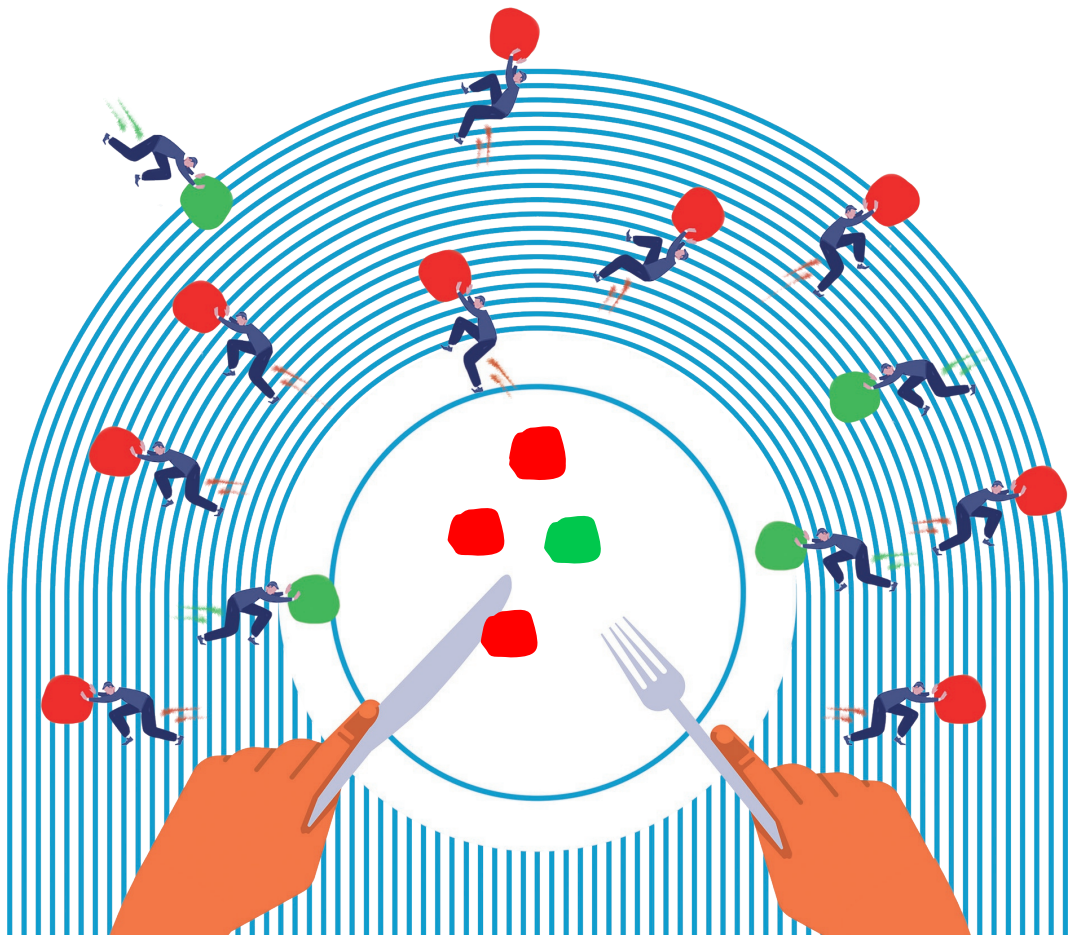


No Appetite for Meddling

The role of anti-institutionalism
in educational differences in the receptivity
to nutrition interventions

Tim van Meurs



No appetite for meddling

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Colofon

No Appetite for Meddling - The role of anti-institutionalism in educational differences in receptivity to nutrition interventions

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Geen trek in bemoeienis

De rol van anti-institutionalisme in
opleidingsverschillen in de ontvankelijkheid voor
voedingsinterventies

Proefschrift

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Erasmus Universiteit Rotterdam
op gezag van de
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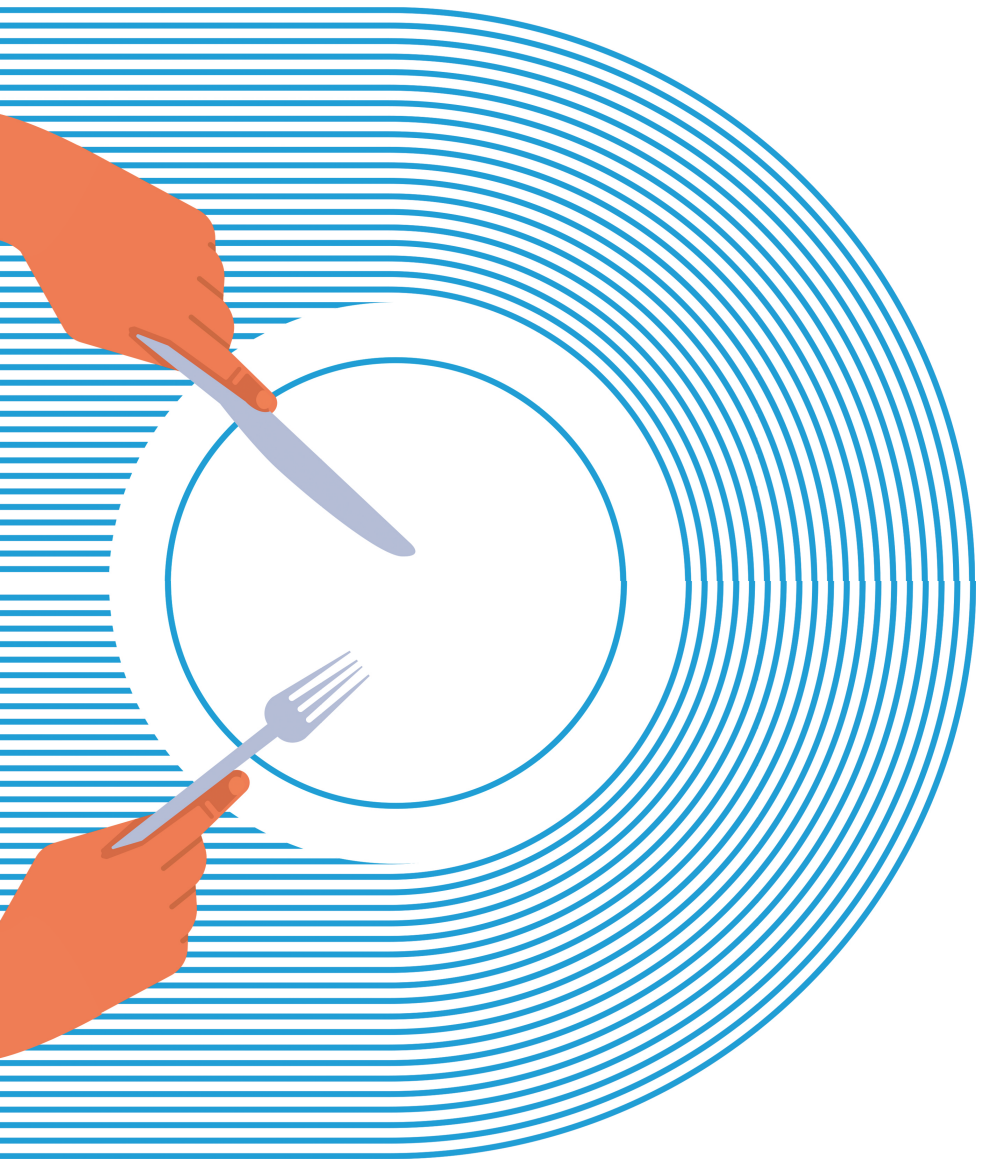
You'll never live like common people

You'll never do whatever common people do

— Pulp, *Common People*

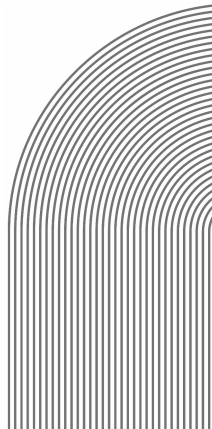
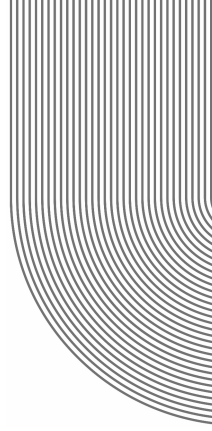
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Chapter 1.

Introduction



Dietary inequalities and citizens' perceptions of health-promotion institutions

The incidence of 'non-communicable' diseases has increased sharply over the last few decades, with no sign that this is going to come to an end anytime soon. Currently, large shares of the population of many countries is overweight, with the result that a shockingly high number of citizens develop illnesses, like diabetes, cardiovascular diseases, strokes, and different types of cancer (e.g., Knai et al., 2007). A major cause of this are the unhealthy food consumption patterns common in, e.g., many European countries (Kopp, 2019). Consequently, various official health-promotion institutions – e.g., health care, science, and government organizations – are seeking ways to combat the rising rates of overweight, partly by means of nutrition interventions that have the goal of improving citizens' diets.

The issue of excess weight, albeit a society-wide problem, is not spread equally across all layers of society. Instead, there are clear stratified patterns, whereby citizens with a lower socioeconomic status (SES) are much more likely to be overweight and suffer from related diseases than their high-SES counterparts. This is in part due to the lower quality of their food consumption patterns (Darmon and Drewnowski, 2008). In this dissertation, my focus is mainly on educational attainment¹ as a SES-indicator, following Mirowsky and Ross' (2003) argument that "education is the key to people's position in the stratification system [...] [being] a root cause of good health" (p.25-26). Indeed, level of education is considered to be the most consistent SES-indicator for predicting overweight in Europe (Mackenbach and De Jong, 2018; Roskam and Kunst, 2008) with citizens with less education having a greater likelihood of being overweight than citizens with more education. Moreover, the

¹ Throughout this dissertation, I use the terms 'less educated' and 'more educated'. While aware of the societal discussions around these terms, I am of the opinion that the suggested alternatives (e.g., practically versus theoretically educated) do not do justice to the educational division, and mask the underprivileged position that less-educated individuals have in society (see also Pleijers and de Vries, 2021)

Netherlands – the country on which I focus in most of the chapters of this dissertation – has less income inequality and a more generous social security system than, e.g., the United States. As such, education-based differences are likely to be more relevant here than income-based differences.

The educational gradient exists not only in diet quality, but also in the effectiveness of nutrition interventions intended to combat overweight and obesity, since they are often less effective among less- than among more-educated citizens (e.g., Hartmann-Boyce et al., 2018; Sarink et al., 2016). Some of these interventions therefore inadvertently increase education-based differences in terms of the rates of excess weight and consequential diseases. Nonetheless, some intervention types are more likely to widen this gap than others. On one side of the spectrum are agentic interventions. As their name suggests, these largely leave it up to the intended recipient as to whether they wish to act upon them or not. Information interventions are a common example: these confront citizens with information about what constitutes an (un)healthy lifestyle or diet, and leave citizens with the choice to act upon the information or plainly ignore it. A step closer to the middle are nudging interventions (Thaler and Sunstein, 2008), which either nudge citizens in the direction of healthier options, or away from unhealthy choices (e.g., by positioning healthier options in more favorable and accessible spots in a store). Here too, the choice ultimately still belongs to the individual. While the freedom to choose, which agentic interventions allow for, is commonly lauded, it also has the downside that such interventions are unlikely to lead to any meaningful behavioral change (Plessz et al., 2019; Schüz et al., 2021; Worsley, 2002).

Structural interventions are at the other end of the spectrum, as they seek to change the “social, physical, economic, or political environments that may shape or constrain health behaviors and outcomes, altering the larger social context by which health disparities emerge and persist” (Brown et al., 2019). These changes are usually in a form that makes it difficult – or even impossible – for citizens to circumvent them. For

example, increasing the price of unhealthy products through taxation makes it more difficult to fit the products within one's budget, and mandating product reformulations to reduce the presence of unhealthy ingredients makes products inherently less unhealthy. While there will always be ways to circumvent them, structural interventions not only generally have greater health benefits than agentic interventions, but they are commonly more effective from the perspective of health equity, too (Lorenc et al., 2013).

Nevertheless, an opposing pattern emerges in relation to the public acceptability of the two ends of the spectrum: information interventions and nudging are commonly approved by citizens, whereas interventions like taxing, restricting availability, or product reformulations encounter more resistance (Diepeveen et al., 2013; Petrescu et al., 2016). These patterns have chiefly been identified in studies where respondents are asked to rate various interventions in terms of their acceptability, which may (unintentionally) cause them to rate the interventions in comparison to one another. This may explain the relatively high acceptance of information interventions, whereas there are indications of aversion to these too (e.g., Veldheer et al., 2019). Unfortunately, studies on the perspectives of citizens on interventions, which could explain the patterns of effectiveness and acceptance, are scarce and largely overshadowed by research on health effectiveness of interventions. This is one of the reasons why it is often unclear why an intervention was, or was not, effective.

The systematic literature review that is central to Chapter 2 – which is discussed in more detail later in this introduction – revealed that intervention studies most commonly explain the (in)effectiveness of interventions, and socioeconomic differences therein, in terms of individualistic factors (e.g., financial or cognitive). Nevertheless, these explanations are often not tested empirically and, if they are, produce inconsistent results. Consequently, the reasons why nutrition information interventions are (in)effective among low-SES adults remain largely unclear, leaving a lacuna in relation to our understanding of effectiveness

inequality and, with that, in understanding how best to develop successful interventions. Moreover, this is not unique to studies of nutrition interventions, with similar patterns of individualistic factors and an absence of empirical evidence of explanations also being found in studies into anti-smoking interventions (see Appendix 1A).

The focus on such individualistic factors leads to a field that largely overlooks sociocultural influences on health-related choices and behavior. As such, it “tends to examine how individuals’ characteristics shape their behavior, rather than how their environment shapes their behavior [with the result that] practitioners may incorrectly assume that interventions that change individuals’ characteristics [...] will be sufficient to change the types of behavior that produce inequality” (Stephens et al., 2012, p. 5). In contrast, a sociocultural perspective recognizes that health-related choices and behavior are also influenced by wider societal dynamics that influence how citizens from different social strata choose and act differently.

Health interventions are often institutional operations, involving societal institutions like the government, science, and health care organizations. As such, citizens’ views about such bodies are likely important for their views on interventions originating from these sources. Insights from – among others – political sociology, political science, and cultural sociology have, however, shown that citizens’ perspectives on institutions are strongly stratified by educational attainment, with less-educated citizens being overall more averse (e.g., Achterberg et al., 2017; Armingeon and Guthmann, 2014; Laveist et al., 2009; Van der Meer, 2010). This is likely to arise from societal power inequalities (Jackman, 1994; McCartney et al., 2020), as less-educated citizens often feel stigmatized, unrecognized, and unrepresented by the various institutions connected to health interventions (Kuppens et al., 2018; Lamont, 2019; Noordzij et al., 2021a). Consequently, in this dissertation, I set out to uncover whether citizens’ perceptions of institutions are indeed connected to their receptivity to nutrition interventions, and whether this can explain educational differences in this receptivity.

Early in the process of writing this dissertation, I conducted interviews to identify how citizens – mainly less-educated ones – view nutrition information interventions from official institutions. Aside from common themes like financial hardship or not understanding the information well enough, one of the issues that arose during these interviews that thus far seems overlooked in the field, was indeed an aversion to institutions like the government, science, and health care. Going forwards, I describe this aversion using the term ‘anti-institutionalism’. For example, one interviewee felt that nutrition information communicates “how [the government] wants people to live their lives” and that it is more in the government’s than in citizens’ interest if information is adhered to. Another expressed distrust in the Netherlands Nutrition Center for not being “really independent”. Some interviewees also shared the view that current information was “not for us”, as it focuses too much on products that are either unaffordable, or not part of their regular dietary patterns for other reasons. In an extreme case, it was even claimed that institutional nutrition information is only employed in the interests of big corporations and industries, with this interviewee preferring information from social media groups of likeminded people.

Unfortunately, as the interviews started in early 2020, they were soon brought to a halt by the COVID-19 pandemic and the related governmental restrictions that followed. This prevented me from safely visiting the interviewees in person. As I intended to interview citizens who perceived a distance between themselves and official institutions, being a representative of such an institution myself meant starting with a disadvantage. Accordingly, conducting face-to-face interviews in the comfort of interviewees’ own homes or other places of their choosing was crucial for collecting rich and valid data. Moreover, aside from practical issues, like interviewees not having the means to do a virtual or telephone interview, speaking to interviewees in person has the invaluable benefit of creating a rapport and building the necessary confidentiality; because the chosen locations reflect interviewees’ everyday social interactions, they

offer “a sense of intimacy and friendliness” (Herzog, 2005, p. 27). Such an approach is in line with that in other qualitative studies on the worldviews of citizens from lower social strata (e.g., Cramer, 2016; Hochschild, 2016), and on their views on health institutions and interventions, in particular (e.g., Bukman et al., 2014; Farmer et al., 2007). It has likewise been proved to be a successful strategy leading to in-depth conversations of sometimes multiple hours in length. It would probably be impossible to obtain such information-rich data via online or telephone interviews with citizens who already experience a great distance to (representatives of) official institutions (see Irvine, 2011; Johnson et al., 2012). Therefore, COVID-19 unavoidably brought this interview phase to an end before I was able to fully and inductively uncover how interviewees shaped the concept of anti-institutionalism and the role this plays in their aversion toward institutional interventions. Further consequences of this necessary change in approach are discussed in the dissertation’s final chapter.

Building on the findings of the early interviews, I conducted a semi-structured content analysis of social media comments (Twitter and Facebook) on Dutch news posts about health interventions. While not as in-depth as interview data, I follow the observation of Leppänen et al. (2017, p.2) that for many citizens “social media serve as important sites for everyday life, as ways of ‘being in the world’, interacting with others, sharing and organizing information and collaboratively constructing culture”. As a result, these platforms are a valid way to get an idea of citizens’ opinions on matters that important to them. Moreover, analyzing of social media comments also gave me access to opinions about various other types of interventions, broadening the scope beyond the focus on information interventions discussed in the initial in-person interviews. Systematically collecting and analyzing the comments on news posts about structural and agentic health interventions revealed that anti-institutionalism was indeed a common sentiment, as evidenced by its frequent occurrence in posts and the large number of likes and responses to relevant comments.

Those commenting often asked themselves, for example, “what will still be allowed?”, even in relation to messages that only involved the dissemination of information about the harm caused by certain products, with complaints posted about the “moralistic tone” with which ‘they’ “shove their lifestyle down your throat”. Others vocally doubted the legitimacy of various institutions, calling them “agitators”, “extremists” and “the club of ‘what we do not like, we forbid’”. The most common complaint, though, was expressed in the view that interventions from all over the spectrum were “governmental patronizing”, with various references made to the concept of the ‘nanny state’ (Magnusson, 2015). Although the socioeconomic background of these commenters could not be determined, some indications could be gleaned from the main sources of the original posts, i.e., tabloids known for their less-educated (De Jong et al., 2020), and vocal and discontented (Kemmers et al., 2015) reader base. In addition, the posts reflected less-educated individuals’ negative perceptions of institutions associated with health promotion (Achterberg et al., 2017; Laveist et al., 2009; Noordzij et al. 2019).

As such, this dissertation addresses the overarching research question: *What role is played by citizens’ perceptions of official institutions in educational differences in the receptivity to nutrition interventions?* With exception of Chapter 2, all studies reported on in this dissertation were positioned in the Netherlands, which has a substantial educational gradient in relation to both nutritional health (Van Rossum et al., 2020) and anti-institutionalism (Noordzij et al., 2019), as well as a strong and broad presence of institutional health interventions. More practically, as a Dutch native, setting the research in my country of origin, where I have first-hand experience of its cultural and health-promotion contexts, means I am able to connect more easily to the lifeworlds of involved citizens.

In the sections of this introduction that follow, I will provide a summary of the various chapters of this dissertation, discussing their research questions, and theoretical and methodological foundations. I also outline how the chapters are interconnected, with each one generally building on its predecessor. The introduction concludes with a

contextualization of the research, in which I describe the Dutch setting in more detail.

Dominant explanations for the (in)effectiveness of interventions

Chapter 2 reports on a systematic literature review, which was conducted to answer the following twofold research question: *What are the key explanations suggested in health intervention studies for why nutrition information interventions are (in)effective at improving health knowledge and achieving (intended) behavioral change among low-SES adults, and have these explanations been studied empirically?* In doing so, it maps the broad field of intervention studies, identifying potential gaps in the literature.

This is done by means of a scoping review. Typically, systematic literature reviews provide an overview of the results of a sample of studies (e.g., by means of a meta-analysis). I deviate from this approach in my scoping review, by conducting a thematic analysis of the explanations given for the outcomes (generally found in the studies' discussion sections) rather than the outcomes themselves. While the health outcomes of interventions are naturally most important for monitoring their success, potential explanations for these outcomes may offer information that future interventions can build on. Indeed, indications of what particularly facilitated or hampered an intervention's effectiveness can provide valuable insights into how future interventions should (or should not) be implemented. Moreover, for the purposes of this dissertation, it is crucial to identify which explanations are viewed as the most important in the field, to take these factors into account while testing for the new explanation I propose in Chapter 3.

Various strategic choices were made regarding the literature search in order to produce an overview that is as comprehensive as possible. First, instead of the more specific emphasis on education-based differences that is central to the subsequent chapters, Chapter 2 is the only one in which the focus is on differences between SES groups in various forms. Given the extensive studying of differences based on e.g., income levels and occupational status, their inclusion in the sample likely

results in a broader – and thus more complete – scope of possible explanations for the (in)effectiveness of interventions. Second, using a scoping review with a thematic analysis (i.e., an inductive, qualitative approach to a systematic literature review) allows for a sample that covers a broader range of study designs and research disciplines (Arksey and O'Malley, 2005). Instead of only synthesizing quantitative data, the scoping review method allows for the inclusion of quantitative, qualitative, and mixed methods studies. Lastly, the interventions that are being analyzed are information interventions. Due to the limited pressure of adhering to such interventions, their effectiveness likely varies more from one to the other, than would be the case with structural interventions. This makes it possible to determine whether those designed with specific features in mind (e.g., text simplification to reduce the need for health literacy) actually achieve the goal of being consistently effective.

The key outcomes of this chapter reveal that the explanations that intervention studies propose for the (in)effectiveness of nutrition information interventions among low-SES adults are, mainly, individualistic in nature, focusing most commonly on financial or cognitive factors. However, the explanations are typically not tested empirically, but introduced post hoc. Moreover, studies that did empirically test their explanations produced inconsistent outcomes, with no constant positive or negative results in relation to the same explanation theme. Accordingly, common individualistic explanations for the (in)effectiveness of interventions do not appear to completely account for the issue of inequality, leaving room for sociocultural reasoning.

Anti-institutionalism's role explored and tested

The concept of anti-institutionalism derived from the early inductive phase, which is central to this dissertation, theorizes that less-educated citizens adhere to interventions less well, because, in comparison to more-educated citizens, they have a stronger aversion to the institutions connected to the interventions. This is likely a result of contemporary

education-based relations in society; less-educated citizens may feel stigmatized by their more-educated counterparts (Kuppens et al., 2018), who are in a higher social position (Jackman, 1994). This might breed feelings of misrecognition among the former (Lamont, 2019), in turn inspiring opposition to more-educated citizens' lifestyles, and the institutions they populate (e.g., Noordzij et al., 2021a). As a result, less-educated citizens may make deliberate choices to not adhere to interventions by these institutions.

Chapter 3 offers an initial exploration of anti-institutionalism in relation to intervention uptake, answering the question: *What is the role of anti-institutionalism in less-educated individuals' limited nutrition information uptake?* Less-educated citizens tend to have a stronger aversion to political, scientific and health care institutions, which is expressed, among others, in the form of lower levels of trust in them (Achterberg et al., 2017; Laveist et al., 2009; Noordzij et al., 2019). Similarly, this anti-institutionalism can also be expressed by a greater aversion to institutional interference in personal choices (Jackman, 1994), like the choice for a specific food consumption pattern. Each of these responses represents a different aspect of anti-institutionalism: institutional distrust and anti-paternalism.

Chapter 3 features high-quality, population-based data from the Netherlands, which was collected via a cross-sectional survey design using tailor-made items². Specifically, the chapter sought to 1) uncover whether anti-institutionalism is (negatively) related to information uptake; 2) identify to what extent education-based differences in information uptake are explained by anti-institutionalism, by means of a decomposition analysis; and 3) do this while taking conventional explanations into account. Adopting the approach employed by Statistics Netherlands (*Centraal Bureau voor de Statistiek*; Pleijers and De Vries, 2021) – and accordingly also many official health statistics – three different

² All empirical chapters use data from the Longitudinal Internet Studies for the Social Sciences (LISS) panel (Centerdata, Tilburg University). See Appendix 1B for a detailed description.

educational levels are examined: primary/lower secondary (*basisonderwijs en vmbo*); higher secondary (*havo/vwo* and *mbo*); and tertiary (*hbo* and *wo*).

The results of Chapter 3 first demonstrate that there are indeed considerable educational differences in the uptake of nutrition information: tertiary-educated citizens take the information on board most often, followed by citizens with a higher secondary education and then those with a primary or lower secondary education. Anti-institutionalism substantially accounts for these differences, especially between groups with or without a tertiary education. This is in line with various other studies, showing that educational differences in the affinity with institutions are primarily between citizens who were socialized in similar (tertiary education) institutions and those who were not (e.g., Lareau, 2015; Noordzij et al., 2021c). Consequently, in the two final empirical chapters of this dissertation, I will scrutinize the differences between these two educational groups.

The finding that anti-institutionalism is indeed associated with less use of nutrition information by non-tertiary educated citizens raises the question of which elements of the information arouse such a response. Various communication strategies arguably emphasize institutional connotations in such information, potentially explaining why it creates aversion among anti-institutionalist citizens. In the following paragraphs, I will discuss two of these strategies and explain how their effects are analyzed in Chapter 4.

The first common strategy used to increase the effectiveness of information is to highlight its institutional sources (Cummings, 2014; Gehrau et al., 2021). The argument that this makes the information seem more credible means that it is often disseminated by communication channels associated with governments, health care organizations, or scientific agencies (De Dobbelaer et al., 2018). The effectiveness of this approach, especially among those with a non-tertiary education, can, however, be called into question, given the role that anti-institutional tendencies play in the lower information uptake among this group. As the information becomes, quite literally, more strongly institutional, citizens

who distrust institutions or do not want them to, as they see it, meddle in their life too much, could be alienated by such a strategy.

As Chapter 2 shows, it is often claimed that information interventions are less effective due to the poorer cognitive abilities of citizens with a lower SES. Taking this into account, the second strategy that is often employed is to simplify the information, with direct language to indicate what should be changed. In doing so, however, this language can also become, or is perceived to be, patronizing. Furthermore, particularly when the information clearly has institutional sources, this can add to the sense of being talked down to if the nutritional lifestyle communicated in the intervention is not already being followed; these individuals can take the information as telling them their lifestyle is wrong and they have to be 'edified', in line with the 'civilizing offensives' that are common in Dutch history (Van den Berg and Duyvendak, 2012; Powell, 2013).

Chapter 4 investigates these dominant communication strategies, both of which, arguably, increase the institutional connotations in the information. In doing so, the goal is to uncover whether such approaches affect receptivity to nutrition information and, if they do, whether the effects are different across various educational groups. The question addressed in this chapter is: *Do highlighting institutional sources and the use of patronizing language in nutrition information affect the public's receptivity to it, and does this differ between non-tertiary and tertiary educated citizens?*

The data used in Chapter 4 were collected using a preregistered survey experiment, with information treatments based on real-world examples of nutrition information and the strategies adopted within them. Employing a between-subjects design, I examine how the receptivity to information is affected when it makes its connections with institutions overt, or when these connections are present and combined with language that may be perceived as patronizing. A moderation analysis is subsequently used to expose potential education-based heterogenous treatment effects. I employ a concept from the field of social psychology to identify whether these strategies do indeed cause negative attitudes toward the information, giving consideration to their effect on

psychological reactance (Brehm and Brehm, 1981). Reactance is a motivational state in which people feel the need to (actively) reject a message as a way to regain the freedom they regard as being under threat when confronted with information intended to change their behavior.

In addition, I study the effects the strategies may have on citizens' attitudes toward the institutions behind the information, looking specifically at whether they lead to source derogation, i.e., a rejection of the validity of the institutions as a source of information (Cameron et al., 2002). Sources are generally viewed more positively when they are perceived to be credible (McCroskey and Teven, 1999) and similar to the recipient (Hu and Sundar, 2010; Wright, 2000). Consequently, overt institutional connections and language that may be perceived as patronizing might endanger this.

Prior studies have found that various persuasiveness-enhancing communication strategies are, in fact, detrimental to the receptivity to the information (cf. Rains, 2013) and its source (cf. Fransen et al., 2015), but have made these claims based on small-sized and specific convenience samples (e.g., Dillard and Shen, 2005; Jacks and Cameron, 2003). In contrast, I employ population-based data to test whether the strategies referred to above do indeed have a negatively impact on information receptivity across society. Moreover, the use of a large population-based sample also enables me to examine potential educational differences, which have not been scrutinized in reactance studies, although they may actually be present to a significant degree for the reasons discussed above.

The results in Chapter 4 primarily demonstrate an absence of proof that the tested strategies do, in fact, induce negative attitudes toward the information or its sources, but also that non-tertiary educated citizens are nonetheless consistently more negative about both, regardless of information form. This suggests that it is factors other than stressing information's institutional sources or the use of patronizing language that create the wedge between non-tertiary and tertiary educated individuals in terms of the receptivity to nutrition information.

Intervention-caused backlash

Although the argument thus far is based on the assumption that anti-institutionalism affects receptivity to interventions, I also examine the reverse relationship. In other words, does a low level of receptivity to interventions cause non-tertiary educated citizens to become more negative toward the institutions involved? Typically, intervention studies are most interested in the direct effects of interventions, particularly examining health outcomes, or the receptivity to or public acceptability of the information. Side-effects, like how citizens' perceptions of associated institutions may change due to interventions, are rarely investigated, but cannot be overlooked.

The public's perception of institutions is a vital factor in the acceptability and effectiveness of interventions (Bos et al., 2013; Eykelenboom et al., 2019). Consequently, if this is altered by a specific action of these institutions, it may create a feedback loop whereby an aversion to an intervention breeds an aversion to the institutions, which in turn leads to further aversion to subsequent interventions. Since institutional aversion is particularly potent among, and results in a lower level of uptake of institutional information by non-tertiary educated citizens, such a feedback loop may occur specifically within this group, countering the goal of health-promotion efforts to reduce (education-based) health disparities.

As discussed previously, people are generally less receptive to structural interventions, likely due to their more intrusive nature. Accordingly, the focus in **Chapter 5** is on this intervention type and tests whether low levels of receptivity do indeed lead to greater aversion to institutions. In particular, I investigate how the perceived legitimacy of health-promotion institutions is affected by structural interventions seeking to reduce the consumption of sugar-sweetened beverages (SSBs). In addition, the design of structural interventions often causes non-tertiary educated citizens to be affected more. For example, the taxation of unhealthy products affects citizens with a smaller budget more strongly, while products that are made less available or are reformulated

are often those consumed the most by this group. Changes such as these probably also produce more negative reactions to such interventions, potentially widening the educational gap in the perceived legitimacy of institutions as a result. This chapter thus aims to answer the question: *Does proposing structural interventions to reduce SSB consumption negatively affect the perceived legitimacy of health-promotion institutions, and is this effect stronger among citizens with a non-tertiary education?*

A preregistered survey experiment is again used to answer this research question, with the set-up largely similar to that in Chapter 4. Here, too, a between-subjects design is adopted to uncover whether citizens perceive institutions to be less legitimate when they are confronted with either a proposal for a sugar tax, or a product reformulation of SSBs (i.e., a mandatory decrease in the sugar content). This is contrasted to the impact of just a description of the current agentic approach, which relies on the provision of health information and nudges.

The analyses in Chapter 5 show that exposure to such structural intervention proposals does indeed lead to a reduction in perceived legitimacy of the involved institutions; citizens who read about these proposals trust involved institutions less, and perceive them to be less benevolent and more culturally distant from themselves, than citizens who are only presented with the agentic approach. More specifically, stratified analyses highlight that it is particularly non-tertiary educated citizens who are exposed to structural intervention proposals that perceive the institutions to be less legitimate, making the already prominent education-based differences in citizens' views on institutions more pronounced.

Chapter 6 discusses the conclusions that can be drawn from the studies that are discussed in the previous chapters, as well as the contributions that the outcomes of these studies could make to future nutrition and other health interventions, and how they are formed by the various contexts of the dissertation's research. Moreover, I will discuss the limitations of this dissertation, and offer suggestions for further research based on the various chapters and my overarching conclusions.

Context of the research: The Netherlands

Apart from the systematic literature review discussed in Chapter 2, each of this dissertation's studies was conducted in the Netherlands. This section describes the Dutch health context, with a specific focus on the health-promotion approaches adopted by the country's official institutions.

Health disparities in the Netherlands

The Netherlands faces significant challenges related to the overweight of its population. More than half of the country's population is overweight, in part due to the generally unhealthy diet of Dutch citizens: consumption of fruit, vegetables and whole-wheat products is (much) too low, while that of salt, red and processed meat, and SSBs is higher than advised (Van Rossum et al., 2020).

Health-inequality studies internationally often measure socioeconomic status by (household) income (Lago et al., 2018). While this also occurs in the Dutch context (e.g., Dalstra et al., 2002), education-based disparities are used more commonly. The Netherlands has less income inequality than countries like the United States – where much of such studies are conducted – and has a more generous social security system. Moreover, an often-discussed cause of income-based inequalities in nutrition – food deserts – are largely absent (Helbich et al., 2017).

Dietary patterns in the Netherlands are clearly stratified along the lines of educational attainment. As described in a report on the 'Dutch National Food Consumption Survey', which was commissioned by the National Institute for Public Health and the Environment (*Rijksinstituut voor Volksgezondheid en Milieu*; RIVM), citizens with a tertiary education come closest to following national dietary guidelines, as compared to primary and lower secondary, or higher secondary educated citizens (Van Rossum et al., 2020). To illustrate, between 2012 and 2016, 24 percent of tertiary-educated citizens adhered to the guidelines on eating at least 200 grams of vegetables a day, versus 12 percent (higher secondary education) and eight percent (primary and secondary education). For

whole-wheat products, respectively 54, 45 and 42 percent adhered to the guidelines. Differences in the consumption of SSBs are also particularly clear, with tertiary educated citizens consuming about 20 percent fewer than those with a non-tertiary education.

Health promotion in the Netherlands

The Dutch health-promotion system involves various meso and macro methods, ranging from community actions to municipal or national measures (Boot, 2013). For this dissertation, two approaches are most important: information provision by the Netherlands Nutrition Center (*Voedingscentrum*), and the policy interventions discussed in the government's National Prevention Agreement (*Nationaal Preventieakkoord*; NPA), which is monitored by the RIVM.

