




Sugar tax and product reformulation proposals reduce the perceived legitimacy of health-promotion institutions: a randomized population-based survey experiment

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Background: Structural nutrition interventions like a sugar tax or a product reformulation are strongly supported among the public health community but may cause a considerable backlash (e.g. inspiring aversion to institutions initiating the interventions among citizens). Such a backlash potentially undermines future health-promotion strategies. This study aims to uncover whether such backlash exists. **Methods:** We fielded a pre-registered randomized, population-based survey experiment among adults from the Longitudinal Internet Studies for the Social Sciences panel ($n = 1765$; based on a random sampling of the Dutch population register). Participants were randomly allocated to the control condition (brief facts about health-information provision/nudging), or one of two experimental groups (the same facts, expanded with either a proposed sugar tax on or reformulation of sugar-sweetened beverages). Ordinary least squares regression was used to estimate the proposed interventions' effects on four outcome variables: trust in health-promotion institutions involved; perceptions that these institutions have citizens' well-being in mind (i.e. benevolence); perceptions that these institutions' perspectives are similar to those of citizens (i.e. alignment of perspectives); and attitudes toward nutrition information. **Results:** Trust, perceived benevolence and perceived alignment of perspectives were affected negatively by a proposed sugar tax (-0.24 , 95% CI -0.38 to -0.10 ; -0.15 , -0.29 to -0.01 ; -0.15 , -0.30 to 0.00) or product reformulation (-0.32 , -0.46 to -0.18 ; -0.24 , -0.37 to -0.11 ; -0.18 , 0.33 to -0.03), particularly among the non-tertiary educated respondents. **Conclusions:** Sugar taxes or product reformulations may delegitimize health-promotion institutions, potentially causing public distancing from or opposition to these bodies. This may be exploited by political and commercial parties to undermine official institutions. **Trial registration:** https://osf.io/qr9jy/?view_only=5e2e875a1fc348f3b28115b7a3fd90. Registered 3 February 2022.

Introduction

Improving citizens' nutritional intake has taken centre stage in health promotion in countries dealing with rising obesity rates. Health professionals, scientists and governments are collaborating to improve and equitize nutritional health using information and public policies. The latter, typically taking the form of structural health interventions, are generally most effective, as they 'change the social, physical, economic, or political environments that may shape or constrain health behaviours and outcomes, altering the larger social context by which health disparities emerge and persist',¹ thus restricting individual agency.² Structural interventions can broadly be subdivided into three groups: interventions that focus on availability, acceptability or accessibility.³ In this study, we focus on two interventions in the first category: a sugar tax, affecting the availability through price changes, and a product reformulation, affecting the availability through regulations for the sugar-sweetened beverages (SSBs) industry.

Such restrictive interventions, however, have relatively low levels of public acceptance.⁴ Although the lack of choice related to such interventions makes this less important (compared with agentic interventions), the pushback may be cause for concern, as it may create a feedback loop that negatively impacts the perceived legitimacy of the institutions involved and, consequently, their future

initiatives.⁵ Especially in times of surging political populism, a vulnerability in the position of public health bodies is concerning, as it may be exploited to further undermine their legitimacy. Ultimately, this can produce movements that attempt to counteract public health promotions, as exemplified by the politicized anti-vaccination groups operating during the COVID-19 pandemic, posing an even greater threat to public health.⁶

This pushback may particularly arise among non-tertiary-educated individuals. Diminishing socioeconomic inequality in nutritional health is one of the key interests of health professionals and governments alike,⁷ leading to strong advocacy for structural interventions, since these have been found to have a greater effect among the lower social strata,⁸ whereas more downstream interventions (e.g. information campaigns) often widen health inequalities.⁹ Nevertheless, this group seems more opposed to structural interventions than members of higher social strata, although the patterns identified are inconsistent.^{10,11} Furthermore, health-promotion institutions are perceived as less legitimate by non-tertiary educated citizens,^{12–14} possibly due to the perceived differences in perceptions between themselves and the institutions.¹⁵ Indeed, a recent study has shown that opposition to the tertiary educated and the institutions they inhabit may be why nutrition health interventions are less effective among non-tertiary educated citizens.¹⁶

This study aimed to uncover if and how proposing structural interventions affect the perceived legitimacy of involved institutions, among citizens with or without tertiary education. To this end, we used examples of interventions seeking to reduce SSB consumption in the Netherlands, where they are a leading cause of obesity and overweight but are not the subject of any relevant structural interventions. This allowed us to evaluate how Dutch citizens confronted with such proposals perceive the legitimacy of the health-promotion institutions involved versus the views of those who only receive a description of the current situation. Accordingly, we asked: 'Does proposing structural interventions to reduce the consumption of SSBs have a negative impact on the perceived legitimacy of health-promotion institutions, and is this effect stronger among non-tertiary educated citizens?'

