representing these themes. Inter-rater reliability analysis of the coded transcripts produced a kappa statistic of 0.90 overall.

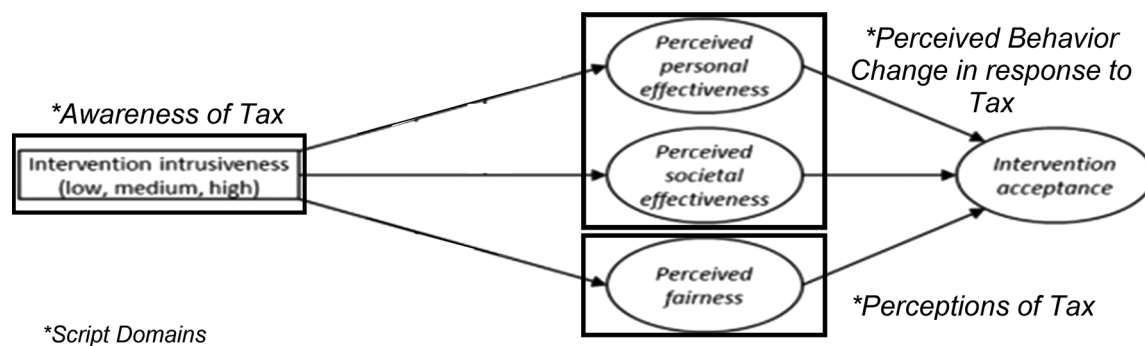


Fig. 1. Conceptual model of factors influencing acceptance of the Philadelphia Beverage Tax.

Results

Participants ($n = 30$) were predominantly African American (97%), female (100%) and had annual household incomes below \$50 000 (80%) (Table 1). Participants ranged from 26 to 72 years old, with an average of 2–3 children per household (range 1–5). The average child age per household was 5 years, (range 7 months to 20 years). Interviews averaged 20 min in length. Themes emerged within three domains of the conceptual model: awareness of the tax, perceptions of the tax and its revenue use, and perceptions of behaviour change in response to the tax. We identified sub-themes within these categories. Illustrative quotes are presented in Table 2.

Awareness of the tax

Spectrum of awareness. All but one participant was aware of the tax. Participants reported different levels of awareness, ranging from a general knowledge to knowing the exact tax rate. Most participants knew the tax was generating revenue for pre-K and city schools, with several participants stating revenue was directed to ‘education’.

Perceptions of the tax and revenue use

The tax conveys a public health message. A common perception among participants was that in addition to the economic disincentive, the tax communicated a public health message about the health impact of consuming sweetened beverages. The tax served as a reminder that some

sweetened beverages contain added sugars. Participants noted that signs posted in some supermarkets designating beverages as subject to the tax flagged the drinks as unhealthy in their minds. The signage reminded them of the added cost as well as the potentially negative health impact of the beverages.

Fairness of the tax. Many participants who felt the tax was fair expressed the designation of tax revenue for education as the main reason it seemed fair. Some acknowledged that funding for pre-K and city schools had to come from somewhere, and the tax was an acceptable approach for generating revenue. One participant noted that because sweetened beverages are not essential to a healthy diet, taxing them seems fair.

Participants who felt the tax was unfair cited two main reasons. Multiple participants cited the city’s struggling school district as evidence that the tax’s revenue was not helping, thus making the tax seem unfair. Others perceived taxing sweetened beverages in particular as unfair because children like them, citing cigarettes as an example of a taxed good that they consider more acceptable since it affects adults more than children.

Many participants were ambivalent regarding the tax’s fairness. Some felt a lower tax would be fairer, so revenue could be raised for pre-K and schools without causing as much financial burden on consumers. Some noted the burden of the tax on low-income families in particular as a reason the tax was unfair. However, these participants also noted that designating revenue towards education offset this, leaving them uncertain about the overall fairness of the tax.