The Netherlands Nutrition Center communicates official information about nutrition in order to “increase the personal significance of [overweight and obesity], increase nutritional knowledge, change norms and beliefs about healthy eating, and motivate people to improve current dietary behaviors” (Feunekes et al., 2020, p.619). Its information is based on the national ‘guidelines for good food’ (*Richtlijnen Goede Voeding*) produced by the Health Council of the Netherlands (*Gezondheidsraad*), and is in accordance with the consensus of the (international) scientific community on nutrition. The Netherlands Nutrition Center is fully funded by the national government and guarantees to only disseminate independent nutritional advice. The Netherlands Nutrition Center is part of the European Public Health Nutrition Alliance (EPHNA), which is a collaboration between similar organization from 16 countries.

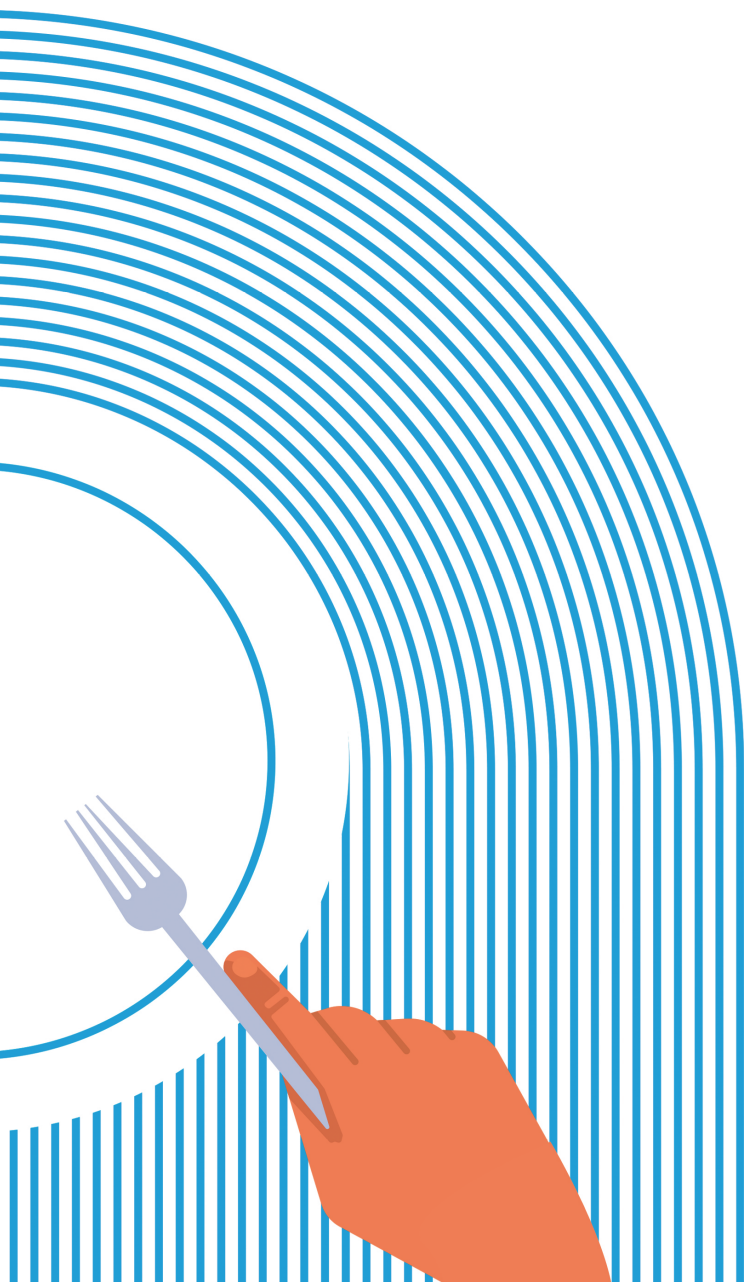
For citizens, the ‘Wheel of Five’ (*Schijf van Vijf*) is likely the best-known output of the Netherlands Nutrition Center. This wheel-shaped information tool is a visual aid on how to follow a healthy dietary pattern, indicating the relative amounts from the various product groups that should be consumed. It is comparable to the internationally more common food pyramid, with the differing shape reflecting the fact that certain food groups are not, inherently, more important than others. The

Netherlands Nutrition Center is also known for various (mass media) information campaigns, for example to urge citizens to switch to healthier options (*'Eetwissel'*) or to raise awareness about the relevance of weight gain (*'Maak Je Niet Dik!'*). The latter campaign has been the subject of an academic study, which found that although citizens were more aware of the issue and more positive about weight gain prevention due to the campaign, there were no meaningful changes in risk perception or behavior (Wammes et al., 2005). This fits within a wider pattern whereby nutrition information does not produce any meaningful behavioral change (Plessz et al., 2019; Worsley, 2002), which is also recognized by the Netherlands Nutrition Center, which claims that “evidence-informed government nutrition policies are therefore recommended as an important step toward the reduction of dietary and health inequalities” (Feunekes et al., 2020, p.631).

Many of these government policies that have been recently implemented – or may be implemented in the (near) future – are discussed in the NPA, which is an agreement between the Dutch national government and over 70 civil society organizations on how to improve the health of Dutch citizens (Rijksoverheid, 2018). One of its main pillars is the goal of reducing the percentage of overweight citizens, from 50 to 38 by 2040. Currently implemented initiatives include increasing the promotion of the Wheel of Five, improving workplace catering healthiness, reducing portion sizes of name-brand cookies, candy and chocolate in supermarkets, and various nudging premises. Although some targets were met by 2021, the first progress report on the NPA (Boer et al., 2022) shows that many were not, and that general levels of overweight and obesity have not fallen since the agreement was first established. Nevertheless, there is a visible trend in which overweight and obesity rates have (minimally) dropped among less-educated citizens, while a slight increase was reported among middle- and more-educated citizens.

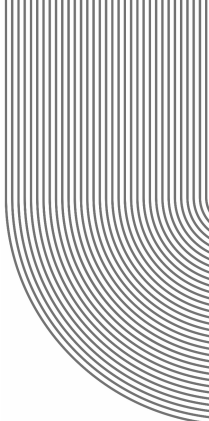
This absence of prominent effects of the NPA's policies had been predicted by the RIVM, which has subsequently asked for an inventory

of potential additional measures. Based on a review of international intervention studies, various measures were proposed (Van Giessen et al., 2021) – most of which are not yet implemented as of November 2022. This report by the RIVM proposes the two interventions I discuss in Chapter 5, i.e., a sugar tax and a mandatory product reformulation.



Chapter 2.

Suggested explanations for (in)effectiveness



Abstract

Unhealthy diets are a major threat to population health and are especially prevalent among those with a low socioeconomic status (SES). Health-promotion initiatives often rely on nutrition information interventions (NIIs) but are usually less effective among adults with a low SES than in their high-SES counterparts. Explanations for this lower effectiveness are set out in extant studies. These have been conducted across a wide range of disciplines and subject fields and using a variety of methodological approaches. We have therefore conducted a scoping review to identify and synthesize the following: (1) explanations suggested in studies carried out in high-income countries for why NIIs are (in)effective among adults with a low SES and (2) whether these suggested explanations were studied empirically. Eight databases were searched for relevant studies published since 2009 across various disciplines. This identified 4,951 papers, 27 of which were included in this review after screening. Only 15 of these proposed an explanation for the (in)effectiveness of NIIs among adults with a low SES. The following four main themes were uncovered: health literacy, economic resources, social resources and convenience. Ten studies tested their explanations empirically, but the results were inconsistent. The reasons why NIIs are (in)effective among low-SES adults are therefore still largely unclear. Also, current literature predominantly relies on individualistic explanations, most notably focusing on psychological and economic attributes. Consequently, if the effectiveness of NIIs among low-SES populations is to be improved, future studies should examine a wider range of explanations and test them systematically and empirically.

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Introduction

Notwithstanding the substantial efforts being made by governmental, scientific and health institutions to promote good health, a significant difference remains in this regard between those in higher and lower socioeconomic status (SES) groups (Mackenbach et al., 2008). The persistence of this gap is partly the result of dietary inequalities (Darmon and Drewnowski, 2008; Plessz and Gojard, 2015). These reflect the reality that health interventions aimed at improving what we eat are either ineffective among adults in the lower social strata, or less effective than among their higher-SES counterparts (Hartmann-Boyce et al., 2018; Sarink et al., 2016). Consequently, nutritional interventions are often, and inadvertently, failing to narrow this SES health disparity. In particular, nutrition information interventions (NIIs), that encourage healthier eating by informing people “how to choose nutritious foods in order to follow guidelines for healthy eating” (Glanz, 2001, p. 87) are frequently less successful at achieving their intended goals among those with a low SES (Beauchamp et al., 2014; Koç and Van Kippersluis, 2017). Nevertheless, NIIs are still popular (Schiavo, 2011), mainly because they are easy to execute and not particularly dependent on governmental decisions and the enactment of legislation.

It is, therefore, clear that the development of more effective and, specifically, more equitable NIIs requires an understanding of *why* current NIIs are (in)effective among low-SES groups. Nevertheless, there has been no comprehensive overview of the explanations suggested for why NIIs are (in)effective among these groups, nor of the extent to which these explanations have been studied empirically. Yet, since this reasoning probably differs across disciplines and research fields, it is important to synthesize this knowledge base. Consequently, I performed a scoping review to identify intervention studies conducted in high income countries that examined the effectiveness of NIIs among low-SES groups (either specifically in these populations or that included a subgroup analysis). The review encompassed research conducted in a variety of fields, using various study designs, and with different types of NIIs. In

particular, I carried out a thematic analysis to uncover the explanations suggested in the studies for the (in)effectiveness of these interventions among low-SES adults. I also examined whether these explanations were studies empirically. My review was guided by the following research question: *What are the key explanations suggested in health intervention studies for why nutrition information interventions are (in)effective at improving health knowledge and achieving (intended) behavioral change among low-SES adults, and have these explanations been studied empirically?*

Data and methods

I conducted a scoping review to answer my research question (Arksey & O'Malley, 2005; Davis et al., 2009). Scoping reviews are commonly used to summarize, rather than evaluate, a particular field, which enabled me to “examine the extent, range and nature of research activity” (Arksey & O'Malley, 2005, p. 21) relevant to the issue at hand. I conducted the review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist extension for scoping reviews (Tricco et al., 2018).

Identifying relevant studies

The studies in my sample were obtained after a search of a variety of electronic databases, in particular by translating into a search syntax the concepts concerning (un)healthy diets that were closely related to the research questions. These were then combined with the terms “health information interventions” and “socioeconomic status”, as well as their equivalent medical subject headings (MeSHs). Abbreviations, synonyms and indicators were added to widen the search.

A variety of databases was used (Web of Science, Embase, Medline Ovid, Cochrane, Psyc INFO, Econ Lit, Abi/inform and Google Scholar) to ensure the inclusion of studies from diverse disciplines and research fields (see Appendix 2A for the search queries used). Subsequently, references of included studies were scanned to identify papers that may have been missed in the initial search, but none were detected.

Study selection

All of the studies' titles, abstracts and keywords, as well as the full texts, were screened independently by me and Jeroen van der Waal, based on pre-set inclusion and exclusion criteria. Studies were included when they: 1) contained an empirical discussion of NIIs that 2) were produced by official institutions (e.g., governmental scientific and health institutions); 3) had the aims of improving knowledge of health issues and/or changing (intended) behavior; 4) concerned (un)healthy diets; and 5) examined the effectiveness of the interventions among low-SES groups. Studies were excluded when the intervention did not take place in a high-income Organisation for Economic Co-operation and Development (OECD) country or was not targeted exclusively at adults. The search period covered papers published from January 2009 to April 2019. The decision to use 2009 as a starting point was based on the landmark publication of the report "Closing the Gap in a Generation" (CSDH, 2008). It was produced by the World Health Organization's Commission on Social Determinants of Health and caused an upsurge in research focusing on reducing socioeconomic health inequalities.

Charting data

Quotes were extracted from the papers concerning the studies' designs, locations, outcome measures, intervention target groups, types of NII and identified effects on low-SES participants. I also extracted details on the equitability of the intervention and the (suggested) explanations for why it was (in)effective. Quotes were subsequently coded inductively by me.

Collating, summarizing, and reporting findings

Coding was conducted based in the thematic analysis (the themes of the explanations proposed). Each study was assigned a theme (and potential additional themes) based on the reasons used to explain why the NII was (in)effective among the low-SES participants. These themes were then categorized using higher-level coding to facilitate the synthesis of the

studies. My analysis thus produced a scoping review of the different explanations currently suggested for the (in)effectiveness and their empirical value. To the best of my knowledge, this is the first review to focus on why NIIs are said to be (in)effective among adults with a low SES, rather than on whether they have an impact and, if so, to what extent.

Results

Descriptive numerical summary

The initial database search produced 22,985 entries, reduced to 15,172 after the removal of duplicated. Of these, 10,581 were pre-excluded based on the publication date (pre-2009), study population (not adults), and the country where the study was carried out (not a high-income OECD member). This reduced the sample to 4,951 studies. Titles and abstracts were then reviewed, producing 58 full texts for screening. This led to a sample comprising 29 studies. Two of these were later excluded after careful consideration during the data-extraction phase, as they proved to be ineligible after all. The final sample thus consisted of 27 studies for use in the thematic analysis. The inter-coder reliability for the full-text phase was 82.1 percent. We subsequently reached a consensus by discussing whether to include or exclude the remaining studies that had initially been regarded as eligible by only one of us. Figure 2.1 contains a detailed overview of the selection process.

Studies discussed nutritional or calorie-labeling ($n=10$); tailored (web-based) health information ($n=6$); general guidelines and recommendations (e.g., state-level guidelines, educational poster) ($n=5$); mass/multimedia campaigns ($n=2$); on-location information (e.g., point-of-purchase merchandising, grocery store interventions) ($n=2$); combined interventions with informational meetings ($n=2$); multicomponent education interventions ($n=1$); and online interventions ($n=1$). The NIIs examined in the studies were produced by the government ($n=12$); health institutions ($n=7$); science/academia ($n=6$); and non-governmental

organizations ($n=1$). Two studies (both systematic literature reviews) did not specify the institution(s) that provided the health information.

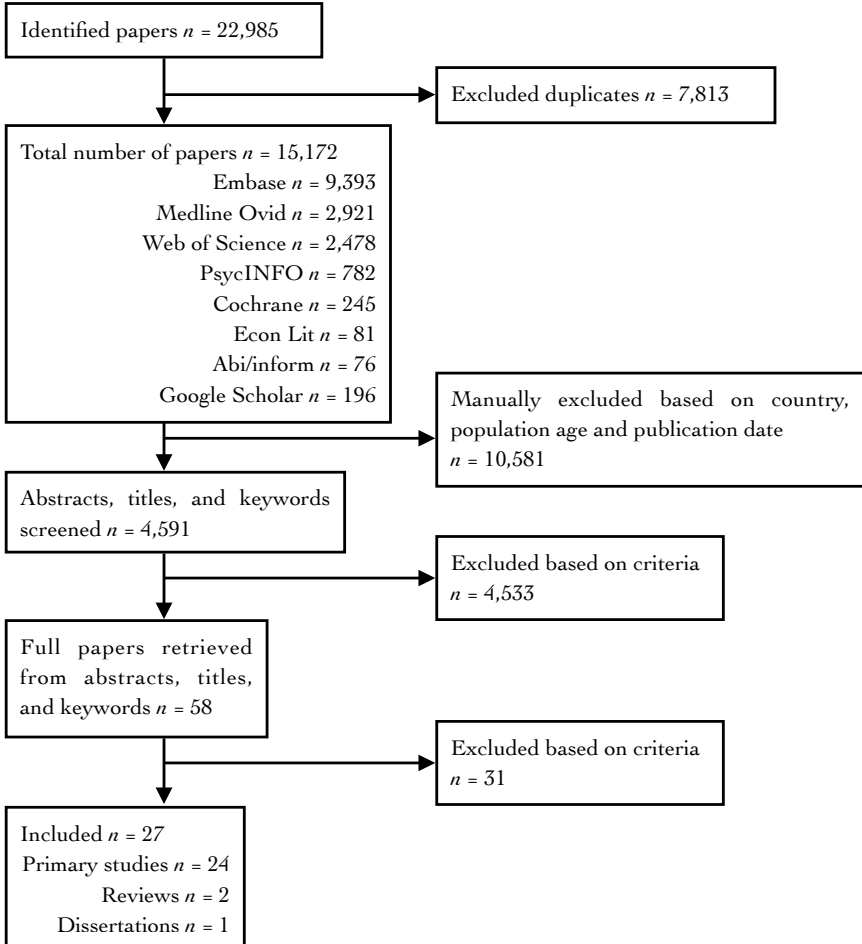


Figure 2.1 — Flowchart of inclusions and exclusions

Most of the studies concerned a single country, in particular: the United States ($n=13$); the Netherlands ($n=5$); New Zealand ($n=2$); the United Kingdom ($n=2$); Australia ($n=1$); France ($n=1$); and Norway

($n=1$). Two studies – both literature reviews – involved multiple countries. A cross-country comparison showed that the studies from the US had a disproportionately strong focus on (fast food menu) calorie labeling, which was a feature in five of 13 studies. The only other studies on labeling (one in the UK and one in Norway) focused more broadly on a variety of forms of labeling.

The crucial findings of the studies included in the thematic analysis are described in columns six (Effect among low SES) and seven (Equity effect) in Table 2.1. 15 studies identified a positive intervention effect on their low-SES participants, five did not, and four had mixed results (a positive effect was found for only some of the outcome measures). In three studies, the effect for low-SES participants was unclear. In terms of equity effects, one study reported that the NII was completely equity-positive (i.e., inequalities decreased), while five identified negative equity effects, and seven highlighted similar effects across SES groups. Seven studies described mixed equity results, which generally meant that the equity findings differed per outcome. In one case (Øvrum et al., 2012), these effects varied per SES indicator, while another was a systematic literature review that identified different equity effects in the studies included in its sample. Seven studies from the US were the only ones to focus exclusively on those with a low SES, with those conducted elsewhere merely examining entire populations. As a result, equity effects were not reported in over half of the US-based studies.

Thematic analysis

The analysis uncovered four main themes, which were supplemented with a category given the name ‘other’. The subsections below are ordered according to the number of times a theme was identified, starting with the most common.

Table 2.1 – Summary table of included studies (columns continue on next page)

Ref.	Study location	Study design	Outcome measures	Study pop.
Backman et al. 2011	US	Quasi-experiment	Behavioral	Low SES
Blake et al. 2018	AU	Discrete choice experiment	Behavioral	Full pop.
Blakely et al. 2011	NZ	(RCT)	Behavioral	Full pop.
Breck et al. 2014	US	Cross-sectional	Behavioral	Full pop.
Capacci and Mazzocchi 2011	UK	Ex-post assessment;	Behavioral	Full pop.
Elbel et al. 2009	US	Cross-sectional	Behavioral	Low SES
Gans et al. 2009	US	RCT	Behavioral	Full pop.
Gans et al. 2018	US	RCT	Behavioral	Low SES
Gorton et al. 2009	NZ	Cross-sectional	Knowledge	Full pop.
Hartmann-Boyce et al. 2018	Multiple	SLR (of RCTs)	Behavioral	Full pop.
Hersey et al. 2015	US	Pre-post quasi-experimental design study	Behavioral	Low SES
Irz et al. 2015	FR	Calibration exercise (simulation)	Behavioral	Full pop.
Mancino and Kuchler 2012	US	Consumer demand modeling	Behavioral	Full pop.
Masic et al. 2017	UK	Forced choice questionnaire paradigm with independent groups	Behavioral	Full pop.
McGeary 2013	US	Cross-sectional	Behavioral	Full pop.
Øvrum et al. 2012	NO	Choice experiment	Behavioral	Full pop.
Rameshbabu 2014	US	Randomized experimental design	Behavioral	Low SES
Sarink et al. 2016	Multiple	SLR	Behavioral; knowledge	Full pop.
Schindler et al. 2013	US	Focus groups	Behavioral	Low SES
Springvloet et al. 2015a	NL	RCT	Behavioral	Full pop.
Springvloet, et al. 2015b	NL	RCT	Behavioral	Full pop.
Springvloet et al. 2016	NL	RCT	Behavioral	Full pop.
Taksler and Elbel 2014	US	Difference-in-difference design; cross-sectional	Knowledge	Full pop.
Thunström 2019	US	Hypothetical experiment	Behavioral	Full pop.
Verheijden et al. 2012	NL	Cohort study	Behavioral	Full pop.
Walsh et al. 2017	US	Non-randomized, quasi-experimental feasibility test	Behavioral	Low SES
Walthouwer et al. 2015	NL	RCT	Behavioral	Full pop.

Table 2.1 Continued

Health information intervention	Effect low SES?	Equity effect	Explanation theme	Empirically studied?
Point-of-purchase merchandising	Yes	N/A	No explanation	N/A
Educational poster on sugar intake	Yes	+	Health literacy	In design
Tailored nutrition education	No	0	No explanation	N/A
Calorie labeling	Unclear	-	No explanation	N/A
Multi-media campaign	Yes	0	Economic resources	Suggested
Calorie information	No	N/A	Health literacy	Suggested
Tailored information, video & print version	Yes	Mixed	Health literacy; personal appeal	In design
Multicomponent educational intervention	Yes	N/A	No explanation	N/A
Nutritional label, four formats	Yes	0	Health literacy	In design
Grocery store interventions; labeling; educational messages	Mixed	Mixed	No explanation	N/A
Dietary guidelines; informational meetings	Yes	N/A	Social resources; economic resources	Suggested
Nutritional recommendations	Yes	Mixed	No explanation	N/A
Dietary guidelines	No	-	Economic resources; convenience; health literacy	Suggested
Nutritional label, four formats	Yes	0	Health literacy	In design
General state-level nutrition education	No	-	No explanation	N/A
Printed information; nutritional labels	Yes	Mixed	No explanation	N/A
Information booklet; informational meetings	Yes	N/A	Self-regulatory skills	In design
Calorie labeling	Mixed	-	Economic resources; social resources; health literacy	Suggested
Calorie labeling	Unclear	N/A	Economic resources; convenience; health literacy	Tested
Web-based tailored nutritional education, two versions	Yes	Mixed	Health literacy	In design
Web-based tailored nutritional education, two versions	Yes	Mixed	Health literacy	In design
Web-based tailored nutritional education, two versions	Mixed	0	Health literacy	In design
Calorie labeling	No	-	No explanation	N/A
Calorie labeling	Unclear	0	No explanation	N/A
Mass media campaign, two waves	Mixed	Mixed	No explanation	N/A
Online educational modules; printed information	Yes	N/A	Health literacy	In design
Web-based computer tailored nutritional education, text and video	Yes	0	No explanation	N/A

Health literacy

12 studies used the issues of ‘health literacy’ (i.e., being (un)able to understand the information contained in an NII) to explain the (in)effectiveness of the interventions among those with a low SES (Blake et al., 2018; Elbel et al., 2009; Gans et al., 2009; Gorton et al., 2009; Mancino and Kuchler, 2012; Masic et al., 2017; Sarink et al., 2016; Schindler et al., 2013; Springvloet et al., 2015a; 2015b; 2016; Walsh et al., 2017). As an example, NIIs were described as succeeding in this group because they were “clear and simple” (Blake et al., 2018, p.161) or had an approach that was “low literate [in] nature” (Gans et al., 2009, p.6).

In both cases, the NII was effective at reducing inequalities in nutritional health between the studies’ low- and high-SES participants. In other cases, too, simpler design elements were reported to be the reason for their effectiveness among those with a low SES (Gorton et al., 2009; Masic et al., 2017; Walsh et al., 2017), although no increases in equity were identified.

Other studies argued that NIIs are less effective because low-SES groups find it harder to process the materials provided to them, reaching the conclusion that simpler interventions could improve equity effects (Sarink et al., 2016). The outcomes of the intervention tested by Springvloet et al. (2015a; 2015b; 2016) caused them to suggest that people with a low SES may be overwhelmed by the scope (in terms of content or quantity) of the NIIs provided to them. Meanwhile, the studies by Elbel et al. (2009) and Schindler et al. (2013), both of which examined the effectiveness of calorie-labeling, proposed that this kind of information is currently not clear enough and required improvement if this type of NII is to succeed.

Mancino and Kuchler (2012) used a slightly different argument to highlight the importance of health literacy. In particular, they suggested that the dietary guidelines concerning wholegrain bread might have less of an impact on low-income consumers, since they may find it difficult to distinguish between wholegrain and non-wholegrain products (even if they understand the message that the former is the healthier option).

This theme was also the only one in which cross-country differences were observable. Although health literacy was discussed in the studies conducted in a number of countries (Australia, New Zealand, the Netherlands, the UK and the US), it was relatively less prominent in US-based studies: while health literacy was discussed in five of seven US-based studies that suggested an explanation for the (in)effectiveness of an NII, the concept mostly arose in combination with other themes. Conversely, save for a single UK-based study, non-US-based studies focused exclusively on health literacy as the explanation for the (in)effectiveness identified.

Economic resources

The second most common theme was economic resources ($n=5$) (Capacci and Mazzocchi, 2011; Hersey et al., 2015; Mancino and Kuchler, 2012; Sarink et al., 2016; Schindler et al., 2013), which was given as a main reason especially for the limited effectiveness of NIIs among those in the low-SES group. Two studies (Hersey et al., 2015; Mancino and Kuchler, 2012) suggested that the chief cause of this was the (un)affordability of healthy food. Indeed, even though the NII employed in the study by Hersey et al. (2015) did lead to an increase in the intake of fruit and vegetables among low-SES individuals, the daily amounts consumed did not accord with the NII's recommendations. The possible explanation suggested for this outcome was the high cost of the relevant products. Mancino and Kuchler (2012, p.98) echoed these findings, arguing that many in the low-SES group live in "areas with limited access to affordable and nutritious food", signaling the concept of 'food deserts'. They also reported that finding inexpensive food was more important than consuming healthy options. This was also highlighted as an issue by the interviewees in the study by Schindler et al. (2013).

Capacci and Mazzocchi (2011) likewise found that having limited economic resources impacted the effectiveness of their study's multimedia campaign among those with a low SES in their sample, making the argument that additional income support or raising the prices of

unhealthy food could improve this. The final study to refer to economic resources was conducted by Sarink et al. (2016), although it offered no further explanation beyond identifying deprivation as a potential factor.

Social resources

The third main theme identified was mentioned by two studies and focuses on the limited social resources of the low-SES group (Hersey et al., 2015; Sarink et al., 2016). Hersey et al. (2015) suggested that social support might be relevant after noting that their participants discussed the information in the material provided to them with their peers. The authors thus proposed that such discussions could increase the backing for healthy food options, implying that NIIs might be less effective for those with a limited social support.

Meanwhile, Sarink et al. (2016) also suggest that there is greater uptake of the advice in NIIs if the intended target has more social resources. Although they do not elaborate on the underlying causal mechanisms, these authors do argue that adults with a low SES have relatively fewer such resources and, as a result, demonstrate only limited support for menu labelling.

Convenience

Two studies pointed to the convenience of unhealthy food as a potential reason for why the advice in NIIs is not adopted (Mancino and Kuchler, 2012; Schindler et al., 2013). According to Mancino and Kuchler (2012), health was a lower priority than convenience for the lower-income consumers in their sample, who were unmoved by the intervention examined in the study. This was also an argument made by Schindler et al. (2013), who found that convenience was a factor in the decisions made about food options, even when a menu provided information on the calories in each dish. In particular, despite the recommendations in the NII employed in the research, their low-income participants continued to buy from fast food chains, stressing that they did so because the convenience of not having to buy and prepare food was more important

to them than the issue of the price of fast food. The participants also pointed to a lack of time and, as a consequence, their disregard for information about calories. Nonetheless, neither of these studies identified why issues of convenience were more prevalent in their particular low-SES sample.

Others

Rameshbabu (2013) found that study participants who scored highly for self-regulation and self-efficacy were affected more by the NII being examined. She consequently argued that “teaching self-regulation skills served to involve the individual in making the behaviour change rather than passively providing them with the information to do so” (p.7). However, the study contained no comparisons with those in other SES groups.

Gans et al. (2009), meanwhile, noted that the NIIs used in their study, in part, worked better among the low-SES respondents, because the material was more tailored to the individual: these interventions addressed the participants directly by using their name and tailoring the health information message to them as individuals, contributing to them being “more positive about how interesting and personally relevant” (p.6) this tailored information was. Their study was the only one to mention the tailored nature of NIIs as a possible reason for intervention effectiveness among low-SES groups, even though other studies have also examined effects of tailoring. However, these other studies do not specifically suggest that the tailoring of such interventions – and their resulting personal appeal – is an explanation for the extent of their effectiveness in these individuals. As a consequence, I have not included them within this theme.

No explanation

A key finding of this review was that 12 of the 27 studies analyzed did not include any explanation at all for why NIIs are (in)effective among low-SES groups (Backman et al., 2011; Blakely et al., 2011; Breck et al., 2014;

Gans et al., 2018; Hartmann-Boyce et al., 2018; Irz et al., 2015; McGeary, 2013; Øvrum et al., 2012; Taksler and Elbel, 2014; Thurnström, 2019; Verheijden et al., 2012; Walthouwer et al., 2015); instead, these studies simply reported their results, with no discussion of possible reasons for these outcomes.

Empirical scrutiny of the suggested explanations

Of the 27 studies included in the analysis, ten contained some empirical scrutiny of the explanations suggested for the (in)effectiveness of an NII among their low-SES participants. The most direct evidence came from focus group interviews (Schindler et al., 2013), which discussed various factors in order to identify why calorie information in fast food restaurants is rarely considered. The issues considered above all others by the participants were, most notably, clarity (i.e., health literacy) and convenience.

Nine studies referred to the design of an NII to account for its (in)effectiveness. Two tested different types of nutritional labels (Gorton et al., 2009; Masic et al., 2017) finding that simplified versions were more effective among low-SES groups. These included traffic-light labelling (using colors to indicate the healthiness of an item) and physical-activity labels (indicating the amount of exercise required to burn off the calories in the product). These approaches thus reduce the need for health literacy to ensure the effectiveness of an intervention. This is in contrast to numerical labels, which simply state the nutritional content in absolute numbers or as a percentage of daily intake. It should be noted that this simplified form of nutritional information also resonated with those in high-SES groups and, as a result, did not lead to any equity changes.

Six studies made the claim that the analyzed NII had been developed with the specific goal that the information should be comprehensible to those with lower health literacy (Blake et al., 2018; Gans et al., 2009; Springvloet et al., 2015a; 2015b; 2016; Walsh et al., 2017), implying that any disparity in relation to this factor is the reason for the relative ineffectiveness of NIIs among low-SES groups. Nonetheless, the

outcomes of these studies are inconsistent, with some producing equity-positive results and others equity-neutral or equity-negative outcomes. Moreover, none of the studies based on NIIs that were easy to understand were compared to versions containing less digestible information.

As well as taking health literacy into account in the design of their study, the tailored nature of the NII examined by Gans et al. (2009) was also claimed to be a reason for its effectivity, as it was deemed to be more personally appealing to those with a low SES. It should be noted, however, that an equity effect was only identified for one of the four outcome measures (change in the intake of fruit and vegetables at seven months follow-up); for the other three (change in the fruit and vegetable intake at four months, and in the intake of fats at four and seven months) no such effects were uncovered. Nevertheless, this combination of equity-neutral and equity-positive results does suggest that the use of tailored nutrition information takes us a step closer to reducing inequality. This seems to be endorsed in the studies by Springvloet et al. (2015a; 2015b; 2016) and Walthouwer et al. (2015), whose mainly equity-neutral or equity-positive results were achieved with tailored NIIs. Nonetheless, it should be noted that neither study attributed the effectiveness of the interventions examined to their tailored nature.

Finally, Rameshbabu (2013) found that promoting self-regulatory skills within an informational message had a positive impact on the extent to which the material was absorbed and acted upon. While the intervention alone also seemed to influence the study's respondents positively, adding information about self-regulation increased this effect significantly. Nonetheless, with participants exclusively from low-SES groups (non-academic employees at one university), it was not possible for the study to make claims about equitability, i.e., it was unable to determine whether the endorsement of self-regulatory skills alongside an informational message would affect high-SES groups to a different extent.

Discussion and conclusion

This scoping review identified 27 studies that examined the effectiveness of NIIs among adults with a low SES. While most of the interventions investigated were shown to be effective among low-SES groups, they were often just as, or more, effective among those whose SES was high. A thematic analysis revealed that that almost half of the 27 studies offered no explanations for the (lack of) impact on low-SES groups. In those that did, four main themes were identified: health literacy, economic resources, social resources and convenience. Two further explanations did not fit within these themes: self-regulation/self-efficacy and personal appeal.

Ten of the examined studies included some form of empirical research on the tenability of the explanations proposed. These predominantly targeted the issue of 'health literacy' and the provision of simplified and easily digestible information. However, since these studies had inconsistent outcomes (equity-positive, equity-neutral, and equity-negative) and most did not include a clear comparison group (e.g., information that was not adjusted to the level of literacy), it was not possible to determine the empirical tenability of this explanation. This suggests that an intervention that is only easy to understand is no panacea when it comes to reducing the nutritional health inequalities that exist today.

The most direct empirical evidence came from focus group interviews. Nonetheless, the qualitative nature of this type of study does not enable findings to be generalized to the population at large. Moreover, the participants were exclusively from low-SES groups, with most also having an ethnic minority background. This makes it difficult to determine whether the attitudes and actions reported were the results of a low SES, a particular ethnic background, or – most likely – combination of both.

Overall, therefore, it is still unclear why the equity effects of NIIs are inconsistent. In large part, this is because many of the studies examined were unable to test for differential effects (e.g., they were not powered to test the moderating effects of SES). However, even those that did include

such an analysis did not always offer an explanation of their findings, perhaps because no between-group differences were identified. Nevertheless, even these limited interventions may provide valuable insights, as it is clearly more common for NIIs to be less effective among those in lower-SES groups. Accordingly, if the impact of such information is to be improved, it is important for intervention studies to focus more on *why* – instead of just on *whether* – some NIIs are effective and equitable and others are not.

Implications

This is the first review to focus on *why* NIIs are (in)effective among those in low-SES groups. Its findings emphasize the need to add an explanatory perspective to a field that primarily focuses on impact assessments. Using research designs that enable determining why an NII is (in)effective in specific target groups could, however, provide the crucial information required to develop more effective – and more equitable – interventions. Moreover, to achieve a better understanding of the mechanisms that explain why an NII is more or less impactful among lower-SES groups, it is crucial that valid arguments are provided about why a specific approach would affect the impact of an intervention *and* why this mechanism may be distributed differentially between socioeconomic groups each pathway determines the effectiveness of an NII and should, as a result, be detailed enough to enable the design of more effective campaigns. Moreover, this approach should, perhaps, not only be limited to NIIs, since any health-promotion intervention would benefit from its creators knowing why and how it is likely to be (in)effective, both generally and per SES group. A similar scoping review I conducted of studies into anti-smoking interventions has shown a similar scarcity of studies that explain their intervention's (in)effectiveness, implying it is far from exclusive to the field of nutrition interventions (see Appendix 1A).