Methods

This study was preregistered with the Open Science Framework and received ethical approval from the DPAS Research Ethics Review Committee (ETH2122-0115) before the start of data collection. For the anonymized pre-registration, see: https://osf.io/qr9jy/?view_only=5e2e875a1fc348f3b28115b7a3fd90

Study participants

Participants were recruited from the Longitudinal Internet Studies for the Social Sciences (LISS) panel, which is administered by Centerdata (Tilburg University, the Netherlands). The panel is composed of a true probability sample of households based on the official population register and comprises about 7500 individuals. In this study, fielded in February 2022, 2440 Dutch adults (18 years and above) were sampled from the panel, with a completion rate of 80.8%. We only selected those who spent longer than 20 s on the page setting out the experimental condition, as this was considered to be the minimum time required to read the text comprehensively. The final sample comprised 1880 respondents.

Study design

The study was a survey experiment with a between-subjects design. The respondents were asked to complete an online survey and, when they started, were allocated randomly to one of three groups. A control group read brief facts about the approach to health promotion of collaborating public health bodies seeking to advance nutritional health in the Netherlands, including nudging and information provision. The experimental groups were confronted with the same information, supplemented with a short text explaining the need for further measures around SSBs and a proposal of either a sugar tax or the regulated reduction of the sugar content, achieved by product reformulation. In both cases, it was specified that the collaborating public health bodies are 'the government, and health care and science organizations'. The subsequent survey questions were the same for each condition.

Intervention design

Our information texts were constructed using information about extant health-promotion initiatives in the Netherlands, and suggested approaches that may be implemented in the future. They were designed so that each text contained a clear treatment¹⁷ and, for each one, we provided respondents with neutral information about the proposed interventions and their direct consequences for citizens. We based this information on official (governmental) reports on similar interventions. To ensure that a proposed intervention came across well, it was explained in clear terms and the text on the central elements was in bold type. Both the original and English translations of the interventions are contained in the Supplementary material (see [Supplementary file S1](#)).

Measures

We used various indicators for perceived legitimacy. These were preceded by a short sentence highlighting the institutions discussed in the texts, which stated that the questions were 'about the various institutions that are named in the text you have just read'. Unless noted otherwise, the answer categories for each item were on a seven-point range: (1) completely disagree; (2) disagree; (3) somewhat disagree; (4) neither disagree nor agree; (5) somewhat agree; (6) agree; (7) completely agree.

'Trust' in health-promotion institutions was measured with a three-item scale.¹⁸ The items are as follows: These organizations are (i) honest; (ii) trustworthy; (iii) genuine. A reliable scale (Cronbach's alpha = 0.97) was created by taking the mean score of those who provided valid answers to each question. Higher scores indicated more trust.

'Perceived benevolence' (i.e. the perception that health-promotion institutions have citizens' well-being in mind) was measured with a three-item scale: These organizations (1) truly care about improving the health of Dutch citizens; (2) have the best intentions; (3) are concerned about Dutch citizens. A reliable scale (Cronbach's alpha = 0.94) was created by taking the mean score of those who provided valid answers to each question. Higher scores indicated more perceived benevolence.

'Perceived alignment of perspectives' (i.e. citizens' perceptions that perspectives of health-promotion institutions match their own) was measured with a three-item scale adapted from items used in studies on various indicators of incongruity in perspectives between institutions and citizens.^{19,20} These organizations (1) do not understand me well; (2) focus on things that do not reflect my wishes; (3) place the interests of others above mine. A reliable scale (Cronbach's alpha = 0.87) was created by reverse coding the items and taking the mean score of those who provided valid answers to each question. Higher scores indicated more perceived alignment.

'Attitudes toward information provision' as a way to reduce SSBs consumption was measured with a three-item scale based on items used in other studies on attitudes toward health interventions.²¹ The respondents were asked to indicate whether they find information provision as a way to reduce the intake of SSBs: Very bad (1) to very good (7); very unnecessary (1) to very necessary (7); and very unwise (1) to very wise (7). A reliable scale (Cronbach's alpha = 0.81) was created by taking the mean score of those who provided valid answers to each question. Higher scores indicated a greater acceptance of the information-provision approach.

