ISSN 1936-5349 (print)
ISSN 1936-5357 (online)

HARVARD

JOHN M. OLIN CENTER FOR LAW, ECONOMICS, AND BUSINESS

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Forthcoming in *Journal of Marketing Behavior*

Discussion Paper No. 890

11/2016

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Preliminary Draft

Copenhagen/Cambridge, September 6th 2016

Better Than A Whip? European Attitudes Toward Health Nudges

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ABSTRACT

We examine whether the populations of six European nations support the use of "health nudges" – strategies that preserve free choice but steer individuals in healthier directions. To assess approval rates for health nudges across, within, and in certain parts of these populations, we analyze the results of six nationally representative online surveys administered in Denmark, France, Germany, Hungary, Italy, and the UK. We find majority support for health nudges across the board but with lower approval rates in Hungary and Denmark. Our findings reveal national differences and identify conditions under which consumers tend to approve of nudging healthy behavior. They therefore provide policymakers with practical guidance on which health nudges are likely to receive high levels of public support in the nation states studied.

Keywords: health policy; health nudges; behavioral regulation; acceptability, health defaults

[1] Corresponding author. Parts of this paper overlap with Reisch and Sunstein (2016), which explores European attitudes toward nudges in general; in this paper, we offer a much more detailed account of health nudges in particular.

Introduction

The Popularity of Nudges

Despite millions of euros and dollars spent by governments worldwide to combat obesity and steer individuals towards healthier lifestyles, global obesity rates have risen substantially over the last three decades, presenting a major public health problem in both the developed and developing world. Unhealthy diets now rank with alcohol and tobacco smoking as a global cause of preventable non-communicable diseases (Ng *et al*. 2013; WHO 2013). Particularly alarming is the fact that child overweight and obesity rates have doubled over the last 20 years (Reisch and Gwozdz 2016). Public health policy directed at countering this pandemic has included myriad health interventions using a multitude of instruments and policies, executed on all levels (individual, family, school, neighborhood, city, nation state). The outcomes, however, have been mixed (Bailey and Ross Harper 2015; Dobbs *et al.* 2014).

As a result, governments worldwide have become increasingly interested in innovative policy tools to curb the obesity crisis, including "nudges" in healthier directions, such as uses of information and communication technology (ICT), reminders, and feedback (e.g. Halpern 2016; Hawkes *et al*. 2015). These nudges are small yet relevant behavioral stimuli that steer individuals in certain directions without limiting their freedom of choice (Thaler and Sunstein 2008). The stimuli may include simplification of information and choices, framing and priming of messages, defaults, positioning of products in supermarkets and canteens, self-pledges, and multiple elements of purposeful choice architecture applied to physical or virtual contexts (e.g., Sunstein 2014).

One notable incident of mass nudging occurred in the summer of 2016, when a surprised public witnessed the virtual game Pokémon motivating a hard-to-reach target group of teenagers (and also playful adults) to move and walk through the parks and streets. The game did so by harnessing *homo ludens*' competitiveness and quest for fun, a little nudge that (at least for a while) did what years of education and information could not do. Although chances are high that this gamification nudge will soon

lose its attraction, it underscores the potential effects of behavioral stimuli other than regulation, financial incentives, and taxes.

In fact, an impressive amount of scientific evidence supports the potential effectiveness of nudges (see Sunstein and Reisch 2016, for an overview) in areas as diverse as health and wealth, poverty and development, and environment and climate change. Hence, both practitioners and governments across the globe are currently "testing-learning-adapting-sharing" their practical experiences with nudging strategies (BIT 2015; Sousa Lourenco *et al.* 2016; SBST 2016). Not only is nudging a low-cost intervention that can guide healthier lifestyle choices across the board without the need for restrictive regulation (Arno and Thomas 2016), but nudge-based policies have also led to an average 15.3% increase in healthier dietary or nutritional choices as measured by changes in healthy choice frequency or overall caloric consumption (ibid.). In light of the increasing empirical evidence, therefore, the question of whether behavioral economics can make our populations healthier (Loewenstein *et al*. 2012) can safely be answered in the affirmative. It remain true, of course, that some nudges can fail, or achieve less than their supporters hope, and that empirical work needs to be done to test the effectiveness of different kinds of nudges in different circumstances.

Despite broadening knowledge on how to design effective, efficient, acceptable, and sustainable nudges, critics of behaviorally based regulation protest that citizens, on principle, do not like to be "nudged" by their governments. A major objection is that nudges are manipulative and not transparent (as opposed to legal instruments or fiscal instruments). Another complaint is that paternalistic nudgers are themselves prone to biases and use heuristics; that is, the same behavioral anomalies that nudgers seek to either compensate for or harness may beset public officials (e.g., Schröder and Lyon 2013). It is possible, however, that these concerns can successfully be addressed by a well-designed "governance of good nudging" with administrative, procedural, and legitimation rules and in particular, with full transparency of the nudges and their aims (Sunstein 2016b). Even when made transparent, nudges have been found to be effective (e.g., Loewenstein *et al.* 2015; Bruns *et al*. 2016) and highlighting the non-conscious processes by which nudge interventions may work does not decrease their acceptability (Petrescu *et al.*

2016). The research also points to third-person effects (i.e., the belief that others are more easily manipulated by external influences than oneself) for nudge-type and incentive-based public policies, a finding that has implications for their popular support (Cornwell and Krantz 2014; but see Jung and Mellers 2016).

At least to appearances, however, the public debate on nudging seems more positive in the Anglo Saxon world (i.e., the UK, U.S., Australia) than in, for example, German-speaking countries, where prominent individuals and groups have seemed (and we emphasize that word) more critical of official use of behavioral science (i.e., a policy of experimenting, pilot testing, and thinking in feedback loops) and of the policy tools (the nudges) themselves. The ideological and philosophical issues underlying these objections are discussed elsewhere (see e.g., Blumenthal-Barby and Burroughs 2012; Sunstein 2016b), and we take an empirical approach here. To assess popular attitudes across Europe, we conducted representative online surveys in Denmark, France, Germany, Hungary, Italy, and the UK, asking respondents whether they approved or disapproved of a list of 15 nudges. These nudges covered a wide range of topics (including health, environment, donations, green energy) and represented different levels of intrusiveness from weak (e.g., educational campaigns against overeating) to strong (e.g., a default of one meat-free day per week in public canteens). Somewhat surprisingly, the responses identified a substantial consensus among disparate nations.