This scoping review revealed a dearth of studies that conducted a rigorous, empirical examination of whether the explanations could actually account for the effects observed. This means it is impossible to

make any empirically substantiated claims about why NIIs are (in)effective among low-SES groups. Nevertheless, my review has identified the *types* of explanation proposed, most notable health literacy and economic resources. If these explanations do, in fact, have an empirical basis, NIIs could become more equitable by relying less on the information-processing capacity of the intended recipient, and more on increasing the affordability and availability of the touted healthy food products. Removing any cognitive and financial barriers should then lead to the creation of interventions that are more successful among lower-SES groups.

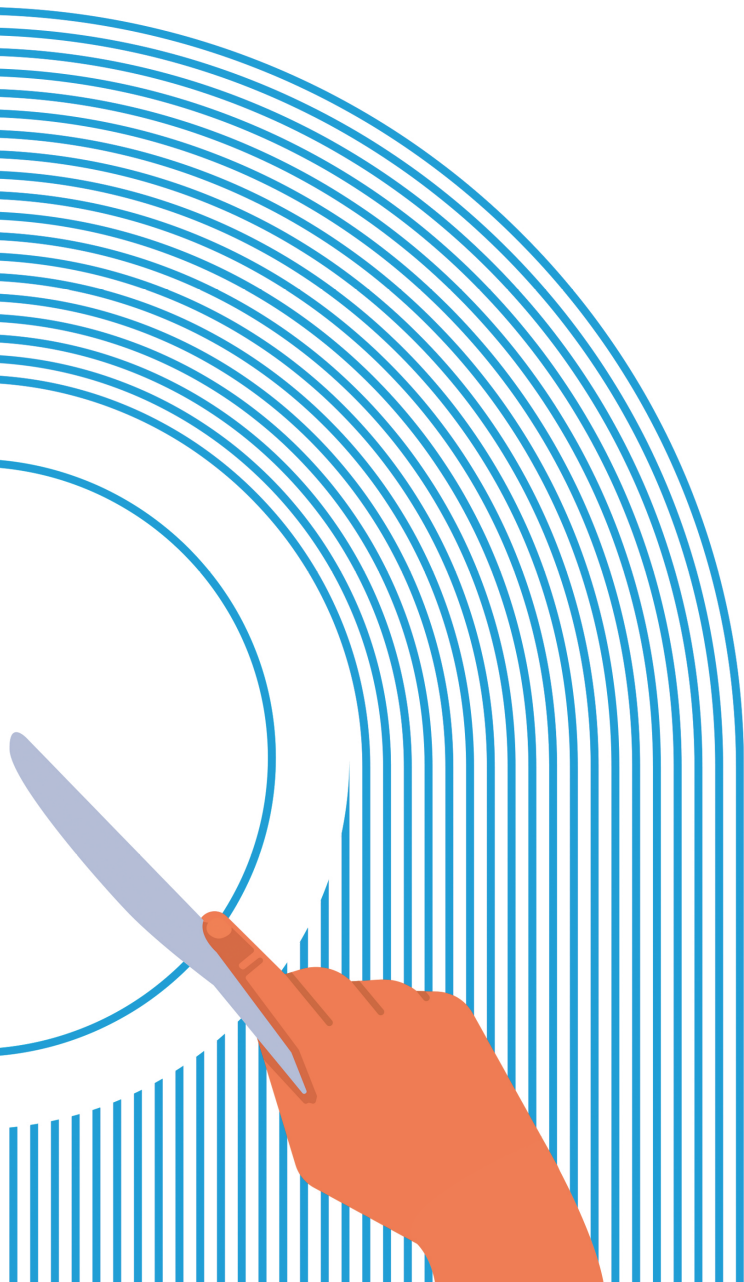
Finally, it is important to note that the explanations suggested in the studies I examined are predominantly individualistic accounts, most notably focusing on psychological and economic attributes. As such, the possible relevance of sociocultural conditions in shaping the uptake of health knowledge has not yet been covered systematically. The field may, therefore, benefit from adding non-individualistic explanations, e.g., from fields like sociology and anthropology (Abel, 2008; Bunton et al., 1995; Lambert and McKeivitt, 2002).

Limitations

There are some limitations to this chapter's scoping review. First, only papers published in English were considered for inclusion, meaning that a considerable number of studies written in other languages were excluded. The inclusion of more languages may have given a more complete picture of the field. Moreover, various studies in our thematic analysis focuses on actual behavioral change rather than information uptake. This could have led to the relatively high number of times that economic factors were suggested as the reason for the (in)effectiveness of the interventions investigated: acting on information probably depends more on economic resources than is the case for its uptake. Furthermore, the relationship between information uptake and behavioral change has been contested (Plessz et al., 2019), which may partly explain the relatively low impact of the analyzed interventions on behavioral change.

Conclusion

This scoping review has highlighted that only about half of the studies to examine NIIs suggest any explanations for their (in)effectiveness among those with a low SES, focusing mainly on cognitive and financial factors. Moreover, only about a third of these studies empirically investigated whether those explanations did actually account for the (in)effectiveness identified. This makes it difficult to learn lessons from past interventions. Future intervention studies should therefore focus more on establishing empirically why NIIs do, or do not, work as intended. This information is essential if we are to confront and reduce the considerable health inequalities that persist across the globe.



Chapter 3. An incongruous intervention

Abstract

Despite many efforts, nutritional health interventions have been largely unable to reduce health inequalities between less- and more-educated individuals, since their effectiveness among the former is often limited. Conventionally, adverse financial circumstances and poorer health literacy are argued to explain this. Drawing on recent sociological insights, I propose a complementing and novel sociocultural explanation based on how contemporary power relations in society breed anti-institutionalism among less-educated individuals. Using a survey of a representative sample of the Dutch population ($n=2,398$), I focus on the strategic case of the lower uptake of nutrition information among less-educated individuals. I find that two aspects of anti-institutionalism, i.e., institutional distrust and anti-paternalism, substantially account for the educational gap in the uptake of nutrition information. This indicates that current nutrition information inspires opposition among less-educated individuals. More generally, it suggests that the development of nutritional health interventions should avoid invoking institutional connotations, to increase their acceptance by those who commonly need these most.

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Introduction

Numerous studies have examined educational differences in nutritional health, repeatedly showing that less-educated individuals have unhealthier nutritional habits than their more-educated counterparts (see e.g., Darmon and Drewnowski, 2008). Despite many efforts, nutritional health interventions have been largely unable to reduce these inequalities, since their effectiveness among lower socioeconomic groups is often limited. Conventional explanations for the stratified effectiveness of nutritional interventions focus primarily on factors like limited financial resources (e.g., Hersey et al., 2015), financial stress (e.g., Daniel, 2016) or limited health literacy (e.g., Springvloed et al., 2015a).

Reflecting the recent claim of McCartney et al. (2020) that power relations are a fundamental cause of health inequalities, through “continuously intersecting socio-political processes of power and domination – but also of *resistance*” (p.33, emphasis added), I add a novel, complementing sociological perspective potentially relevant for the limited effectiveness of health interventions among less-educated individuals. More specifically, I theorize that the latter’s resistance to the domination of more-educated individuals and the institutions they inhabit offers opportunities to better understand the (in)effectiveness of nutritional health interventions.

Aside from being associated with cognitive and financial differences, educational attainment has recently been described as “the object of group-based acting and thinking” (Spruyt and Kuppens, 2015a, p.292), impacting one’s way of looking at the world. These education-based sociocultural differences are widely reported (e.g., Kuppens et al., 2015; Spruyt and Kuppens, 2015b) and may incite stigmatization of less-educated individuals by their more-educated counterparts (e.g., Kuppens et al., 2018). Consequently, the former may experience feelings of misrecognition (Flemmen et al., 2018; Lamont, 2019), in turn inspiring opposition to the lifestyles of the latter and the institutions they populate, e.g., in the field of politics, science and health (Lamont, 2018; Noordzij et al., 2019; Noordzij et al., 2021a). This is illustrated most clearly in recent

sociological studies on politics: compared with more-educated individuals, less-educated citizens are less likely to engage with politics (Laurison, 2016; Visser et al., 2021), and in case they do, they embrace its anti-establishment kind (Noordzij et al., 2021b). Either way, this proves largely informed by feelings of cultural distance from and perceived contempt by professionals in the political domain (Noordzij et al., 2021a, 2021b; Visser et al., 2021).

Less-educated citizens' aversion and resistance to dominant institutions fueled by their feelings of misrecognition as uncovered in aforementioned studies are likely to also be relevant with regard to their stance toward health interventions. If only because the institutions and professionals involved – e.g., scientists, the government and medical professionals (Stroobant et al., 2018; Tanner, 2004) – are similar to the ones those studies focused on, signaling that education-based sociocultural differences make the interventions incongruous with the lifeworlds of less-educated individuals. This highlights that feelings of anti-institutionalism among less-educated individuals associated with contemporary power dynamics potentially impact how they respond to nutritional health interventions. Drawing on recent sociological debates, this chapter shall further elaborate and test this idea.

Being the first to do so, I chose the strategic case of the uptake of nutrition information to test my novel explanations because a) it has a particularly large educational gradient and b) its low impact on individual agency would expectedly mitigate the effects of anti-institutionalism on its receptivity. Any effect anti-institutionalism may have on information uptake likely also occurs when it comes to the acceptability of other, less agentic health-promotion efforts. Hence, I ask: *What is the role of anti-institutionalism in less-educated individuals' limited nutrition information uptake?* More specifically, this chapter assesses whether anti-institutionalism 1) is negatively associated with institutional nutrition information uptake and 2) accounts for the relationship between education and this uptake, while 3) simultaneously taking the conventional explanations – financial circumstances and health literacy – into account.

A novel explanation for less-educated individuals' limited nutrition information uptake: education-based sociocultural differences and the anti-institutionalism they inspire

More-educated individuals are better equipped to thrive in and navigate elite institutions (Forster and Van de Werfhorst, 2020; Lareau, 2015), as they are more familiar with the 'rules of the game' and possess the experience and sense of entitlement to deal with potential problems within the institutions (Lareau, 2015; Rivera, 2012). This largely results from their lifelong socialization in those institutions (especially higher education) and upper-strata milieus. As another consequence of this socialization, their lifestyles differ from those of many less-educated individuals in terms of, e.g., cultural consumption (Katz-Gerro, 2002; Van Eijck, 1999) and political viewpoints (Noordzij et al., 2019; Spruyt et al., 2016), as well as health (Oude Groeniger et al., 2020; Pampel et al., 2010) and food practices (Oude Groeniger et al., 2017; Pampel, 2012). In and of themselves, these lifestyle differences are no cause for anti-institutionalist tendencies by less-educated individuals. Yet, as more-educated individuals hold a dominant position in contemporary society, it is often their lifestyle choices that are deemed to be 'appropriate', while those of the less-educated are frowned upon (Bourdieu, 1984; Currid-Halkett, 2017).

Such stark education-based sociocultural differences, and the way both ends of the spectrum are appreciated in society, may cause less-educated individuals to develop feelings of misrecognition, believing that their way of life is indeed looked down on by their more-educated counterparts (Flemmen et al., 2018; Lamont, 2018; Noordzij et al., 2021a). Tellingly, less education, more than other indicators of low socioeconomic status (e.g., a low income), is evaluated negatively by more-educated individuals, which fuels the stigmatization of the former by the latter group (Kuppens et al., 2018).

Nutrition information provided by institutions mainly populated by more-educated individuals is therefore likely to be perceived by less-educated individuals as an attempt to force them to adopt elements of a

highbrow lifestyle (Bergman et al., 2020), in line with so-called ‘civilizing offensives’ common in Dutch history (Van den Berg and Duyvendak, 2012): “Deliberate, conscious attempts of powerful groups, including a historically paternalistic state, at altering the behaviour of sections of the population and inculcating lasting, ‘civilized’ habits” (Powell, 2013, n.p.). The feelings of misrecognition and subsequent anti-institutionalism they fuel can affect the uptake of nutrition information from institutional sources.

This can occur in two ways. First, a sizable body of literature demonstrates that less-educated individuals are less trusting of the institutions active in providing nutrition information, i.e., politics (Noordzij et al., 2021c), science (Achterberg et al., 2017) and health care (Laveist et al., 2009), with this lower institutional trust connected to unhealthier behavior (Ahnquist et al., 2008) and lower self-rated health (Mohseni and Lindström, 2008). While the relationship between distrust and suboptimal health outcomes has not been tested causally, its existence could indicate a disregard of the institutions’ health-promotion efforts, including, but not limited to, nutrition information, among those who distrust institutions more (e.g., less-educated individuals). Moreover, research during the COVID-19 pandemic has shown that support for preventive health measures is much greater among individuals with more institutional trust (e.g., Ahluwalia et al., 2021; Lachapelle et al., 2021), providing an incentive to also study its merit in nutrition-related health-promotion efforts. Consequently, I hypothesize:

Less-educated individuals make less use of institutional nutrition information because they distrust institutions more (hypothesis 1).

Second, the uptake of nutrition information is probably affected by anti-paternalism, i.e., an aversion to perceived “interference by some outside agent in a person's freedom for the latter's own good” (Le Grand and New, 2015, p.7). While it is possible that more-educated individuals would be more prone to exhibiting anti-paternalistic tendencies, given

their generally greater appreciation of individual liberties and self-actualization (Houtman et al., 2011), there are actually more reasons why anti-paternalism would be more pronounced among less-educated individuals. As Jackman (1994) argues, paternalism has an aura of power dynamics because the dominant paternalistic group (here, more-educated individuals and the institutions they populate) is perceived as believing it has the moral superiority to decide what is best for the dominated group (here, the less-educated individuals; Kuppens et al., 2018; Spruyt, 2014). The latter are therefore urged to change their behavior to bring it in line with that of the former, which can be perceived as meddling. This is echoed in anecdotal evidence, comprising semi-structured, inductive observations of hundreds of social media reactions (Facebook comments and Tweets). These comments were in response to health promotion-related news posts from media outlets commonly consumed by less-educated individuals in the Netherlands (De Jong et al., 2020; Kemmers et al., 2015) and were translated here for matters of readability and anonymity. They reveal that some perceive such interventions as attempts to interfere with their freedom to choose, with one commenter stating: “Everyone should decide what to eat him- or herself. [People in] government jobs should be dealing with other things!”. Others were concerned with the “constantly patronizing tone about how humanity should behave” or denounced the perceived arrogance of sources: “These kinds of fundamentalists have a day job in correcting their poor old unhealthy fellow man”.

As the commenting users are potentially a vocal minority, and there is no way to ascertain their educational attainment, I use this chapter to empirically uncover the relevance of these anti-paternalistic tendencies in the educational gap in the uptake of nutrition information. Given the sources of the commented-on news posts and the link between anti-paternalism and power dynamics made in extant theorizing, I will test the following hypothesis:

Less-educated individuals make less use of institutional nutrition information because of their higher levels of anti-paternalism (hypothesis 2).

Conventional explanations for less-educated individuals' limited nutrition information uptake: financial circumstances and health literacy

Research on the lower uptake of nutrition information by less-educated individuals suggests multiple plausible explanations, with financial circumstances and health literacy being the most prominent (see Chapter 2).

Financial circumstances

The financial circumstances of less-educated individuals are generally worse than those of their more-educated counterparts (Psacharopoulos, 2014). There are two main pathways³ through which this is assumed to affect the uptake of nutrition information: 1) less-educated individuals may not have enough money to buy the food recommended in official nutrition information campaigns (e.g., Hersey et al., 2015); and 2) they are more likely to experience financial stress, making problems other than diet more pressing (e.g., Daniel, 2016). While both factors are able to explain non-compliance (i.e., not acting on material provided), they are also likely to affect the uptake of information: when exposed to recommendations that cannot be acted on, these are unlikely to be listened to.

Health literacy

Health literacy, as defined by Nutbeam (1998, p.357), “represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health”. It is generally regarded as a

³ In addition to so-called ‘food deserts’, which are not discussed here as they are largely absent in the Netherlands (Helbich et al., 2017).

precursor to the uptake of information, with the consensus being that greater health literacy leads to an improved understanding of nutrition information and, subsequently, better uptake of it (see Aldoory, 2017). On this basis, less-educated individuals' uptake of nutrition information is expected to be lower, as their health literacy tends to be poorer than that of more-educated counterparts (Rikard et al., 2016).

The above implies there is a basic level of factual knowledge needed to understand nutrition information. For example, a campaign communicating a message to eat more wholegrain products will probably fail for those lacking basic nutritional knowledge since, in this specific case, they are unable to determine whether an item is actually wholegrain (Mancino and Kuchler, 2012). This information could, however, be effective for those who can comprehend it but were previously unaware of the health benefits of wholegrain foods.

Data and methods

Dataset

This chapter uses data from the LISS panel (see Appendix 1B). The data were collected as part of a wider research project on societal, political and health-related issues (Van der Waal et al., 2020). In the current chapter, 3,042 Dutch adults (18 years and above) were sampled from the LISS panel, with 2,436 of them completing the survey, equating to a response rate of 79.1%. I excluded 38 people who finished the questionnaire in ten minutes or less, as this is the minimum time realistically required to provide valid responses. This resulted in a dataset of 2,398 individuals for the analyses.

Measures

The *use of institutional nutrition information* was measured by asking the respondents whether they use information from 1) the government and/or 2) the Netherlands Nutrition Centre (*Voedingscentrum*) when deciding what best to eat. Their responses were recorded on a seven-point Likert

scale (completely disagree to completely agree). A principal component analysis (PCA) of the answers produced a factor with an explained variance of 78.3% and an eigenvalue of 1.56. I examined reliability based on the standardized coefficient alpha, which is viewed as the most appropriate reliability test for two-scale items (Eisinga et al., 2013), indicating a reliable scale (Cronbach's $\alpha=0.72$). The *use of institutional nutrition information* was calculated for respondents with valid responses on both items. A higher score indicated a greater use of this information.

Level of education was measured by recoding the highest education level attained into three categories that complied with the International Standard Classification of Education, 2011 (UNESCO, 2012): less educated (primary and lower secondary education: ISCED 0–2); medium educated (upper secondary education: ISCED 3–4); and more educated (tertiary education: ISCED 5–7). Those still in education were excluded ($n=120$).

Institutional distrust was measured with three items about trust in: 1) politics; 2) medical doctors; and 3) scientists, with possible answers ranging from 0 (no trust at all) to 10 (complete trust). A PCA revealed a single factor explaining 70.1% of the variance and an eigenvalue of 2.13. I reverse-coded the items and created a single, reliable scale (Cronbach's $\alpha=0.77$) by taking the average score of respondents who provided valid answers to all three questions. Higher scores indicated more institutional distrust.

I constructed a new measure for nutrition-related *anti-paternalism*. The respondents were asked to indicate their agreement with two statements inspired by semi-structured observations of social media reactions (Facebook comments and Tweets) to posts by popular news media on health-related issues, e.g., the “Week Without Meat” campaign, or public calls to eat more fruit and vegetables. In detail, I used the search function of both platforms to identify especially opinionated user comments on relevant posts by strategically selected sources, i.e., tabloids known for their less-educated (De Jong et al., 2020), vocal and discontented (Kemmers et al., 2015) reader base: *Algemeen Dagblad* and *De*

Telegraaf. If any social media pages were then identified that seemed to be relevant based on the same criteria, they were added as sources. The quotes obtained were analyzed and used to construct the two final statements: 1) “The government should not meddle in my eating habits”; and 2) “The government should be dealing with more important things than my eating habits”. Possible answers ranged from 1 (completely disagree) to 7 (completely agree). The statements underwent pilot testing involving a small non-probability sample ($n=224$), after which they were included in the final survey. A PCA of the responses to them in the final survey revealed a single factor explaining 81.5% of the variance and an eigenvalue of 1.63. The scale for assessing anti-paternalism, made by taking the average score of respondents who provided valid answers to both items, was reliable (standardized Cronbach's $\alpha=0.77$).

In exploring the empirical value of anti-institutionalism, I controlled for indicators for two conventional explanations of less-educated individuals' limited uptake of nutritional information: financial circumstances and basic nutritional knowledge. The former was measured with two variables: self-reported net monthly *household income* and *financial stress*. For the first of these, I excluded two sets of respondents with very improbable answers: three older than the statutory retirement age in the Netherlands who reported a remarkably high net monthly household income (€47,000, €146,652 and €178,677) and 20 who described a monthly household income of 0 Euros, which is highly implausible given the Dutch social security system. I used the log of the responses to account for the skewness of household income, as well as the fact that this better resembles the functional relationship between household income and the use of institutional nutrition information.

Financial stress was measured with a single variable taken from the results of the most recent survey wave of the annual “Economic Situation: Income questionnaire” prior to the data collection. This particular survey forms part of the LISS panel's Core Study (De Cock, 2019), and the data for it were collected in June and July 2019. The respondents were asked how hard or easy it is to live off their household income, with answers on

a scale from 0 (very hard) to 10 (very easy). I reverse-coded the answers for the sake of clarity, with higher scores indicating greater financial stress.

In relation to the second conventional explanation, I measured *basic nutritional knowledge* using 12 items on factual knowledge of the nutritional value of various food products, instead of items asking what different foods mean for health (a more applied form of health literacy). This is because the former is more likely to precede my outcome of interest (Nutbeam, 2000). The items were adapted from a validated nutritional knowledge scale (Parmenter and Wardle, 1999) and focused on four food constituents that are generally linked to unhealthy outcomes: added sugars, fats, saturated fats and salt. I adjusted the items where needed to only include products widely available in the Netherlands. The respondents were asked whether each of the four food elements was present in certain products (see the original Dutch items and the English translation in Appendix 3A for the precise wording). Correct answers were coded as 1 and incorrect ones as 0. I included a “don't know” option (also coded as 0) to minimize the effect of guessing. By emphasizing that my interest was in the facts known by the public at large, the respondents were actively encouraged to use this answer when they were uncertain about the correct response. The variable for basic nutritional knowledge was calculated as the total score for all 12 items, with no allowance for missing values. A higher score represented more nutritional knowledge.

I added the following as additional control variables: *age* in years; *gender* (0 for male, 1 for female); *ethnicity* (0 for native Dutch, 1 for non-native Dutch); *children in the household* (0 for no children, 1 for one or more); and *partner in the household* (0 for no, 1 for yes). Descriptive statistics for all the variables are reported in the Table 3.1.

Analytic strategy

The analysis included pairwise correlation analyses using Pearson's *r* to assess how level of education, the uptake of institutional nutrition information and the two aspects of anti-institutionalism were linked

among the public at large. I also conducted analyses of variance (ANOVA) using a post hoc Scheffé test to uncover educational differences in the levels of information use, institutional distrust and anti-paternalism. I then performed linear regression analyses to test the strength of the association between education and institutional distrust and anti-paternalism, taking into account the control variables. A separate regression analysis was conducted for each mediator.

Table 3.1 – Descriptive statistics

	n	Mean	S.D.	Min	Max
Use of institutional nutrition information	2,263	3.98	1.33	1	7
Educational level					
<i>Less educated</i>	2,276	0.27		0	1
<i>Medium educated</i>	2,276	0.33		0	1
<i>More educated</i>	2,276	0.40		0	1
Institutional distrust	2,278	3.27	1.55	0	10
Anti-paternalism	2,262	4.68	1.50	1	7
Household income (log)	2,071	7.96	0.53	5.52	9.59
Financial stress	1,801	3.04	1.94	0	10
Basic nutrition knowledge	2,253	7.49	2.31	0	12
Age	2,278	57.73	16.11	18	96
Gender	2,278	0.52		0	1
Ethnicity	2,250	0.16		0	1
Children in household	2,278	0.29		0	1
Partner in household	2,278	0.67		0	1

Linear regression analyses were also carried out to help determine the need for a mediation analysis, with the uptake of institutional information as the dependent variable. This identified changes in the association between education and the use of information when institutional distrust and anti-paternalism were added. A subsequent Wald test was employed to examine the potential moderating effects of my hypothesized mediators. The results gave no reason to assume moderation ($F(2, 1,608)=2.04$; $p=0.13$ for institutional distrust; $F(2, 1,608)=0.43$; $p=0.65$ for anti-paternalism). I therefore conducted a decomposition analysis using the Karlson–Holm–Breen (KHB) method (Karlson et al., 2012). As my main predictor (educational level) was an ordinal-level dummy variable, the KHB analysis separately compared both medium-educated individuals and more-educated individuals with

the reference category, less-educated individuals, rather than showing a singular education effect.

Finally, I conducted a sensitivity analysis in which I did not control for conventional explanations (household income, financial stress and nutritional knowledge). This was used to assess whether or not the mediation effect was overestimated in the main analysis. It also allowed to conduct the analysis with more respondents, as there were approximately 20% fewer valid responses for the variable for *financial stress* (imported from a different dataset) than for the other core variables.

Results

There was a substantial negative relationship between information uptake and both institutional distrust ($r=-0.31$, $p<0.001$) and anti-paternalism ($r=-0.33$, $p<0.001$). Additionally, Table 3.2 reveals significant educational differences in the uptake of nutrition information, institutional distrust and anti-paternalism. Closer inspection using a post hoc Scheffe test identified that only the differences between less- and medium-educated individuals, and less- and more-educated individuals were significant for information uptake. All the between-group differences were significant for institutional distrust and anti-paternalism.

Table 3.2 – ANOVA for educational differences in dependent variable and mediators, with post hoc Scheffe test for significance of differences

	Mean	F	Between group comparison	<i>p</i>
Use of instit. nutrition info		16.80***		
<i>Less educated</i>	3.73		vs. more educated	<0.001
<i>Medium educated</i>	3.98		vs. less educated	0.002
<i>More educated</i>	4.13		vs. medium educated	0.074
Institutional distrust		71.76***		
<i>Less educated</i>	3.73		vs. more educated	<0.001
<i>Medium educated</i>	3.42		vs. less educated	0.001
<i>More educated</i>	2.83		vs. medium educated	<0.001
Anti-paternalism		72.23***		
<i>Less educated</i>	5.17		vs. more educated	<0.001
<i>Medium educated</i>	4.77		vs. less educated	<0.001
<i>More educated</i>	4.27		vs. medium educated	<0.001

*** $p<0.001$, ** $p<0.01$, * $p<0.05$

Both institutional distrust and anti-paternalism were still significantly associated with education when controlling for standard sociodemographic control variables (Table 3.3). Moreover, Table 3.3 shows that the differences between less- and more-educated individuals in terms of institutional distrust and anti-paternalism were far greater than between the less- and medium-educated respondents.

Table 3.3 — Multiple regression analysis for institutional distrust and anti-paternalism, unstandardized coefficients, $n=1,623$

	Institutional distrust	Anti-paternalism
Educational level		
<i>Less educated</i>	Ref.	Ref.
<i>Medium educated</i>	-0.30** (0.10)	-0.28** (0.10)
<i>More educated</i>	-0.93*** (0.10)	-0.77*** (0.09)
Controls		
Age	-0.00 (0.00)	0.01*** (0.00)
Gender	-0.02 (0.08)	0.01 (0.07)
Ethnicity	0.17 (0.10)	-0.20 (0.10)
Children in household	0.13 (0.10)	0.17 (0.09)
Partner in household	-0.05 (0.08)	-0.01 (0.08)
Constant	3.89*** (0.23)	4.25*** (0.22)
R ²	0.06	0.07

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Model 1 in Table 3.4 shows that both medium- and more-educated respondents use institutional nutrition information more than their less-educated counterparts when controlling for all the control variables, including those accounting for conventional explanations of the limited information uptake by the latter group. Greater financial stress was, as expected, associated with less use of institutional nutrition information.

Meanwhile, the uptake of information was more substantial among those with more nutritional knowledge or a higher household income, in line with conventional theorizing. Nevertheless, the education gap in that uptake remains substantial when taking these patterns into account.

Table 3.4 — Multiple regression analysis for the use of institutional nutrition information, unstandardized coefficients, $n=1,623$

	Model 1	Model 2
Educational level		
<i>Less educated</i>	Ref.	Ref.
<i>Medium educated</i>	0.25** (0.09)	0.19* (0.08)
<i>More educated</i>	0.32*** (0.09)	0.09 (0.09)
Institutional distrust		-0.23*** (0.02)
Anti-paternalism		-0.21*** (0.02)
<i>Controls</i>		
Household income (log)	0.18* (0.09)	0.09 (0.08)
Financial stress	-0.05* (0.02)	-0.02 (0.02)
Basic nutrition knowledge	0.06*** (0.01)	0.02 (0.01)
Age	0.01* (0.00)	0.01*** (0.00)
Gender	0.19** (0.07)	0.20** (0.06)
Ethnicity	0.07 (0.09)	0.03 (0.08)
Children in household	-0.14 (0.09)	-0.08 (0.08)
Partner in household	0.01 (0.08)	0.09 (0.08)
Constant	1.63** (0.70)	4.04*** (0.67)
R ²	0.05	0.18

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

The anti-institutionalism variables were included in Model 2 in Table 3.4, showing that higher levels of institutional distrust and anti-

paternalism are related to a lower uptake of nutrition information. Moreover, both the size of the coefficients and the increase in the R^2 from Model 1 to Model 2 point to the substantially greater explanatory strength of the newly added variables than for those indicating conventional explanations. In addition, none of the latter variables were significantly associated with information uptake after the inclusion of institutional distrust and anti-paternalism. Interestingly, the difference in the use of institutional nutrition information between the more-educated and less-educated had largely disappeared in Model 2, while the difference between medium- and less-educated individuals was attenuated to a much lesser extent. This implies that the difference between less- and more-educated individuals is largely explained by institutional distrust and anti-paternalism, while the difference between less- and medium-educated individuals is much less so.

Table 3.5 provides the results of the decomposition analysis used to test for mediation. The first row of Table 3.5 shows how education is associated with information uptake when anti-institutionalism predictors were not included in the model, but when all control variables were included, mirroring Model 1 in Table 3.4. The second row depicts how much of this association persisted after institutional distrust and anti-paternalism was added (thus reflecting Model 2 in Table 3.4). The third row shows the difference between the two former rows. The lower part of Table 3.5 reports to what extent each of the two anti-institutionalism indicators accounts for educational differences in institutional nutrition information.

Taken together, the anti-institutionalism mediators accounted for 25% of the difference between less- and medium-educated individuals. However, the margins of error were too large to make any strong claims about whether, and to what extent, anti-institutionalism underlies the gap in the uptake of institutional nutrition information between those two educational categories. In contrast, anti-institutionalism does significantly account for the gap between less- and more-educated individuals (that is, for 72%). More precisely, institutional distrust accounted for 37%, and

anti-paternalism for 35%, of the difference in the uptake of institutional nutrition information between less- and more-educated individuals.

Table 3.5 – Decomposition of total association between education and use of institutional nutrition information into direct and indirect association via indicators for anti-institutionalism, $n=1,623$

	Less vs. medium education		Less vs. more education	
Total association education and information uptake	0.25**		0.32***	
	(0.08)		(0.08)	
Direct association education and information uptake	0.19*		0.09	
	(0.08)		(0.09)	
Indirect association education and information uptake	0.06		0.23***	
	(0.05)		(0.05)	
<i>Indirect association of education via ...</i>				
		Per separate effect	Total anti-instit.	
Institutional distrust	0.02	10%	0.12***	37%
	(0.02)		25%	72%
Anti-paternalism	0.04	15%	0.11***	35%
	(0.02)		(0.02)	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Sensitivity analysis

The sensitivity analysis (see Table 3.6 and Table 3.7) revealed similar patterns to those of the main analysis, albeit somewhat more outspoken: 1) anti-institutionalism accounts slightly more for the difference in the uptake of nutritional information between less- and more-educated individuals (institutional distrust accounts for 39% and anti-paternalism for 38%) and 2) anti-institutionalism does significantly account for the difference in nutritional information uptake between the less and medium educated (institutional distrust accounts for 21% and anti-paternalism for 23%). The second finding is most likely due to greater statistical power arising from the inclusion of more respondents in these models. Nevertheless, the explained difference between less- and medium-

educated individuals was still less than between less- and more-educated individuals.

Table 3.6 — Sensitivity analysis: Multiple regression analysis for use of institutional nutrition information, unstandardized coefficients, $n=2,021$

	Model 1	Model 2
Educational level		
<i>Less educated</i>	Ref.	Ref.
<i>Medium educated</i>	0.35*** (0.08)	0.19** (0.07)
<i>More educated</i>	0.52*** (0.08)	0.12 (0.07)
Institutional distrust		-0.22*** (0.02)
Anti-paternalism		-0.24*** (0.02)
<i>Controls</i>		
Age	0.01** (0.00)	0.01*** (0.00)
Gender	0.25*** (0.06)	0.24*** (0.05)
Ethnicity	0.03 (0.08)	0.03 (0.07)
Children in household	-0.09 (0.07)	-0.01 (0.07)
Partner in household	0.15* (0.07)	0.12 (0.06)
Constant	3.08*** (0.17)	5.00*** (0.18)
R ²	0.03	0.18

Note: The sensitivity analysis excludes the indicators for traditional explanations that are included in the main analysis

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Discussion and conclusion

Echoing a recent call to assess the role of power relations in health inequalities (McCartney et al., 2020), this chapter explored the role of less-educated individuals' anti-institutionalism in their often-reported limited uptake of nutritional health information. Using a survey conducted with a panel representative of the Dutch population in 2020, I

found that two aspects of anti-institutionalism—institutional distrust and anti-paternalism—accounted for a substantial part of the educational differences in the uptake of institutional nutrition information, while taking conventional complementing explanations into account.

Table 3.7 – Sensitivity analysis: Decomposition of total association between education and use of institutional nutrition information into direct and indirect association via indicators for anti-institutionalism, $n=2,021$

	Less vs. medium education		Less vs. more education			
Total association education and information uptake	0.35*** (0.07)		0.52*** (0.07)			
Direct association education and information uptake	0.19** (0.07)		0.12 (0.07)			
Indirect association education and information uptake	0.15*** (0.04)		0.40*** (0.05)			
<i>Indirect association of education via ...</i>						
		Per separate effect	Total anti-instit.	Per separate effect	Total anti-instit.	
Institutional distrust	0.07*** (0.02)	21%	37%	0.20*** (0.03)	39%	77%
Anti-paternalism	0.08*** (0.02)	23%		0.20*** (0.03)	38%	

Note: The sensitivity analysis excludes the indicators for traditional explanations that are included in the main analysis

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Our results revealed that anti-institutionalism explained a large part of the difference in nutritional information uptake between less- and more-educated individuals, but much less for the difference between less- and medium-educated individuals. This is in line with previous research in a variety of fields, indicating that educational differences in affinity with all kinds of institutions, e.g., politics, science, health and the judiciary, most notably reflect a distance between those who attained a degree at an (applied) university versus those who did not (e.g., Lareau,

2015; Noordzij et al., 2021c). Tellingly, levels of anti-institutionalism in the analyses also differed far less between less- and medium-educated, than between less- and more-educated individuals.