Accountability of revenue spending. Accountability was closely linked to perceived fairness of the tax for many participants. Participants with first-hand experience of the pre-K expansion or improvements to their neighbourhood parks had more positive sentiments about the tax overall. Conversely, parents who had not witnessed revenue’s direct impact, or who had negative experiences with local schools or parks, wanted accountability from the city. School closures (related to pre-pandemic consolidation of elementary schools) were commonly cited as evidence that

Table 1. Demographic characteristics of participants

Age, median, years (range)	32 (26–72 years)
Sex	Female (100%)
Race/Ethnicity	
Black/African American	$n = 29$, 96.7%
White	$n = 1$, 0.03%
Number of children at home, median (range)	3 (1–5 children)
Age of children at home, range (mean)	7 months to 20 years (5 years)
Annual Household Income	
Less than \$25 000/year	$n = 8$, 27.6%
\$25 000 to \$50 000/year	$n = 16$, 55.2%
\$51 000 to \$100 000/year	$n = 5$, 17.2%
Unsure/unknown	$n = 1$, 0.03%

**Table 2.** Major study themes and illustrative quotes

Domain	Subdomain	Illustrative Quote ^a
Awareness of Tax	Spectrum of awareness	<p>'I remember hearing about it around 2017 and it was saying something like . . . it was coming to about 1-5 cents per ounce or something like that.' [1749]</p> <p>'It was supposed to be for education. And then part of it went to education, part of it went to the Philadelphia General Fund.' [1408]</p>
Perceptions of the Tax and Revenue Use	The tax conveys a public health message	<p>'It made me take a bigger look at how much sugar that's actually in the drinks and if my kids should even be drinking it at all.' [1554]</p> <p>'I do have that when I go to buy a drink and it has that tag on it that says Philly beverage tax, . . . I do say to myself, oh, this is a sugary drink . . . so is this good for me to drink?' [1009]</p> <p>'I look at it as being an inconvenience, but also while I'm there, I just kind of feel like, well, if it's going to be this high, we don't need it anyway. You know what I mean? I don't need to buy it and we need to cut down anyway. So, if anyone was planning on just saying, 'I'm gonna cut down on this, I'm drinking so much, then this probably was the time because when you get in there and you start looking at your finances and you're looking at money, you're like, "No, I don't need this soda right now. I'll just get something else or water." You know what I mean?' [1749]</p> <p>'When you think about paying that much money for something that's gonna make you sick in a way – weight gain or possibly get diabetes – yeah, it's not good.' [1507]</p> <p>'It definitely made me more – wanna become more informative about what I'm actually buying, as opposed to just grabbing anything.' [1600]</p>
	Fairness of the tax	<p>'I do think it's fair to Philadelphia because I feel like even though we're a big city, our schools are lowly taken care of. We don't have the budget that schools in suburbs that parents get together and they help keep the school up.' [1420]</p> <p>'I don't necessarily think it's unfair. It just seems like the wrong place to start raising taxes. I mean, I definitely get it. No one needs sugary drinks. But at the same time . . . it ends up targeting people that are less well off.' [1751]</p> <p>'I do think it's fair . . . it benefits a lot of families, so I think it's fair because . . . some people . . . they're a single parent, they have to pay their bills, they don't have that help. So, yeah . . . I can say yes, it's fair.' [1508]</p> <p>'I don't think it's fair because I don't see it in the school district. The school district is horrible.' [0908]</p> <p>'That's what kids like to drink. They love juice. It doesn't matter what type of kid it is, they love juice. So, I feel like it's not fair that it went up.' [1516]</p> <p>'I don't think it's fair. I think that it could have been put somewhere else that – I think it could have been put on cigarettes. So I think if they put it on something that doesn't affect the child, or more affecting adults, then maybe I would agree with it. But I feel like sugary drinks – everybody drinks them.' [1637]</p> <p>'I would say I think they're fair but I feel like it's maybe extremely too high. But I think it's fair because of the cause – of the reasons behind the taxes. But I guess I would say I'm in between.' [1640]</p>
	Accountability of revenue spending	<p>'Well, I heard it was supposed to be – to help with the schools. But I don't see it. There's so many schools closing down. I'm not talking about the COVID thing. I'm just talking about in general I can't understand how the soda tax just been going up for years. It's supposed to save schools, but it's still a lot of the schools are shutting down, so I'm trying to figure out where is this money going to.' [1637]</p> <p>'So, where is the soda tax money going? Because the schools don't seem like they're getting it.' [0908]</p> <p>'I would like to maybe read a publication or something like that, see something that's saying like . . . with this sugar tax, this is what they've done.' [1749]</p> <p>'They gotta prove it, they gotta show it more. Have an event that's stating why they are doing this soda tax, show us where, or programs that they are introducing into it, for us to be interested in.' [1554]</p>
	Revenue: good cause v. better use of funds	<p>'If it's going to a good cause, I'm all for it.' [1749]</p> <p>'So I mean, if it's for a good cause, why not?' [1517]</p> <p>'Our children are the future.' [1343]</p> <p>'I think it's awesome to help the children . . . it's wonderful for that purpose.' [1541]</p> <p>'The teens – summer jobs and helping them – giving them something to do in the summertime.' [1508]</p> <p>'Teenagers, they don't really have – teenage boys, specifically, they don't have a place to go and play sports like they used to. And I know that's caused a lot of them to just be out on the street hanging. And so, yeah, I do think that possibly opening up recreation centers would be a good idea.' [1600]</p>
	Decreased sweetened beverage consumption v. no change	<p>'I'm not buying as much sugary drinks, soda. It's helping me not buy the soda because it's too high.' [1508]</p> <p>'I definitely buy more waters now, and I think that's a good thing.' [1637]</p> <p>'It's pretty much the same, I wasn't doing too much of the . . . soda drinks anyway.' [1431]</p> <p>'I like soda. So, I'm going to pay whatever the price is for soda because I like soda.' [1134]</p> <p>'For the most part it hasn't really impacted what I buy too much. Especially because I knew the money was supposed to be going toward a good cause, so I was kind of fine with the tax.' [1009]</p>
Perceived Behaviour Change in Response to Tax	Kids' behaviour changes	<p>'It changed a lot because they'd be drinking soda and juice all day. And I tell them . . . "Soda and juice is not how they used to be, they're more expensive."' [1517]</p> <p>'Not really. My kids are still pretty young, so they didn't get into that soda and sugary drink – they didn't really get into that, so it didn't really affect us too much.' [1007]</p> <p>'I'm not going to make them suffer because they like certain things. . . . I'll make sure that they have it, whatever they want.' [1516]</p>