Our treatment variable measured the experimental condition to which a respondent was assigned: (0) control; (1) sugar tax; (2) product reformulation. These were included as dummy variables, with (0) being the reference category.

Our moderation analysis interacted with the variable measuring the treatment assigned to a respondent with our measure of educational attainment. The measure was derived from the LISS background variables (automatically provided with each data collection by Centerdata) and assesses the highest level of completed education. Respondents with a degree but currently still in education ($n = 76$) were excluded, as were those who had not (yet) completed, or started any education ($n = 39$). As official institutions are primarily peopled by those with a tertiary education, and since recent studies have shown that attitudinal differences toward institutions mainly exist between individuals with or without a tertiary education^{15,16} we recoded this variable into two categories: (0) tertiary education (ISCED 5-7), and (1) non-tertiary education (ISCED 0-4). We deliberately chose 'tertiary education' as the reference category for clarity, as our theoretical focus in the moderation hypotheses was on the non-tertiary educated respondents.

Analytical strategy

Ordinary least squares regression models were estimated to identify the effects of the intervention proposals on our outcome measures.

For the main confirmatory analyses, we fitted a separate model for each outcome measure. The model was similar for the four outcome variables:

$$Y = \beta_0 + \beta_{1\text{sugartax}} + \beta_{2\text{productreformulation}} + \varepsilon \quad (1)$$

where Y is the outcome measure; sugartax is a dichotomous variable indicating the sugar tax treatment; $\text{productreformulation}$ is a dichotomous variable indicating the product reformulation treatment and ε is the error term. The reference category was the control condition.

For the confirmatory moderation analyses, we also fitted a separate model for each outcome measure:

$$Y = \beta_0 + \beta_{1\text{sugartax}} + \beta_{2\text{productreformulation}} + \beta_{3\text{ntedu}} + \beta_{4(\text{ntedu} * \text{sugartax})} + \beta_{5(\text{ntedu} * \text{productreformulation})} + \varepsilon \quad (2)$$

where ntedu is a dichotomous variable indicating whether a respondent was non-tertiary (1) or tertiary educated (0); $(\text{ntedu} * \text{sugartax})$ is the interaction between educational attainment and the first treatment and $(\text{ntedu} * \text{productreformulation})$ is the interaction between educational attainment and the second treatment.

Results

There were 1765 respondents in our sample after exclusions based on the time spent on the treatment page and educational attainment. The median age was 61 (mean age 58), 55% were female, and 56% non-tertiary educated.

The structural intervention proposals strongly impacted the perceived legitimacy of the health-promotion institutions involved (table 1). They were trusted significantly less by the respondents confronted with a proposed sugar tax ($b = -0.24$, 95% CI -0.38 to -0.10) or product reformulation ($b = -0.32$, 95% CI -0.46 to -0.18) than by those in the control group. This was also true for perceived benevolence: the respondents confronted with either proposal viewed the institutions as less benevolent than their control-group counterparts ($b = -0.15$, 95% CI -0.29 to -0.01 and $b = -0.24$, 95% CI -0.37 to -0.11 , for the sugar tax and product reformulation proposals, respectively). Lastly, the institutions' perspectives were to a lesser extent perceived to match citizens' own perspectives when the respondents were confronted with the sugar tax ($b = -0.15$, 95% CI -0.30 to 0.00), or product reformulation ($b = -0.18$, 95% CI -0.33 to -0.03) proposals, although the former's confidence interval included the null. The attitudes toward information provision were not obviously affected by either proposal ($b = -0.12$, 95% CI -0.26 to 0.02 and $b = -0.08$, 95% CI -0.22 to 0.06).

We also tested for effect modification by education (table 2). There was one interaction effect with confidence intervals not including the null: the negative impact of a proposed sugar tax on the perceived benevolence of the health-promotion institutions involved was greater among the non-tertiary educated respondents than among their tertiary-educated counterparts ($b = -0.30$, 95% CI -0.57 to -0.02). Nevertheless, visualizing the interaction effects revealed large differences in the extent to which the tertiary and

non-tertiary educated respondents were affected by the experimental conditions (figure 1). Indeed, explorative subgroup analyses stratifying the results by educational attainment (table 3) showed that perceived legitimacy fell on seven of eight occasions among the non-tertiary educated group, but only on one of eight occasions among those with tertiary education.