I also found that financial circumstances and nutritional knowledge seemed to be less relevant for predicting nutrition information uptake than suggested by previous studies. A likely cause for the small association in this study, as compared to common findings in e.g., US-based studies, is the relatively smaller income inequality in the Netherlands. In less egalitarian countries, the relevance of economic factors may be higher. Note moreover that in the Dutch case, the association of financial circumstances and nutritional knowledge with information uptake was even smaller when they were modelled simultaneously with anti-institutionalism. This could mean two things: 1) the relationship between financial circumstances and nutritional knowledge on the one hand, and nutritional information uptake on the other, is spurious; or more likely, 2) their link with that uptake (partly) runs via anti-institutionalism. On the latter basis, the results of this chapter should therefore not be read as discouraging attempts to make health information more sensitive to the situations of the financially deprived, or to connect it to people with less health knowledge.

It is also relevant to note that the present chapter focused on the *uptake* of nutrition information, which does not necessarily imply *compliance* with it. In fact, nutrition information uptake rarely brings about a considerable change in diet, especially among individuals with a lower socioeconomic status like the less-educated individuals in this research (Koç & Van Kippersluis, 2017; Plessz et al., 2019). Considering the continuous use of nutrition information as a health-promotion effort, however, this chapter attempted to pinpoint reasons for its non-uptake, which simultaneously serves as a strategic case that aids improving our understanding of the relevance of education-based sociocultural differences when it comes to health promotion more generally.

Achieving dietary change and beneficial health outcomes would require a concerted effort also including less agentic health interventions.

As anti-institutionalism affects the uptake of the least intrusive form of health promotion, it is highly probable that it is also relevant for other health-promotion efforts. I expect two main ways in which anti-institutionalism affects health-promotion interventions: 1) directly, affecting, for instance, the public acceptability of various forms of health promotion, and 2) indirectly, where aversion to one form (e.g., intrusive structural interventions) may further affect attitudes toward other interventions from the same (or a similar) source. In short, I consider information uptake to be a single empirical example of the relevance anti-institutionalism holds for health promotion, with more research being clearly needed to further explore the extent of this relevance, both in relation to other health-related outcomes (e.g., smoking and drinking) and other intervention types.

Clearly, future information-based interventions could be made more effective and equitable if they are to somehow avoid evoking feelings of misrecognition among less-educated individuals. Although this connects with studies arguing for the importance of similarity or relatability in health interventions (e.g., Young, 2015), my findings suggest that this is not necessarily about using a messenger who is similar to the receiver but using one who is, primarily, not perceived to be elitist and meddling. This insight identifies a social pathway through which fundamental causes of health inequalities operate (cf. Link & Phelan, 1995), which adds to extant theorizing: both to McCartney and colleagues' "framework identifying important sources of power" (2020, p.34) relevant for studying those pathways and the literature on the role of stigma in that regard (Hatzenbuehler et al., 2013). In both cases, a worthwhile addition would be to include explicit attention for the power imbalance and cultural distance between institutions and professionals responsible for health interventions on the one hand and less-educated citizens on the other, and the feelings of misrecognition the former inspire in the latter. Such institutions "are infused with the implicit but distinctive assumptions, values and taken-for-granted knowledge of the middle class" (Ridgeway, 2014, p.11), which especially breeds stigmatizing tendencies

toward less-educated individuals and subsequently their anti-institutionalism (cf. Noordzij et al., 2021a, 2021c; Visser et al., 2021).

Future research can further scrutinize the role of anti-institutionalism in less-educated individuals' aversion to institutional health information. Previous studies of that kind focused on, e.g., menu labelling at fast food restaurants (Schindler et al., 2013), or the uptake of antismoking information (Kim et al., 2018). However, in both examples, the consumption itself was primarily discussed, instead of the information that should inspire restraint in the first place. Tellingly, a study that did actually discuss the latter revealed the role of distrust in 'public intellectuals', including the government and public health advocates, in the limited acceptance of antismoking information by those in the lower strata (Veldheer et al., 2019). Taking in mind the common communication strategy of connecting health information to official sources (e.g., Cummings, 2014), together with indications that this may work counterproductively (e.g., Song et al., 2018), it is relevant to study how attitudes toward health information differ when connotations with health-promotion institutions are stripped (e.g., by keeping the explicit naming of institutional connections to a minimum, or even fully removing it).

This chapter has some limitations. First, the use of a cross-sectional survey did not enable conducting strict tests of the causality implied by my theorizing. Nevertheless, I do not anticipate that my research will suffer from reversed causality, as educational attainment is measured as past attainment, thus preceding both anti-institutionalism and the use of nutrition information measured as contemporary attitudes and behavior. Furthermore, it is implausible that the use of nutrition information affects such deep-rooted attitudes as institutional distrust and anti-paternalism. Additionally, I have controlled for potential confounding variables by including both various control variables and variables accounting for conventional explanations for lower information uptake. However, experimental research is required to test rigorously whether anti-paternalism and institutional distrust cause a lower uptake of information

among less-educated individuals. Second, the use of institutional nutrition information is self-reported, which might have led to measurement errors.

Conclusion

In summary, this chapter has demonstrated that less-educated individuals' lower uptake of institutional nutrition information can most notably be attributed to their anti-institutionalist tendencies, and far less so to conventional explanations focusing on their financial circumstances or limited nutritional knowledge. This implies that current forms of institutional information on nutrition are incongruous with less-educated receivers' life worlds, as these evokes perceptions of elitism and inspires feelings of misrecognition among that particular group—providing yet another social pathway in how a fundamental cause like power inequalities can inspire health inequalities.

In addition to the various promising efforts to make health promotion less reliant on financial and cognitive resources, it holds promise to consider whether health-promotion strategies can be made more effective and equitable by being sensitive to how contemporary power dynamics can breed less-educated individuals' anti-institutionalism. This seems to call for rather straightforward practical action geared toward addressing health inequalities, as it asks for altering communication strategies by institutions involved in health interventions. A major challenge in this regard seems creating awareness of the stigmatizing tendencies toward the lifestyles of less-educated citizens by institutions that aim to improve their wellbeing.



Abstract

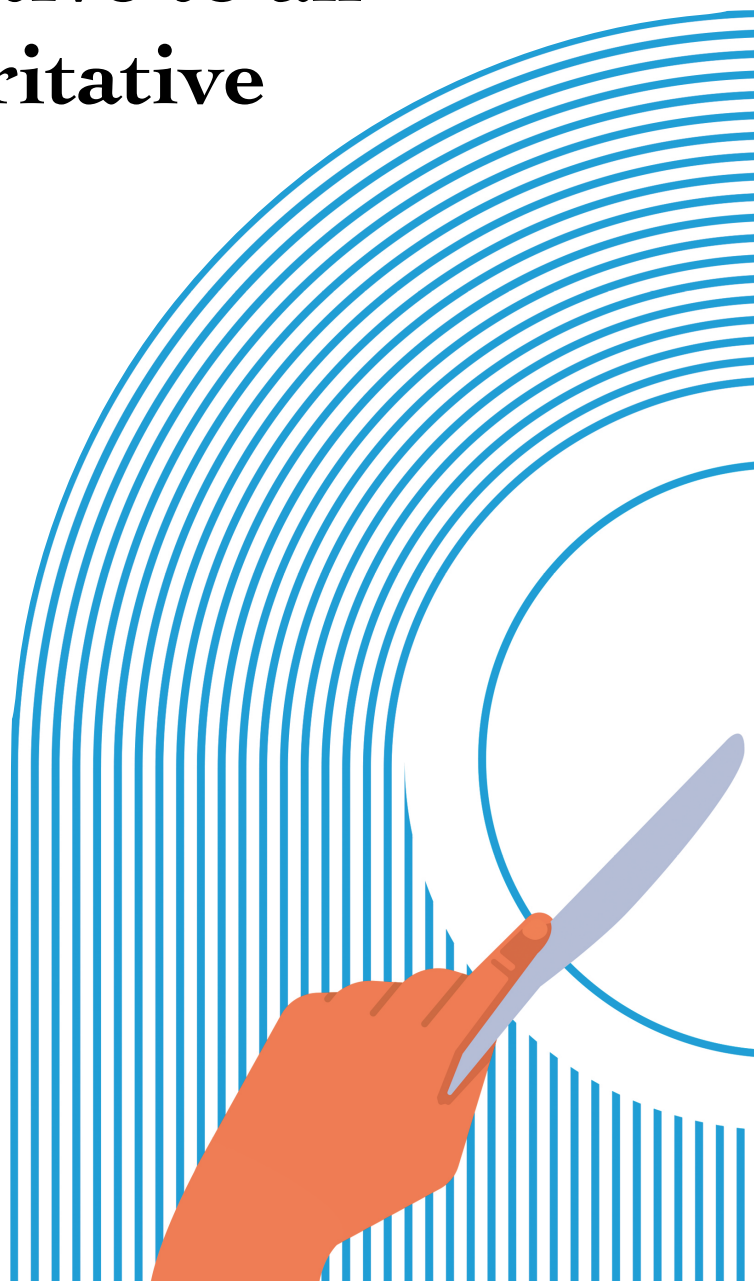
Common strategies to make official nutrition information more persuasive include highlighting its institutional sources and using simple and direct language. However, such strategies may be counterproductive, as institutions are no longer self-evidently deemed to be legitimate in contemporary societies and such language can be viewed as patronizing. This preregistered, population-based survey experiment fielded among a high-quality Dutch probability sample in February 2022 ($n=1,947$) 1) examines whether these dominant strategies hold up when tested against suggestions of psychological reactance and source derogation, and 2) scrutinizes if such responses are stronger among less-educated citizens. My experiment mirrored real-life examples of health-information campaigns concerning healthy and unhealthy beverages, with data collected on seven outcome measures to discern receptivity toward the information and its sources. We found that just highlighting institutional sources in the information did not lead to it being perceived more negatively. This was also the case when the language used could be perceived as patronizing, with reactance only present for one outcome measure. Moreover, while less-educated citizens were generally less receptive to nutrition information (six of seven outcome measures), versions that could possibly be perceived as patronizing or/and highlighted institutional sources did not make them less receptive systematically. Importantly, therefore, while the results show that the dominant health-communication strategies do not increase receptivity either, their use will probably not have a negative effect on the general public and so do not need to be discarded.

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Chapter 4.

Receptive to an authoritative voice?



Introduction

Many societies across the globe deal with problems arising from overweight or obesity. In 2016, about forty percent of adults globally was overweight (WHO, 2021), and more recent statistics show that this goes for more than half the EU population (Eurostat, 2021). In their attempts to tackle this, public-health organizations have produced numerous initiatives to encourage citizens to improve their diet, including providing information on nutrition (see e.g., Brambila-Macias et al., 2011; Rimal and Lapinski, 2009; Snyder, 2007). Such information, broadly, is meant to communicate to citizens what healthy and less healthy food choices are, in order to motivate or empower them to make conscious decisions about their food behavior (Schiavo, 2007). Health-communication scholars have long studied how this can be done effectively (e.g., Noar, 2006), yet there are indications that some of the dominant strategies may be counter-productive (e.g., Fransen et al., 2015; Rains, 2013).

Common advice in relation to the provision of health communication is to do so through authoritative sources or present it as information from expert sources. (Cummings, 2014; Gehrau et al., 2021). As such, many members of the European Public Health Nutrition Alliance (EPHNA)⁴ – the network of official bodies providing nutrition communication organizations in Europe – highlight the scientific background of their information prominently on their various webpages. Furthermore, to emphasize the official nature of the advice, it is often disseminated by governmental organizations and linked to specific health professionals or bodies (e.g., De Dobbelaer et al., 2018), since this is assumed to improve a message's credibility (Cummings, 2014).

Nevertheless, in highly individualized societies, institutions no longer have self-evident legitimacy. Instead, their actions are more critically reflected on by (Beck and Beck-Gernsheim, 2002; Houtman et al., 2011; 2021). As such, citizens' adherence to institutions is more strongly based

⁴ See <http://www.ephna.eu/>. EPHNA consists of 17 members from Germany, Belgium, Austria, Switzerland, Portugal, Spain, Denmark, Bulgaria, Poland, Malta, Greece, Latvia, Ireland, the Netherlands, Czech Republic and Italy

on an interplay of various individual and contextual characteristics, instead of the more taken-for-granted adherence of generations before. That makes explicitly signaling the involvement of institutional sources not as unquestionably beneficial as theorized. Indeed, a critical attitude toward institutions may, in fact, be one of the reasons for the low uptake of official health information, as previously highlighted for receptivity to, e.g., information about nutrition (see Chapter 3), the hazards of smoking (Veldheer et al., 2019) or COVID-19 (Caplanova et al., 2021; Wong and Jensen, 2020), or public support for various non-health related institutional interventions (e.g., Davidovic and Haring, 2020; Rudolph, 2009).

Attempts to further improve the uptake of health information can often be seen in the use of simplified language (e.g., Calderón and Beltran, 2005; Meppelink et al., 2015), and explicitness of the message (Dillard and Shen, 2005; Miller et al., 2007); making directly clear what the intention of the message is in an understandable way. However, the way this is done could lead to health messages coming across as patronizing (Atkinson and Sloan, 2017), portraying a sense of perceived superiority while actually trying to be helpful. This can take the form of sentences like *'Everyone should know this: there is too much sugar in sugar-sweetened beverages'*, or *'It would be smart to eat more fruit'*. As patronizing language in health information has been found to be unattractive (Brown and Draper, 2003), the strategy of making it easier to understand and more direct may unintentionally lower the public's receptivity to it. Indeed, earlier studies exploring receptivity to health information have suggested that various health-communication strategies may actually increase the extent to which the advice being provided is rejected (e.g., Dillard and Shen, 2005; for an overview, see Rains, 2013). However, since many of these studies only involved small non-probability samples, it is unclear what the relevance of the aversion identified is to how health information is received among the public at large.

To advance the research described above, I conducted a survey experiment among a high-quality panel randomly drawn from the official

Dutch population register. The goal was to test the public's receptivity to two communication strategies: 1) the highlighting of institutional sources, and 2) the use of simplified and direct language that could be perceived as patronizing. My focus was on a specific form of nutrition information – the intake of healthy drinks. The consumption of sugar-sweetened beverages (SSBs) is a major cause of excess weight (Thompson et al., 2009), and the issue is therefore highlighted in various health-information campaigns. As knowledge of the risks of SSBs has been shown to be associated with their consumption (Park et al., 2014), information that disseminates the facts may have a positive effect on the levels of sugar consumed.

A correlation between the consumption of excess sugar and an individual's educational attainment has also been identified (Thompson et al., 2009), with less-educated citizens found to be more likely to (over)consume SSBs than their more-educated counterparts. Ideally, therefore, health-promotion efforts should have an impact on this group to an at least equal, but preferably greater extent than on more-educated citizens. However, research has shown that non-tertiary educated individuals are less receptive to nutrition information than tertiary educated individuals (see Chapter 2), with this gap strongly associated with the former's more negative views toward institutions (see Chapter 3). This may be an indication that the two strategies tested in the present chapter will be less well received by this group.

This chapter examines how the aforementioned communication strategies affect citizens' receptivity to nutrition information among the general public. In addition, I test for heterogeneous treatment effects by educational attainment (Mullinix et al., 2015). As such, I aim to answer a two-part question: *Do highlighting institutional sources and the use of patronizing language in nutrition information affect the public's receptivity to it, and does this differ between non-tertiary and tertiary educated individuals?* The research is positioned in the Netherlands, where information provision is a widely employed health-promotion strategy and an official organization is used to disseminate such guidance (*Voedingscentrum*; Netherlands

Nutrition Centre). The provision of health information also has a prominent role within the National Prevention Agreement, a highly ambitious comprehensive collaboration between the Dutch government and over 70 civil society organizations. Its goal is to improve the health of Dutch citizens, including reducing the number of those who are overweight and obese by more than ten percent over the next two decades (Rijksoverheid, 2018).

Common health-communication elements: institutional sources and patronizing language

Nutrition information is a form of persuasive communication aiming to encourage people to eat and drink more healthily. In many countries, an official organization is responsible for disseminating such guidance population-wide. An example is the EPHNA, of which 17 members communicate advice on nutrition on a national or regional level. These organizations collaborate with, or are part of, national health, governmental, and science institutions, which is emphasized when they produce their advice on nutrition. Some focus on the fact that their guidance is backed by science, e.g., the Flemish Institute for Health Living assures readers that its ‘food triangle’ is “scientifically proven” (Gezond Leven, n.d.) and the Spanish Academy of Nutrition and Dietetics stresses its use of an in-house scientific committee. Other members have a direct link to national governmental agencies: the Austrian Agency for Health and Food Safety and the German Federal Centre for Nutrition are both part of federal offices, and the Netherlands Nutrition Centre is an independent organization funded by two ministries.

These institutional connections are emphasized to increase the persuasiveness and credibility of the information provided (Cummings, 2014; Gehrau et al., 2021). Cummings (2014) argues that although citizens can understand health advice, they cannot always judge which information is ‘right’: “Rather than communicating advice about health risks in a manner that is divorced from the expert base that generated this

advice, public health officials *should seek wherever possible to reveal this base so that it may be rationally evaluated by the public*” (p. 1054, emphasis added). In other words, an institutional background should be communicated to signal expertise and officiality.

Nonetheless, the success of this strategy likely hinges on the extent to which the institutions are regarded as legitimate. The longstanding process of individualization has, however, led to many of these institutions losing some of their self-evident legitimacy (Beck and Beck-Gernsheim, 2002; Houtman et al., 2011; 2021); it “can no longer be simply taken for granted or expected; it has to be worked on and won” (Meyer et al., 2008, p.179). This was clearly visible during the COVID-19 pandemic, where an initial upsurge of trust in both government and science (Oude Groeniger et al., 2021) was quickly followed by a more critical stance (Bromme et al., 2022). Clearly, then, at a time when the legitimacy of institutions cannot be taken for granted, highlighting explicit connections to them may not be as effective as anticipated.

Keeping information simple and direct is another common strategy (Calderón and Beltran, 2005), e.g., using brief, easy to understand, sentences and placing an exaggerated emphasis on the key points. This probably has merit, since it is often argued that health information is less effective among those in the lower social strata for reasons such as cognitive factors (see Chapter 2 and Appendix 1A). Nevertheless, this type of language is sometimes also criticized for seeming to talk down to people who do not follow the guidelines being communicated (Atkinson and Sloan, 2017).

While the focus of current research into potentially patronizing health advice is on communication with elderly citizens (e.g., Atkinson and Sloan, 2017), health information aimed at the general public includes many of the same elements. In guidelines on nutrition, some material signals that unhealthier diets are the ‘wrong’ or ‘irrational’ choice by claiming: “*you don’t need products such as candy, snacks and soft drinks at all for your health*” (Voedingscentrum, n.d. emphasis added); “*We all actually already know our shelves are full of unhealthy food*” (Alliantie

Voeding voor de Gezonde Generatie, n.d. emphasis added); and “The message is *reasonably simple*: if we are gaining weight, we need to eat less and be more active!” (European Food Information Council, 2017, emphasis added). These examples seem to imply that people who do not follow the guidance are somehow ‘wrong’ or ‘not smart enough’, potentially causing them to feel stigmatized.

If persuasive communication is to be effective at changing behavior, it is important that the information is viewed positively. Communication strategies like those described above are often employed in an attempt to achieve this, but may also cause the content being conveyed to be perceived negatively. The foremost evidence of this comes from studies on psychological reactance and source derogation.

Opposing the message: reactance

Individuals confronted with persuasive communication might show signs of reactance: a motivational state in which people feel the need to (actively) reject a message as a way to regain the freedom they perceive to be under threat (Brehm and Brehm, 1981). Reactance goes beyond just passively ignoring the message, instead representing a state in which the communicated content produces a negative reaction and, possibly, outcomes that are polar opposite to those hoped for and expected.

Information interventions are often lauded for their low level of intrusiveness (Diepeveen et al., 2013), i.e., individuals still have agency to choose how to act upon the guidance being given. Nevertheless, as reactance theory shows, the intention to change behavior into the ‘proper’ conduct conveyed in health advice may cause recipients to in fact feel as if their freedom to choose is threatened (Brehm and Brehm, 1981). Accordingly, people may feel pressure to adopt a particular form of behavior when it is not reflective of how they actually behave in real life. Moreover, the stronger the perceived intention to correct, the stronger this sense of threat is likely to be (Dillard and Shen, 2005).

In view of the issues highlighted above, attempts to increase the persuasiveness of a message may be counterproductive. Indeed, early

accounts of reactance have already reported that seemingly more-credible sources lead to more negative receptivity (Brehm, 1966), although this is not a consistent finding (e.g., Rains and Turner, 2007). Nevertheless, given the critical attitudes toward institutions that are common in today's individualized societies (e.g., Houtman et al., 2021), stressing the involvement of such sources may be perceived as unwelcome correction, rather than as a sign of greater credibility. Consequently, people might oppose, rather than comply with, the information directed at them.

Similarly, health-information language that is perceived to be patronizing may be unwelcome (Brown and Draper, 2003) and likely heightens message recipients' perceptions that their current behavior – if not in line with that communicated – is inappropriate. Again, the sense of being judged that arises from the use of patronizing language also probably breeds an aversion to, rather than compliance with, the information being conveyed.

According to reactance theory, this opposition can be expressed in various ways. Recipients may perceive the information as a greater threat to their freedom to choose if it stresses institutional sources and uses patronizing language. They may then become defiant and expressively negative about the advice – defined as state reactance – and the communicated 'appropriate' behavior. As a worst-case effect, such information may subdue the envisioned impact, or even influence the recipients in the opposite way to that intended (Oschatz et al., 2021; Zhao and Fink, 2021). This leads to the first four hypotheses:

The perceived threat to freedom is greater after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 1).

State reactance is greater after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 2).

Attitudes to reducing the consumption of sugar-sweetened beverages are more negative after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 3).

Intended non-compliance is greater after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 4).

Beyond the message: source derogation

Aside from aversion to the message in question, how information is presented may also influence opinions of its sources, and even of information provision in general (Fransen et al., 2015). One possible negative effect is source derogation, i.e., rejecting the validity of the institution as a source of information (Cameron et al., 2002). Institutions' absence of self-evident legitimacy in contemporary societies may also have a negative impact on attitudes to the sources themselves and their information in general, creating a feedback loop. Indeed, research has shown that compliance is greater when institutions are considered legitimate (Tyler and Jackson, 2014). This suggests that a more strongly negative evaluation of institutions (i.e., source derogation) may cause further undermining of their broader health-promotion efforts in the future.

How sources of information are evaluated commonly comes down to identification and appreciation. Identification focuses on whether those providing the advice resemble the intended audience in relevant ways (Chang, 2011; McCroskey et al., 1975). Indeed, it is often the case that a source is judged to be more credible when it is also perceived to be similar to the recipient (Hu and Sundar, 2010; Wright, 2000). Consequently, interventions are more effective when they communicate the experiences of like-minded individuals (see Appendix 1A). This is in contrast to institutionalized and patronizing information. Institutional sources are, by definition, impersonal and, as a result, unlike many recipients; and

patronizing language causes further distance, giving those the advice is intended for the impression that they are being talked down to. Consequently, I expect that:

Source disidentification is higher after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 5).

The appreciation of sources is often based on their competence, trustworthiness and benevolence (McCroskey and Teven, 1999). Extant research has shown that information from explicitly named sources is not deemed to be more credible than that where these sources are not identified (Bates et al., 2006). Moreover, given the critical attitudes to institutions today, this strategy may increase the negativity of perceptions. This is particularly the case when the language used is condescending (König and Jucks, 2019) and thus links this type of communication to the named institutional sources, causing them to be judged more negatively. Accordingly, I hypothesize:

Source disappreciation is higher after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 6).

Lastly, as a culmination of the theorizing above, I hypothesize that institutional and patronizing information may negatively affect attitudes toward nutrition information provision in general. In line with negative receptivity to the information and source, it may also take the form of overall disdain for any advice that aims to persuade recipients to change their diet. The final main effect hypothesis is thus:

Attitude to information provision as an effort to promote health is more negative after reading information that a) stresses its institutional sources, or b) stresses its institutional sources and uses patronizing language, than it is after reading basic information (hypothesis 7).

Educational differences in reactance and source derogation

Non-tertiary educated individuals make less use of health information than their tertiary educated counterparts (Koç and van Kippersluis, 2017). Moreover, when it is taken into account, it is generally not as effective among the former group (see Chapter 2). This gap is strongly associated with the anti-institutionalism of non-tertiary educated individuals (see Chapter 3), meaning that the use of named institutional sources is potentially counterproductive. Moreover, given the well-documented high levels of distrust of institutions felt by this group, whether toward government (Noordzij et al., 2021b), science (Achterberg et al., 2017) or healthcare institutions (Laveist et al., 2009), a strategy of overtly communicating the involvement of such sources may result in less receptivity to a message by non-tertiary educated individuals in particular.

Alongside this, the lifestyles of non-tertiary educated individuals are often frowned on by tertiary educated individuals (Bourdieu, 1984; Currid-Halkett, 2017), leading the former to perceive that their lifestyles are being stigmatized (Kuppens et al., 2018) and that they are not represented by institutions populated by the latter (Lamont, 2018; Noordzij et al., 2021a). Any attempts to interfere in their lives may thus be perceived as patronizing. Indeed, it is argued that initiatives by a dominant group that seek to ‘edify’ the dominated have an aura of power dynamics, with the former being accused of believing that they have the moral superiority to decide what is best for the latter (Jackman, 1994; Veldheer et al., 2019). These power dynamics are also very much in play in health inequalities (Bergman et al., 2020; McCartney et al., 2020) and have a role in conflicts between educational groups (Stubager, 2009). When the language in information that already condemns certain lifestyle elements is also patronizing, it probably increases the perception that the behavior is regarded as morally wrong, reflecting the stigmatization that non-tertiary educated individuals already feel. Given the above, I expect the information effects theorized in hypothesis 1 to 4 to be moderated by educational attainment:

The effects hypothesized in H1-4 are stronger among non-tertiary educated individuals than among their tertiary educated counterparts (hypothesis 8i-a/8i-b – hypothesis 8iv-a/8iv-b).

I expect similar outcomes for source effects. First, institutions like those central in health information are largely composed of tertiary educated individuals (Rivera, 2012). Lifelong socialization in elite institutions (especially higher education) allows those in this group to identify more closely with them (Forster and Van de Werfhorst, 2020; Lareau, 2015), whereas non-tertiary educated individuals lack this experience and are thus likely to identify with them less.

Second, less-educated individuals judge the more educated to be less benevolent, and no more competent than their own in-group (Spruyt and Kuppens, 2015b). Consequently, this group's more negative assessments of information providers are likely due to: a perceived closer connection between (the lifestyles of) the tertiary educated and the institutional sources mentioned in the health advice; or the use of condescending language in that advice, which is experienced as stigmatizing health behavior that is typically more associated with non-tertiary educated individuals. I thus theorize in relation to the source effects in hypothesis 5 and 6 that:

The effects hypothesized in H5-6 are stronger among non-tertiary educated individuals than among their tertiary educated counterparts (hypothesis 8v-a/8v-b – hypothesis 8vi-a/8vi-b).

Lastly, it is likely that the effects of institutional and patronizing advice on attitudes toward the provision of nutrition information in general are experienced more negatively by non-tertiary educated citizens, who probably take it to be just a continuation of the stigmatization they feel is a constant presence in their daily lives. Information that feeds this stigmatization may thus strengthen the view

that the provision of nutrition information is another way to look down on them and their lifestyles. Accordingly, and reflecting the expected effect moderation theorized in hypothesis 7, the final hypothesis is as follows:

The effects hypothesized in H7 are stronger among non-tertiary educated than among their tertiary educated counterparts (hypothesis 8vii-a/8vii-b).

Data and methods

The research in this chapter was preregistered with the Open Science Framework (OSF) and received ethical approval from my institution's ethics review board (DPAS Research Ethics Review Committee; ETH2122-0115) before data collection. The details of the preregistration can be found at: https://osf.io/we82u?view_only=d1b16852011d4a5fa7730f09048983c6.⁵

Study participants

The participants were recruited from the LISS (Longitudinal Internet Studies for the Social Sciences) panel (see Appendix 1B). In this study, fielded in February 2022, Dutch adults (aged 18 and above) were sampled from the panel, with a response rate of 80.9% (Van Meurs et al., 2022). Of these individuals ($n=2,340$), I only selected those who spent more than ten seconds on the web page with the experimental condition, as this was determined to be the minimum amount of time required to read the text. This produced a final sample of 2,092 respondents.

Study design

I used a survey experiment with a between-subjects design. The respondents were asked to complete an online survey and, once they had started, were allocated randomly to one of three groups. A control group

⁵ Please note that while the hypotheses in this dissertation correspond to those in the preregistration (except for some stylistic adjustments), their order (and therefore their numbers) differ.

was confronted with factual information. Meanwhile, those in the experimental groups saw the same information, but this time it was either supplemented with explicit references to its institutional sources or it contained these references and also used patronizing language. The content of the basic information was the same in each condition, as were subsequent questions in the survey.

Intervention design

The starting point for designing the experimental conditions was information taken from various pages on the website of Netherlands Nutrition Center, an independent organization communicating nutrition information on a national and regional level. This was supplemented with information obtained from other members of the EPHNA and Dutch health institutions like the *Alliantie Voeding voor de Gezonde Generatie*. The facts in the control condition were based on information on healthy drinks taken from the Netherlands Nutrition Center website, reduced to several core facts. The two experimental conditions presented the same information, but included either: 1) explicit references to its institutional sources; or 2) referred to these sources and used language that may be perceived as patronizing.

For these, I consulted the web pages of EPHNA members that explained how various food guidelines are produced, in particular relating to issues like funding and the acquisition of source material. I centered pedantic and imperative language in the second experimental condition, as well as the suggestion that the proposed behavior is the 'proper' approach. This was based on the various uses of language employed in the campaigns of the referenced institutions. The final texts used (in Dutch) can be found in Appendix 4A.

The use of examples from real-life nutrition information ensures the external validity of the study. However, as a single exposure to an information treatment in an experimental setting cannot compare to its continuous use in real-world scenarios, I adopted the common strategy of increasing the overtness of the manipulations (see Gaines et al., 2007).

The institutional and patronizing elements in the two treatments were therefore slightly exaggerated.

Measures

Unless otherwise noted, all the questions were answered on a seven-point scale from (1) completely disagree to (7) completely agree.

Perceived threat to freedom was measured with four items: 1) My freedom to choose is taken away; 2) a choice is made for me; 3) something is forced upon me; 4) I am pressured into something. Spearheaded by the research of Dillard and Shen (2005), this measure is often used in studies of reactance, albeit with some alterations in the wording. An internally consistent scale (Cronbach's $\alpha=0.90$) was constructed using the mean score of the respondents who provided valid answers to all four questions. Higher scores on the scale indicated a greater perceived threat to freedom.

I also followed Dillard and Shen's (2005) research for *state reactance*, viewing it as a latent construct underlying both negative emotions and negative cognition. This dual measure is the best way to capture state reactance, as subsequently validated by Quick and Stephenson (2007). I therefore asked the respondents to indicate their level of anger, annoyance, irritation, and aggravation on a seven-point response scale, ranging from: (1) a great deal of this feeling to (7) none of this feeling. After reverse coding, an internally consistent scale (Cronbach's $\alpha=0.96$) was constructed using the mean score, with higher scores indicating a stronger emotional reactance. I adopted Al-Ghathithi et al.'s (2019) approach for the negative cognitions, which were measured with a Likert scale. In addition to the practical advantages of such a scale over the original thought-listing exercise, recent comparative research has confirmed a minor advantage of this approach (Reynolds-Tylus et al., 2021). The respondents were asked to evaluate their thoughts while reading the information using three seven-point Likert scale items: (1) unpleasant to (7) pleasant; (1) unfavorable to (7) favorable; and (1) negative to (7) positive. This produced an internally consistent scale

(Cronbach's $\alpha=0.94$), which was constructed by reverse coding and taking the mean score for these items. Higher scores indicated a stronger cognitive reactance.

Various studies have determined that an 'Intertwined Process Model' is the best way to combine the two (Dillard and Shen, 2005; Quick and Stephenson, 2007; Rains and Turner, 2007), leading to a model in which they function as "indicators of an underlying concept" (Dillard and Shen, 2005, p. 149) – i.e., state reactance. Consequently, the measures for emotion and cognition were combined in a single scale. I tested internal consistency for the state reactance scale based on the standardized coefficient alpha. This is viewed as the most appropriate test for two-item scales (Eisinga et al., 2013) and indicated that the scale was internally consistent (Cronbach's $\alpha=0.66$). The final variable was calculated by taking the mean scores of emotional and cognitive reactance scales, with higher scores indicating that the state reactance was stronger.

The respondents' *negative attitude toward drinking sugar-sweetened beverages* was measured with three items, again based on a common measure used in reactance studies (cf. Dillard and Shen, 2005). To uncover whether the information caused the respondents to become more recalcitrant, and so more positive about the behavior it cautioned against, they were asked to indicate if they thought the idea of reducing their SSB intake (i.e., the core message) was (1) very bad to (7) very good; (1) very unnecessary to (7) very necessary; and (1) very unwise to (7) very wise. I reverse coded the items and created a single scale that was internally consistent (Cronbach's $\alpha=0.87$), using the mean score of the respondents who provided valid answers to each question. Higher scores indicated a more negative attitude.

Intended non-compliance is a single item measuring if the respondents planned to reduce their consumption of SSBs after reading the information. An additional answer category, coded as missing, was included for them to indicate whether they were already non-consumers: (8) I do not drink any sugar-sweetened beverages. The variable was

reverse coded, meaning that higher scores indicated a higher level of intended non-compliance.

I used five items to measure the extent of the respondents' lack of identification with those they perceived to be the source of the information. Three items were derived from Chang (2011), while (the latter) two were newly added to expand the scale by encompassing a sociocultural element. These five items were: 'The people from whom the information originates...' 1) are similar to me; 2) and I are alike; 3) and I could be friends; 4) share my norms and values; and 5) have the same outlook on life as me. The variable for *source disidentification* was created by reverse coding the items and creating a scale (Cronbach's $\alpha=0.91$) using the average score of the respondents who provided valid answers to each of the five questions. Higher scores indicated more disidentification.

Source disappreciation was adapted from McCroskey and Teven (1999). To avoid repetition in the Dutch translations of the items, the original 18 were reduced to nine. These were as follows: "The people from whom the information originates... 1) are smart; 2) know a lot about the subject; 3) are experts; 4) care for me; 5) want what is best for me; 6) are trying to help me; 7) are honest; 8) are trustworthy; 9) are sincere. A single, reverse coded, internally consistent scale (Cronbach's $\alpha=0.93$) was calculated for the respondents who provided valid responses to all nine items. A higher score on the scale indicated a stronger disappreciation of the perceived source.