The simplest lesson we take from this observation is that if individuals believe that a nudge has legitimate goals and conforms to the interests or values of the majority, they are overwhelmingly likely to favor it. This finding also fits with other research evidence that individuals do not oppose nudges as such. Rather, their judgments usually depend on whether the particular nudge is likely to be well-motivated and have worthwhile consequences for most of those it affects (Reisch and Sunstein 2016). In this respect, polucymakers will often have a kind of permission slip from the public. Of course, public approval is not enough. Officials still have the challenging task of carefully weighing the costs and benefits of the respective nudges, of comparing their efficacy with other potential policy tools, and of fitting them into the larger policy toolbox (Gorski and Roberto 2015; Hawkes *et al*. 2015).

Nudging for Health

Because much of the individual and societal health burden is still caused by such modifiable behaviors as smoking, unhealthy food consumption, and sedentary lifestyles, governments worldwide are increasingly implementing health nudge interventions to steer individuals into healthier eating and, more generally, into healthier lifestyles (Bailey and Ross Harper 2015; Halpern 2016; Matjasko 2016; Wansink 2013). Such new tools are appealing because questions remains about the sufficiency of other tools, including required nutritional standards (e.g., salt content) and fiscal measures (fat or soft drink taxes), in promoting healthier lifestyles or halting the rise of obesity. Even isolated attempts at hard regulation (e.g., banning advertisements in children's TV programming) and voluntary self-regulation by industry (e.g., the EU Pledge) appear to have achieved less than their advocates hoped. Increasing research evidence suggests that a key to changing nutritional and activity patterns is the purposeful design of living and consumption environments – the so-called choice architecture or context (Bucher *et al*. 2016; Halpern 2016). Such architecture not only influences the amount of calorie intake (Wansink *et al*. 2009) but assists in the maintenance of healthier lifestyles once adopted (Kelly *et al.* 2016).

In fact, policymakers have achieved good results with different types of health nudges, including commitment contracts for smoking cessation (Giné *et al*. 2010) and temptation bundling (Milkman *et al.* 2014). Health communication can be improved by the priming and framing of key information (Wilson *et al.* 2016). All such research combines to provide mounting empirical evidence for the World Health Organization's mantra: "Make the healthier choice the easy choice" through easy access and broad availability and affordability.

As of now, over 150 governments worldwide enlist behavioral science, with particular emphasis on nudges (Ly and Soman 2013; Sunstein 2016a, Whitehead *et al.* 2014). For example, in 2010, the UK established a Behavioural Insights Team that has served as a model for many governments and now has an extensive track record in "nudging for health" (BIT 2015). In 2014, the U.S. created its own Social and Behavioral Sciences Team (SBST 2015). President Obama has formally embraced such approaches with

his 2015 Executive Order endorsing the use of behavioral science to improve public service provision (jncluding public health). In 2015, both Germany and Australia established their own behavioral science teams, with the latter making systematic use of behaviorally based policies in the health sector (Halpern 2016). The Netherlands and some Nordic countries have been systematically using behavior-based health policies for many years and evaluate these programs regularly. In all these countries, "nudging for health" is considered an attractive additional option in the health policy toolkit, one that promises to make health policies more effective, efficient, and acceptable.

This paper aims to provide deeper insights into the general acceptability and endorsement of health nudges among sociodemographically and politically defined population segments in six European nations. We begin by reviewing extant research on attitudes toward health nudges, which is not only scarce but limited to specific nudges and countries. We then outline our sampling and analysis method, survey instrument, types of nudges studied, key sociodemographic variables, and the political attitudes that may be relevant in explaining the findings for different countries. To measure the acceptability of the different health nudges in the six countries surveyed, we test several hypotheses using multilevel regression analysis. From these results, we extrapolate overall patterns, national characteristics, and the influence of political attitudes on social approval of health nudges, all with potential implications for research and policy.

Prior Studies

To date, a handful of valuable studies have employed interviews, surveys, experimental designs, or systematic evidence reviews to answer the question of whether the citizens of various nations endorse health nudges – and if yes, which ones. One such study of 952 individuals in Sweden and the U.S. found that strong majorities in both countries support nudges on smoking discouragement, smoking cessation, choice architecture for healthier canteens, and "traffic light" labeling of food items (Hagman *et al.* 2015). An earlier survey of 2,775 individuals in Canada and the U.S. showed that individuals are favorably

disposed to nudges that promote reflection and deliberation (System 2 nudges) and those that target or enlist more automatic processing (System 1 nudges) – but with stronger support for the former. The most comprehensive study to date, conducted in the U.S. (Jung and Mellers 2016), also finds broad support for a wide range of nudges, several involving public health. It similarly found that System 2 nudges targeting deliberative cognitive decision making are more popular than System 1 nudges targeting emotional and fast decision (Kahneman 2011). It further found, however, that certain personality characteristics (e.g., an empathetic tendency) seem to be associated with support for (certain) nudges, whereas others (e.g., individualistic or reactant tendencies) are associated with their rejection. In another U.S. study, Tannenbaum and colleagues (2015),found that if participants are told that certain nudges are supported by particular leaders or parties (including automatic enrollment for food stamp programs and safe sex education), their general views about nudging can be greatly affected, suggesting what they term a "partisan nudge bias." They find, in short, that most people do not approve or disapprove of nudging as such; they form their judgments on the basis of the particular political valence that they associate with nudges.

Particularly relevant for our study is a Dutch survey comparing individual health nudge attitudes in Germany, the Netherlands, France, Italy, Poland, Bulgaria, and the UK, which found broad approval in those countries for health nudge policies (Junghans *et al*. 2016). It also found that consumer approval is influenced by the perceived intrusiveness of the nudge, gender, and the source of the nudge mediated by the degree to which this source is trusted. Not surprisingly, overall levels of approval are higher when perceived intrusiveness is low and the source is more trusted. Also more highly approved are nudges implemented by experts and industry as opposed to policy makers. Approval does not seem associated, however, with consumer political orientation, although women approve nudge policies on average more than men do. Rather, according to a comparative overview of the acceptability of government interventions for health-related behaviors (Diepeveen *et al*. 2013), nudge policy approval varies as a function of three factors: the targeted behavior (with more support for smoking-related interventions), type of intervention (with most support for less intrusive interventions, those already implemented, and

those targeting children and young individuals), and individual respondent characteristics (with the highest support coming from those who do not engage in the targeted behavior, and women and older respondents more likely to endorse even more restrictive measures).