Discussion

Scholarly attention on sugar taxes and product regulation primarily addresses the direct, intended impacts on citizen health. Findings are overwhelmingly positive, as these measures tend to be effective at producing healthier behaviours.²² Nonetheless, the results of our population-based survey experiment identify a need to look beyond these immediate health effects, demonstrating that proposing such interventions may lead to a lower perceived legitimacy of the health-promotion institutions involved. These unintended consequences may have substantial implications for population health and deserve greater emphasis in discussions on successful health-promotion strategies. Whereas the effectivity of sugar taxes and product regulation does not depend on popular trust in the institutions involved, more agentic health interventions and the uptake of health information do, as will be discussed below.

Our results show that while the aforementioned delegitimization takes place among the population at large, it occurs even more strongly among a substantial and, for health-promotion purposes, important subgroup: citizens without tertiary education. This group already perceives health-promotion institutions as less legitimate, and these views became more entrenched after exposure to a proposal for a sugar tax or reformulation of SSBs.

The delegitimization of health-promotion institutions may have far-reaching consequences for population health and beyond. For example, there are associations between institutional distrust and a higher likelihood of harmful alcohol consumption²³ and non-compliance with health policies.²⁴ Such distrust has also been found to be detrimental to other institutional activities like paying tax²⁵ and cooperating with the law²⁶ and justice.²⁷ As a low level of institutional legitimacy is already more prevalent among non-tertiary educated citizens, it is important that interventions do not widen this gap further. While this legitimacy gap is already a problematic, but not uncommon, phenomenon, it becomes a greater concern if political actors exploit it to drive a bigger wedge between their constituents and public health institutions. One need only look at the COVID-19 pandemic, where the dangers of populist rhetoric in a public health crisis were clear.^{28,29}

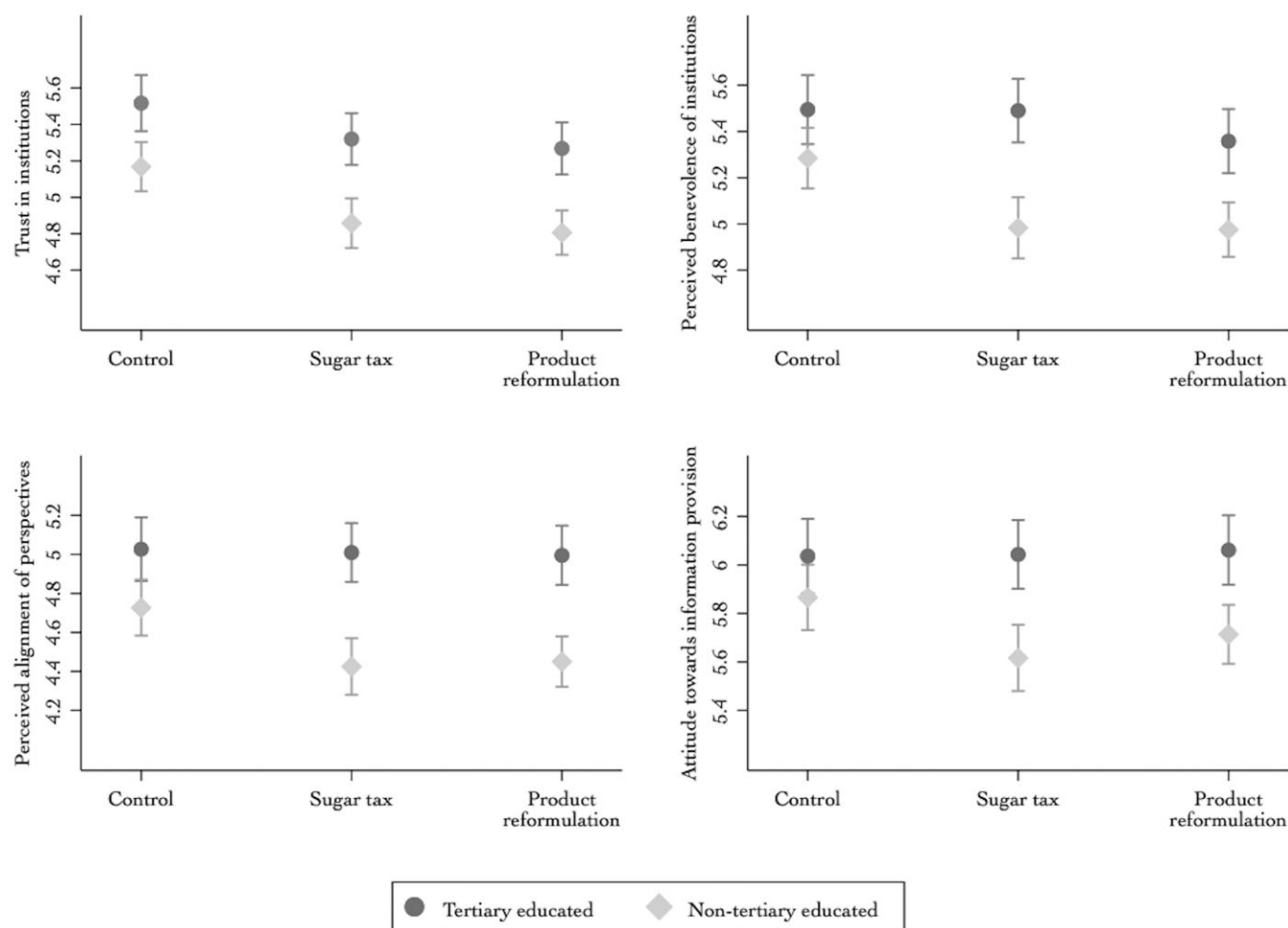
Our findings in the Netherlands show that this delegitimization may occur even in a country where, relatively, institutions are deemed to be legitimate. While we observed a reduction in perceived legitimacy among those confronted with a structural intervention proposal, the country's institutions still scored reasonably well regarding public legitimacy. In nations where such institutions are regarded less benignly (e.g. eastern and central European countries),³⁰ effects on the perceived legitimacy of involved institutions may be even stronger, potentially impacting future compliance with other health-promotion strategies. More research is therefore required to investigate the impacts of proposing and implementing