Lastly, I measured the respondents' *negative attitude toward information provision* using three items. Respondents were asked to indicate if they thought providing information as a way to reduce the consumption of SSBs was (1) very bad to (7) very good; (1) very unnecessary to (7) very necessary; and (1) very unwise to (7) very wise. I reverse coded the items and created a single scale (Cronbach's $\alpha=0.92$), using the mean score of the respondents who provided valid answers to each question. Higher scores indicated a more negative attitude.

The independent variables measured which treatment had been assigned to a respondent: (0) control condition; (1) information stressing

institutional sources; (2) information stressing informational sources and using patronizing language. This was included in the analyses as dummy variables, with (0) as the reference category.

To test hypothesis 8, I interacted the treatment variables with my measure of educational attainment. The original levels were (1) primary school; (2) vmbo (intermediate secondary education); (3) havo/vwo (higher secondary education/preparatory university education); (4) mbo (intermediate vocational education, US: junior college); (5) hbo (higher vocational education); (6) wo (university); (7) other; (8) not (yet) completed any education; and (9) not yet started any education. Respondents that had a degree but were currently still in education ($n=92$) were excluded from the analyses, as were respondents that answered, (7), (8) and (9) of the original measurement ($n=53$). As recent studies have shown that there is a difference in the attitudes toward institutions between (mainly) those with a tertiary education on the one hand, and those with a non-tertiary education on the other (Noordzij et al., 2021a; see also Chapter 3), I recoded this variable into two categories: (0) tertiary educated (categories 5 and 6 of the original measurement); and (1) non-tertiary educated (categories 1 to 4 of the original). I chose 'tertiary educated' as the reference category for reasons of clarity, as my theoretical focus in the moderation hypotheses was on non-tertiary educated individuals.

Analytical strategy

I used ordinary least squares (OLS) regression models to identify the effects on the outcome measures of stressing institutional connections and the use of patronizing language.

For my main confirmatory analyses, I fitted a separate, but similar, model for each outcome measure:

$$Y = \beta_0 + \beta_1 \text{institutional} + \beta_2 \text{institutionalpatronizing} + \varepsilon$$

Y is the outcome measure; *institutional* is a dichotomous variable indicating the treatment in which institutional sources are stressed; *institutionalpatronizing* is a dichotomous variable for the treatment that highlights institutional sources and also uses patronizing language; and ϵ is the error term. The treatment effects were compared to the control condition, which was the reference category. The equation was used to test both the 'a' and 'b' versions of the main effect hypotheses.

I also fitted a separate model for each outcome measure for my confirmatory moderation analyses:

$$Y = \beta_0 + \beta_1\text{institutional} + \beta_2\text{institutionalpatronizing} + \beta_3\text{ntedu} + \beta_4(\text{ntedu}*\text{institutional}) + \beta_5(\text{ntedu}*\text{institutionalpatronizing}) + \epsilon$$

Y is the outcome measure; *institutional* is a dichotomous variable indicating the treatment variant in which institutional sources are stressed; *institutionalpatronizing* is a dichotomous variable indicating the treatment variant in which institutional sources are stressed and patronizing language is used; *ntedu* is a dichotomous variable indicating whether a respondent is non-tertiary educated (1) or tertiary educated (0); (*ntedu*institutional*) is the interaction between educational attainment and the first treatment; (*ntedu*institutionalpatronizing*) is the interaction between educational attainment and the second treatment; and ϵ is the error term. The treatment effects were compared to the control condition, which was the reference category. The equation above was used to test both the 'a' and 'b' versions of the moderation hypotheses.

Results

Our sample counted 1,947 respondents after exclusions based on the time spent on the page of text, and educational attainment. The median age was 59 (mean age 57), 54 percent was female, and 56 percent was non-tertiary educated. The descriptive statistics for all the variables included in the analysis are reported in the Table 4.1.

Table 4.1 — Descriptive statistics.

	n	Mean	S.D.	Min	Max
Perceived threat to freedom	1,947	2.30	1.26	1	7
State reactance	1,947	2.49	1.05	1	7
Neg. attitude towards decreasing SSB consumption	1,947	2.02	1.17	1	7
Intended non-compliance	1,138	3.52	1.78	1	7
Source disidentification	1,947	3.54	1.17	1	7
Source disappreciation	1,946	3.14	1.01	1	7
Neg. attitude towards information provision	1,947	1.98	1.15	1	7
Experimental condition					
<i>Control condition</i>	1,947	0.34		0	1
<i>Institutional condition</i>	1,947	0.34		0	1
<i>Institutional and patronizing condition</i>	1,947	0.32		0	1
Education attainment					
<i>Non-tertiary educated</i>	1,947	0.56		0	1
<i>Tertiary educated</i>	1,947	0.44		0	1

Overall, the experimental conditions had little effect on receptivity to the information provided (see Table 4.2). Perceived threat to freedom was the only outcome variable affected in any significant way by one of the experimental conditions in the direction hypothesized. In particular, the combination of stressing institutional sources and using patronizing language (compared to the control condition) caused a 0.14 increase in the threat perceived, corroborating hypothesis 1b. However, the same outcome variable was not affected by information that only stressed institutional sources, meaning hypothesis 1a was not corroborated. Hypotheses 2 to 7 were also not corroborated. Although both experimental conditions (compared to the control) did have a significant effect on source disappreciation, this was in the opposite direction to that hypothesized, causing a greater appreciation of the perceived informational sources.

Table 4.2 — OLS regression for hypotheses 1 to 7; unstandardized coefficients with standard errors in parentheses.

	Reactance			
	H1: Perceived threat to freedom	H2: State reactance	H3: Neg. attitude decreasing SSB- consumption	H4: Intended non- compliance
Experimental condition				
<i>Control condition</i>	Ref.	Ref.	Ref.	Ref.
<i>Institutional condition</i>	-0.02 (0.07)	0.02 (0.06)	0.07 (0.06)	0.00 (0.13)
<i>Institutional and patronizing condition</i>	0.14* (0.07)	0.09 (0.06)	0.05 (0.07)	-0.09 (0.13)
Constant	2.26*** (0.05)	2.45*** (0.04)	1.98*** (0.05)	3.55*** (0.09)
	Source derogation			
	H5: Source disidentification	H6: Source disappreciation	H7: Negative attitude toward information provision	
Experimental condition				
<i>Control condition</i>	Ref.	Ref.	Ref.	
<i>Institutional condition</i>	0.03 (0.06)	-0.19*** (0.05)	0.02 (0.06)	
<i>Institutional and patronizing condition</i>	0.02 (0.07)	-0.19*** (0.06)	0.01 (0.06)	
Constant	3.53*** (0.05)	3.26*** (0.04)	1.97*** (0.04)	

Note: $n=1947$ for all models except for intended non-compliance (H4; $n=1138$). The lower n is due to the number of respondents that indicated “I do not drink any sugar-sweetened beverages” when asked about their intention to decrease their SSB consumption.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

The moderation analysis in Table 4.3 shows that there were heterogeneous treatment effects (HTEs) for some of the outcome variables: four of the 14 interaction effects yielded significant coefficients. I plotted these in Figure 4.1, which reveals that, contrary to the hypothesis, it was the tertiary educated citizens in particular whose receptivity was affected by the stimuli.

Table 4.3 — OLS regression for hypothesis 8; unstandardized coefficients with standard errors in parentheses.

	Reactance			
	H8i: Perceived threat to freedom	H8ii: State reactance	H8iii: Neg. attitude decreasing SSB- consumption	H8iv: Intended non- compliance
Experimental condition				
<i>Control condition</i>	Ref.	Ref.	Ref.	Ref.
<i>Institutional condition</i>	-0.07 (0.10)	-0.01 (0.08)	0.08 (0.09)	-0.04 (0.20)
<i>Institutional and patronizing condition</i>	0.19 (0.11)	0.22* (0.09)	0.20* (0.10)	0.02 (0.20)
Institutional*Non-tertiary educated	0.12 (0.14)	0.07 (0.11)	0.01 (0.13)	0.07 (0.26)
Institutional and patronizing*Non-tertiary educated	-0.10 (0.14)	-0.23* (0.12)	-0.26* (0.13)	-0.19 (0.26)
Constant	2.00*** (0.07)	2.34*** (0.06)	1.76*** (0.07)	3.59*** (0.14)
	Source derogation			
	H8v: Source disidentification	H8vi: Source disappreciation	H8vii: Negative attitude toward information provision	
Experimental condition				
<i>Control condition</i>	Ref.	Ref.	Ref.	
<i>Institutional condition</i>	-0.11 (0.09)	-0.36*** (0.08)	-0.00 (0.09)	
<i>Institutional and patronizing condition</i>	0.02 (0.10)	-0.26*** (0.08)	0.09 (0.10)	
Institutional*Non-tertiary educated	0.27* (0.13)	0.33** (0.11)	0.06 (0.12)	
Institutional and patronizing*Non-tertiary educated	-0.02 (0.13)	0.12 (0.11)	-0.16 (0.13)	
Constant	3.41*** (0.07)	3.20*** (0.06)	1.78** (0.07)	

Note: $n=1,947$ for all models except for intended non-compliance (H4; $n=1,138$). The lower n is due to the number of respondents that indicated “I do not drink any sugar-sweetened beverages” when asked about their intention to decrease their SSB consumption.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

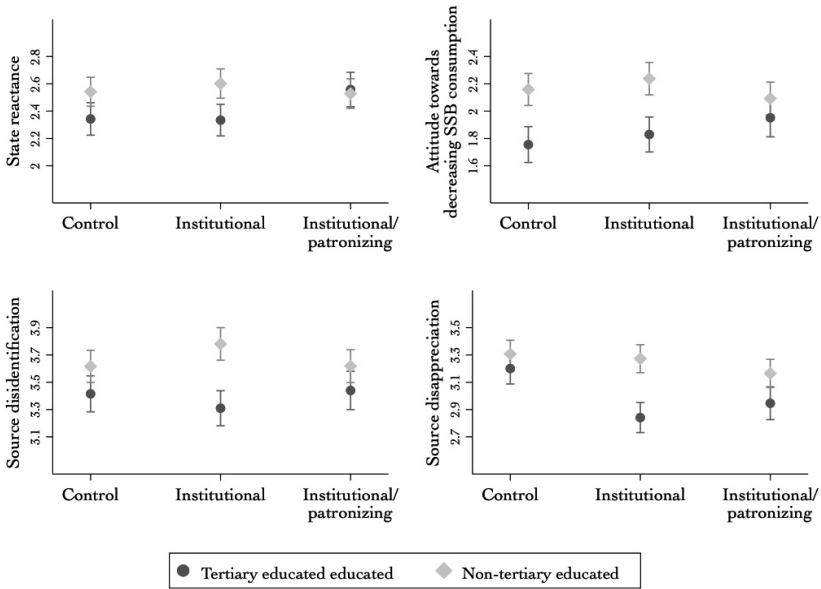


Figure 4.1 — Visualisation of significant mediation effects

Among the tertiary educated respondents, information that emphasized institutional sources and used patronizing language increased their levels of state reactance and negative attitudes toward reducing the consumption of SSBs (see Figure 4.1); this was not the case for their non-tertiary educated counterparts. In terms of source derogation, the HTE was in line with hypothesis 8v-a: non-tertiary educated respondents confronted with information that stressed its institutional sources reported higher levels of source disidentification than those in the control condition, while their tertiary educated counterparts did not. However, this was not the case when they were confronted with information that also used patronizing language. Lastly, the stimuli did not lead to more source disappreciation among the non-tertiary educated citizens (as had been hypothesized); instead, it actually led to less source disappreciation among the tertiary educated respondents.

The outcomes of the moderation analysis mean that 13 of the 14 hypotheses regarding the strength of the information and source effects among the non-tertiary educated respondents must be rejected. Nonetheless, Figure 4.1 also reveals a pattern worth further exploration: in all four depicted cases, the non-tertiary educated respondents were less receptive to nutrition information. As an additional explorative investigation, I conducted regression analyses with education as the predictor (see Table 4.4). Save for intended non-compliance, non-tertiary educated respondents had more strongly negative scores for all the outcome measures than their tertiary educated counterparts. However, the testing of the hypotheses identified that this was not aggravated systematically by confronting them with information that also stressed its institutional sources or used patronizing language.

Table 4.4 - OLS regression analysis for education differences at baseline, unstandardized coefficients

	Reactance			
	Perceived threat to freedom	State reactance	Neg. attitude decreasing SSB-consumption	Intended non-compliance
Tertiary educated	Ref.	Ref.	Ref.	Ref.
Non-tertiary educated	0.48*** (0.06)	0.15*** (0.05)	0.32*** (0.05)	-0.10 (0.11)
Constant	2.03*** (0.04)	2.40*** (0.04)	1.84*** (0.04)	3.58*** (0.08)
	Source derogation			
	Source disidentification	Source disappreciation	Neg. attitude information provision	
Tertiary educated	Ref.	Ref.	Ref.	
Non-tertiary educated	0.29*** (0.05)	0.25*** (0.05)	0.30*** (0.05)	
Constant	3.38*** (0.04)	3.00*** (0.03)	1.81*** (0.04)	

Note: $n=1,947$ for all models but intended non-compliance (H4; $n=1,138$). The lower n in this model is due to the high number of respondents that indicated “I do not drink any sugar-sweetened beverages” when asked about their intention to decrease their SSB consumption.

*** $p < 0.001$, ** $p < 0.01$ * $p < 0.05$

Discussion and conclusion

The goal of this chapter was to uncover how receptivity to nutrition information was affected by two dominant communication strategies: emphasizing institutional sources, and simplifying information, with the unintended consequence of making it sound patronizing. While there have been plenty of warnings that people become more closed off to persuasive communication (cf. Rains, 2013), the findings discussed in this chapter provide little to no evidence that this really occurs among the population at large, at least for the strategies tested in this study. The use of population-based data from the Netherlands in this preregistered experiment has demonstrated that there is only a small negative effect on receptivity if information is presented in which institutional sources are emphasized *and* language is used that is generally perceived to be patronizing: only one of seven outcome measures – perceived threat to freedom – was slightly affected. Indeed, information that only stressed institutional sources to make it more persuasive did not affect receptivity negatively at all.

Studies in the field of psychological reactance have been a critical voice on the use of persuasive information, arguing that it could produce negative reactions, with boomerang effects being the most extreme outcome (Brehm and Brehm, 1981). My results run counter to this, which may be due to sample differences – reactance studies largely use student-based convenience samples, often involving those enrolled in communication courses (e.g., Dillard and Shen, 2005). This closer connection to the subject-matter may produce biased, more critical views on the issue. Nonetheless, this experiment has shown that the postulated negative effect of persuasive communication on receptivity to nutrition information among the public is negligible.

In terms of the expectation that a negative effect is more likely among non-tertiary educated citizens, this was also barely in evidence: only one of the two experimental conditions (stressing institutional sources) had a stronger negative effect on only one measure of receptivity

(source disidentification) among the non-tertiary educated respondents compared to their tertiary educated counterparts.

Two further observations should be made regarding the differences between non-tertiary and tertiary educated citizens in my experiment. First, the exploratory analysis demonstrated that the non-tertiary educated individuals in the sample were, overall, less receptive to health advice: they had higher scores for most outcomes, largely regardless of the experimental condition to which they were assigned. This is in line with previous studies that have shown that non-tertiary educated individuals are less interested in using health information (Koç and van Kippersluis, 2017; see also Chapter 3).

Second, contrary to my expectations, receptivity to nutrition information containing patronizing language had a more negative impact on the tertiary educated respondents for two of the outcome measures (state reactance and negative attitudes toward reducing SSB consumption). This may be because this group perceives the language to be more condescending than is the case for their non-tertiary educated counterparts. Indeed, the former often have a greater appreciation of individual liberties and self-actualization (Beck and Beck-Gernsheim, 2002; Houtman et al., 2021, 2011) and may therefore detest being told what to do – especially if this is done in a manner that is so simplified and direct that it implies they lack the relevant knowledge. Moreover, indications in previous studies that non-tertiary educated individuals especially feel patronized by (health) professionals and institutions (Bergman et al., 2020; Noordzij et al., 2021a) might be due to very different factors than the type of language. Future research could shed light on this.

This chapter has some important implications for conventional persuasive-information strategies. Theoretical and empirical evidence, specifically that from the field of psychological reactance and source derogation, paints persuasive communication and the strategies involved as potentially endangering the intended effects of health-promotion efforts, as it may in fact lead to stronger aversion, rather than stronger

compliance (cf. Rains, 2013). However, the findings presented in this chapter show that conventional health-communication strategies have no negative effects overall on receptivity to the information being presented. Nonetheless, in this also lies a limitation of my study: due to the setup of the survey experiment, I was able to test for effects on attitudes but not on behavior. Consequently, future research should shift its focus toward behavioral – rather than attitudinal – change to identify the overall merit of the strategies discussed in this study.

A second limitation relates to the subject-matter of the information read by the respondents. As the responses to the non-compliance question show, a substantial proportion of them indicated that they were not consumers of SSBs. This may have affected receptivity in at least two ways: respondents 1) regard information about SSBs as personally irrelevant and are, therefore, not as affected by changes in communication strategies as they might otherwise be; or 2) are already against the high consumption of SSBs (see the low average score for negative attitudes toward both reducing SSB consumption and information to facilitate it). Therefore, they adopt the view that something should be done about this, making them likely to agree more with advice voiced authoritatively. Future research could thus investigate whether and how receptivity changes if the conventional strategies tested are applied to information about more ‘controversial’ topics, e.g., meat consumption. In addition, the research discussed in this chapter could be replicated in countries with a higher SSB consumption, like the United States or various Central American countries (Singh et al., 2015).

Results may also differ in countries where institutions are considered less legitimate in general. Perceived legitimacy of institutions is relatively high in the Netherlands, especially compared to e.g., countries in eastern and central Europe (Boda and Medve-Bálint, 2014). In such countries, persuasive communication by institutions may be more likely to create aversion. An international comparison might shed light on this.

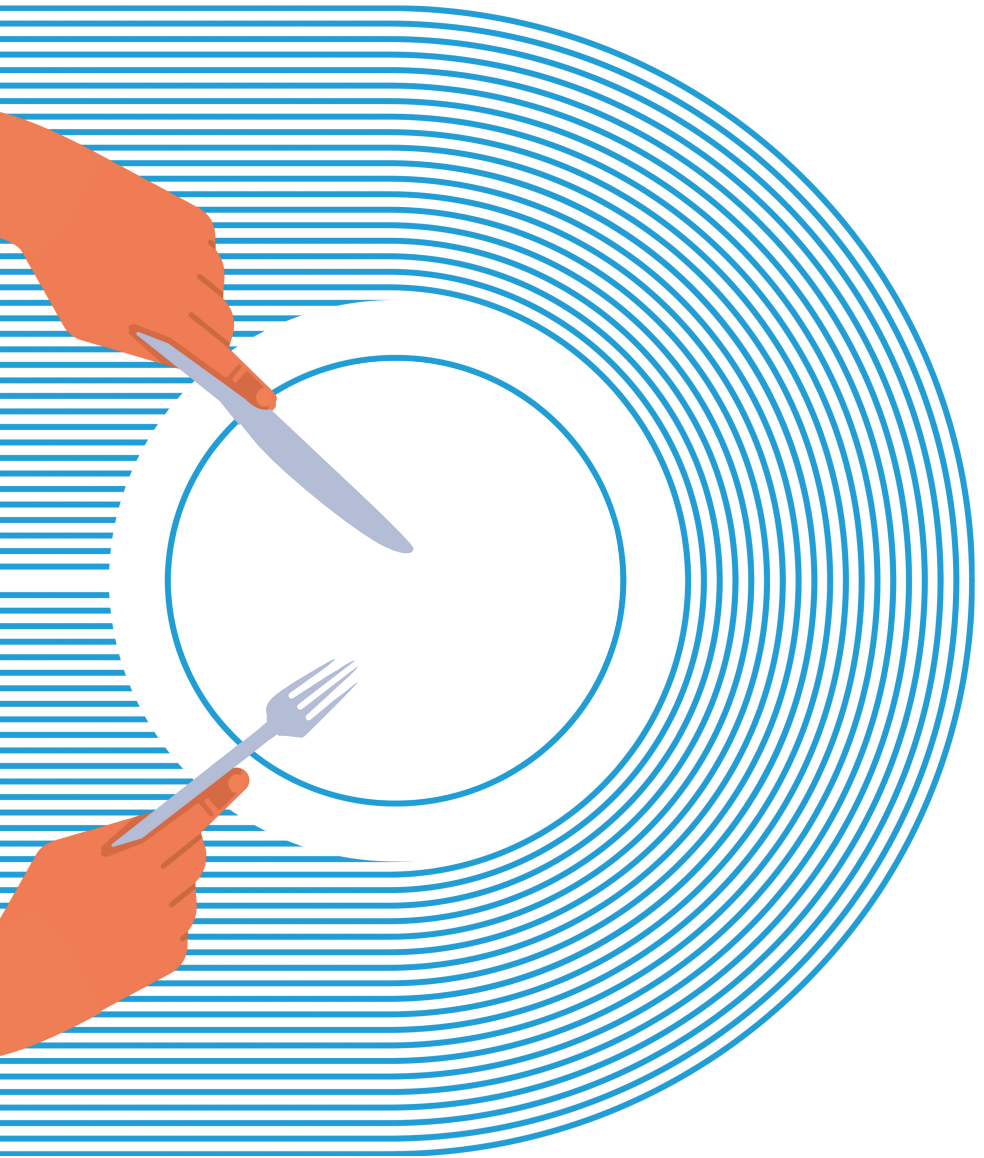
A final limitation is the external validity of the survey experiment, as respondents may simultaneously be under- and overexposed to the

treatment condition in comparison to its real-world comparison, and my setup does not allow us to ascertain which is the case. On the one hand, a one-shot treatment cannot capture accumulated effect of continuous exposure to real-world health information campaigns (Gaines et al. 2007). On the other hand, a survey experiment enhances the potency of the exposure by forcing respondents to pay more specific attention to the information, whereas real-world exposure is likely to be more fleeting (Barabas and Jerit, 2010). Future research may take exposure levels into consideration, study other contexts, or use other study designs for triangulation, in order to assess the external validity of the results.

Conclusion

In short, it can be concluded that emphasizing institutional sources in nutrition information and using simplified language that could be perceived as patronizing seem to be safe health-communication strategies. While they do not generally increase the receptivity to health information, neither do they substantially antagonize the recipients in any substantial way, contrary to the claims often made in reactance studies. It is crucial for future research to confirm and expand on the findings of this chapter in order to identify the effects on actual behavioral change of stressing institutional sources and using patronizing language.

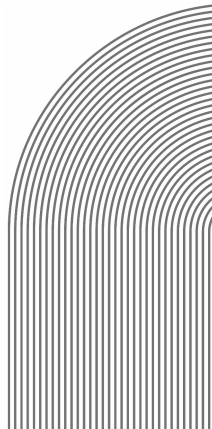
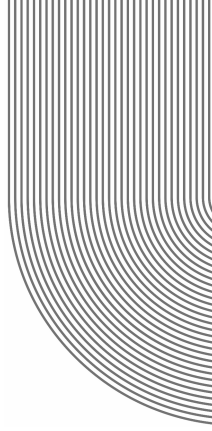
Receptive to an authoritative voice?



Chapter 6.

Conclusion and

discussion



Summary

The aim of this dissertation was to answer the question: '*What role is played by citizens' perceptions of official institutions in educational differences in the receptivity to nutrition interventions?*'. By means of a literature review (Chapter 2) and three empirical studies (Chapter 3, 4 and 5), I have tried to achieve this aim.

Chapter 2 contains an extensive overview of the explanations currently given in intervention testing studies for the (in)effectiveness of nutrition information interventions among adults with a low socioeconomic status (SES). The accounts most commonly involve individualistic reasoning, with cognitive (e.g., health literacy) or financial features (e.g., income levels) in particular discussed as explanatory factors. However, a substantial number of intervention studies offer no explanations for their findings and, if an explanation is provided, it is rarely tested empirically. Moreover, the outcomes of the studies that do empirically test their proposed explanations are relatively inconsistent, meaning it is still unclear why information interventions are (in)effective among citizens with a low SES.

The findings of Chapter 2 show that the field of nutrition intervention studies pays little attention to sociocultural aspects, which is not a pattern that is exclusive to this field (see Appendix 1A for a similar literature review focusing on anti-smoking information interventions). For nutrition interventions, economic and cognitive factors are of particular academic interest. As such, when testing the empirical value of other possible explanations, like the one in this dissertation, it is imperative to consider and control for such dominant factors.

The inductive exploration phase that followed the literature review, which is explicated more in-depth in Chapter 1, identified that anti-institutionalism – i.e., an aversion to institutions and their 'meddling' in private matters like food consumption – is likely to be related to how interventions are received and may also contribute to educational differences in this receptivity.

In Chapter 3, I demonstrate that citizens with a non-tertiary education are less likely to use official information about nutrition than their tertiary educated counterparts, which is quite convincingly explained by anti-institutionalism. The two aspects thereof identified and examined in this chapter – i.e., institutional distrust and anti-paternalism – are present more strongly among non-tertiary educated citizens and seem to inspire them to not use nutrition information from official channels like the Netherlands Nutrition Center as much as tertiary educated citizens do. Moreover, where anti-institutionalism accounts for the educational gap in the uptake of nutrition information, more traditional explanations – i.e., a lower household income level, greater financial stress, or less nutritional knowledge – do not.

Nevertheless, does this mean that information that has very overt institutional connotations is likely to be less well received, especially by citizens with no tertiary education? Chapter 4 demonstrates that this is not necessarily the case, as anti-institutionalism is not evoked by information that stresses its institutional sources or uses simplified and direct language, which could be perceived as patronizing. Although non-tertiary educated citizens were again found to be less receptive to the information than tertiary educated citizens are, this gap did not widen when the information included these elements. This probably means that it is factors other than an emphasized association with institutions that tap into non-tertiary educated citizens' anti-institutionalism, causing them to be less receptive to official nutrition information. The presumption, then, is that these factors are more deep-rooted than the surface-level elements considered in Chapter 4, and will be discussed later in this concluding chapter when examining societal power dynamics.

The study in Chapter 5 examined anti-institutionalism from a different angle, finding that it may also be evoked by proposed structural interventions. Reading a proposal for a sugar tax, or a mandatory product reformulation of sugar-sweetened beverages (SSBs) (i.e., a compulsory reduction in sugar content) may be an instigator or motivator for anti-institutionalism. Indeed, those confronted with a proposal for either of

these (unpopular) interventions had higher levels of institutional distrust and perceived institutions to be less benevolent and more culturally distant. Although this response was not exclusive to the non-tertiary educated respondents, such a delegitimization of institutions was especially strong among this group.

In short, the thus far largely ignored concept of anti-institutionalism provides a promising explanation for why nutrition interventions may be particularly ineffective among non-tertiary educated citizens. In the following sections of this chapter, I reflect on what the outcomes of my research mean for both nutrition interventions and health interventions more generally. Furthermore, I discuss how the findings are shaped by the Dutch context, the particular case of nutrition interventions, and my methodological choices. Throughout the chapter, I also examine some important limitations of the dissertation, and propose avenues for future research.

The multifaceted role of anti-institutionalism

The outcomes discussed in Chapter 2 and 3 demonstrate that economic and cognitive factors cannot provide a consistent explanation for the (in)effectiveness of nutrition interventions. Although aspects like having a lower income, greater financial stress, or less health literacy may, in some cases, reduce the likely success of some interventions, they do not in others, and specific intervention designs that take these elements into account have produced inconsistent results. It is also striking that the most common explanations for (in)effectiveness in intervention studies are highly individualistic in nature, with sociocultural reasoning largely disregarded. As such, broader societal patterns are not considered. Nevertheless, the sociocultural explanation central to this dissertation – anti-institutionalism – shows promise in this regard.

The contours of anti-institutionalism's role in educational differences in information receptivity are quite clear: on the one hand, citizens that have a greater aversion to institutions – expressed through institutional distrust and anti-paternalism – are less likely to be influenced by agentic

interventions originating from institutional channels. As this aversion is more common among those without a tertiary education, it is among this group in particular that such interventions are used or adhered to less. Anti-institutionalism, therefore, primarily explains the educational differences in how information interventions are received. On the other hand, anti-institutionalism also appears to be evoked by interventions themselves – particularly those with a generally low level of public acceptance, like a sugar tax or product reformulation.

This dual role of cause and effect in the low level of intervention receptivity means that anti-institutionalism seems to exist in a feedback loop, where an aversion to institutions leads to an aversion to interventions, and an aversion to interventions leads to an aversion to institutions. This can have serious consequences for public health. Indeed, while the delegitimization of institutions because of their interventions is no immediate cause for concern in the case of structural interventions, a continuation of this pattern certainly is.

If an intervention is to be adhered to, it is important that both it and the institutions involved are considered to be legitimate (Bargain and Aminjonov, 2020; Tyler and Jackson, 2014). Consequently, if a sugar tax, product reformulation, or any other type of structural intervention not only has the anticipated and desired positive health outcomes, but also causes some citizens to increasingly oppose the institutions backing it, this can likewise lead to antipathy to future interventions, as the institutions involved have lost some of their legitimacy among (a group of) citizens. If a constant stream of additional interventions is proposed (as in the Dutch National Prevention Agreement), this delegitimization is unlikely to be a one-off thing. Although the perceived legitimacy of institutions by citizens is never likely to plummet to a minimum (see e.g., Oude Groeniger et al., 2021 for evidence that institutional intervening in health can also *increase* perceived legitimacy), such bodies could nonetheless come to be regarded as significantly less legitimate by those who view this as a constant interference in their lifestyles. This may therefore particularly be the case when interventions fail to take into account the lifeworlds of non-tertiary

educated citizens and are developed, instead, from the ‘elite’ perspective of those with a tertiary education. As health promotion will remain a desirable (and core) task of the government, it is vital that these lifeworlds are taken into serious consideration, so that health promotion loses the elitist connotation it has among the non-tertiary share of the population.

Institutional delegitimization may be particularly problematic at times when official intervening is more desirable, such as during potential future pandemics or other disasters. COVID-19 provides an example, since the perceived legitimacy of institutions was unstable in this period (e.g., Kenworthy, 2021; Weingart et al., 2022). A lower perceived legitimacy of health-promotion institutions likely led not only to some citizens absorbing less information about the pandemic, but also to less compliance with the various measures put in place to contain it (Fridman et al., 2020; Gratz et al., 2021). This more vulnerable position of institutions was, furthermore, highly politicized and exploited by (populist) politicians (Bobba and Hubé, 2021; Lasco, 2020; Kreps and Kriner, 2020). The consequence was that aversion to institutions became more widespread, involving citizens who would normally not have thought too much about them (Kenworthy, 2021). This exploitation thus increases the strength of the feedback loop, causing an increasingly lower level of perceived legitimacy of important institutions. This may lead to widespread health-related and non-health-related non-adherence, particularly among less-educated citizens. As the feedback loop is, in itself, already a cause for concern, any potential exploitation of weakened institutional legitimacy only heightens this unease.

While the feedback loop may always exist to some extent – it might even be beneficial when citizens feel positive about institutions and their interventions – it is important to at least reduce the degree to which anti-institutionalism can cause educational differences in receptivity to nutrition interventions. Apparently, current nutrition information campaigns do not appeal to non-tertiary educated citizens due to their anti-institutionalism, withholding them from using the information to

improve their diets. This could be addressed in two broad ways: either removing the institutional connotations from the official information or reducing the negative perception these connotations have, particularly, among less-educated citizens.

Naturally, making changes to nutrition information internally would be the easiest solution, whereas it is likely challenging to completely alter less-educated citizens' perspectives on health-promotion institutions, at least in the short to medium term. However, the outcomes of the study discussed in Chapter 4 demonstrate that whether or not the information has enhanced institutional connotations does not affect how an intervention is received. Consequently, even though the institutional elements tested in the study were not exhaustive, these findings imply that the change required is not as simple as just altering some elements within information campaigns. This indicates that the culprits of the educational differences in intervention receptivity are, instead, the deep-rooted negative connotations that institutions have among citizens without a tertiary education, which are even felt in interventions without explicit reference to the institutions involved.

This all occurs even in a country like the Netherlands, where, overall, institutions are perceived to be relatively legitimate, as can be seen, amongst others, in the results of the study described in Chapter 5. This position does however seem to be somewhat wavering. Following a number of controversies linked to various Dutch institutions (e.g., COVID-19 related unrests, the childcare benefits scandal, and farmers' protests), their perceived legitimacy appears to have taken a major blow among various segments of the Dutch population. If this decline in perceived legitimacy persists, there may be widespread consequences for the role of anti-institutionalism in the receptivity to health interventions. First, anti-institutionalist sentiments may become stronger, as people become increasingly negative about institutions. While Dutch institutions currently have a 'safety net' of relatively high perceived legitimacy, this may increasingly disappear. Second, anti-institutionalist sentiments could become more widespread as other groups, too, begin to perceive a

distance between themselves and institutions. As these groups might also include more-educated citizens (e.g., Ten Kate et al., 2021), the mediating role of anti-institutionalism between educational attainment and intervention receptivity may decrease. Future longitudinal research could thus monitor anti-institutionalism and educational group differences therein in order to better determine how these factors are affected by the actions of institutions.

Anti-institutionalism as a result of societal power dynamics

With this dissertation, I have not been able to identify what *causes* anti-institutionalism especially in its connection to health-promotion efforts. The fact that receptivity to nutrition interventions is consistently lower among non-tertiary educated citizens, but not more so when the information is *overtly* institutional, leads me to propose that the cause may lie somewhere within the deep roots of societal power dynamics. These might be why health interventions are perceived as institutional by default and, therefore, as reflective of the power dynamics experienced in many facets of public life (Jackman, 1994). Accordingly, anti-institutionalism, and the non-adherence with or opposition to health interventions that go with it, may be a form of resistance to these dynamics (McCartney, 2020).

The institutions responsible for official health interventions are generally closely connected to and largely populated by the tertiary educated population (Ridgeway, 2014). As these citizens and their non-tertiary educated counterparts are increasingly segregated among the various facets of life (e.g., where they live and work, what culture they consume, and who they form social relationships with; see Bovens et al., 2014), those in the latter group feel more culturally distant from these institutions. As a result, they often indicate that such institutions (e.g., political and higher education institutions) are not for ‘people like them’ (e.g., Laurison, 2016; Visser et al., 2021). Moreover, the behavioral patterns that are promoted by health interventions tend to reflect the practices that are already more adhered to by citizens from higher social

strata. This may cause their lower social strata counterparts to feel like they are being coerced by the 'elite' in society to act in accordance with a lifestyle that is 'not theirs'. In the Netherlands in particular, with its known history of civilizing offensives aiming to 'enlighten' lower social strata by getting them to conform to the lifestyles of the dominant (i.e., upper) classes, health interventions may be perceived in the same tradition. It is thus crucial that interventions convey the sense that they reflect, or are at least connected to the lifeworlds of non-tertiary educated citizens, rather than being imposed on them by the societal elite. The question of how to facilitate this, however, remains.