A qualitative interview study with UK consumers (Junghans *et al.* 2015) further indicated that most consumers approve of the concept if it is explained to them, especially in the realm of health behavior, especially if the nudges are understood to benefit individuals and society, and especially if consumers understand the decision-making context and the reasoning behind the promotion of the targeted behavior. Interestingly, these interviews revealed very little concern with the manipulative aspects of nudges. Nevertheless, Petrescu and colleagues (2016) showed that although consumers in both the UK and the U.S. find nudge interventions to reduce consumption of sugar-sweetened beverages more acceptable than taxation, they judge them less acceptable than education (which can be seen as a kind of nudge). Contrary to their predictions, however, these authors found no evidence that highlighting the non-conscious processes through which some nudge interventions may work decreases their acceptability, although highlighting the effectiveness of all interventions did seem to *increase* it.

The present study adds to this growing literature by using a representative sample from six European countries, including countries not covered in prior studies. These countries were selected to represent different cultural and geographic regions of Europe, as well as different socioeconomic regimes and political traditions. More specifically, the sample encompasses a Nordic welfare state (Denmark); a social market economy with a deep, historically grounded distrust of paternalism (Germany); a Central European post-socialist country (Hungary); two Southern European countries with different political regimes, problems, strengths, and experience with nudging (France and Italy); and the UK, the country that has spearheaded nudging as a policy tool worldwide.

Method

Sampling Procedure

Our nationally representative online surveys were administered to approximately 1,000 respondents each in Denmark, France, Germany, Hungary, and Italy and to about 2,000 respondents in the UK.[2] We assume almost full representativeness because the six nations' online populations nearly equal each country's full population and because we employed stratified quota samples. In five of the countries, the questionnaires were filled out as part of a CAWI (computer assisted Web interview) omnibus survey, which being unavailable in Hungary was replaced by a CAWI ad hoc survey. The questionnaire contained no screening questions and was administered to the entire sample of adult males and females aged according to the country-specific age range. No significant differences emerged between using unweighted and weighted data.

Survey Instrument

The survey questionnaire built on prior work in the U.S. (Sunstein 2016a), with some vignettes adjusted to the European setting. For example, two added items reflected issues recently debated in European politics: requiring supermarket chains to keep sweets (candies) away from cashier stations and requiring canteens in public institutions to have one meat-free day per week. The nine nudges related to health included different nudge types, targeting either automatic System 1 or deliberative System 2, and reflected five different levels of intrusion: educative nudges (e.g., information campaigns), mandated information nudges (e.g., labels and warnings), defaults and choice architecture, choice editing, and manipulative stimuli (subliminal advertising). Once developed, the fully structured questionnaire with randomized questions was translated into the respective languages using the final English (UK) version as the blueprint. It was then back translated by native speakers in our research group who were knowledgeable about the concept and applications of nudging. In the Danish and Hungarian

[2] For more details on the overall survey methodology, see Reisch and Sunstein (2016).

questionnaires, as well as that for the UK, the currencies were adapted as follows: euros were replaced by the equivalent amount in Danish kroner, Hungarian forints, and British pounds. The questionnaires were then copy-tested in the six countries between June and August 2015.

The final survey was conducted online by GFK (*Gesellschaft für Konsumforschung*), a large international market research organization with operations in all survey countries, which assumed that respondents in all countries were widely, and similarly, familiar with online surveys. During survey administration, each item was shown on a single screen, and respondents were required to follow the questions in the given order and wording. Approval was measured by the following question "Do you approve or disapprove of the following hypothetical policy?" with two possible answers, "approve" or "disapprove" displayed in an adjacent column. In all six countries, this field phase took place during the first two weeks of September 2015.

Nudges

The nine health nudges can be grouped as follows in terms of increasing intrusiveness: (1) purely governmental campaigns to educate individuals (e.g., about childhood obesity, smoking, or overeating); (2) mandatory information nudges, imposed by the government on the private sector, requiring disclosure of nutritional value and health risks of food (e.g., calorie labels, high salt level warnings, nutritional traffic lights); (3) mandatory defaults and choice architecture for retailers to support healthy foods (sweet-free cashier zones; placement of healthy goods); (4) mandatory choice editing that goes beyond mere nudging (e.g., meat-free days in public cafeterias); and (5) mandatory subliminal advertising, imposed by government on movie theaters, to discourage individuals from smoking and overeating. The mean approval ratings for these five intervention groups are reported as percentages in Table 1.

Table 1: Approval of the nine health nudges in the countries surveyed

	IT	UK	FR	DE	HU	DK
I - Public education messages						
To reduce childhood obesity, the national government adopts a public education campaign, consisting of information that parents can use to make healthier choices for their children.	89	88	89	90	82	82
The federal government requires movie theaters to run public education messages designed to discourage individuals from smoking and overeating.	77	67	66	63	40	35
II – Mandated information nudges						
The federal government requires calorie labels at chain restaurants (such as McDonald's and Burger King)	86	85	85	84	74	63
The federal government requires labels on products that have unusually high levels of salt; for example, "This product has been found to contain unusually high levels of salt, which may be harmful to your health"	83	88	90	73	69	69
The federal government requires a "traffic light" system for food by which healthy foods would be sold with a small green label, unhealthy foods with a small red label, and foods that are neither especially healthy nor especially unhealthy with a small yellow label	77	86	74	79	62	52
III – Defaults rules and choice architecture						
A state law requires all large grocery stores to place their most healthy foods in a prominent, visible location.	78	74	85	63	59	48

To halt the rising obesity problem, the federal government requires large supermarket chains to keep cashier areas free of sweets	54	82	75	69	44	57
IV – Choice editing						
For reasons of public health and climate protection, the federal government requires canteens in public institutions (e.g., schools, public administration offices) to have one meat-free day per week	72	52	62	55	46	30
V – Subliminal advertising						
The federal government requires movie theaters to provide subliminal advertisements (i.e., advertisements that go by so quickly that individuals are not consciously aware of them) designed to discourage individuals from smoking and overeating	54	49	40	42	37	25

Note: Total support in percentages; unweighted results.