Table 1 Effects of intervention proposals on perceived legitimacy of health-promotion institutions, $n = 1765$

Experimental condition	Trust β (95% CI)	Perceived benevolence β (95% CI)	Perceived alignment of perspectives β (95% CI)	Attitudes toward information provision β (95% CI)
Control condition	Ref.	Ref.	Ref.	Ref.
Sugar tax	-0.24 (-0.38 to -0.10)	-0.15 (-0.29 to -0.01)	-0.15 (-0.30 to 0.00)	-0.12 (-0.26 to 0.02)
Product reformulation	-0.32 (-0.46 to -0.18)	-0.24 (-0.38 to -0.11)	-0.18 (-0.33 to -0.03)	-0.08 (-0.22 to 0.06)
Constant	5.32 (5.22 to 5.42)	5.38 (5.28 to 5.48)	4.86 (4.75 to 4.97)	5.94 (5.84 to 6.04)

Table 2 Effects of intervention proposals on perceived legitimacy of health-promotion institutions, with effect modification by education, $n = 1765$

	Trust β (95% CI)	Perceived benevolence β (95% CI)	Perceived alignment of perspectives β (95% CI)	Attitudes toward information provision β (95% CI)
Experimental condition				
Control condition	Ref.	Ref.	Ref.	Ref.
Sugar tax	-0.20 (-0.41 to 0.01)	-0.00 (-0.21 to 0.20)	-0.02 (-0.24 to 0.20)	0.01 (-0.20 to 0.22)
Product reformulation	-0.25 (-0.46 to -0.04)	-0.14 (-0.34 to 0.07)	-0.03 (-0.25 to 0.19)	0.02 (-0.19 to 0.23)
Non-tertiary education	-0.35 (-0.55 to -0.14)	-0.21 (-0.41 to -0.01)	-0.30 (-0.52 to -0.08)	-0.17 (-0.38 to 0.03)
Sugar tax * non-tertiary education	-0.11 (-0.40 to 0.17)	-0.30 (-0.57 to -0.02)	-0.28 (-0.59 to 0.02)	-0.26 (-0.54 to 0.03)
Product reformulation * non-tertiary education	-0.11 (-0.39 to 0.16)	-0.17 (-0.44 to 0.10)	-0.24 (-0.54 to 0.05)	-0.18 (-0.45 to 0.10)
Constant	5.52 (5.36 to 5.67)	5.49 (5.35 to 5.64)	5.03 (4.86 to 5.19)	6.04 (5.88 to 6.19)

**Figure 1** Visualization of intervention effects on the perceived legitimacy of health-promotion institutions, stratified by education

structural interventions in countries with varying levels of perceived institutional legitimacy.