Future research could investigate ways to ensure that interventions are a better fit with the lifeworlds of non-tertiary educated citizens. A promising direction is the co-creation approach (Pearce et al., 2020), in which intended recipients are included in various stages of the intervention process. Unfortunately, systematic reviews reveal that co-creation often still only occurs in certain (early) stages (Halvorsrud et al., 2021) or without any actual community involvement at all (Vargas et al., 2022). I argue that co-creation could benefit from a more in-depth inclusion of the perceptions, values and needs of the citizens to be targeted, which leads to a broader understanding of the context in which the intervention shall be located. To this end, it might be worthwhile to start by inductively studying e.g., how the cultural distance between interventions and lifeworlds is perceived by this group, to gain a better understanding of what the target population thinks can be improved.

The relevance of in-depth, inductive research into the perceptions of citizens was felt in this dissertation, through its absence. Indeed, one of the major limitations of this dissertation is the lack of a completed qualitative phase, as had initially been planned but was cut short by the COVID-19 pandemic and the measures put in place by the Dutch government to combat it. Even though early insights from the few interviews that were conducted before the pandemic were supplemented with insights from the social media analysis discussed in chapters 1 and 3, the phase intended to uncover why and how anti-institutionalism formed

within non-tertiary educated citizens was insufficient for acquiring a clear and complete understanding of its deep roots.

That the inductive phase was incomplete, which meant having less in-depth knowledge about non-tertiary educated citizens' anti-institutionalism, may also be why the information elements examined in the study described in Chapter 4 (stressing institutional sources and using simplified, but potentially patronizing language) did not have the anticipated negative effects on receptivity. In the absence of knowledge about why and how non-tertiary educated individuals experience anti-institutionalism when confronted with health interventions, the chapter focused instead on surface-level intervention elements that are not able to address the deep-rooted foundations upon which health interventions are built in the first place. This may also explain why, in all of the chapters, less-educated citizens were found to be less receptive to interventions, but strengthening the information's overt institutional connotations, as discussed in Chapter 4, had no moderating effects per educational attainment. The presence of elements that highlight these institutional connotations yet again expose what less-educated citizens already know and feel: health interventions are imposed on them 'from above'.

Given these findings, there may be value in informing citizens about healthier food practices via institutions or professionals that are more closely (and positively) embedded in the lifeworlds of those being targeted. Research has shown that certain health care professionals, such as general practitioners and other physicians (e.g., Hesse et al., 2005; Khoo et al., 2008), or cultural figures, like well-known actors or influencers (e.g., Lutkenhaus et al., 2019; Staudigl et al., 2016) are viewed positively as sources of health information. Additionally, the content of the information should resonate with its intended audience; e.g., less-educated citizens are unlikely to be swayed by the promotion of food products that are healthy but too expensive for them to buy, or are not part of their cultural lifestyles. Future research could thus investigate whether anti-institutionalism is still associated with less receptivity to health information if campaigns take such suggestions into account.

The fact that anti-institutionalism is affected by interventions, as the results in Chapter 5 demonstrate, also seems to be in line with the notion of deep-rooted societal power dynamics. The interventions tested in the chapter – a sugar tax and a mandatory product reformulation – each reflect these dynamics in their own way. Both are commonly found to have strong health effects among the lower social strata (e.g., Basto-Abreu et al., 2018; Coyle et al., 2021; Gillespie et al., 2015; Kao et al., 2020). Taxing interventions, for example, are clearly aimed at restricting citizens' ability to buy the taxed products, by making them more expensive. This, obviously, has a greater impact on those with a smaller budget. Indeed, it is not for nothing that sugar taxes and similar 'sin taxes' (e.g., meat tax, fat tax) have been criticized for being regressive and worsening social inequality (e.g., Young et al., 2022). In fact, by increasing economic inequalities they are argued to potentially make the taxed product something solely "for the rich" (Osendarp, 2022).

However, the results of the study discussed in Chapter 5 indicate that the negative social inequality-increasing effects do not only take place on the economic level, but also on the sociocultural one. The delegitimization of institutions connected to health-promotion efforts employed in the study was especially potent among citizens without tertiary education. This might partly be explained by the fact that the product group affected by the interventions – i.e., SSBs – is generally consumed more by those in lower social strata (Naomi et al., 2022; Xu et al., 2017). If SSBs do in fact have a greater connection to the cultures of more socially deprived groups, interventions that seek to reduce SSB consumption levels may be viewed as an attack on their lifestyles. Indeed, this was reflected in the increase observed in the perceived cultural distance to the institutions involved in the proposed intervention.

Again, this plays into the perception that the higher social strata are trying to force their lifestyles on the lower strata by preventing them from consuming products that are a better fit with how they live, or at least making it more difficult for them to do so. Accordingly, from the perspective of power dynamics, then, future research could investigate if

and how institutional delegitimization still occurs if interventions do not negatively reflect cultural differences between dominant and dominated (e.g., more- and less-educated) groups. This could be achieved, for example, by examining interventions that promote healthy behavior rather than of discouraging unhealthy consumption (e.g., reducing taxes on fruit and vegetables), or those that address consumption patterns that are not as clearly stratified. After all, is the goal to get less-educated citizens to live like the more-educated, or to encourage them to live (more) healthily? Most health-promotion practitioners would probably say the latter, but the former nevertheless seems to be the approach that is propagated.

Beyond the Dutch context

Other than in the literature review discussed in Chapter 2, this dissertation's research has all been conducted within the Netherlands. This has had some clear implications for the generalizability of the chapters' various outcomes, due to the country-specific characteristics partly discussed in Chapter 1. Broadly, these can be separated into two categories: the country's economic (in)equality and its institutions' overall levels of legitimacy (and educational differences therein).

The Netherlands has a relatively low degree of income inequality compared to e.g., the United States. In addition, an often-discussed cause for income-based inequalities in nutrition – food deserts – are largely absent (Helbich et al., 2017). Consequently, in terms of status positions, economic disparities are less conspicuous than sociocultural differences like educational attainment. Tellingly, it is less-educated citizens in particular who are among the most stigmatized social group in the Netherlands (Kuppens et al., 2018). This may explain why financial factors did not play a meaningful role in the Dutch context described in Chapter 3, whereas international intervention studies focus on these aspects much more strongly (as shown in Chapter 2). Additionally, this implies that the opposition to the sugar tax proposed in the study discussed in Chapter 5 is not (only) due to its potential financial effects,

but also due to its cultural implications. This is supported by the observation that the effects were comparable for the sugar tax and the non-economic product reformulation. In countries like the United States where status differences are more intertwined with economic factors, anti-institutionalism may be associated less with education and more with, e.g., income.

The Netherlands is also a country with a relatively positive outlook toward official institutions, as demonstrated amongst others in the results of the studies discussed in chapters 3 and 5, which show that (very) negative views on institutions are not particularly common. Consequently, even though clear (education-based) differences exist, the perceived legitimacy of institutions is typically quite high. Nonetheless, even in this context, anti-institutionalism affects the level of receptivity to institutional health interventions. International differences therein may thus be an issue worth investigating further. For example, in countries where the baseline institutional legitimacy is already quite low, such as in various Eastern- and Central-European countries (Boda and Medve-Bálint, 2014), anti-institutionalism's direct relationship with intervention receptivity may be stronger and its mediating role between educational attainment and intervention receptivity may be weaker. Alternatively, it would be particularly interesting to examine this mediating role in countries where the relationship between education and perceived institutional legitimacy is negative, rather than positive as is the case in the Dutch context. In China, for example, more-educated citizens are more anti-institutionalist than their less-educated counterparts (Xu, 2013). Given the role of anti-institutionalism in educational differences in intervention receptivity, then, it would appear that more-educated Chinese citizens are less receptive than their less-educated counterparts.

Furthermore, aside from single-country studies, future research could also incorporate cross-country comparisons. This would enable the identification of how various country-level characteristics affect the role played by anti-institutionalism in the (stratified) receptivity to health interventions. Potentially relevant characteristics might include income

inequality, power imbalance, levels of individualism, or the overall ways in which health promotion is organized. This can highlight the contexts in which anti-institutionalism and its connections to health promotion are less or more powerful.

Beyond nutrition interventions

In this dissertation, I have identified that anti-institutionalism plays a role in educational differences in the receptivity to nutrition interventions. The decision to focus on this particular type of intervention was a strategic choice for a number of reasons. First, dietary intake is heavily stratified by educational attainment, more so than various other health behaviors that cause non-communicable diseases. Excessive alcohol consumption, for example, is common among both high- and low-SES groups (e.g., Pabst et al., 2019), albeit in different ways (e.g., Lui et al., 2018; Roche et al., 2015). Second, compared to, e.g., tobacco smoking, unhealthy diets are tackled a lot less on a structural basis. In the Netherlands, tobacco consumption is actively discouraged by, amongst others, smoking bans in various public spaces (e.g., schools, public pools, soccer stadiums), high taxes on tobacco, a reduction of selling points, and an elaborate marketing ban (including prohibiting the public display of tobacco products in many stores). Nutrition interventions, comparatively, are much more strongly focused on agentic interventions like nudging and information campaigns, meaning that they are significantly easier to reject.

Nevertheless, interventions to counter tobacco and excessive alcohol consumption are also often more effective among high- than among low-SES groups, increasing the inequality between them (e.g., Brown et al., 2014; Roche et al., 2015). As with explanations for nutrition intervention (in)effectiveness, the explanations given in the field of anti-smoking information interventions are also primarily individualistic in nature (see Appendix 1A). However, interviews with non-tertiary educated (former) smokers have highlighted that institutional distrust, which is one pillar of anti-institutionalism, is behind the non-compliance with anti-smoking

advice (Veldheer et al., 2019). Accordingly, future research could examine whether anti-institutionalism plays a similar role in receptivity to anti-smoking and anti-alcohol interventions, with the focus also on how this may differ from the part it plays in receptivity to nutrition interventions.

Aside from health behaviors linked to non-communicable diseases, the feedback loop between anti-institutionalism and interventions likely also plays a role in large-scaled health crises. The COVID-19 pandemic was illustrative of this, as institutional aversion is considered to be one of the explanations for the lack of compliance with a variety of implemented policies, including the wearing of masks, social distancing, and vaccination (Hromatko et al., 2021; Fridman et al., 2020). That the official approach to a health crisis can influence the way in which citizens perceive their government, became clear when the initial actions of the Dutch government and its advisory bodies led to an upsurge in political trust (Oude Groeniger et al., 2021). However, this initially positive reaction did not last, and the approach of the Dutch government – and that adopted in many other countries – caused large-scale protests, at least among specific groups within the population (e.g., Neumayer et al., 2023; Rohlinger and Meyer, 2022). In part, this was fueled by the rhetoric of various politicians, whose clear opposition to the interventions likely inspired a similar opposition among the citizens who felt connected to them (Bobba and Hubé, 2021; Dyer, 2020; Kreps and Kriner, 2020; Lasco, 2020).

In fact, the COVID-19 pandemic may also be an excellent setting within which to study how anti-institutional sentiments can arise in health contexts. For example, scholars can study citizens who have become vocally anti-institutionalist as a result of the official COVID-19 intervention approach, in particular to identify how this came about and whether it has consequences for opposition to other health-promotion approaches, such as other adult vaccinations, or interventions to counter unhealthy behaviors (e.g., diets, alcohol consumption, or tobacco smoking). Various groups in society that were not previously (vocally or

actively) involved in anti-institutionalist discourses, now began to reject the interventions during the pandemic (e.g., Duin, 2022). It would thus be relevant to examine whether their opposition to COVID-19 measures has transferred to other health-related interventions with which the same institutions are associated.

Beyond survey experiments

Throughout this dissertation, I have addressed limitations related to the various studies discussed, and to the overall absence of an in-depth qualitative phase. In this section, I will discuss three particular overarching limitations of the survey experiment approach adopted in the studies discussed in chapters 4 and 5.

First, the survey experiments described in these two chapters both measured intervention-induced changes to attitudes, rather than to behavior. This was, in part, due to the self-reported nature of the data used. A second reason, however, was that the data were collected at a single point in time, directly after confrontation with the experimental conditions. While I argue that knowledge of attitudes toward health-promotion institutions and their efforts is vital to questions concerning compliance, it cannot provide direct insights into health behavior, meaning that the health effects of the interventions are unknown. Future research into the role of anti-institutionalism in health promotion could scrutinize how interventions with or without a clear institutional connotation differ in their impact on actual adherence of citizens, as well as analyze potential educational differences therein.

The fact that the research participants were asked to answer questions about their attitudes towards the intervention and institutions immediately after being confronted with the experimental conditions also has consequences of itself – consequences mainly relating to the studies' external validity. The respondents in the survey experiments may have been both under- and overexposed to the treatment condition in comparison to the real-world version of the treatment. A cumulative effect can take hold if people are confronted continuously with, e.g.,

nutrition information. They see such information in television commercials, in the news, and in various other (media) outlets. In contrast, the one-shot treatment with which respondents are confronted in the survey experiment setup is not cumulative, and is clearly presented to respondents in a research context. As such, underexposure may limit the external validity of the survey experiment approach (see Gaines et al., 2007).

Nevertheless, at the same time, the attention citizens pay to real-world health-promotion efforts may be much more fleeting than in the context of a survey experiment (Barabas and Jerit, 2010). Indeed, people are commonly not asked to think as directly about intervention proposals as they are in the study discussed in Chapter 5, nor about nutrition information, as in the research described in Chapter 4. Even though various reviews of intervention studies have shown that the memory of having seen a health message or advertisement is quite strong (e.g., Cavill and Bauman, 2004; Niederdeppe et al., 2008), recall is also stratified (e.g., Ayotte et al., 2009; Niederdeppe et al., 2011). As a result, certain societal groups (e.g., those with less education) are overexposed to the treatment in the context of the survey experiment compared to what occurs in the real world. If possible, future studies should take measures to promote the external validity of their outcomes, for example via triangulation or by measuring levels of exposure.

Concluding thoughts

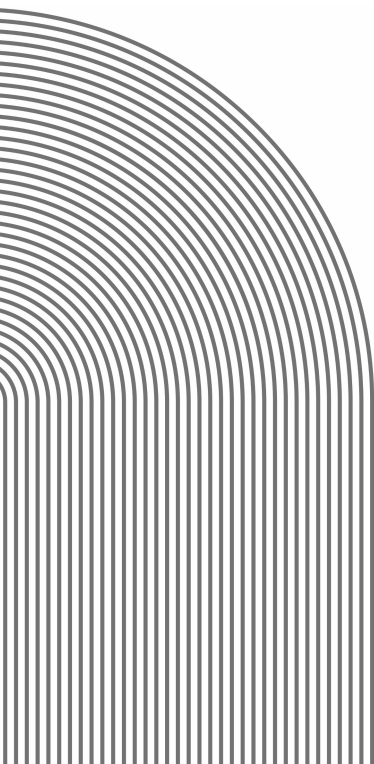
Coming to the end of this dissertation, I can clearly state that the role of anti-institutionalism as discussed throughout is but a stepping-stone towards achieving a deeper understanding of educational differences in the receptivity to official nutrition interventions. As discussed earlier in this final chapter, it likely ties into the wider societal power dynamics that are in play between educational groups and may be a way for less-educated citizens to address their dissatisfactions with their misrecognition and underrepresentation throughout society.

The paternalistic notion of “interference by some outside agent in a person’s freedom for the latter’s own good” (Le Grand and New, 2015, p.7) reflects these dynamics, as one dominant societal group (tertiary educated citizens, and the institutions they primarily populate) decides what is good and desirable for a dominated group (non-tertiary educated citizens). While it is likely that interventions are implemented with good intentions (after all, the main purpose is to get citizens across all layers of society to live long and healthy lives (although, see, e.g., Young et al., 2022 for a critical view)), they are not perceived in the same way by everyone, in particular not by non-tertiary educated citizens.

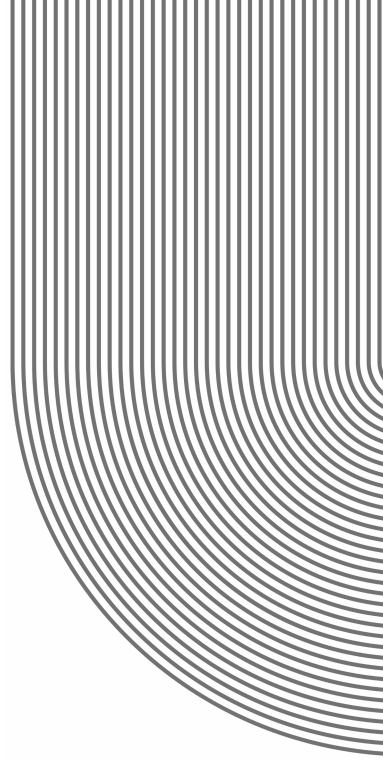
Nonetheless, effective health-promotion efforts by official institutions are desperately needed to counter unhealthy behavior and promote healthy alternatives. Unfortunately, unhealthy consumption is actively marketed for by various commercial parties, be it tobacco firms, fast-food or SSB corporations, or alcohol producers, all of which contribute to the ubiquity of unhealthy lifestyles (Mialon, 2020). This is also achieved more covertly, by raising “doubt about issues when, in reality, there is scientific consensus, for example, on the health effects of smoking and the causes of climate change” (McKee and Stuckler, 2018, p. 1168). Large corporations have the power to discredit health-promotion institutions and their actions, as well as to create a ruling discourse of individual responsibility. This means it is essential for health-promotion institutions to find a way to counter these commercial and corporate influences (Lee and Freudenberg, 2022; Maani et al., 2020). However, as some citizens perceive these institutions to be far removed from their lives, commercial parties can easily exploit this and impose their own agendas.

In light of this, official health-promotion institutions may need to reflect on their position, to find a way to build bridges between themselves and those they want to reach. This dissertation has made it clear that, to be effective and equitable, health interventions should not make citizens feel that the lifestyle of the societal elite is being imposed on them. Instead, interventions should be created with all layers of society in mind or, better still, with all layers of society included in the process.

After all, the goal should not be to get everyone to live like those of 'us' with our university diplomas, but to get everyone to live healthily, in the way that suits them best.



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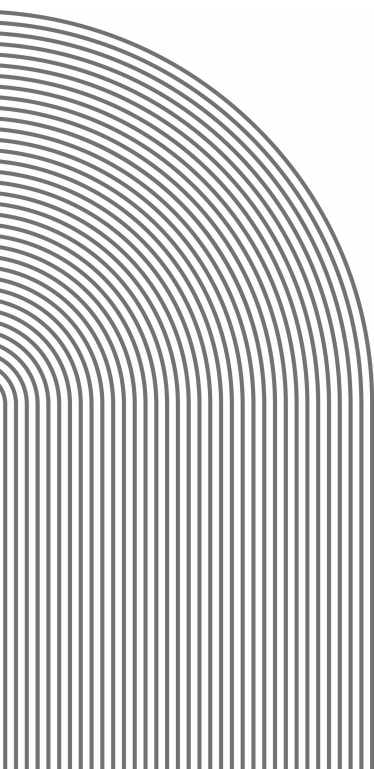
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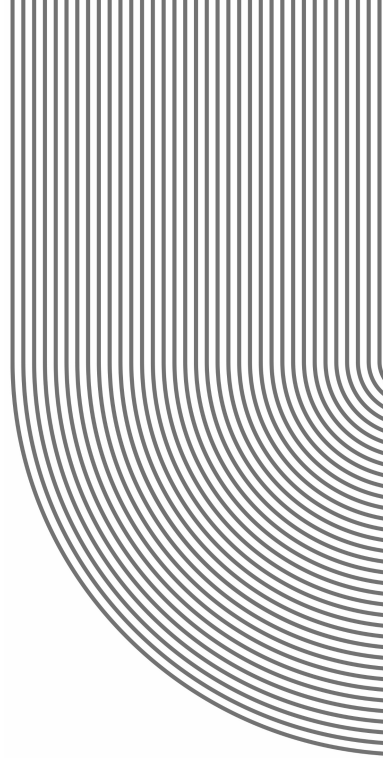
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Appendices



APPENDIX 1A – SUGGESTED EXPLANATIONS FOR (IN)EFFECTIVENESS IN A DIFFERENT FIELD⁶

Introduction

Smoking is a major risk factor for illnesses such as (lung) cancer, coronary heart disease and stroke; in fact, half of those who develop tobacco-related conditions die prematurely (Burns, 2003; Flay et al., 1992). Globally, cigarette consumption is the second greatest risk factor for premature death and disability (Reitsma et al., 2017). Despite a declining smoking prevalence in high-income countries, smoking remains a serious public health concern (Bader et al., 2011). Indeed, the rates of smoking and unsuccessful cessation remain high, particularly among those with a lower socioeconomic status (SES; commonly measured by income, education or occupation) (Hiscock et al., 2012).

Countries have made considerable efforts to implement ‘stop-smoking’ interventions, not only as a way to improve general population health, but to also tackle socioeconomic inequalities in well-being (Gloechha, 2016). While structural interventions (e.g., price increases) have been shown to reduce smoking rates across all SES groups (Hill et al., 2014; Sharbaugh et al., 2018), the effectiveness of health-information interventions (HII) like mass-media campaigns and health-warning labels often proves to be lower among low-SES groups (Hill et al., 2014; Lorenc et al. 2013; Niederdeppe et al., 2008; Sharbaugh et al., 2018). Some interventions do have a positive effect on low-SES groups, albeit equal or lower compared to high-SES groups, while other interventions are simply ineffective among the former. In these situations, the health gap between SES groups is either maintained or increased. Other interventions do

⁶ This appendix is based on an article published as:

Van Meurs, T., Çobay, F., de Koster, W., van der Waal, J., Oude Groeniger, J., 2022. Why are anti-smoking health-information interventions less effective among low socioeconomic status groups? A systematic scoping review. *Drug and Alcohol Review*, 41, 1195-1205. doi: 10.1111/dar.1346

decrease the gap, although these are rare. While aforementioned differences in effectiveness between SES groups are widely acknowledged, the question of why they occur largely remains uncharted territory.

Information provision remains the intervention of choice by various governmental and health institutions in high-income countries, despite the uncertainty of what makes them (not) work as intended. If the equity of anti-smoking HIIs is to be improved, it is crucial to identify why these interventions are especially (in)effective among low-SES groups. There is, however, no comprehensive overview of possible explanations and the empirical evidence supporting them. Moreover, prevailing accounts can differ across disciplines and research fields, making it all the more important to synthesize what is currently known.

In this study, I carried out a systematic scoping review, including a thematic analysis, to uncover: 1) the prevailing explanations for the (in)effectiveness among low-SES adults in high-income countries of anti-smoking HIIs performed by official institutions; and 2) whether these explanations have been studied empirically. I assessed anti-smoking HIIs aimed at impacting factors regarding knowledge (e.g., risk assessment) or (intended) behavior (e.g., quit rates or intentions). This echoes calls to provide more in-depth analyses of anti-smoking interventions and go beyond ‘simply recognizing and describing the disparity’ in anti-smoking research to better understand why disadvantaged groups smoke more often (Halas et al., 2020).

Methods

To answer the research questions, I conducted a systematic scoping review (Arksey and O’Malley, 2005; Peters et al., 2015). Scoping reviews are commonly used to summarize, rather than evaluate, a particular field, allowing us to “examine the extent, range and nature of research activity” (Arksey and O’Malley, 2005, p.21) relevant for the research at hand. I conducted the review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist extension for Scoping

Reviews (Tricco et al., 2018), in order to conduct the review transparently and systematically (Peters et al., 2015). The eligibility criteria and data extraction and analysis methods were specified in a documented protocol in advance, which was not registered.

Identification

Eight electronic databases were searched for relevant papers: 1) Web of Science; 2) Embase; 3) Medline Ovid; 4) Cochrane; 5) Psyc INFO; 6) Econ Lit; 7) Abi/inform; and 8) Google Scholar. These were chosen for their reputation and their multidisciplinary scope. The search strategy used was similar to the one used in Chapter 2, replacing the relevant MeSH terms. The concepts covered in the search terms were: ‘smoking’, ‘health information intervention’ and ‘socioeconomic status’.

Eligibility criteria

All articles resulting from the literature search were imported and deduplicated in EndNote. I subsequently used EndNote for the screening of abstracts, titles and keywords, which was done independently by me and Feray Çoban, based on pre-determined selection criteria. Studies were only included if they: 1) focused on one or more HIIs; and 2) reported on the effectiveness among low-SES adults. The HIIs discussed in the studies needed to: 3) be aimed at changing knowledge or behavior; 4) concern smoking cessation; 5) be directed at adults; 6) be performed by an official institution; and 7) be conducted in a high-income country that is a member of the Organization for Economic Cooperation and Development.

Articles that could not unequivocally be excluded based on title, abstract and keywords (e.g., when most criteria were met, but others could not be judged with the information at hand) were still included in this phase. Subsequently, we independently reviewed the full texts of articles included in the previous phase, using the same criteria. In the case of disagreements in these two phases, the reasons for inclusion or exclusion were discussed to come to an agreement. A third coder could be

consulted in the case consensus would not be reached, but this did not prove necessary.

I included a wide variation of study designs, ranging from randomized controlled trials to cross-sectional designs to qualitative studies, as long as they included an indication of intervention effectivity. Only studies published in the English language were selected. The initial focus was on studies published in the period January 2009–April 2019, following publication of the landmark report ‘Closing the Gap in a Generation’ by the Commission on Social Determinants of Health (CSDH, 2008). This report emphasized the importance of social determinants of health, causing increased awareness of the differential effects of health interventions across groups in different socioeconomic positions. In October 2021, the literature search was repeated to include the most recent relevant studies.

Data extraction and analysis

I collected the following information to perform our scoping review: 1) study design; 2) SES indicator; 3) HII type; 4) HII source; 5) study population; 6) outcome variables; 7) effectiveness in the low-SES study population; 8) SES disparity in effectiveness; 9) explanations for the findings among the low-SES study population; and 10) whether these explanations were studied empirically. For studies reporting on an effective intervention, I additionally specified the intervention's core elements. Regarding the explanations, I performed an inductive thematic analysis in which the relevant text segments were selected from the articles, and subsequently categorized in overarching themes. All explanations were first manually coded through open coding, after which axial and selective coding were applied to get the overarching themes used. Me and Feray Çoban coded independently, and Joost Oude Groeniger aided the process in the case of inconsistencies in the coding. This formed the basis of the thematic analysis, in which the themes are discussed.

I conducted a quality assessment of all included studies, and Feray Çoban and Joost Oude Groeniger independently assessed a (different) random sample of five studies each. Given the large variety of study designs within the included studies, I opted for the Mixed-Methods Appraisal Tool (Hong et al., 2018), which exists of separate quality questions for: 1) qualitative studies; 2) randomized controlled trials; 3) non-randomized studies; 4) quantitative descriptive studies; and 5) mixed methods studies. As a quality appraisal is not essential for scoping reviews (Arksey and O'Malley, 2005) and the exclusion of studies with low methodological quality is discouraged, I analyzed all included studies in the thematic analysis, regardless of quality.

The analysis, thus, provides a systematic scoping review of different explanations currently suggested for the (in)effectiveness of institutional anti-smoking HIIs and their empirical worth. To the best of my knowledge, this is the first review focusing on *why* anti-smoking HIIs are argued to be (in)effective among low-SES adults, instead of focusing on *whether* they have an impact and to what extent.

Results

Study selection

The initial database search yielded 22,873 papers, of which 12,167 remained after removal of duplicates. Subsequently, 7,766 papers were manually pre-excluded based on the publication date, country criteria and the age of the study population. This left 4,401 papers for screening based on their abstracts, titles and keywords. Of these, 68 were eligible for a full-text review and another 11 were identified by screening the references. The final analysis was applied to 33 publications: 26 primary studies, five reviews and two dissertations. The search update in October 2021 led to an additional six studies, including the replacement of one of the dissertations (Veldheer, 2018) from the initial inclusion results, by a peer-reviewed article that followed from it (Veldheer et al., 2019). The inter-coder reliability of the full-text reviews was 86.8%. Subsequently, we achieved full consensus on including or excluding the remaining

studies that initially were considered eligible by one of us. Figure 1A.1 contains a detailed description of the selection process. Table 1A.1 summarizes the characteristics of the identified studies.

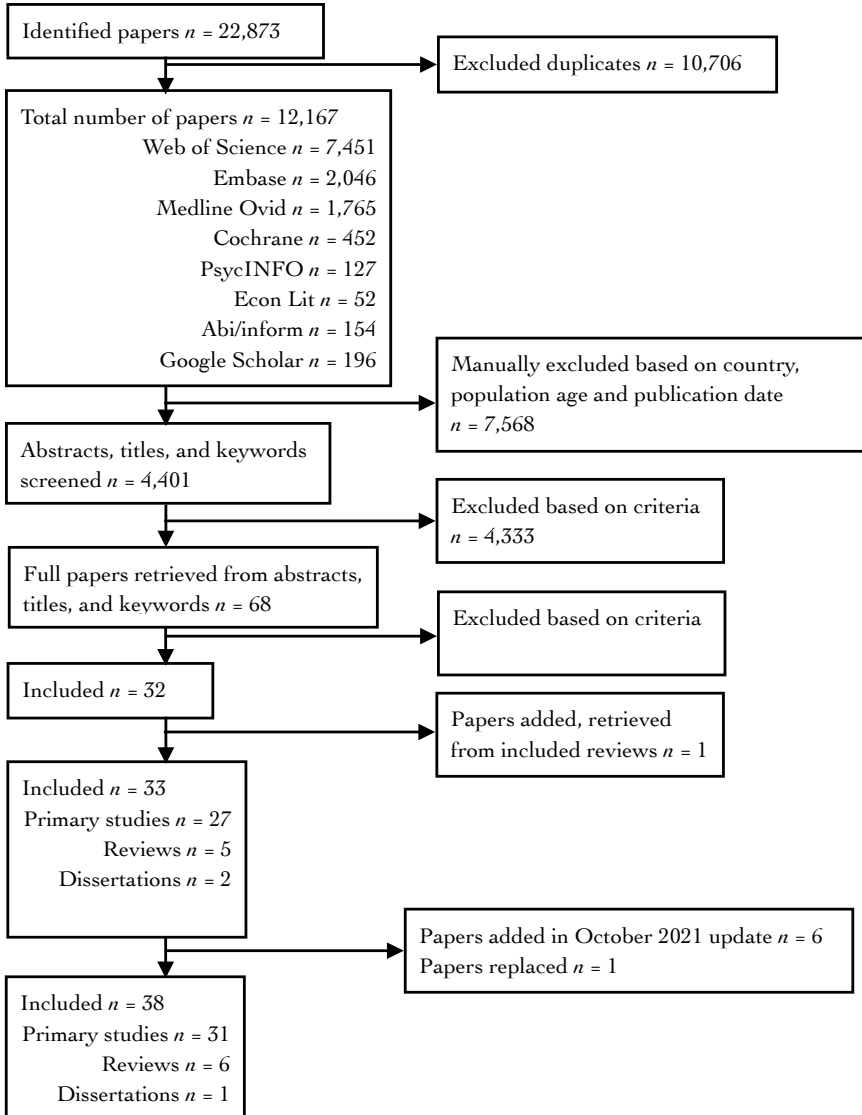


Figure 1A.1 — Flowcart of inclusions and exclusions

Table 1A.1 — Summary table of included studies (columns continue on next page)

Ref.	Study design	Outcome measure(s)	HII type*
Baskerville et al., 2015	Quasi-experimental	Behavioural	HWL
Bekalu et al., 2019	Cross-sectional	Behavioural, intention	GHW
Brown et al., 2014	Systematic review	Behavioural, knowledge	MMC
Cantrell et al., 2013	Randomized web-based experiment	Intention	HWL
Colston et al., 2021	Repeated cross-sectional	Behavioural	MMC
Durkin et al., 2009	Baseline + follow-up	Behavioural	TV ads
Durkin et al., 2011	Field study	Intention	TV ads
Durkin et al., 2012	Systematic review	Intention	MMC
Durkin et al., 2018	Cross-sectional	Behavioural	TV ads
Farrelly et al., 2012	Repeated cross-sectional	Behavioural	TV ads
Guillaumier et al., 2012	Systematic review	Behavioural	MMC
Guillaumier et al., 2015	Focus groups	Behavioural, intention, knowledge	HWL, TV ads
Guillaumier et al., 2017	Experimental crossover trial	Behavioural	TV ads
Hill et al., 2014	Systematic review	Behavioural	MMC
Hitchman et al., 2012	Cross-sectional	Behavioural	HWL
Katyal et al., 2020	Mixed methods	Intention; knowledge	GHW
Kim et al., 2018	RCT	Intention	PSA
Kuehnl et al., 2019	Panel data	Behavioural	GHW
Lorenc et al., 2013	Systematic review	Behavioural	HWL, MMC
McCloud et al., 2017	Field experiment	Intention	GHW
McCullough et al., 2018	Focus groups	Behavioural	TV ads
Mead, 2014	Interviews	Knowledge	GHW
Nagelhout et al., 2016	Repeated cross-sectional	Behavioural, knowledge	HWL
Neff et al., 2016	Cross-sectional	Behavioural, intention	MMC
Niederdeppe et al., 2011	Repeated cross-sectional	Intention	TV ads
Nonnemaker et al., 2014	Cross-sectional	Behavioural	TV ads
Ramanadhan et al., 2017	Field experiment	Behavioural	GHW
Richardson et al., 2011	Baseline + follow-up	Behavioural, intention	MMC
Skurka et al., 2019	Experimental studies	Intention, knowledge	HWL
Smith et al., 2020	Systematic review	Behavioural, knowledge	MMC
Springvloet et al., 2015	Repeated cross-sectional	Intention	General anti-tobacco info
Swayampakala et al., 2018	Panel data	Intention, knowledge	HWL
Thrasher et al., 2018	Discrete choice experiment	Intention	HWL
Thrasher et al., 2015	Panel data	Behavioural	HWL
Vallone et al., 2011	Baseline + follow-up	Behavioural	MMC
Van Mourik et al., 2020	Cross-sectional	Knowledge	GHW
Veldheer et al., 2019	Interviews	Behavioural, knowledge	General public health education
Zhu et al., 2010	Repeated cross-sectional	Behavioural, knowledge	TV ads

*HWL = Health warning label; GHW = Graphic health warning; MMC = Mass media

Table 1A.1 Continued.