Continued



Table 2. Continued

Domain	Subdomain	Illustrative Quote ^a
	Dissonance between stated health goals and behaviour	'I'm teaching healthy eating but I go eat a cheesesteak on lunch and drink like a bunch of sugar and calories.' [1343] 'We try to stay pretty healthy around here, especially because my daughter is bigger for her age ... She loves Capri Sun. She might have a little ... but she doesn't have more than like 16 ounces of juice per day.' [1009]
	Tax avoidance and substitution	'Oh, any sugary drink, I don't buy in Philadelphia. I go out to where there's no soda tax and I buy it from there.' [2007] 'That's ridiculous, I'll drive out of the county and get it regular price or a cheaper price.' [1507] 'Before the soda tax we never bought Kool-Aid packets ever. But now with that in place, we go to Kool-Aid packets all the time. We usually have two or three pitchers of Kool-Aid in the refrigerator because it's way cheaper.' [1749]

^a Unique participant numbers presented in brackets.

the city was not using the revenue properly. Numerous participants stated they wished they could check a public record to see how the funds were being used.

Revenue: good cause v. better use of funds. When asked about how the city was using tax revenue, both supporters and critics of the tax agreed that revenue was going to a 'good cause', often using that phrase verbatim. We followed up with a question about whether there was a better use for the tax revenue. Many participants said no. Others suggested that the funding still be used for youth programming, but should be expanded in ways that explicitly support adolescents, like funding teen recreation centres and summer job opportunities.

Perceived behavior change in response to the tax

Decreased sweetened beverage consumption v. no change.

We asked participants to reflect on the beverages in their refrigerators at the time of the interview and before the tax went into effect, considering whether they were different, and if so, how. Over half reported decreased sweetened beverage consumption since tax implementation. Participants did not specify whether beverages were sweetened with sugar or artificial sweeteners. Others noted they had swapped sweetened beverages for water.