Although our study was limited to proposals of a sugar tax or product reformulation, the similarity in their effects suggests that the impact on other policies and interventions may be comparable. Moreover, this suggests that it is not only due to the prospect of price increases but indicative of a wider resentment toward structural interventions targeted at unhealthy consumer products among non-tertiary educated citizens. In order to improve the public acceptance of health-promotion efforts and prevent backlash on the perceived legitimacy of involved institutions, it is imperative to

better understand why this resentment occurs, for which interventions, and if it is maintained after such interventions are implemented.

For example, while we observed a considerable backlash against proposals aiming to make it harder to consume unhealthy products, interventions seeking to make the consumption of healthy items easier (e.g. by reducing taxes on healthy foods), might instead increase trust in the institutions involved. Similarly, non-tertiary educated citizens may feel particularly stigmatized by policies that seem to target their 'unwanted' behaviours while also disregarding the wider societal conditions that shape their health chances.³¹

Table 3 Effects of intervention proposals on perceived legitimacy of health-promotion institutions, stratified by education

	Trust β (95% CI)	Perceived benevolence β (95% CI)	Perceived alignment of perspectives β (95% CI)	Attitudes toward information provision β (95% CI)
Non-tertiary educated, $n = 980$				
Experimental condition				
Control condition	Ref.	Ref.	Ref.	Ref.
Sugar tax	-0.31 (-0.50 to -0.12)	-0.30 (-0.49 to -0.11)	-0.30 (-0.50 to -0.10)	-0.25 (-0.45 to -0.04)
Product reformulation	-0.36 (-0.55 to -0.18)	-0.31 (-0.49 to -0.13)	-0.28 (-0.46 to -0.09)	-0.15 (-0.35 to 0.04)
Constant	5.17 (5.03 to 5.30)	5.28 (5.15 to 5.42)	4.73 (4.59 to 4.87)	5.87 (5.72 to 6.01)
Tertiary educated, $n = 785$				
Experimental condition				
Control condition	Ref.	Ref.	Ref.	Ref.
Sugar tax	-0.20 (-0.40 to 0.01)	-0.00 (-0.20 to 0.19)	-0.02 (-0.25 to 0.21)	0.01 (-0.18 to 0.20)
Product reformulation	-0.25 (-0.46 to -0.04)	-0.14 (-0.34 to 0.06)	-0.03 (-0.26 to 0.20)	0.02 (-0.17 to 0.22)
Constant	5.52 (5.37 to 5.67)	5.49 (5.35 to 5.64)	5.03 (4.86 to 5.20)	6.04 (5.90 to 6.18)

Additional research is required to determine whether health interventions are deemed more legitimate if they are part of a balanced effort to improve the societal conditions in which various groups are born, live, work and age.

Nonetheless, given their undeniable health benefits, it is also vital to identify how commonly employed interventions that restrict the intake of unhealthy products can be employed without delegitimizing the institutions involved. A first endeavour would be to scrutinize how citizens think of various interventions. While this study has identified a clear aversion, primarily among those with a non-tertiary education, more in-depth research could uncover the reasons underlying this disdain and illuminate ways to produce interventions that do not cause the same (degree of) backlash. Such efforts should also consider how industry actors try to frame health debates and undermine the public's acceptance of related policies and find ways to counteract these framings.³²

Furthermore, while our survey experiment was designed to specifically test the effect of the factual characteristics of a proposal of structural interventions without including any positive or negative framing, effects may differ if, for example, more emphasis is placed on its potential health effects, whether it will be implemented as a singular policy or as part of a wider strategy, and how the revenues gained from, e.g. the sugar tax will be used. Future research could study whether delegitimization effects depend on such conditions while keeping in mind that how this is communicated to the public may also depend on the source through which this occurs.