Sociodemographic Variables and Political Preference

Although the survey collected data on several sociodemographic variables in all six countries, the limited comparability of region, income, education, and work status coupled with the complexity of running comparative analysis using our chosen statistical tool make a full cross-country comparison infeasible. We therefore report comparative results for only two robust sociodemographic variables: age (coded in 12 categories from 1 “16-19 years” to 12 “>70 years”) and gender (a dummy coded as 0 “female,” 1 “male”). We also report political preference, measured by asking “In the last national election, which party did you vote for?” and clustered by political party into conservative, left-wing, liberal, green, populist, and other (Reisch and Sunstein 2016).

Statistical Analysis

In a first step, we test for national differences in nudge approval rates (calculated as the mean score for all nine nudges) by running descriptive analyses, including ANOVA, over all countries. We then focus on the main analytic outcome, the approval/disapproval frequencies for individual health nudges by country shown above in Table 1. In a next step, we check for significant differences in approval rates dependent on sociodemographic variables and political preferences within countries. Because the data have a nested structure, we run a multilevel logistic regression analysis with the specification of a two-level random intercept model in which the first level is country and the second is individual respondent. In samples such as ours, individual observations are generally not independent because individuals within one country tend to be more similar to each other than across countries. We therefore estimate the multilevel regression for each of the five intrusion-level groups (from weak to strong) with approval rates as the dependent variable, and age, gender, and political attitude on the individual and country levels as the independent variables.

Results

Approval of the Nine Health Nudges

Comparing the approval of health nudges by country shows that, on average, approval is quite high: around 74% in Italy, UK, and France, followed by 69% in Germany, and 57% and 51% in Hungary and Denmark, respectively. An ANOVA confirms significant intercountry differences (F = 173.15, $p \leq .000$): although Italy, the UK, and France barely differ, Germany differs significantly from all other countries, as do Hungary and Denmark (see Figure 1). (Note, however, that contrary to perception in some circles, Germany shows strong majority support for health nudges, and is significantly more supportive than Hungary and Denmark.)

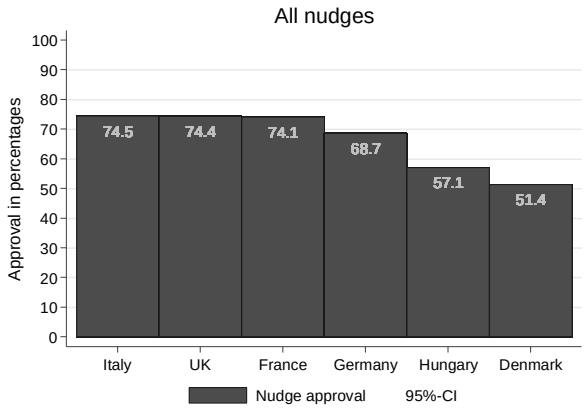

Figure 1: Average approval ratings for the nine health nudges (all countries).

Public education messages

The seemingly least intrusive of the nudges (in that they involve mere information provision by the government) are (1) public education campaigns to reduce childhood obesity and (2) similar campaigns in movie theaters to discourage individuals from smoking and overeating. Both these interventions received overwhelming support in all six nations (see Figure 2). Approval of the least intrusive (1) is univocal and very high in all countries (90.1%), which is hardly surprising given the mildness of the intervention and the fact that governments worldwide have spent decades implementing campaigns targeted at educating parents on healthier food and lifestyles. The second nudge (2) involving movie theatres and targeting overeating and smoking, however, received far less approval (63.3% overall), with Hungary and Denmark particularly showing approval rates markedly below those of the other nations.

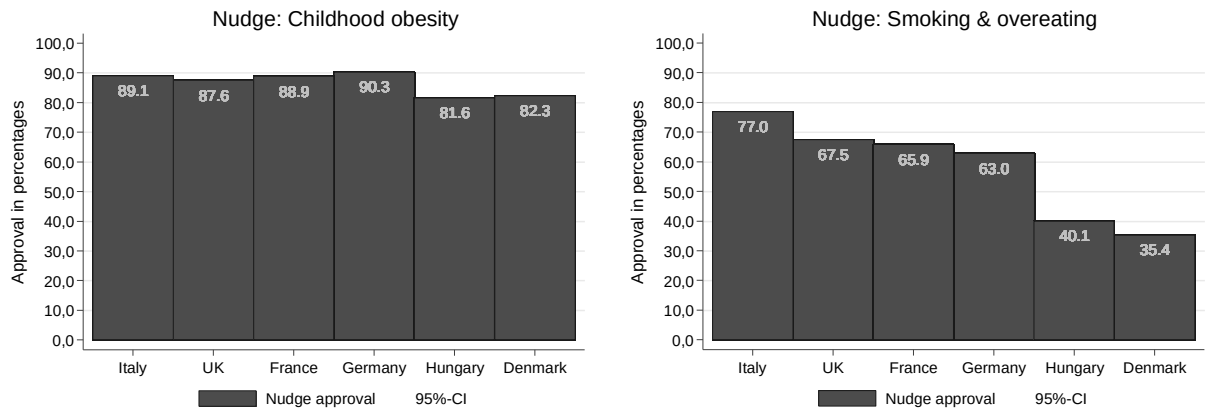

Figure 2: Public education messages: total support in % (unweighted).