Some participants reported their beverage consumption had not changed since the tax, either because they did not drink many sweetened beverages prior to tax implementation or the tax had not influenced their consumption habits. Some stated there were certain sweetened beverages they really enjoyed, like Pepsi or ginger ale, that they were willing to pay for at higher cost. One participant stated that supporting 'a good cause' was the reason she had not changed her habits, because each time she purchases a taxed drink, it contributes to education revenue.

Children's behaviour changes. Participants reported a range of perspectives about the tax's impact on their children's consumption of sweetened beverages, from decreased intake to no effect. Some parents noted a direct connection between the tax and a decrease in their children's sweetened beverage consumption, either due to increased cost, the

health message conveyed by the tax, or both. For others, the tax had no effect because their children never drank sweetened beverages. More than one parent stated their child's consumption of sweetened beverages had not changed because they were 'protecting' them from the tax, stating they would sacrifice their own consumption to be able to afford sugary drinks for their children.

Dissonance between stated health goals and behaviour. The majority of participants expressed that they considered how 'healthy' a beverage was before purchasing it for their families. However, almost half of the parents interviewed went on to say that despite prioritising health, they bought sweetened drinks for their children. Some cited juice-adjacent beverages such as Capri Sun or sweetened 'waters' as the sugary drinks they allowed. Only a few parents acknowledged the dissonance between their stated health goals and continuing to drink sweetened beverages.

Tax avoidance and substitution. Several participants reported avoiding the tax by shopping for sweetened beverages outside of Philadelphia's city limits. Some noted that they would be outside of the city for other reasons, like visiting family members or for work, and would coordinate food shopping with those activities to avoid the tax. Others noted that they swapped buying sweetened beverages for powder or liquid drink mixes like Kool-Aid or Gatorade that are not taxed, to continue having the sugary drinks they wanted.

Discussion

This is the first qualitative study, to our knowledge, focused on low-income parents' perceptions of a sweetened beverage tax. Our results support Bos *et al.*'s conceptual model (Fig. 1) depicting that perceived fairness and effectiveness influence a food policy's acceptability, and shed further light on how certain elements of beverage tax policies influence how they are perceived by low-income parents. The key findings can be summarised into four main conclusions, each of which has direct policy implications (Table 3). First, using tax revenue to support programmes highly valued by parents, like education, was viewed favourably. Second, the perceived fairness of the tax was contingent upon the city using tax revenue as

**Table 3.** Recommendations for policymakers considering beverage taxes

Policy Implication	Message
1. Align Tax Revenue use with Community Values	Policymakers should partner with community organisations and representatives when designing sweetened beverage taxes to ensure revenue is allocated towards programming valued by the community to increase the acceptability of the policy.
2. City Accountability & Transparency of Revenue Spending	Policymakers should be transparent in revenue spending to improve public opinion of sweetened beverage taxes.
3. State or National Taxes	Policymakers should consider state or national-level sweetened beverage taxes to increase tax effectiveness at promoting health behaviour change.
4. Pair Tax Policies with Health Promotion Campaigns	Policymakers should work with local health departments to pair sweetened beverage taxes with health promotion campaigns to augment health behaviour change beyond the signalling effect of the tax.

promised. Third, some Philadelphia parents avoided the tax through cross-border shopping in areas outside the city. Finally, the tax communicated a public health message about the negative health impact of sweetened beverage consumption. The policy implications of these findings and how they fit into the current understanding of perceptions of sweetened beverage taxes are summarised below.

Proponents, including grassroots groups, have argued that beverage taxes can advance health equity by generating revenue for programmes benefitting low-income communities, who are most affected by nutrition-related diseases⁽¹⁴⁾. However, no prior studies have documented whether low-income communities agree with this view^(15,25). We found that many low-income Philadelphia parents supported the policy as long as its revenue is directed to programmes meaningful to them, such as early childhood education. Many participants felt the tax revenue was being used in the best way possible, suggesting that Philadelphia's policymakers identified a suitable use for the revenue.