Study pop.	Effect low SES?	Equity effect	Explanation theme	Empirically studied?
Full pop.	Yes	0	No explanation	N/A
Low SES	Mixed	N/A	Material conditions, Risk perception	Suggested
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	Yes	+	Cognition	Tested
Full pop.	Yes	0	No explanation	N/A
Full pop.	Yes	+	No explanation	N/A
Full pop.	Mixed	Mixed	Message engagement, cognition	Suggested
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	Mixed	Mixed	Material conditions	Suggested
Full pop.	Yes	0	No explanation	N/A
Mixed	Mixed	Mixed	No explanation	N/A
Full pop.	No	N/A	Message engagement, risk perception	Tested
Full pop.	Mixed	N/A	No explanation	N/A
Mixed	Mixed	Mixed	No explanation	N/A
Full pop.	Yes	+	No explanation	N/A
Low SES	Yes	N/A	No explanation	N/A
Full pop.	No	-	Message engagement	Tested
Full pop.	Yes	+	Cognition	In design
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	Mixed	N/A	No explanation	N/A
Full pop.	No	N/A	Message engagement, material conditions, risk perception	Tested
Full pop.	Mixed	N/A	Message engagement, risk perception, self-efficacy	Tested
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	No	-	No explanation	N/A
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	Yes	0	No explanation	N/A
Full pop.	Yes	N/A	Social environment	Tested
Full pop.	Yes	+	No explanation	N/A
Full pop.	No	N/A	Material conditions	Suggested
Full pop.	Mixed	Mixed	No explanation	N/A
Full pop.	Yes	0	Cognition	Suggested
Full pop.	No	-	Material conditions	Suggested
Full pop.	Yes	+	No explanation	N/A
Full pop.	No	-	No explanation	N/A
Full pop.	Yes	+	Message engagement	In design
Full pop.	Unclear	-	Cognition	Suggested
Low SES	No	N/A	Message engagement	Tested
Full pop.	No	-	Material conditions, social environment	Suggested

campaign; PSA = Public service announcement

Study characteristics

The majority of the studies had a (repeated) cross-sectional ($n=12$) or experimental ($n=8$) design, followed by systematic reviews ($n=6$), longitudinal designs ($n=6$) and qualitative studies, that is interviews ($n=2$) and focus group discussions ($n=2$). A field study and a mixed methods approach both appeared once. Most studies focused on multiple outcome measures, with the majority involving behavior change ($n=25$), followed by an intention to change behavior ($n=15$) and knowledge ($n=11$).

Most studies used samples of the full population ($n=33$), whereas only three focused solely on low-SES smokers. Two reviews evaluated several HIIs targeting smokers from both the population at large as well as disadvantaged populations. It has to be noted, however, that some of the discussed interventions were primarily focused on low-SES individuals. Nevertheless, inclusion of higher-SES individuals in most of these studies made SES comparisons possible regarding the HII's (in)effectiveness. The evaluated HIIs were generally mass-media campaigns or TV advertisements ($n=20$), or health-warning labels or graphic health warnings ($n=17$). Two studies looked at anti-tobacco information in general, and one study evaluated public service announcements. The indicators of SES were education and income ($n=12$), education ($n=9$), income ($n=6$), the Socioeconomic Index for Areas ($n=3$) or were undefined ($n=3$). The systematic reviews all used widely varying indicators of SES, including, but not limited to education, income, area indicators and occupation.

Most of the studies were single-country studies, conducted in the USA ($n=20$), Australia ($n=5$), Canada ($n=2$) or the Netherlands ($n=1$). Multi-country studies were comparing various Western-European nations (e.g., France, Germany, the Netherlands and the UK; $n=3$), or Canada and Australia ($n=1$), or reported on reviews with a broad inclusion of countries ($n=6$). The HII sources were government institutions ($n=27$), the Food and Drug Agency ($n=6$), the Center for Disease Control ($n=2$), the European Commission ($n=1$), or both government ministries and cancer institutions ($n=1$). In one systematic

review, the source of the discussed mass media campaigns was not made clear.

Study effectiveness and equity

Table 1A.1 shows the varying effectiveness of the interventions among low-SES participants between the studies (column ‘Effect among low SES?’). Most studies ($n=14$) included multiple outcomes or evaluated multiple intervention elements, observing that some were effective for the low-SES group specifically, whereas others were not (i.e., ‘Mixed’). Another 14 found that the intervention was effective among low-SES participants, while nine found no such effect. One study only discussed the equity results of the intervention, not providing the results for separate SES groups.

Regarding the effectiveness of an intervention among those in low- and high-SES groups (column: ‘Equity effect’): seven found a positive equity effect (+), meaning that the intervention reduced the SES disparity in knowledge, behavior change and/or intention to change; six observed a negative equity effect (-), meaning the intervention increased one or more of these disparities; five identified no differences between its low- and high-SES participants (0); and ten reported mixed findings because multiple outcomes were evaluated. The remaining ten studies offered no SES comparison (N/A).

Studies that discussed effective interventions showed little consensus on the elements of the HII that positively impacted low-SES populations. While 11 studies discussed graphic HIIs (primarily graphic health warnings) (Cantrell et al., 2013; Farrelly et al., 2012; Guillaumier et al., 2017; Katyal et al., 2020; Kuehne, 2019; McCloud et al., 2017; Mead, 2014; Nagelhout et al., 2016; Niederdeppe et al., 2011; Nonnemaker et al., 2014; Ramanadhan et al., 2017), another contrarily noted the effectiveness of text-only warnings or narrative interventions (Hitchman et al., 2012). Similarly, many effective interventions were noted to be emotion-based ($n=9$), but the types of emotions widely varied, from negative emotions (Bekalu et al., 2019; Durkin et al., 2018; Nonnemaker

et al., 2014) (e.g., fear-evoking, loss-framed, stigmatizing) to an empathetic tone (Richardson et al., 2011; Vallone et al., 2011). Some consistency was found in the effectiveness of persuasion through similarity ($n=5$), for example by using strong narratives (Durkin et al., 2011) or including the experiences of other (former) smokers (Colston et al., 2021; Guillaumier et al., 2017; Mead, 2014; Richardson et al., 2011). Two separate studies (Baskerville et al., 2015; Thrasher et al., 2015) noted that including cessation resource information on the health warnings (e.g., a Quitline number) positively affects quit intentions.

Aside from the inconsistency in the intervention elements, the majority of interventions that showed either positive or mixed effectiveness among low-SES individuals did not provide equity-positive results, and elements found in equity-positive interventions were found in equity-negative or equity-neutral interventions as well. Abovementioned explanations furthermore do not in and of themselves explain potential SES differences in the results of HIIs. A key finding of our review is that more than half of the studies included ($n=21$) did not suggest any explanation for why the intervention was found to be (in)effective among low-SES participants. Although the nature of the intervention of some studies made it possible to guess what the relevant factors were in relation to its effectiveness (or lack thereof), I refrained from making any inferences since these accounts were not explicitly mentioned by the authors. In the following section, I will discuss the studies that did include explanations for low-SES (in)effectiveness.

Thematic analysis

17 studies suggested one or more explanations for the (in)effectiveness of HIIs among low-SES participants (column 'Explanation theme'). The thematic analysis of these explanations yielded six main themes: message engagement, material conditions, cognition, risk perception, social environment and self-efficacy.

Message engagement

The most occurring theme concerned message engagement, with a focus on how relatable a HII message is to its targeted population (Durkin et al., 2011; Guillaumier et al., 2015; Kim et al., 2018; McCullough et al., 2018; Mead, 2014; Vallone et al., 2011; Veldheer et al., 2019). McCullough et al. (2018) and Veldheer et al. (2019) suggested that their participants' distrust of the HII source and preference for lay over expert knowledge may have reduced the intervention's effectiveness. Kim et al. (2018) proposed that those in low-SES groups might respond counterproductively to stigmatizing anti-smoking campaigns, since they already feel socially discriminated against because of their SES. Using a slightly different argument, Guillaumier et al. (2015) suggested that their participants may have been unable to identify with health-warning labels, thereby reducing their effectiveness. Similar arguments were made by Mead (2014, p.86), claiming that the “credibility of the characters portrayed on graphic warning labels can have significant implications for label effectiveness”; by Durkin et al. (2011), who stated that identification with characters in the advertisements was crucial for the effectiveness of its highly emotional narrative; and by Vallone et al. (2011, p.S48), whose information intervention was “carefully tailored in terms of set design and occupation of characters to help the audience identify with the messages”. This theme, therefore, suggests that the generally reduced effectiveness of HIIs among those in low-SES groups can be attributed to limited engagement and a lack of relatability to the HII's message or the messenger.

Material conditions

Material conditions occurred as a theme in six studies (Bekalu et al., 2019; Durkin et al., 2018; McCullough et al., 2018; Skurka et al., 2019; Swayampakala et al., 2018; Zhu et al., 2010), making it the second most occurring theme. The central element is the notion that the limited effectiveness of HIIs among low-SES groups can be attributed to a lack of financial resources, and stressful living conditions. Skurka et al. (2019)

for example, suggested that the former is the key factor, being an obstacle to any action required to stop smoking. Something similar was proposed by Swayampakala et al. (2018) and Zhu et al. (2010). Also arguing in line with this theme, Durkin et al. (2018) suggested that the stress induced by financial constraints meant that a focus on stopping smoking was viewed as irrelevant. McCullough et al. (2018) and Bekalu et al. (2019) provided a similar explanation, noting that stressful living conditions may thwart any attempts to quit.

Cognition

Cognition (Cantrell et al., 2013; Durkin et al., 2011; Kuehnle, 2019; Springvloet et al., 2015; Van Mourik et al., 2020) involves factors related to an individual's capacity to absorb and understand a HII's message. Cantrell et al. (2013, p.8), for example, stated that “cognitive processing may be enhanced by visceral graphic pictures designed to clearly illustrate the meaning of text messages by reducing potential variation across groups in interpretation of textual information due to differences in literacy, culture, language or prior health knowledge”. Kuehnle (2019) and Durkin et al. (2011, p.1005) employed a similar line of reasoning, with the latter stating: “These ads rely on the viewer being convinced by persuasive arguments from experts which may require higher levels of health and numeric literacy, not typically found in lower SES groups”. Springvloet et al. (2015) suggested that educational differences may have affected their participants' awareness and memory of the HII message, which could explain why it was ineffective among those from low-SES groups. Similarly, Van Mourik et al. (2020) suggest that more-educated individuals have more experience with health information, and thus understand it better. The central argument of these studies, thus, is that low-SES individuals generally have more difficulties to understand or absorb the HII message.

Risk perception

Risk perception was the fourth most common theme (Bekalu et al., 2019; Guillaumier et al., 2015; McCullough et al., 2018; Mead, 2014) and relates to how people in low-SES groups perceive their susceptibility to, or self-exempting (risk-minimizing) beliefs about, the harms of smoking. So, Bekalu et al. (2019, p.731) suggested that the effectiveness of HIIs on an intention to stop smoking, and any attempts to do so, was reduced because those in these groups “may have other issues that they perceive as more health-damaging to them than smoking”. Similarly, Guillaumier et al. (2015, p.64) proposed that “less well-educated smokers are more likely to hold self-exempting beliefs and low SES smokers are known to have poorer awareness of the risks of smoking”, which was also claimed by McCullough et al. (2018). Following this reasoning, Mead (2014, p.109) argued that interventions are less effective among low-SES groups because “the participants live within economically and socially deprived areas in which smoking may be perceived as lower risk relative to other risks in the environment, such as injection drug use, HIV, and violence”. Central to this theme, then, is the notion that smokers in low-SES groups are less susceptible to anti-smoking HIIs because they perceive the risks of smoking to be lower than those in high-SES groups.

Social environment

The fifth theme was social environment, as found in two studies (Ramanadhan et al., 2017; Zhu et al., 2010). This theme largely deals with the extent to which (low-SES) smokers are affected by their social surroundings in smoking-related outcomes. Zhu et al. (2010, p.37) argued that a higher smoking prevalence “in one's social group affects the perception of how normative smoking is, which affects the current smokers' likelihood of quitting and the non-smokers' likelihood of taking up cigarettes”. This probably translates into a reduced receptiveness to anti-smoking HIIs among those in low-SES groups. Ramanadhan et al. (2017) studied the association between conversations about graphic health warnings and quit attempts, finding that having a social network

that facilitates such conversations indeed leads to more quit attempts. The study does not attempt to compare these effects across SES-groups, but through its largely low-SES sample, argues that social networks are an important driver for quit attempts among this group. Both studies, thus, discuss how one's social environment affects smoking-related behavior.

Self-efficacy

The final theme was self-efficacy: an individual's belief in their ability to stop smoking (Mead, 2014). Mead studied the effects of different anti-smoking messages on self-efficacy beliefs, finding that interventions portraying successful attempts to stop had a positive impact on the self-efficacy of her participants. Thus, the study discussed how an individual's own or someone else's experience influences self-efficacy.

Empirical scrutiny of the suggested explanations

Only nine of the studies included in this review attempted to assess empirically whether the explanations they proposed could actually account for the (in)effectiveness of anti-smoking HIs among low-SES adults (Cantrell, 2013; Guillaumier et al., 2017; Kim et al., 2018; Kuehnle, 2019; McCullough et al., 2018; Mead et al., 2014; Ramanadhan et al., 2017; Vallone et al., 2011; Veldheer et al., 2019). Of these nine, two studies accounted for the explanation in the design of the intervention beforehand ('In design' in the 'Empirically studied?' column of Table 1A.1). Kuehnle (2019) tested the effect of pictorial warnings as an easier-to-understand form of warning labels, thus implying the diminished need for tobacco-related cognition to be at the basis of the effectiveness. Vallone et al. (2011, p.S48), stating message engagement is at the center of their intervention's effectiveness, tested the effect of television ads that were "carefully tailored [...] to help the audience identify with the messages".

The other seven studies empirically tested their suggested explanations. Cantrell et al. (2013) used a web-based experimental study ($n=3,371$) to evaluate whether pictorial warning labels (as an attempt to

make an intervention less reliant on cognition) had a greater impact than text-only labels on their participants' intentions to stop smoking and other self-reported (health-knowledge related) outcomes. The study found that the pictorial condition elicited stronger reactions among both lower- and higher-SES groups, but this difference was greater among the former.

Kim et al. (2018) conducted an online experiment ($n=136$) to compare the impact of an anti-smoking public service announcement (PSA) containing stigmatizing content to one without this content. Their expectation was that low-SES groups would be less sensitive to anti-smoking norms for a number of reasons and, as a consequence, would engage less with stigmatizing PSAs. They found that the intervention with stigmatizing content was more effective among participants with a higher income than among their lower-income counterparts. The authors subsequently tested a moderated mediation model using feelings of shame and income as mediator and moderator variables, respectively. They observed that “the stigmatizing PSA induced less shame among low-income participants; this low level of shame was then translated into their lesser cessation intention” (p.686).

Ramanadhan et al. (2017) used a field experiment to uncover whether graphic health warnings inspire conversations about tobacco- or label-related issues (e.g., quit options, smoking risks, mocking labels), and whether these conversations in turn led to more quit attempts in a SES-varied population. They found that individuals with less education are more likely to have smaller health discussion networks, but do not report on SES differences regarding the effect of such social networks on quit attempts. In general, though, they found that negative conversations about the warnings lead to more quit attempts. So, although no equity claims are made by the authors, the study still shows how having a social network to discuss tobacco-related issues may increase the number of quit attempts made in low-SES groups.

Four other studies came to their proposed explanations via research in the form of interviews (Mead, 2014; Veldheer et al., 2019) or focus-group discussions (Guillaumier et al., 2012; McCullough et al., 2018)

with low-SES smokers. The participants in these qualitative studies were asked about their perceptions of and engagement with anti-smoking HIIs, with the authors deriving their proposed explanations from the responses they obtained.

Lastly, Richardson et al. (2011) tested whether more cessation-related cognition leads to more quit attempts. However, cessation-related cognition is not included as an explanation for potential equity effects in our thematic analysis as it strongly overlaps with quit intention, which I only included as an outcome measure in our research question. I, thus, categorized both the mediator and the outcome measure of their study as outcome measures in our analysis.

Quality appraisal

The quality of the included articles was appraised by means of the Mixed-Methods Appraisal Tool. The majority of articles ($n=22$) was appraised using criteria for non-randomized studies, followed by randomized controlled trials ($n=4$, also including other randomized experimental designs) and qualitative studies ($n=4$). Quantitative descriptive studies and mixed methods studies were both appraised once. The six studies not included in the quality appraisal were all systematic literature reviews.

Regardless of study design, many studies did not include the required information to properly ascertain whether all quality criteria were met. The representativeness or comparability of the samples was often not explicitly clear from the data description. In addition, the completeness of outcome data or potential nonresponse biases were often not properly elaborated on either. In studies in which it was discussed, there was often incomplete data or nonresponse bias due to a high nonresponse percentage, or a low follow-up rate. For randomized experiments, the way in which the randomization was performed sometimes remained unexplained, as did a baseline group comparison. The qualitative studies in the sample adhered to the Mixed-Methods Appraisal Tool criteria well.

Discussion and conclusion

This review identified and mapped studies examining the effect of institutional anti-smoking HIIs among low-SES adults in high-income countries. I found that many of these studies did not suggest any explanation for why an anti-smoking intervention was (less) effective among their low-SES participants. In those that did, I uncovered six main themes: message engagement, material conditions, cognition, risk perception, social environment and self-efficacy. However, most of these studies did not scrutinize empirically whether the explanations they proposed could indeed account for the observed effects.

To the best of my knowledge, instead of examining *if* institutional anti-smoking HIIs have an impact and to what extent, this is the first systematic literature review to explore *why* they are (less) effective among those in low-SES groups. Its findings revealed that, in the studies that do provide an explanation, why the proposed mechanism is causally related to an individual's SES is not always well-defined. As an example, the reasons why those in low-SES groups would have lower risk perceptions are rarely clearly outlined. A more explicit line of argument on the hypothesized causal pathways would significantly improve the plausibility of these studies and allow for more rigorous empirical testing of their theorizing.

A productive way to proceed with future research on the issue of the (in)effectiveness of anti-smoking HIIs among low-SES groups is to expand such intervention studies by including an explanatory element, making the empirical validation of proposed explanations the rule rather than the exception (Halas, 2020). As such, study designs can be expanded to include some form of causal inference (e.g., causal pathway analysis), in order to properly test whether the explanation is indeed the cause of potential differences in effectiveness. However, as many studies will not be sufficiently powered for such designs, a test for the suggested explanation can, alternatively, be built into the intervention design. For example, testing the role of cognition in SES differences in effectiveness by comparing a standard information treatment with an overtly simplified

one. Both designs are currently underused, given the relatively low number of studies in the 'tested' or 'in design' categories in our sample. Such additions to intervention studies could help to move the field forward in two key ways: 1) the tenability of explanations that are thus far only theorized could be assessed, which would enable 2) the development of more effective anti-smoking HIIs to aid in the global endeavor to reduce rates of smoking. To that end, it is vital that such interventions are targeted better at those with a relatively high smoking prevalence, such as individuals in low-SES groups. Investigating why interventions are (not) effective among such groups could benefit from looking beyond the dominant individualistic explanations, such as cognition and risk perception.

As a case in point, and taking the findings in the studies that explored the role of message engagement into account, there seems to be a potential to develop explanations for why different social groups respond differently to the same message. Also, elements that are considered effective in one study often do not yield positive results in another (e.g., the inconsistent findings on the use of emotion-based information). Understanding how and why different groups have different perceptions, or why certain elements are only effective in some contexts, is likely to be crucial for developing anti-smoking messages that reduce both smoking rates *and* SES-disparities in smoking.

Furthermore, the quality appraisal conducted for this study uncovered that very few studies offered sufficient information about their samples and populations, randomization, and how the authors dealt with nonresponse and attrition. In order to assess the quality of studies fully, future studies are advised to elaborate more on such methodological elements. Information about study samples and the populations they aim to represent is especially salient in studies like the ones discussed in this review, as proper judgement of these elements is needed to assess the empirical worth of a SES comparison.

This review has some limitations. First, I only included papers written in English, which may have resulted in an overrepresentation of

studies from English-speaking nations. However, scientific papers in Organization for Economic Cooperation and Development countries are increasingly written in English and aimed at an international audience, reducing the risk that I may have missed important explanations. Second, I excluded studies conducted in low- and middle-income countries. This means that our results are not generalizable to these contexts, and that important explanations more relevant to these countries may be missing from our review. Nevertheless, there is mitigation in the fact that there is currently limited research available on the effectiveness of HIIs in low- and middle-income countries (Durkin et al., 2013). Lastly, the review was conducted without registering the research protocol in advance. Nonetheless, I have composed an a priori protocol for use within the research team, which has been adhered to throughout the entire process.

Conclusion

In conclusion, this review reveals that many studies do not provide an explanation for why institutional anti-smoking HIIs are less effective among low-SES groups in high-income countries. Of those that do, it is striking that most explanations are only proposed, rather than studied empirically. This is regrettable, as empirical research into potential contributory reasons for the (reduced) effectiveness of interventions might uncover the root causes of why those in low-SES groups respond to the same message differently compared to individuals in high-SES groups. Conducting this type of research could lead to improved anti-smoking interventions, thereby ensuring their effectiveness among low-SES groups and reducing current inequalities in smoking prevalence.

APPENDIX 1B – DETAILED DESCRIPTION OF THE LISS PANEL

Data for Chapter 3, 4 and 5 have been collected using the Longitudinal Internet Studies for the Social Sciences (LISS) panel, which is administered by Centerdata (Tilburg University, the Netherlands). The LISS panel consists of 5,000 households, containing about 7,500 individuals. Households are sampled from Statistics Netherlands (*Centraal Bureau voor de Statistiek*, CBS). For the initial recruitment of the households, letters addressed specifically to a randomly chosen adult living in the household (if possible) were sent, asking each household member to participate in the panel (Scherpenzeel, 2009). Follow-up invitations were done by telephone calls or house visits. To reduce non-response, households are contacted up to 15 times, and an extensive refusal conversion process is applied if respondents refuse recruitment. As the LISS panel questionnaires are all shared online, the (increasingly minor) share of households without Internet access is loaned equipment facilitating a broadband Internet connection.

After the initial background characteristics questionnaire, respondents are requested to participate in a longitudinal survey that is fielded in the panel on a yearly basis, covering such topics as health, political views, economic situations, and personality. In addition to this, scholars can request the services of the LISS panel to field their own studies, as was done for most data in this dissertation. Due to an anonymized participant identification number, data from all studies can be combined.

To improve the representativeness of the panel, various refreshment samples were carried out over the years. These oversampled specifically from social groups that were underrepresented in the initial recruitment. The latest statistics on the representativeness of the LISS panel show that there is a small overrepresentation of tertiary-educated citizens and citizens with higher incomes (Centerdata, n.d.). Despite this, comparisons to other Dutch population-based surveys demonstrate that the LISS panel is overall most representative of the Dutch population

(Scherpenzeel and Bethlehem, 2018), therefore providing high-quality data for research into societal group differences.

APPENDIX 2A – SEARCH QUERIES FOR CHAPTER 2

Embase

(diet/exp OR 'dietary intake'/de OR 'food intake'/de OR 'caloric density'/exp OR 'caloric intake'/exp OR 'carbohydrate intake'/exp OR 'diet restriction'/exp OR 'dietary reference intake'/exp OR 'fat intake'/exp OR 'maternal nutrition'/exp OR 'nutrition'/de OR 'feeding behavior'/de OR 'eating habit'/de OR 'food preference'/de OR 'soft drink'/de OR 'sweetened beverage'/exp OR (diet OR dieting OR diets OR dietar* OR ((soft OR sweet*) NEAR/3 (drink* OR beverage*)) OR ((feed* OR eat* OR food* OR diet*) NEAR/3 (behavior* OR behaviour* OR habit* OR preferenc* OR pattern**)) OR ((nutrition OR food* OR beverage* OR nutrient* OR micronutrient* OR macronutrient* OR vitamin* OR calor* OR energ* OR vegetable* OR fruit* OR fat OR fats OR fatty OR sugar* OR carbohydrate* OR glucose* OR sodium* OR salt* OR cholesterol*) NEAR/6 (intake* OR ingest* OR supplement* OR consum* OR restrict* OR depriv*)) OR ((weight*) NEAR/3 (manag*)) OR ((well OR under) NEXT/1 nourish*) OR ((well OR under) NEXT/1 nourish*):ab,ti) AND (policy/exp OR politics/de OR government/exp OR 'legal aspect'/de OR deregulation/exp OR 'government regulation'/exp OR law/exp OR 'law enforcement'/exp OR 'mandatory program'/exp OR 'mass communication'/de OR 'mass medium'/de OR 'consumer health information'/de OR 'information dissemination'/de OR 'information literacy'/de OR 'information seeking'/de OR (regulation* OR government* OR law OR laws OR policy OR policies OR ((weight*) NEAR/3 (manag*)) OR ((information*) NEAR/3 (consumer-health* OR disseminat* OR literac* OR seek*)) OR ((diet OR nutrition OR sugar* OR fat OR fats*) NEAR/3 (restrict* OR act OR acts OR price OR pricing OR tax OR taxes OR taxation)) OR legal* OR illegal* OR hotline* OR quitline* OR (mass NEXT/1 (media OR medium OR communicat*)) OR ordinanc* OR prohibit* OR decree* OR enactment* OR mandator* OR campaign* OR ((pictorial OR graphic) NEAR/3 (warning*)) OR packaging OR mpower OR advertizing OR advertising

OR legislat* OR statut* OR (('population-based' OR 'public health') NEAR/3 strateg*):ab,ti) AND ('socioeconomics'/exp OR 'social status'/exp OR (((digital*) NEAR/3 (devide* OR inequalit*)) OR socioeconomic* OR socio-economic* OR ((economic* OR educat* OR career* OR job OR jobs OR work OR profession* OR social* OR socio OR sociocultur* OR socio-cultur* OR sociodemograph* OR socio-demograph* OR occupat* OR employ*) NEAR/3 (status* OR achievement* OR condition* OR rank* OR rank* OR standing* OR state OR background* OR class* OR mobilite* OR deprivat* OR disadvantag* OR equal* OR inequal* OR low OR lower)) OR literac* OR illitera* OR ((abilit* OR capabilit* OR skill*) NEAR/3 (read* OR learn*)) OR ((living) NEXT/1 (standard*)) OR poverty OR income* OR employed OR unemployed OR remunerat* OR salary OR salaries):ab,ti) NOT ([animals]/lim NOT [humans]/lim) AND [english]/lim NOT ([Conference Abstract]/lim AND [1800-2016]/py)

Medline

(exp Diet/ OR Eating/ OR Energy Intake/ OR exp Maternal Nutritional Physiological Phenomena/ OR Nutritional Status/ OR Feeding Behavior/ OR Food Preferences/ OR soft drink/ OR (diet OR dieting OR diets OR dietar* OR ((soft OR sweet*) ADJ3 (drink* OR beverage*)) OR ((feed* OR eat* OR food* OR diet*) ADJ3 (behavior* OR behaviour* OR habit* OR preferenc* OR pattern*)) OR ((nutrition OR food* OR beverage* OR nutrient* OR micronutrient* OR macronutrient* OR vitamin* OR calor* OR energ* OR vegetable* OR fruit* OR fat OR fats OR fatty OR sugar* OR carbohydrate* OR glucose* OR sodium* OR salt* OR cholesterol*) ADJ6 (intake* OR ingest* OR supplement* OR consum* OR restrict* OR depriv*)) OR ((weight*) ADJ3 (manag*)) OR ((well OR under) ADJ nourish*) OR ((well OR under) ADJ nourish*)):ab,ti.) AND (exp Policy/ OR Politics/ OR exp Government/ OR exp Jurisprudence/ OR Government Regulation/ OR exp Legislation, Drug/ OR Antitrust Laws/ OR Law Enforcement/ OR exp Mandatory Programs/ OR exp Mass Media/ OR exp Consumer Health

Information/ OR Information Dissemination/ OR exp Information Literacy/ OR Information Seeking Behavior/ OR (regulation* OR government* OR law OR laws OR policy OR policies OR ((weight*) ADJ3 (manag*)) OR ((information*) ADJ3 (consumer-health* OR disseminat* OR literac* OR seek*)) OR ((diet OR nutrition OR sugar* OR fat OR fats*) ADJ3 (restrict* OR act OR acts OR price OR pricing OR tax OR taxes OR taxation)) OR legal* OR illegal* OR hotline* OR quitline* OR (mass ADJ (media OR medium OR communicat*)) OR ordinanc* OR prohibit* OR decree* OR enactment* OR mandator* OR campaign* OR ((pictorial OR graphic) ADJ3 (warning*)) OR packaging OR mpower OR advertizing OR advertising OR legislat* OR statut* OR ((population-based OR public health) ADJ3 strateg*).ab,ti.) AND (exp Socioeconomic Factors/ OR exp Social Class/ OR (((digital*) ADJ3 (devide* OR inequalit*)) OR socioeconomic* OR socio-economic* OR ((economic* OR educat* OR career* OR job OR jobs OR work OR profession* OR social* OR socio OR sociocultur* OR socio-cultur* OR sociodemograph* OR socio-demograph* OR occupat* OR employ*) ADJ3 (status* OR achievement* OR condition* OR rank* OR rank* OR standing* OR state OR background* OR class* OR mobilit* OR deprivat* OR disadvantag* OR equalt* OR inequalt* OR low OR lower)) OR literac* OR illitera* OR ((abilit* OR capabilit* OR skill*) ADJ3 (read* OR learn*)) OR ((living) ADJ (standard*)) OR poverty OR income* OR employed OR unemployed OR remunerat* OR salary OR salaries).ab,ti.) NOT (exp animals/ NOT humans/) AND english.la.

Cochrane (RCTs)

((diet OR dieting OR diets OR dietar* OR ((soft OR sweet*) NEAR/3 (drink* OR beverage*)) OR ((feed* OR eat* OR food* OR diet*) NEAR/3 (behavior* OR behaviour* OR habit* OR preferenc* OR pattern*)) OR ((nutrition OR food* OR beverage* OR nutrient* OR micronutrient* OR macronutrient* OR vitamin* OR calor* OR energ* OR vegetable* OR fruit* OR fat OR fats OR fatty OR sugar* OR carbohydrate* OR glucose* OR sodium* OR salt* OR cholesterol*) NEAR/6 (intake* OR

ingest* OR supplement* OR consum* OR restrict* OR depriv*) OR ((weight*) NEAR/3 (manag*)) OR ((well OR under) NEXT/1 nourish*) OR ((well OR under) NEXT/1 nourish*):ab,ti) AND ((regulation* OR government* OR law OR laws OR policy OR policies OR ((weight*) NEAR/3 (manag*)) OR ((information*) NEAR/3 ((consumer NEXT/1 health*) OR disseminat* OR literac* OR seek*)) OR ((diet OR nutrition OR sugar* OR fat OR fats*) NEAR/3 (restrict* OR act OR acts OR price OR pricing OR tax OR taxes OR taxation)) OR legal* OR illegal* OR hotline* OR quitline* OR (mass NEXT/1 (media OR medium OR communicat*)) OR ordinanc* OR prohibit* OR decree* OR enactment* OR mandator* OR campaign* OR ((pictorial OR graphic) NEAR/3 (warning*)) OR packaging OR mpower OR advertizing OR advertising OR legislat* OR statut* OR (('population-based' OR 'public health') NEAR/3 strateg*):ab,ti) AND (((digital*) NEAR/3 (devid* OR inequalit*)) OR socioeconomic* OR (socio NEXT/1 economic*) OR ((economic* OR educat* OR career* OR job OR jobs OR work OR profession* OR social* OR socio OR sociocultur* OR (socio NEXT/1 cultur*) OR sociodemograph* OR (socio NEXT/1 demograph*) OR occupat* OR employ*) NEAR/3 (status* OR achievement* OR condition* OR rank* OR rank* OR standing* OR state OR background* OR class* OR mobilit* OR deprivat* OR disadvantag* OR equal* OR inequalt* OR low OR lower)) OR literac* OR illitera* OR ((abilit* OR capabilit* OR skill*) NEAR/3 (read* OR learn*)) OR ((living) NEXT/1 (standard*)) OR poverty OR income* OR employed OR unemployed OR remunerat* OR salary OR salaries):ab,ti)

Web of Science

TS=(((diet OR dieting OR diets OR dietar* OR ((soft OR sweet*) NEAR/2 (drink* OR beverage*)) OR ((feed* OR eat* OR food* OR diet*) NEAR/2 (behavior* OR behaviour* OR habit* OR preferenc* OR pattern*)) OR ((nutrition OR food* OR beverage* OR nutrient* OR micronutrient* OR macronutrient* OR vitamin* OR calor* OR energ* OR vegetable* OR fruit* OR fat OR fats OR fatty OR sugar* OR

carbohydrate* OR glucose* OR sodium* OR salt* OR cholesterol*)
 NEAR/5 (intake* OR ingest* OR supplement* OR consum* OR restrict*
 OR depriv*) OR ((weight*) NEAR/2 (manag*)) OR ((well OR under)
 NEAR/1 nourish*) OR ((well OR under) NEAR/1
 nourish*)) AND ((regulation* OR government* OR law OR laws OR
 policy OR policies OR ((weight*) NEAR/2 (manag*)) OR
 ((information*) NEAR/2 (consumer-health* OR disseminat* OR literac*
 OR seek*)) OR ((diet OR nutrition OR sugar* OR fat OR fats*) NEAR/
 2 (restrict* OR act OR acts OR price OR pricing OR tax OR taxes OR
 taxation)) OR legal* OR illegal* OR hotline* OR quitline* OR (mass
 NEAR/1 (media OR medium OR communicat*)) OR ordinanc* OR
 prohibit* OR decree* OR enactment* OR mandator* OR campaign* OR
 ((pictorial OR graphic) NEAR/2 (warning*)) OR packaging OR
 mpower OR advertizing OR advertising OR legislat* OR statut* OR
 ("population-based" OR "public health") NEAR/2
 strateg*)) AND (((digital*) NEAR/2 (devide* OR inequalit*)) OR
 socioeconomic* OR socio-economic* OR ((economic* OR educat* OR
 career* OR job OR jobs OR work OR profession* OR social* OR socio
 OR sociocultur* OR socio-cultur* OR sociodemograph* OR socio-
 demograph* OR occupat* OR employ*) NEAR/2 (status* OR
 achievement* OR condition* OR rank* OR rank* OR standing* OR state
 OR background* OR class* OR mobilit* OR deprivat* OR disadvantag*
 OR equalt* OR inequalt* OR low OR lower)) OR literac* OR
 illitera* OR ((abilit* OR capabilit* OR skill*) NEAR/2 (read* OR
 learn*)) OR ((living) NEAR/1 (standard*)) OR poverty OR income* OR
 employed OR unemployed OR remunerat* OR salary OR salaries))
 NOT ((animal* OR rat OR rats OR mouse OR mice OR murine OR dog
 OR dogs OR canine OR cat OR cats OR feline OR rabbit OR cow OR
 cows OR bovine OR rodent* OR sheep OR ovine OR pig OR swine OR
 porcine OR veterinar* OR chick* OR zebrafish* OR baboon* OR
 nonhuman* OR primate* OR cattle* OR goose OR geese OR duck OR
 macaque* OR avian* OR bird* OR fish*) NOT (human* OR patient* OR

women OR woman OR men OR man))) AND DT=(Article OR Review)
AND LA=(English)

PsycINFO

(exp Diets/ OR Eating Behavior/ OR Food Intake/ OR exp Nutrition/
OR Food Preferences/ OR (diet OR dieting OR diets OR dietar* OR
((soft OR sweet*) ADJ3 (drink* OR beverage*)) OR ((feed* OR eat*
OR food* OR diet*) ADJ3 (behavior* OR behaviour* OR habit* OR
preferenc* OR pattern*)) OR ((nutrition OR food* OR beverage* OR
nutrient* OR micronutrient* OR macronutrient* OR vitamin* OR calor*
OR energ* OR vegetable* OR fruit* OR fat OR fats OR fatty OR sugar*
OR carbohydrate* OR glucose* OR sodium* OR salt* OR cholesterol*)
ADJ6 (intake* OR ingest* OR supplement* OR consum* OR restrict*
OR depriv*)) OR ((weight*) ADJ3 (manag*)) OR ((well OR under)
ADJ nourish*) OR ((well OR under) ADJ nourish*).ab,ti.) AND (exp
Health Care Policy/ OR Politics/ OR exp Government/ OR exp "Law
(Government)" OR Government Policy Making/ OR exp Drug Laws/
OR Law Enforcement/ OR exp Mass Media/ OR Information
Dissemination/ OR exp Information Literacy/ OR Information Seeking/
OR (regulation* OR government* OR law OR laws OR policy OR
policies OR ((weight*) ADJ3 (manag*)) OR ((information*) ADJ3
(consumer-health* OR disseminat* OR literac* OR seek*)) OR ((diet OR
nutrition OR sugar* OR fat OR fats*) ADJ3 (restrict* OR act OR acts
OR price OR pricing OR tax OR taxes OR taxation)) OR legal* OR
illegal* OR hotline* OR quitline* OR (mass ADJ (media OR medium
OR communicat*)) OR ordinanc* OR prohibit* OR decree* OR
enactment* OR mandator* OR campaign* OR ((pictorial OR graphic)
ADJ3 (warning*)) OR packaging OR mpower OR advertizing OR
advertising OR legislat* OR statut* OR ((population-based OR public
health) ADJ3 strateg*).ab,ti.) AND (exp Socioeconomic Status/ OR
exp Socioeconomic Class Attitudes/ OR (((digital*) ADJ3 (devide* OR
inequalit*)) OR socioeconomic* OR socio-economic* OR ((economic*
OR educat* OR career* OR job OR jobs OR work OR profession* OR

social* OR socio OR sociocultur* OR socio-cultur* OR sociodemograph* OR socio-demograph* OR occupat* OR employ*) ADJ3 (status* OR achievement* OR condition* OR rank* OR rank* OR standing* OR state OR background* OR class* OR mobilite* OR deprivat* OR disadvantage* OR equal* OR inequal* OR low OR lower)) OR literac* OR illitera* OR ((abilit* OR capabilit* OR skill*) ADJ3 (read* OR learn*)) OR ((living) ADJ (standard*)) OR poverty OR income* OR employed OR unemployed OR remunerat* OR salary OR salaries).ab,ti.) NOT (exp animals/ NOT humans/) AND english.la.