Mandated information nudges

Three informational nudges designed to promote healthy eating took the form of mandates on the private sector: (3) calorie labels, (4) salt labels (for products with particularly high levels), and (5) a "traffic light" system" for more or less healthy food. Because such nudges require action by private institutions, they might seem more intrusive than governmental education campaigns, but on average, all three earned majority support in all countries, with approval rates of 83.2% for calorie labels, 72.1% for salt labels, and 78.3% for "traffic light" labels (see Figure 3). The latter particularly is surprising given that the political debate in many EU countries and within the European Parliament has shown considerable skepticism about such labeling, likely fueled by fierce opposition from the food industry lobby,

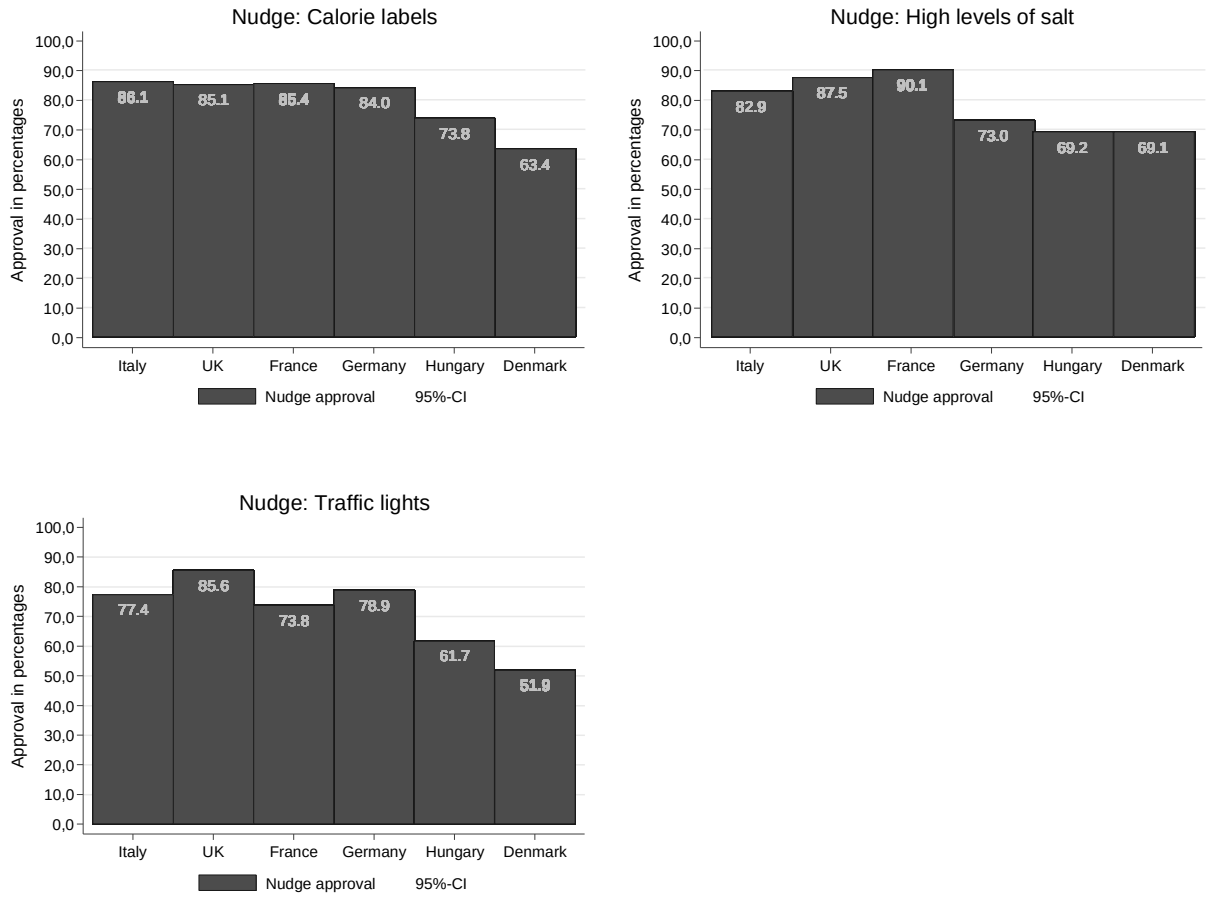

Figure 3: Governmentally mandated information nudges (labels): total support in % (unweighted).

Default rules and choice architecture

Default rules are often the most prominent and effective nudges; they tend to "stick" (primarily as a result of inertia or the informational signal that they contain) across diverse cultures and domains. We asked respondents about requiring large grocery stores to place healthy foods in a prominent, accessible location and keep cashier stations free from sweets (Figure 4). Both these nudges are currently being retailer tested in some EU countries, partly in an effort to avoid harsher regulation through voluntary action. Approval rates are quite high for both health defaults: 61.6% for healthy food placement and 68.8% for sweet-free cashier zones in supermarket, but again with lower approval in Hungary and Denmark. The second proposal -- for sweet-free cashier zones to avoid pestering by children and impulse buying by adults -- has

been controversial in European politics, which is hardly surprising given the fact that sweets are one of the product categories with the highest margin for retailers. Nevertheless, some retailers are now experimenting with sweet-free cashier stations, thereby offering individuals (including parents) a choice. Italy is a relative outlier on this issue, with approval levels similar to those in Hungary and Denmark.

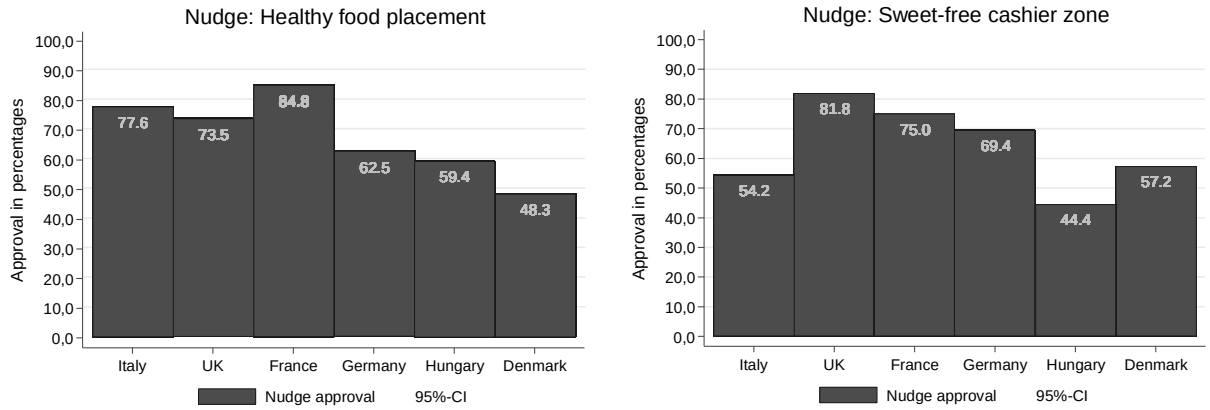

Figure 4: Default rules and choice architecture in supermarkets: total support in % (unweighted).