Our study is limited by the relatively high number of excluded respondents due to the pre-registered exclusion criterion relating to the minimum time required to read the informational text properly. This eliminated 560 respondents and affected the representativeness of our sample: these individuals were generally younger, male and non-tertiary educated. Nonetheless, our view is that 20 s was appropriate for reading the text properly, which was crucial to the study. Moreover, the exclusion of a high number of respondents was inevitable for achieving some certainty that the text was read completely: less time still excluded many individuals (438 and 328 with times of 15 and 10 s, respectively). These exclusions would again have involved younger, male and non-tertiary educated respondents more. As a sensitivity analysis, we also included participants who spent at least 10 s (but not 20 s as per our pre-registered protocol) on the page setting out the experimental condition. This resulted in a slight attenuation of the observed effects, but did not impact our substantive conclusions (see the [Supplementary file S2](#)).

An additional limitation is that respondents might have had different things in mind regarding the public health institutions they were told and asked questions about. The treatment texts include an allusion to 'various organizations [that] collaborate [such as] the government, and health care and science organization', and as an introduction to the questions the respondents were asked to keep in mind the organizations they just read about in the treatment text. As

government, health care and science organizations are rather general and different entities, respondents might still vary in what they actually had in mind when making their evaluations. For the current study, the focus was mainly on the overarching collaboration of the aforementioned institutions, rather than on any specific institution, but future research could delve deeper into which institutional entities are particularly susceptible to the reported backlash. We would expect that those with an already lower baseline legitimacy (e.g. the government) will be more subject to it than, e.g. healthcare organizations.

Conclusion

While structural interventions are a very promising form of health promotion, their success should be evaluated for more than their immediate health outcomes. Without careful consideration of how various societal groups respond to such interventions, institutional legitimacy may suffer, especially among citizens with a non-tertiary education. This may have far-reaching consequences for the support given to institutions, and consequently hamper the uptake of the health information they provide, and the compliance with their more agentic health interventions. It also puts them in a vulnerable position which may be exploited by politicians and commercial parties to further undermine health-promotion efforts. We therefore urge for more consideration of the wider societal consequences of health-promotion efforts and avoiding potential unintended consequences. This will possibly paint a less optimistic image than a focus on health outcomes, but a more realistic one too.

Supplementary data

[Supplementary data](#) are available at *EURPUB* online.

Funding

The study was funded by the Erasmus Initiative 'Smarter Choices for Better Health'. They had no role in the design of the study and collection, analysis and interpretation of data and in writing the manuscript.

Conflict of interest: None declared.

Data availability

Research data were collected among CentERdata's LISS panel and will become freely available for academic research purposes from the LISS Data Archive repository, which has the International Data Seal of Approval (DSA).

Ethics approval

The study got ethics approval by the DPAS Research Ethics Review Committee (ETH2122-0115).

Key points

- Proposals for structural interventions reduce trust in health-promotion institutions, and the perception that they have citizens' well-being in mind and that their perspectives align with those of citizens.
- This reduction is especially potent among non-tertiary educated citizens, in addition to their already lower baseline levels of perceived legitimacy.
- This reduction in perceived legitimacy can cause an undermining of the position health-promotion institutions take during critical health crises (e.g. COVID-19).