Econ Lit

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demograph* OR occupat* OR employ*) N2 (status* OR achievement* OR condition* OR rank* OR rank* OR standing* OR state OR background* OR class* OR mobil* OR deprivat* OR disadvantag* OR equal* OR inequal* OR low OR lower)) OR literac* OR illitera* OR ((abilit* OR capabilit* OR skill*) N2 (read* OR learn*)) OR ((living) N1 (standard*)) OR poverty OR income* OR employed OR unemployed OR remunerat* OR salary OR salaries))))

Google Scholar (random top-200)

diet|dieting|diets|dietary|"soft|sweet drink|beverage"|"feed|eat|food|diet behavior|behaviour|habit|preference|pattern"|"nutrition|food|vitamin|caloric|energy|vegetable|fruit|fat|sugar|carbohydrate|glucose|sodium|salt|cholesterol intake|ingest" "government|policy|policies"|"information health|dissemination|literacy|seeking"|"diet|fat|sugar ban|bans|banned|free|restriction" socioeconomic|"economic|education|social|soci|sociocultural|sociodemograph|occupation status|achievement|poverty|income|employed|unemployed|salary|salaries

APPENDIX 3A – MEASUREMENT OF BASIC NUTRITIONAL KNOWLEDGE

The items used to measure *basic nutritional knowledge* are as follows (correct answers italicized behind the items):

Original Dutch version

Denkt u dat er veel of weinig **toegevoegde suikers** in onderstaande producten zitten?

1. Naturelyoghurt. *Weinig*
2. Pot appelmoes. *Veel*
3. Tomatenketchup. *Veel*

Denkt u dat er veel of weinig **vetten** in onderstaande producten zitten?

1. Pasta (zonder saus). *Weinig*
2. Avocado. *Veel*
3. Vleeswaren. *Veel*

Denkt u dat er veel of weinig **verzadigde vetten** in onderstaande producten zitten?

1. Makreel. *Weinig*
2. Olijfolie. *Veel*
3. Chocolade. *Veel*

Denkt u dat er veel of weinig **zout** in onderstaande producten zit?

1. Brood. *Weinig*
2. Tofu. *Weinig*
3. Kipfilet (broodbeleg). *Veel*

English translation

Do you think there are a lot or little **added sugars** in the following products?

1. Unflavored yoghurt. *A little*
2. Jar of applesauce. *A lot*
3. Tomato ketchup. *A lot*

Do you think there are a lot or little **fats** in the following products?

1. Pasta (without sauce). *A little*

2. Avocado. *A lot*

3. Luncheon meat. *A lot*

Do you think there are a lot or little **saturated fats** in the following fatty products?

1. Mackerel. *A little*

2. Olive oil. *A lot*

3. Chocolate. *A lot*

Do you think there is a lot or little **salt** in the following products?

1. Bread. *A little*

2. Tofu. *A little*

3. Chicken cold cuts. *A lot*

APPENDIX 4A – TEXTS OF EXPERIMENTAL TREATMENTS FOR CHAPTER 4

Control text

Gezond drinken

Je lichaam heeft iedere dag genoeg vocht nodig, maar geen extra suiker. Daarom vind je hier informatie over gezonde en minder gezonde dorstlessers.

- Gezond vocht innemen kan met water, koffie en thee.
- Kraanwater heeft geen calorieën, en is goedkoop en overal te krijgen.
- Gezonde volwassenen kunnen ongeveer 4 kopjes koffie per dag drinken.
- Zwarte en groene thee zonder suiker zijn gezond. Deze verlagen de bloeddruk en verkleinen het risico op een beroerte.
- In zoete dranken zoals frisdrank, energiedrank of sappen zit veel suiker. Dat vergroot de kans op overgewicht en suikerziekte. Water of thee en koffie zonder suiker zijn gezonder.

Treatment text for explicit references to institutional sources

Gezond drinken: Informatie van het Voedingscentrum

Je lichaam heeft iedere dag genoeg vocht nodig, maar geen extra suiker. Daarom vind je hier informatie over gezonde en minder gezonde dorstlessers. Deze informatie komt van het Voedingscentrum.

Het Voedingscentrum gebruikt inzichten van de Gezondheidsraad, het Rijksinstituut voor Volksgezondheid en Milieu (RIVM) en een raad van verschillende wetenschappers en diëtisten. Het Voedingscentrum wordt ondersteund door de overheid.

Deskundigen concluderen op basis van uitgebreid wetenschappelijk onderzoek:

- Gezond vocht innemen kan met water, koffie en thee.
- Kraanwater heeft geen calorieën, en is goedkoop en overal te krijgen.
- Gezonde volwassenen kunnen ongeveer 4 kopjes koffie per dag drinken.
- Zwarte en groene thee zonder suiker zijn gezond. Deze verlagen de bloeddruk en verkleinen het risico op een beroerte.
- In zoete dranken zoals frisdrank, energiedrank of sappen zit veel suiker. Dat vergroot de kans op overgewicht en suikerziekte. Water of thee en koffie zonder suiker zijn gezonder.

Treatment text for explicit references to institutional sources and use of patronizing language

Verstandige keuzes voor gezond drinken: Advies van het Voedingscentrum

Je lichaam heeft iedere dag genoeg vocht nodig. Maar extra suiker? Nou nee. Daarom vind je hier informatie over slimme en minder slimme keuzes voor dorstlessers. Deze informatie komt van het Voedingscentrum.

Het Voedingscentrum gebruikt inzichten van de Gezondheidsraad, het Rijksinstituut voor Volksgezondheid en Milieu (RIVM) en een raad van verschillende wetenschappers en diëtisten. Het Voedingscentrum wordt ondersteund door de overheid.

Deskundigen concluderen op basis van uitgebreid wetenschappelijk onderzoek:

- De juiste keuzes voor een gezonde inname van vocht zijn water, koffie en thee.
- Kraanwater heeft geen calorieën, en is goedkoop en overal te krijgen.
- Gezonde volwassenen kunnen ongeveer 4 kopjes koffie per dag drinken.
- Zwarte en groene thee zijn gezond. Deze verlagen de bloeddruk en verkleinen het risico op een beroerte. Dat geldt natuurlijk alleen als je er geen suiker indoet.
- In zoete dranken zoals frisdrank, energiedrank of sappen zit veel suiker. Dat vergroot de kans op overgewicht en suikerziekte. Het is sowieso slim om in plaats hiervan water of thee zonder suiker te drinken, eigenlijk weten we dat allemaal wel.

APPENDIX 5A – TEXTS OF EXPERIMENTAL TREATMENTS FOR CHAPTER 5

Original texts

Control group text

Overgewicht en obesitas komen in Nederland veel voor. Bijna de helft van de volwassen Nederlanders is te zwaar. Dit kan leiden tot grote problemen, zoals hart- en vaatziekten of suikerziekte.

Om overgewicht tegen te gaan, werken meerdere organisaties samen. Hierbij kun je denken aan de **overheid en organisaties uit de zorg en uit de wetenschap.**

Een van de manieren om overgewicht te bestrijden bestaat uit **voorlichting over gezond en ongezond eten en drinken.** Die voorlichting wordt gegeven door **het Voedingscentrum,** dat door de overheid wordt betaald. De adviezen van het Voedingscentrum zijn **gebaseerd op wetenschappelijk onderzoek.** Alleen als wetenschappers het met elkaar eens zijn, is de informatie betrouwbaar genoeg voor het Voedingscentrum.

Er worden ook andere middelen ingezet in de strijd tegen overgewicht. Bijvoorbeeld ongezonde producten niet meer op een aantrekkelijke plek in de winkel zetten. Of met een kleurcode op de verpakking laten weten hoe gezond of ongezond een product is.

Sugar tax text

Overgewicht en obesitas komen in Nederland veel voor. Bijna de helft van de volwassen Nederlanders is te zwaar. Dit kan leiden tot grote problemen, zoals hart- en vaatziekten of suikerziekte.

Om overgewicht tegen te gaan, werken meerdere organisaties samen. Hierbij kun je denken aan **de overheid en organisaties uit de zorg en uit de wetenschap.**

Een van de manieren om overwicht te bestrijden bestaat uit **voorlichting over gezond en ongezond eten en drinken**. Die voorlichting wordt gegeven door **het Voedingscentrum**, dat door de overheid wordt betaald. De adviezen van het Voedingscentrum zijn **gebaseerd op wetenschappelijk onderzoek**. Alleen als wetenschappers het met elkaar eens zijn, is de informatie betrouwbaar genoeg voor het Voedingscentrum.

Er worden ook andere middelen ingezet in de strijd tegen overgewicht. Bijvoorbeeld ongezonde producten niet meer op een aantrekkelijke plek in de winkel zetten. Of met een kleurcode op de verpakking laten weten hoe gezond of ongezond een product is.

Maar hiermee alleen lukt het niet om overgewicht genoeg tegen te gaan. Daarom werken onder andere de overheid, zorg en wetenschap ook samen aan **andere maatregelen** die ervoor moeten zorgen dat Nederlanders gezonder gaan eten en drinken.

Een belangrijke oorzaak van overgewicht en obesitas is het drinken van dranken waar suiker in zit, zoals energiedrank en frisdrank. Als er minder dranken waar suiker in zit worden gedronken krijgt iedereen in de toekomst minder suiker binnen. Daardoor zullen steeds minder mensen te zwaar worden.

Om dit doel te bereiken, stellen de samenwerkende organisaties voor om **meer belasting te hebben over dranken waar suiker in zit**. Deze zogenaamde 'suikertaks' zorgt ervoor dat deze producten in de winkel bijna anderhalf keer zo duur kunnen worden.

Product reformulation text

Overgewicht en obesitas komen in Nederland veel voor. Bijna de helft van de volwassen Nederlanders is te zwaar. Dit kan leiden tot grote problemen, zoals hart- en vaatziekten of suikerziekte.

Om overgewicht tegen te gaan, werken meerdere organisaties samen. Hierbij kun je denken aan **de overheid en organisaties uit de zorg en uit de wetenschap**.

Een van de manieren om overgewicht te bestrijden bestaat uit **voorlichting over gezond en ongezond eten en drinken**. Die voorlichting wordt gegeven door **het Voedingscentrum**, dat door de overheid wordt betaald. De adviezen van het Voedingscentrum zijn **gebaseerd op wetenschappelijk onderzoek**. Alleen als wetenschappers het met elkaar eens zijn, is de informatie betrouwbaar genoeg voor het Voedingscentrum.

Er worden ook andere middelen ingezet in de strijd tegen overgewicht. Bijvoorbeeld ongezonde producten niet meer op een aantrekkelijke plek in de winkel zetten. Of met een kleurcode op de verpakking laten weten hoe gezond of ongezond een product is.

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Om dit doel te bereiken, stellen de samenwerkende organisaties voor om ervoor te zorgen dat **de hoeveelheid suiker in dranken waar suiker in zit wordt verlaagd**. Producenten van bijvoorbeeld frisdranken of energiedranken zijn dan verplicht om minder suiker in hun producten te stoppen.

Translated texts

Control group text

Being overweight or obese is common in the Netherlands - almost half of the adult Dutch population is too heavy. This can cause major health problems, including cardiovascular disease or diabetes.

Several organizations are working together to combat overweight, including the **government and healthcare and science bodies**.

One way to combat overweight is to **provide information about healthy and unhealthy food and drink**. The **Netherlands Nutrition Centre**, which is paid by the government, makes recommendations that are always **based on reliable scientific research**. The Netherlands Nutrition Centre only treats information as reliable if scientists agree about its validity.

Other approaches are also used to combat the problem of excess weight. These include removing unhealthy products from easy-to-reach and hard-to-ignore places in stores or using color coding on packaging to provide a visual cue on how healthy or unhealthy an item is.

Sugar tax text

Being overweight or obese is common in the Netherlands - almost half of the adult Dutch population is too heavy. This can cause major health problems, including cardiovascular disease or diabetes.

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Other approaches are also used to combat the problem of excess weight. These include removing unhealthy products from easy-to-reach and hard-to-ignore places in stores or using color coding on packaging to provide a visual cue on how healthy or unhealthy an item is.

But this, on its own, isn't enough to prevent overweight. This is why the government and healthcare and science bodies are also working together on **other measures** to help Dutch citizens make healthier choices about what they eat and drink.

Sugary beverages like energy drinks and sodas are an important contributor to people becoming overweight or obese. If fewer drinks like these were consumed, everyone would be having less sugar in the future. As a result, less and less people will gain excess weight.

To achieve this goal, the collaborating organizations are proposing **raising taxes on sugary drinks**. This so-called 'sugar tax' will make these products almost one and a half times as expensive in stores.

Product reformulation text

Being overweight or obese is common in the Netherlands - almost half of the adult Dutch population is too heavy. This can cause major health problems, including cardiovascular disease or diabetes.

Several organizations are working together to combat overweight, including the **government and healthcare and science bodies**.

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Sugary beverages like energy drinks and sodas are an important contributor to people becoming overweight or obese. If fewer drinks like these were consumed, everyone would be having less sugar in the future. As a result, less and less people will gain excess weight.

To achieve this goal, the collaborating organizations propose to **ensure that there is less sugar in the beverages we consume**. This would mean that the producers of, for example, sodas or energy drinks would be obliged to add less sugar to their products.

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Nederlandse samenvatting

Niet-overdraagbare ziekten als gevolg van overgewicht komen steeds vaker voor. Overgewicht wordt deels veroorzaakt door ongezonde voeding. Daarom implementeren officiële instituties die zich bezighouden met gezondheidsbevordering – bijvoorbeeld in de gezondheidszorg, wetenschap en politiek – voedingsinterventies, gericht op het bevorderen van gezonde voedingspatronen. Veel van deze interventies zijn echter minder effectief onder lageropgeleide burgers, waardoor de toch al aanzienlijke kloof die bestaat op het gebied van voedingsgezondheid nog groter wordt. Vooral interventies waarbij aan burgers informatie wordt gegeven over (on)gezond voedingsgedrag zijn minder effectief onder lageropgeleide dan onder hogeropgeleide burgers. Structurele interventies – die minder makkelijk te omzeilen zijn – zijn veelbelovender vanuit het oogpunt van gelijkheid in effectiviteit. Waar het gaat om de maatschappelijke aanvaardbaarheid van interventies geldt juist dat interventies die vrijheid van keuze toelaten door burgers meer geaccepteerd worden dan beperkende interventies. Wat echter veelal mist in interventiestudies is het perspectief van burgers zelf, hoewel dit sociale patronen in zowel effectiviteit als aanvaardbaarheid zou kunnen verklaren. Dit proefschrift – geïnformeerd door een vroege interviewfase die werd afgebroken vanwege COVID-19-gerelateerde maatregelen, een semigestructureerde inhoudsanalyse van reacties op sociale media op Nederlandse nieuwsberichten over gezondheidsinterventies, en inzichten uit aangrenzende sociologische velden – gaat in op de rol die anti-institutionalisme (i.e., afkeer van officiële instituties) speelt in de ontvankelijkheid van burgers voor voedingsinterventies.

Om eerst het veld in kaart te brengen waarin deze nieuw voorgestelde verklaring voor interventie-ontvankelijkheid zal worden gepositioneerd, bespreekt Hoofdstuk 2 een *scoping review* van onderzoeken naar de effectiviteit van voedingsinformatie onder burgers

met een lage sociaaleconomische status (SES). Hiermee identificeer ik wat de belangrijkste verklaringen zijn voor waarom voedingsinformatie wel of niet effectief is onder burgers met een lage SES, en of deze verklaringen al dan niet empirisch zijn onderzocht. Interventiestudies blijken veelal de (in)effectiviteit van hun interventies niet te verklaren. Wanneer dit wel gebeurt, worden verklaringen vooral gezocht in cognitieve vaardigheden (zoals gezondheidsgeletterdheid) of economische middelen (zoals inkomen). De gangbare verklaringen zijn dus voornamelijk individualistisch. Daarnaast worden de verklaringen zelden empirisch getoetst en wanneer dat wel gebeurt zijn de uitkomsten inconsistent. Deze individualistische kijk op (in)effectiviteit van interventies kan dus niet volledig verklaren waarom SES-gerelateerde ongelijkheden in effectiviteit van interventies bestaan. Een sociologische benadering is dus welkom, waarbij wordt gekeken naar wijdere sociale dynamieken die invloed uitoefenen op hoe burgers van verschillende sociale lagen anders denken en doen.

In Hoofdstuk 3 bestudeer ik de rol die anti-institutionalisme speelt in het beperkte gebruik van voedingsinformatie door lageropgeleide burgers. In dit hoofdstuk probeer ik te achterhalen of anti-institutionalisme gerelateerd is aan gebruik van voedingsinformatie en in hoeverre het opleidingsverschillen hierin kan verklaren, terwijl ik rekening houd met de voornaamste conventionele verklaringen achterhaald in Hoofdstuk 2 (inkomen, financiële stress, en kennis over voeding). Hiervoor maak ik gebruik van representatieve Nederlandse data, verzameld middels een cross-sectioneel onderzoek met nieuw ontwikkelde items toegespitst op de onderzoeksvraag. Bevindingen tonen aan dat anti-institutionalisme (in tegenstelling tot de conventionele verklaringen) voor een aanzienlijk deel ten grondslag ligt aan de opleidingsverschillen in informatiegebruik. Dit geldt met name voor het verschil tussen burgers met of zonder hbo- of universiteitsdiploma. Dit lijkt te impliceren dat instituties die zich bezighouden met gezondheidsbevordering, in hun poging de voedingspatronen van Nederlandse burgers te verbeteren, onvoldoende rekening houden met de

belevingswerelden van burgers die geen tertiair onderwijs hebben genoten.

Aangezien anti-institutionalisme een belangrijke verklaring lijkt te zijn voor het opleidingsverschil in informatiegebruik, is de vraag welke eigenschappen van informatie ervoor zorgen dat burgers zonder tertiair onderwijsdiploma deze als institutioneel zien. In dat licht is het mogelijke relevant dat verscheidene communicatiestrategieën die bedoeld zijn om de overredingskracht van voedingsinformatie te verhogen, daarmee ook de institutionele connotaties van de informatie benadrukken. In sommige gevallen is dit opzettelijk, zoals wanneer institutionele bronnen van de informatie worden benadrukt. In andere gebeurt het als bijeffect, zoals wanneer het versimpelen van informatie ervoor zorgt dat deze ook als betuttelend kan worden opgevat. Vooral wanneer beide worden gecombineerd kan het voor lageropgeleide burgers voelen alsof er op hen wordt neergekeken door de 'elite' die als bron van de informatie fungeert, waardoor zij er minder ontvankelijk voor worden. Gebruikmakend van data representatief voor de Nederlandse bevolking, verkregen middels een gepreregistreerd surveyexperiment, vind ik in Hoofdstuk 4 dat geen van deze strategieën een negatief effect heeft op de ontvankelijkheid voor voedingsinformatie, noch onder de gehele bevolking, noch onder burgers zonder tertiaire opleiding. Toch is deze deze groep wel structureel minder ontvankelijk voor de informatie, ongeacht de vorm waarin het wordt gepresenteerd. Het is daarom aannemelijk dat de diepgewortelde negatieve connotaties die instituties hebben onder niet-tertiair opgeleide burgers door hen worden waargenomen in de informatie, zelfs wanneer de connectie met instituties niet wordt benadrukt.

In het laatste empirische hoofdstuk onderzoek ik hoe anti-institutionalisme wordt *beïnvloed* door gezondheidsinterventies. Bepaalde interventies worden negatiever ontvangen in de publieke opinie dan anderen en dit is een essentiële factor in de effectiviteit van interventies. Ook kan dit negatief uitstralen op de instituties die aan deze interventies worden gelinkt. Aangezien burgers met name minder ontvankelijk zijn voor structurele interventies (vergeleken met interventies die meer

vrijheid van keuze toelaten), richt ik me in Hoofdstuk 5 op het effect dat een voorstel voor zulke interventies heeft op de legitimiteit die gezondheidsbevorderingsinstituties hebben onder burgers. Hierbij gaat het om een suikertaks en het verplicht verminderen van de suikerinhoud van suikerhoudende dranken. Opnieuw maak ik gebruik van data representatief voor de Nederlandse bevolking, verkregen middels een gepreregistreerd surveyexperiment. Daarmee toon ik in dit hoofdstuk aan dat blootstelling aan een van deze voorstellen ervoor zorgt dat burgers de betrokken instituties minder vertrouwen, en ze beschouwen als minder welwillend en cultureel verder verwijderd van zichzelf. Dit speelt met name onder niet-tertiair opgeleide burgers: gestratificeerde analyses onderstrepen dat de legitimiteit van betrokken instituties vooral onder deze groep daalt, terwijl deze onder tertiair opgeleide burgers relatief stabiel blijft. Het opleidingsverschil dat al bestaat in deze legitimiteitsbeoordeling houdt dus niet alleen stand, maar wordt enkel groter als burgers worden geconfronteerd met voorstellen voor interventievoorstellen.

In het concluderende hoofdstuk reflecteer ik op wat de bevindingen van de voorgaande hoofdstukken betekenen voor voedingsinterventies en gezondheidsinterventies in het algemeen, en bespreek ik hoe ze waarschijnlijk zijn beïnvloed door verschillende keuzes die gemaakt zijn tijdens het schrijven van dit proefschrift. Omdat anti-institutionalisme zowel een invloed heeft op als wordt beïnvloed door ontvankelijkheid voor interventies, ga ik in Hoofdstuk 6 uitgebreider in op de resulterende *feedback loop*, waarin afkeer van instituties en afkeer van interventies elkaar versterken. Hoewel de feedback loop naar alle waarschijnlijkheid niet eenvoudig kan worden gestopt, is het ten minste van belang om opleidingsverschillen in interventie-ontvankelijkheid – veroorzaakt door afkeer van instituties – te verkleinen. Aannemelijk is dat maatschappelijke machtsdynamieken tussen opleidingsgroepen de oorzaak zijn van de afkeer van niet-tertiair opgeleide burgers van instituties en hun interventies. Om de ontvankelijkheid van burgers voor gezondheidsinterventies te vergroten, kan het bevorderlijk zijn als hogeropgeleide burgers, die met name de instituties bevolken, sterkere bruggen bouwen tussen henzelf en

degenen die bereikt dienen te worden, in plaats van de levensstijl opleggen die zij zelf correct achten.

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According to the letter that indicated the end of my employment at the Erasmus University Rotterdam, I left after working there for a total of 6 years and 9.517241 months. I would not have managed to stay here for this oddly specific amount of time, if not for a lot of people.

First and foremost, I want to thank my supervisors: Jeroen van der Waal, Willem de Koster and Joost Oude Groeniger. While the usage of the words ‘I’, ‘me’ and ‘my’ throughout this dissertation might lead to the assumption that it was a solitary work, nothing could be further from the truth. Your seemingly endless support during the writing of this dissertation has been invaluable and your knowledge of and experience in your respective fields made this project better than I could have thought of myself. Even more than that, your ability to do this with a level of looseness and humor made it a joy to collaborate. While my time at the EUR is over, I certainly hope our collaboration is not.

My project was part of the bigger Erasmus Initiative ‘Smarter Choices for Better Health’. I cannot thank everyone involved in this individually, but I’d like to mention Hans van Kippersluis in particular, for including this lone sociologist in the economics- and public health-focused action line.

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Paps en mams, thanks for your unending support, whatever I do. Thanks for your support when I changed from Commercial Economics to a 'kunststudie'. Thanks for your support when I wanted to sign up for a Master's at the very last moment, and sure, another one after that. Thanks, basically, for your support during every big or small decision of my life. Maybe except for when I decided to surprisingly leave Hoogvliet to live in a small "disgusting" student room. Sorry daarvoor, mam...

Over to the two girls that have endured me the most during the writing of this dissertation. Deb, you were there during fun times, and you were there during rough times. You were there when I asked for your help, and you were there when I did not. You helped me in more ways than you can imagine. You were there when I got the call that I was hired for the position, and you are here still at the end of it. I hope you'll be there for what comes next; whatever, whenever, and wherever it may be. Te amo, muito.

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Curriculum vitae

Tim van Meurs was born in 1991 in Rotterdam. He holds a Bachelor's degree in Arts and Culture Studies (*Algemene Cultuurwetenschappen*) from the Erasmus School of History, Culture and Communication (ESHCC) of the Erasmus University Rotterdam (EUR), obtained in 2014. He also received a Master's degree in Arts, Culture and Society, and a Research Master's degree in Sociology of Culture, Media and the Arts at the ESHCC

In 2018, Tim started his PhD position at the Erasmus School of Social and Behavioral Sciences of the EUR, as part of the Erasmus Initiative 'Smarter Choices for Better Health'. In this project, he applied his wide interests in cultural sociology and sociology of stratification to the topic of health intervention receptivity, and educational differences therein. Tim's work within this project has been published in international, peer-reviewed journals – *Sociology of Health & Illness*; *SSM – Population Health*, *Journal of Nutritional Science* and *Drug and Alcohol Review*. Moreover, he presented his work at various international academic conferences in sociology and public health, like the *European Sociological Association Conference*, the *Biennial European Society for Health and Medical Sociology Conference*, and the *European Public Health Conference*. Before and during his PhD, Tim has taught various Bachelor's and Master's level courses for students of Arts and Culture Studies, Sociology, History, and Cultural Economics. His teaching expertise is courses related to social science methodology and conducting social scientific research.

Since 2023, Tim works as a postdoctoral researcher at the Cultural Sociology group of the Amsterdam Institute for Social Science Research at the University of Amsterdam (UvA).

Working experience

2023 – Postdoctoral researcher, University of Amsterdam

2018 – 2022 PhD Candidate, Erasmus University Rotterdam

2016 – 2018 Junior lecturer, Erasmus University Rotterdam

Education

2015 – 2017 MSc in Sociology of Culture, Media and the Arts (Research Master)

2014 – 2015 MA in Arts, Culture and Society

2011 – 2014 BA in Arts and Culture Studies

Portfolio

Articles published

Van Meurs, T., Çobay, F., De Koster, W., Van der Waal, J. and Oude Groeniger, J. (2022). Why are anti-smoking health-information interventions less effective among low socioeconomic status groups? A systematic scoping review. *Drug and Alcohol Review*, 41, 1195-1205. doi: 10.1111/dar.13466

Van Meurs, T., Oude Groeniger, J., De Koster, W. and Van der Waal, J. (2022). An incongruous intervention: Exploring the role of anti-institutionalism in less-educated individual's limited uptake of nutrition information. *Sociology of Health & Illness*, 44, 432–450. doi: 10.1111/1467-9566.13430

Van Meurs, T., Oude Groeniger, J., De Koster, W. and Van der Waal, J. (2022). Suggested explanations for the (in)effectiveness of nutrition information interventions among adults with a low socioeconomic status: A scoping review. *Journal of Nutritional Science*, 11, e50. doi: 10.1017/jns.2022.42

Van Meurs, T., Oude Groeniger, J., De Koster, W. and Van der Waal, J. (2022). Receptive to an authoritative voice? Experimental evidence on how patronizing language and stressing institutional sources affect public receptivity to nutrition information. *SSM - Population Health*. 20, 101295. doi: 10.1016/j.ssmph.2022.101295

Courses taught during PhD research

Bachelor Thesis Supervision, Bachelor Sociology (2020 – 2021)

Research Project, Bachelor Sociology (2018 – 2019)

Research Traineeship Supervision, Research Master Sociology of Culture, Media and the Arts (2018 – 2019)

Social Science Research in Practice, Master programs Sociology (2019 – 2020, 2020 – 2021)

Doctoral training

Basic didactics and group dynamics, Risbo

Brush up your research design, Erasmus Graduate School of Social Sciences and the Humanities (EGSH)

Communicating your research: Lessons from Bitescience, EGSB

Doing the literature review, EGSB

Introduction to data analysis with R, EGSB

Professionalism and integrity in research, EGSB

Q-methodology, EGSB

Survey design, EGSB

The statistics of causal inference, European Consortium for Political Research (ECPR)

Attended conferences

15th European Public Health Conference, Berlin, 2022

19th Biennial European Society for Health and Medical Sociology Conference, Bologna, 2022

Dag van de Sociologie, Groningen, 2022

15th European Sociological Association Conference, online, 2021

Cultural Sociology Lowlands, online, 2020 | Brussels, 2019

Other activities

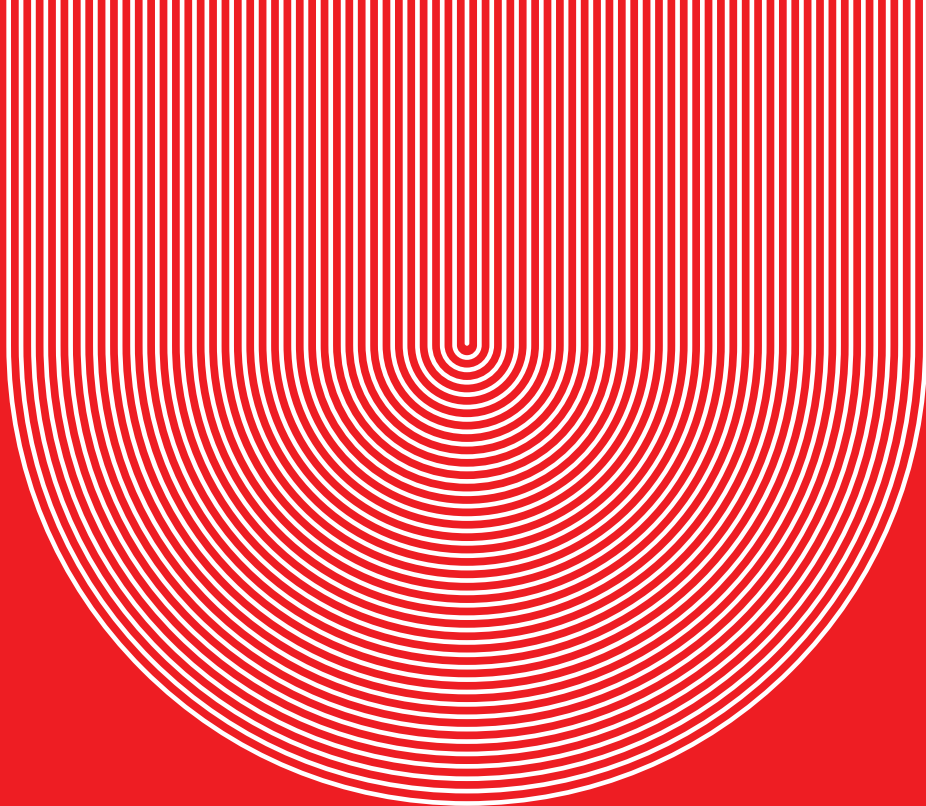
Invited participant in roundtable discussion with the COVID Urgent Team, in collaboration with Erasmus Verbindt.

Invited participant in data donation workshop of the LDE Centre for BOLD Cities.

Invited participant in expert workshop of the ‘Underserved groups’ project of the Pandemic and Disaster Preparedness Center

*Sing along with the common people
Sing along and it might just get you through
Laugh along with the common people
Laugh along even though they're really laughing at you
And the stupid things that you do*

— Pulp, *Common People*



Attempts by official health promotion institutions to promote healthy diets among citizens are not equally effective across society: those who did not complete tertiary education, whose food consumption patterns are commonly less healthy, are not as strongly affected. Common explanations for this pattern are sought in cognitive or economic factors but leave citizens' perspectives out of the equation.

In this dissertation, Tim van Meurs answers the question: *What role is played by citizens' perceptions of official institutions in educational differences in the receptivity to nutrition interventions?* His interdisciplinary perspective, applied to studying the Dutch case, reveals in various ways the high relevance of anti-institutionalism for understanding why nutrition interventions are least effective among those with the greatest potential for health gains. He concludes that, to be effective across society, nutrition interventions should be more sensitive to the lifeworlds of non-tertiary educated citizens, which necessitates a transition from the tertiary-educated gaze that is now present.