Choice editing

Because choice editing eliminates choice in a particular setting, it can be regarded as quite intrusive. For example, the relatively strong government intervention requiring meat-free days in public institution cafeterias (which goes beyond a nudge) has given rise to heated debates in Germany. Nevertheless, as Figure 5 shows, a majority of individuals (55.3%) in all but the two outlier countries (Hungary, Denmark) approved of this intervention.

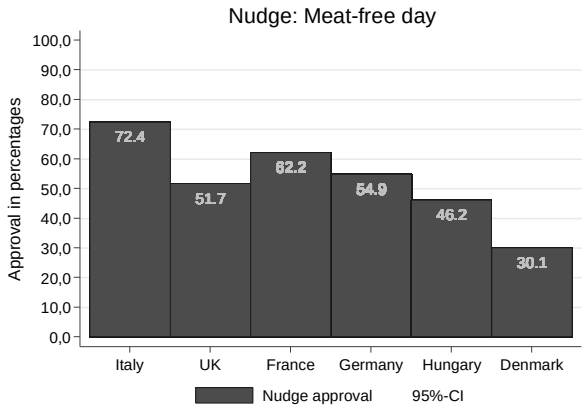

Figure 5: Choice editing of a meat-free day: total support in % (unweighted).

Subliminal advertising

Finally, we asked respondents about a nudge that might be expected to be widely rejected as a defining example of manipulation: compulsory subliminal advertising in movie theaters, designed to discourage smoking and overeating. This nudge was indeed widely opposed with an average approval rate of 42.5%, except for the puzzling phenomenon of majority or near-majority support in Italy and the UK (see Figure 6).

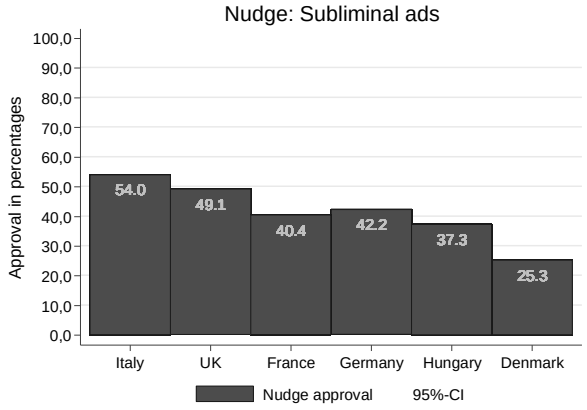

Figure 6: Subliminal advertisements: total support in % (unweighted).

Multilevel regression analysis

As previously explained, we estimate the multilevel regressions for the nine health nudges grouped into five levels of intrusion (from weak to strong) using approval rates as the dependent variable, and age, gender, and political attitudes on the individual and country levels as independent variables. We find broad support for most of the nine nudges notwithstanding certain striking differences across the six countries (as shown in Figures 1-6). We also test for approval differences across demographic categories and among groups with different political preferences within countries or groups of countries.

In this analysis (see Table 2), *Country* explains between 3 and 11% of nudge approval, dependent on the nudge: the stronger the intrusiveness (from 3.2% to 9.1%), the more important the country effects and thus the more variance in nudge approval they explain. The one exception is the low-intrusive Nudge 2, the "public education campaign in cinemas on smoking and overeating," for which 11.4% of the variance is explained by country. *Gender effects* follow the previously observed pattern: males generally show lower approval rates than females -- for example, OR=.875 for high salt level and OR=.585 for healthy food placement (but no difference for the Nudge 2 campaign against smoking and overeating). Women are also notably more positive on choice editing in supermarkets, subliminal advertising, sweet-free cashier zones, and a meat-free day. *Age effects*, on the other hand, are not univocal and vary among nudges: the older the respondent, the lower the approval for subliminal ads, calorie labels, and a meat-free day but the higher the approval for childhood obesity education, salt labels, and sweet-free cashier zones (but with no age differences for other nudges). We thus note a slight linear trend of increasing approval with higher age.

Table 2: Estimates of demographics and political attitude on health nudge approval: multilevel logistic regression analysis

	I		II			III		IV	V
	Public education messages		Mandated information rules			Default rules and choice architecture		Choice editing	Subliminal advertising
	Childhood obesity	Smoking & overeating	Calorie labels	High levels of salt	Traffic lights	Healthy food placement	Sweet-free cashier zone	Meat-free day	Subliminal ads
Demographics									
Male (dummy)	.784***	.969	.821**	.875*	.782***	.585***	.728***	.683***	.800***
	[.681,.903]	[.876,1.072]	[.727,.928]	[.775,.988]	[.699,.874]	[.526,.650]	[.655,.809]	[.619,.754]	[.725,.882]
Age (12 categories)	1.034**	1.004	.967**	1.043***	1.012	1.014	1.063***	.951***	.976**
	[1.010,1.058]	[.987,1.021]	[.948,.987]	[1.022,1.063]	[.993,1.030]	[.997,1.032]	[1.044,1.082]	[.936,.967]	[.960,.992]
Political preference									
Conservative	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*	*ref.*
Left-wing	.908	.912	.962	.852	1.048	1.061	.977	1.148	.744***
	[.732,1.126]	[.786,1.060]	[.795,1.165]	[.702,1.034]	[.881,1.247]	[.906,1.242]	[.832,1.148]	[.994,1.326]	[.645,.857]
Liberal	1.176	.705**	.662**	.481***	.803	.581***	.773*	.712**	.548***
	[.830,1.667]	[.554,.898]	[.506,.868]	[.367,.629]	[.618,1.043]	[.457,.739]	[.601,.993]	[.557,.911]	[.428,.702]
Green	1.477*	.839	.790	.945	.894	.967	1.036	1.653***	.412***
	[1.026,2.126]	[.669,1.053]	[.602,1.037]	[.715,1.249]	[.696,1.148]	[.765,1.223]	[.815,1.317]	[1.316,2.076]	[.324,.523]
Populist & others	.681**	.722***	.682***	.644***	.727**	.929	.801*	.795**	.734***
	[.538,.861]	[.609,.857]	[.552,.843]	[.520,.799]	[.600,.880]	[.775,1.113]	[.669,.959]	[.675,.938]	[.625,.863]