Our first key finding is that policymakers should align sweetened beverage tax revenue use with community values to increase their acceptability (Table 3). Our results affirm previous evidence that aligning tax revenue with the community's goals is essential for the success and longevity of the tax. Prior studies examining U.S. beverage tax revenue allocation show that each of the existing taxes have allocated revenue specific to their community's needs⁽²⁶⁾. For example, Berkeley, California, which has a more highly educated and health-conscious population, allocates its tax revenue to healthy living programmes, compared to Philadelphia, which focuses tax revenue on early childhood education and renovating city schools, parks and libraries, consistent with the needs of its low-income population⁽²⁶⁾. In contrast, the short-lived beverage tax in Cook County, Illinois, enacted and repealed 3 months later, was framed to both help fill a \$200 million budget gap and as a way to improve health⁽²⁷⁾. One qualitative study showed that the public found these goals to be seemingly unrelated and not community-specific, contributing to mistrust about the tax's purpose and ultimately leading to its repeal⁽²⁷⁾.

Our second key finding is that transparent revenue spending is likely to improve public opinion of sweetened beverage taxes. In addition to designating revenue for programmes that benefit low-income families, policymakers must also consider strategies for accountability. We found that parents who had directly

benefitted from the beverage tax revenue, through expanded free pre-K, for example, felt more favourably about the tax than parents who had not seen the direct impact of the funds. Although Philadelphia does publicly report revenue use online, many participants were not aware of this and called for increased visibility, even explicitly asking for 'a public record', or 'an event' to publicise revenue use. These findings are consistent with prior qualitative work assessing beverage tax acceptability, noting mistrust that revenue will be used as promised, rather than for 'generic government business'⁽²⁸⁾. Consistent with these concerns, as of 30 June 2021, 53.6% of Philadelphia's tax revenue was in the city's 'general fund'⁽¹⁶⁾.

Several U.S. sweetened beverage taxes (Berkeley, Oakland, San Francisco, Boulder and Seattle) have existing community advisory boards to ensure accountability in tax revenue use⁽²⁶⁾. Given our findings that some low-income Philadelphia parents remain sceptical about the tax's revenue use, advisory boards such as these may be a model for maintaining accountability and improving public opinion about sweetened beverage taxes.

Our third key takeaway is that policymakers should consider state or national sweetened beverage taxes to increase tax effectiveness at promoting health behaviour change. Our study found that cross-border shopping contributed to low-income parents' mixed feelings about perceived effectiveness of the tax. Though some parents reported a decrease in their family's sweetened beverage intake or substituting water for sweetened beverages, others reported avoiding the tax by purchasing sweetened beverages outside the city. This is consistent with other findings from Philadelphia, though net declines in volume of sweetened beverages sold since tax implementation far exceed the amount of cross-border shopping^(6,29,30). In line with our findings that low-income parents are contributing to this phenomenon, Supplemental Nutrition Assistance Program sales increased in neighbouring counties and decreased in Philadelphia after tax implementation, though given the different numbers of participants in each county it is difficult to estimate the relative impact of the changes^(31,32). Still, in order to maximise the tax's effect, policymakers should consider state or national taxes to increase the geographical spread and decrease cross-border shopping.

Participants also reported substituting powdered or liquid beverage mixes as a way to consume nontaxed sugary drinks. This aligns with findings from a recent longitudinal analysis of



commercial retail sales data that noted substitution towards beverage concentrates in supermarkets since implementation of Philadelphia's tax^(33,34). Therefore, policymakers should consider including powdered beverage mixes and concentrates to close this loophole in future beverage tax policies.

Finally, our results suggest that pairing sweetened beverage taxes with health promotion campaigns may augment healthy behaviour change beyond the economic impact of the tax. Participants expressed that the tax served as a reminder that sweetened beverages are detrimental to health, communicating a public health message along with the tax's economic disincentive. After enactment of Philadelphia's tax, many supermarkets and other establishments posted 'Philly Beverage Tax' signs above taxed beverages to explain the higher price to consumers. For our participants, these signs communicated the dual message of an explanation of the higher price as well as flagging the beverage as 'unhealthy' in their minds. Tobacco taxation, paired with public health messaging about the health risks of smoking, serves as a strong historical precedent for the synergy of tying a health promotion campaign to economic disincentives⁽³⁵⁾. Evidence is mounting that the same approach may be effective for sweetened beverage taxes⁽²⁵⁾.