References

- 1 Brown AF, Ma GX, Miranda J, et al. Structural interventions to reduce and eliminate health disparities. *Am J Public Health* 2019;109:S72–8.
- 2 Adams J, Mytton O, White M, Monsivais P. Why are some population interventions for diet and obesity more equitable and effective than others? The role of individual agency. *PLoS Med* 2016;13:e1001990.
- 3 Blankenship KM, Bray SJ, Merson MH. Structural interventions in public health. *AIDS* 2000;14(Suppl 1):S11–21.
- 4 Diepeveen S, Ling T, Suhrcke M, et al. Public acceptability of government intervention to change health-related behaviours: a systematic review and narrative synthesis. *BMC Public Health* 2013;13:756.
- 5 Veldheer S, Wright RR, Foulds J. What low-income smokers have learned from public health pedagogy: a narrative inquiry. *Am J Health Behav* 2019;43:691–704.
- 6 Kennedy J. Populist politics and vaccine hesitancy in Western Europe: an analysis of national-level data. *Eur J Public Health* 2019;29:512–6.
- 7 Kersh R, Morone J. The politics of obesity: seven steps to government action. *Health Aff (Millwood)* 2002;21:142–53.
- 8 McGill R, Anwar E, Orton L, et al. Are interventions to promote healthy eating equally effective for all? Systematic review of socioeconomic inequalities in impact. *BMC Public Health* 2015;15:457.
- 9 Backholer K, Beauchamp A, Ball K, et al. A framework for evaluating the impact of obesity prevention strategies on socioeconomic inequalities in weight. *Am J Public Health* 2014;104:e43–50.
- 10 Bélanger-Gravel A, Desroches S, Janezic I, et al. Pattern and correlates of public support for public health interventions to reduce the consumption of sugar-sweetened beverages. *Public Health Nutr* 2019;22:3270–80.
- 11 Farrell LC, Moore VM, Warin MJ, Street JM. Why do the public support or oppose obesity prevention regulations? Results from a South Australian population survey. *Health Promot J Austr* 2019;30:47–59.
- 12 Achterberg P, de Koster W, van der Waal J. A science confidence gap: education, trust in scientific methods, and trust in scientific institutions in the United States, 2014. *Public Underst Sci* 2017;26:704–20.
- 13 Laveist TA, Isaac LA, Williams KP. Mistrust of health care organizations is associated with underutilization of health services. *Health Serv Res* 2009;44:2093–105.
- 14 Noordzij K, de Koster W, van der Waal J. The micro–macro interactive approach to political trust: quality of representation and substantive representation across Europe. *European J Political Res* 2021;60:954–74.
- 15 Noordzij K, de Koster W, van der Waal J. A revolt of the deplored? The role of perceived cultural distance in the educational gradient in anti-establishment politics. *Br J Sociol* 2021;72:1448–63.
- 16 van Meurs T, Oude Groeniger J, de Koster W, van der Waal J. An incongruous intervention: exploring the role of anti-institutionalism in less-educated individual's limited uptake of nutrition information. *Sociol Health Illn* 2022;44:432–50.
- 17 Mutz DC. *Population-Based Survey Experiments*. Princeton, NJ: Princeton University Press, 2011.
- 18 McCroskey JC, Teven JJ. Goodwill: a reexamination of the construct and its measurement. *Commun Monogr* 1999;66:90–103.
- 19 Easterbrook MJ, Kuppens T, Manstead ASR. The education effect: higher educational qualifications are robustly associated with beneficial personal and socio-political outcomes. *Soc Indic Res* 2016;126:1261–98.
- 20 Spruyt B. An asymmetric group relation? An investigation into public perceptions of education-based groups and the support for populism. *Acta Polit* 2014; 49:123–43.
- 21 Dillard JP, Shen L. On the nature of reactance and its role in persuasive health communication. *Commun Monogr* 2005;72:144–68.
- 22 Briggs ADM, Mytton OT, Kehlbacher A, et al. Health impact assessment of the UK soft drinks industry levy: a comparative risk assessment modelling study. *Lancet Public Health* 2017;2:e15–22.
- 23 Ahnquist J, Lindström M, Wamala SP. Institutional trust and alcohol consumption in Sweden: the Swedish National Public Health Survey 2006. *BMC Public Health* 2008;8:283–10.
- 24 Bargain O, Aminjonov U. Trust and compliance to public health policies in times of COVID-19. *J Public Econ* 2020;192:104316.
- 25 Batrancea L, Nichita A, Olsen J, et al. Trust and power as determinants of tax compliance across 44 nations. *J Econ Psychol* 2019;74:102191.
- 26 Marien S, Hooghe M. Does political trust matter? An empirical investigation into the relation between political trust and support for law compliance. *Eur J Polit Res* 2011;50:267–91.
- 27 Hough M, Jackson J, Bradford B, et al. Procedural justice, trust, and institutional legitimacy. *Policing* 2010;4:203–10.
- 28 Bobba G, Hubé N. *Populism and the Politicization of the COVID-19 Crisis in Europe*. Cham: Palgrave Macmillan, 2021.
- 29 Kreps SE, Kriner DL. Model uncertainty, political contestation, and public trust in science: evidence from the COVID-19 pandemic. *Sci Adv* 2020;6.
- 30 Boda Z, Medve-Bálint G. Does institutional trust in East Central Europe differ from Western Europe? *Eur Q Polit Attitudes Mentalities* 2014;3:1–17.
- 31 Berg J, Harting J, Stronks K. Individualisation in public health: reflections from life narratives in a disadvantaged neighbourhood. *Crit Public Health* 2021;31:101–12.
- 32 Maani N, van Schalkwyk MCL, Petticrew M, Buse K. The pollution of health discourse and the need for effective counter-framing. *BMJ* 2022;377:o1128.