Don't know/Didn't vote	.709** [.571,.880]	.690*** [.591,.804]	.616*** [.509,.746]	.669*** [.553,.809]	.690*** [.581,.819]	.894 [.760,1.052]	.805** [.685,.946]	.836* [.720,.971]	.715*** [.617,.829]
Country effects (ICC)	.032 (.019)	.114 (.059)	.062 (.035)	.083 (.025)	.088 (.047)	.091 (.049)	.086 (.046)	.091 (.048)	.036 (.021)
Obs.	7,079	7,079	7,079	7,079	7,079	7,079	7,079	7,079	7,079
Wald X^2 (*p*-value)	48.01 (.000)	33.71 (.000)	53.53 (.000)	70.73 (.000)	53.55 (.000)	126.86 (.000)	97.39 (.000)	157.79 (.000)	87.93 (.000)

Notes: The dependent variables are the approval rates for the nine nudges (0–1) sorted by intrusiveness level. Age is measured in 12 categories from 1 "14-19 years" to 12 "≥70 years." Gender is a dummy variable for which 1 = male. For political preference, conservative is the reference group. Country effects are the intracorrelation coefficients (ICCs). Interpretation of the odds ratios: <1 negative effect, >1 positive effect (e.g., a score of OR=1.477* for Green Party voters on the childhood obesity nudge means that the odds of a Green approving the nudge are 1.477 higher than a th odds of a conservative approving the nudge). Standard errors are in parentheses. * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

Finally, *Political preference* is discernible but varies by nudge. In general, all other groups approve nudges less than conservatives, although not statistically significantly so in all cases. (We emphasize that this is a report on particular nudges tested; it would be easy to find nudges for which conservatives would show higher levels of approval than other groups.) There are exceptions, however: Greens approve the meat-free day more than conservatives (OR = 1.65) but only differ from conservatives in this one aspect (e.g., their approval of subliminal ads is OR = .41). Left-wing voters also have quite similar approval rates to conservatives, but populists and liberals have generally lower approval rates than conservatives. The meat-free day is particularly disapproved by liberal voters but approved by Greens. Interestingly, the group that did not remember or did not vote shows comparably low approval of most health nudges.

Discussion

Considering all health nudges across all countries, we find majority approval for almost all the interventions with the expected gradient along intrusion level. (The only exception is subliminal advertising.) These findings echo previous evidence that health nudges typically majority approval (see the Prior Studies section). As in all comparable studies, women approve more of all the health nudges, which might be partly explained by their being generally more health conscious (Beadsworth *et al.* 2002). Females are also more often vegetarians or vegans, or eat less meat, and so might welcome additional policies that promote meat-reduced diets. The public education campaigns in cinemas against smoking and overeating are notably unpopular in Denmark (40%) and Hungary (34%) yet very popular in Italy (77%), possibly because of the different smoking prevalence – and thus different reactive mechanisms – in these respective countries. Indeed, according to smoking statistics, Hungary and Denmark have a comparably high prevalence of men who smoke, ranking highest within our six countries.[3] France and the UK, on the other hand, show a higher acceptance of the salt label nudge than Hungary, Denmark, and

[3] See http://www.tobaccoatlas.org/country-data/: In all statistics, Hungary stands out as heavy smoking country, and Denmark is in the upper middle field in Europe.

Germany, which might reflect the then-recent campaign against eating too much salt in both countries. Salt consumption has been targeted particularly in Hungary, with a tax on salty snacks and a tight regime regarding salt content on labels and in recipes (Trieu *et al.* 2015). UK respondents also show a higher approval for the positioning of sweets in retail: 80% in contrast to only 44% in Hungary. One reason might be that the UK has the highest obesity rate in our EU country sample, and some retailers (e.g. Tesco, Lidl) are already testing sweet-free cashier zones, meaning that shoppers have prior experience of this nudge.

The greatest intercountry differences are for the meat-free day in public institution cafeterias, with approval rates ranging from 72% of Italians to only 30% of Danes. Given that Denmark has one of the highest meat consumption rates (kg per capita) worldwide, this finding is hardly surprising. Italy, on the other hand, is in the same consumption category as Germany and the UK: still high but markedly lower than Denmark.[4] A major difference is also observable for "placing most healthy foods in a prominent location in supermarkets," with an 84% approval rate in France compared to only 47% in Denmark. For this finding, we can only speculate that the traditionally food quality-oriented French consumers welcome the promotion of vegetables, fruits, and other healthier options. Nevertheless, the traditionally price sensitive Danes are also health-conscious today, and even most discounters have begun focusing on quality and freshness, not simply price.[5]

We caution that our methodology is subject to certain limitations. First, although the online populations in the selected countries are close to the real populations, the omnibus survey sample is not fully representative, and online population effects may be possible in countries whose Internet access is markedly lower; for example, Italy at 59% and Hungary at 76% versus Denmark at 95% and the UK at 90% (Nielsen 2015). In addition, omnibus surveys are always subject to framing effects because of the questions asked before the target items. Although we did check for possible framing effects ex post and

[4] Food and Agriculture Organization of the United Nations (FAO), FAOSTAT on-line statistical service (FAO, Rome, 2004). Available online at: http://apps.fao.org ; http://chartsbin.com/view/12730

5 http://www.euromonitor.com/health-and-wellness-in-denmark/report; http://www.euromonitor.com/health-and-wellness-in-france/report

found no obvious influential themes, we could not prevent them ex ante. Also, the assignment of political preference and clustering of political parties are admittedly rough measures, precluding strong conclusions. Finally, we acknowledge measurement issues with the sociodemographic variables other than gender and age that do limit result comparability between nations. For this reason, they are reported only in upcoming country studies and not in this paper.

Conclusions

This study explores national differences and conditions for consumer approval of nudging healthy eating behavior. It thus provides practical information, potentially relevant to policy makers, about which health nudges might be adopted with high levels of public approval in the respective countries or even on a European level. The largest lesson is that strong majorities generally approve of nudging for health, possibly because they recognize that people lack the self-control and discipline to stick to healthier eating plans (a weakness leveraged by an entire sector – the dieting industry). As a result, they view soft nudges as benign assistance rather than malicious tricks.