The extent to which there is 'signalling' of the harms of sweetened beverages through the presence of a tax on its own has been examined in other cities with beverage taxes, with mixed results depending on local context and whether the tax was paired with a public health campaign at its outset⁽²⁵⁾. In Cook County, Illinois, where there was not a concerted public health campaign accompanying the tax, consumers bought fewer sweetened beverages when the tax was in place and sales returned to pre-tax levels after it was repealed, suggesting no persistent signalling effect⁽³⁶⁾. Some criticised the inclusion of artificially sweetened beverages in Cook County's tax as 'diluting' the public health message of the tax⁽²⁷⁾. This 'diluting' of the health message may partially explain the lack of a persistent signalling effect after the revocation of the Cook County tax. However, Philadelphia's tax does extend to artificially sweetened beverages and this criticism did not arise in our study. In contrast to both Cook County and Philadelphia, Berkeley, California launched a health promotion campaign about the harms of excess sweetened beverage consumption prior to the enactment of their beverage tax and the University of California, Berkeley campus saw a decline in sales of sweetened beverages even before the tax took effect⁽³⁷⁾.

While history and prior research suggest that in some contexts, focusing only on the potential health impacts of a sweetened beverage tax as reason for its implementation may be unsuccessful, pairing a health promotion campaign with a tax policy may be an effective approach to maximise health behaviour change in response to the tax^(17,25). Indeed, Philadelphia failed to implement a sweetened beverage tax twice using a health frame as the main reason for tax implementation, before ultimately passing the current tax⁽³⁸⁾. Yet, we found that many participants reported prioritising health when grocery shopping. At the same time, parents reported regularly buying sugary drinks, which for some represented a treat for their children that they were unwilling to sacrifice. The dissonance between parents reporting that they prioritise

health yet continue to purchase sugary drinks – often as an inexpensive indulgence for their children – deserves further investigation. This finding also suggests that health promotion and education, in concert with promoting beverage taxes as a revenue stream for valued programmes, could help support families make the healthy choices they aspire to.

Limitations

The present study has several limitations. The first is selection bias, as study participation was voluntary and eligible individuals who declined participation may have differed from our study population. Second, our findings may not be generalisable to other groups. We recruited a largely homogenous sample of low-income Black/African American women in Philadelphia. While ideal for exploring the spectrum of views held by this population, which has not been well represented in prior work on sweetened beverage taxes, this approach does limit generalizability. We excluded non-English speakers because, due to the low prevalence in our clinic population, we could not adequately capture their distinct perspectives. Additionally, caregivers of young children may be particularly enthusiastic about tax revenue being used for education. Future studies characterising perceptions among populations less likely to benefit personally from these services – like the elderly or adults without children – and including non-English-speaking families would provide further insight into the most widely acceptable policy design. The present study is also limited by social desirability bias, as caregivers may feel pressure to report providing healthier diets for their children than they are consuming in practice, particularly to researchers affiliated with a children's hospital. Conducting interviews via telephone allowed for more anonymity which may have mitigated some social desirability bias. Finally, we did not ask specifically about perceptions of the inclusion of artificially sweetened beverages in the tax, which would have shed light on an understudied area. Future studies should investigate how the inclusion of artificially sweetened beverages in beverage taxes influences their perceived fairness and effectiveness.

Conclusion

For low-income Philadelphia parents, perceptions of beverage tax fairness were driven by two critical elements: use of revenue for programmes valued by the community, such as early childhood education, and accountability of city government to use tax revenue as promised. Because some individuals leave the city to avoid taxation, state or national taxes would likely be even more effective at reducing sweetened beverage intake than local taxes. Pairing sweetened beverage tax policies with public health education campaigns reinforcing the negative health impact of sweetened beverage consumption may further improve tax effectiveness.

Supplementary material

The supplementary material for this article can be found at <https://doi.org/10.1017/jns.2022.64>.



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