For researchers, it would be interesting to follow approval ratings over time and replicate the same study in a European setting that has witnessed dramatic changes since our investigation, including a worsening refugee crisis, further terrorist attacks, and Brexit. The theoretical foundation of behavior-based regulation might also be advanced by examining such cultural characteristics as collectivism and individualism in different societies (Hofstede 2001) or investigating whether and how identifiable ideologies or values (Schwartz 2012) systematically affect (dis)approval. Two new areas of research that deserve closer investigation are ICT-based health nudges (e.g., wearables and applications) and "big data health nudging" based on artificial intelligence. It would also be valuable to extend the country set beyond the U.S. and Europe to include nation states in Asia, Africa, Australia, and South America. Global health politics[6] is increasingly testing new behavioral tools – for example, defaults, framing, and choice

6 See Chapter 8 of *World Bank Report 2015*, available at http://www.worldbank.org/en/publication/wdr2015

architecture – and extending the traditional policy toolbox of hard regulation and financial incentives. Both private and public organizations are likely to be interested in more evidence about acceptance rates, potential target groups, and culturally specific opportunities for nudging for health.

References

Arno, Anneliese and Steve Thomas (2016), "The Efficacy of Nudge Theory Strategies in Influencing Adult Dietary Behaviour: A Systematic Review and Meta-analysis," *BMC Public Health*, 16, 676 DOI 10.1186/s12889-016-3272-x.

Bailey, Rob and David Ross Harper (2015, May), "Reviewing Interventions for Healthy and Sustainable Diets," research paper, the Energy, Environment and Resources Department and Centre on Global Health Security at Chatham House, London.

Beadsworth, Alan, Alan Brynan, Teresa Keil, Jacky Goode, Cheryl Haslam, and Emma Lancashire (2002), "Women, Men, and Food: The Significance of Gender for Nutritional Attitudes and Choices," *British Food Journal*, 104, 470–91.

Behavioural Insights Team [BIT], in partnership with the UK Cabinet Office (2015), *The Behavioural Insights Team Update Report 2013–2015*. Retrieved from: http://38r8om2xjhhl25mw24492dir.wpengine.netdna-cdn.com/wp-content/uploads/2015/08/BIT_Update-Report-Final-2013-2015.pdf

Blumenthal-Barby, Jennifer S. and Hadley Burroughs (2012), "Seeking Better Health Care Outcomes: The Ethics of Using the 'Nudge,'" *American Journal of Bioethics*, 12(2), 1–10.

Bruns, Hendrik, Elena Kantorowicz-Reznichenko, Katharina Klement, and Marijane Luistro Jonsson (2016), "Can Nudges Be Transparent and Yet Effective?", available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2816227.

Bucher, Tamara, Clare Collins, Megan E. Rollo, Tracy A. McCaffrey, Nienke De Vlieger, Daphne Van der Bend, Helen Truby, and Federico J.A. Perez-Cueto (2016), "Nudging Consumers Towards Healthier Choices: A Systematic Review of Positional Influences on Food Choice," *British Journal of Nutrition*, 115, 2252–63, doi:10.1017.

Cornwell, James F.M. and David H. Krantz (2014), "Public Policy for Thee, but Not for Me: Varying the Grammatical Person of Public Policy Justifications Influences their Support," *Judgment and Decision Making*, 9, 433–44.

Diepeveen, Stephanie, Tom Ling, Marc Suhrcke, Martin Roland, and Theresa M. Marteau (2013), "Public Acceptability of Government Intervention to Change Health-Related Behaviours: A Systematic Review and Narrative Analysis," *BMC Public Health*, 13, 756. DOI**:** 10.1186/1471-2458-13-756.

Dobbs, Richard, Corinne Sawers, Fraser Thompson, James Manyika, Jonathan Woetzel, Peter Child, Sorcha McKenna, and Angela Spatharou (2014), "Overcoming Obesity: An Initial Economic Analysis," Discussion Paper, McKinsey Global Institute.

Felsen, Gidon, Noah Castelo, and Peter B. Reiner (2013), "Decisional Enhancement and Autonomy: Public Attitudes Towards Overt and Covert Nudges," *Judgment and Decision Making*, 8(3), 202–13.

Giné, Xavier, Dean Karlan, and Jonathan Zinman (2010), "Put Your Money Where Your Butt Is: A Commitment Contract for Smoking Cessation," *American Economic Journal: Applied Economics 2* (October 2010), 213–35. http://www.aeaweb.org/articles.php?doi=10.1257/app.2.4.213

Gorski, Mary T. and Christina A. Roberto (2015), "Public Health Policies to Encourage Healthy Eating Habits: Recent Perspectives," *Journal of Healthcare Leadership*, 7, 81–90.

Hagman, William, David Andersson, Daniel Västfjäll, and Gustav Tinghög (2015), "Public Views on Policies Involving Nudges," *Review of Philosophy and Psychology*, 6(3), 439–53.

Halpern, David (2015), *Inside the Nudge Unit: How Small Changes Can Make a Big Difference*, London: WH Allen.

Halpern, David (2016), *Behavioural Insights and Healthier Lives*, Melbourne: Victorian Health Promotion Foundation.

Hawkes, Corinna, Trenton G. Smith, Jo Jewell, Jane Wardle, Ross A. Hammond, Sharon Friel, Anne Marie Thow, and Juliana Kain (2015), "Smart Food Policies for Obesity Prevention," *Lancet*, 385, 2410–21.

Hofstede, Geert (2001), *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations across Nations*, 2nd ed., Thousand Oaks, CA: Sage.

Jung, Janice Y. and Barbara A. Mellers (2016), "American Attitudes Toward Nudges," *Judgment and Decision Making,* 11(1), 62–74.

Junghans, Astrid F., Tracy T.L. Cheung, and Denise D. T. De Ridder (2015), "Under Consumers' Scrutiny: An Investigation into Consumers' Attitudes and Concerns about Nudging in the Realm of Health Behaviour," *BMC Public Health*, 15, 336. DOI: 10.1186/s12889-015-1691-8.

Junghans Astrid F., David Marchiori, and Denise T. D. De Ridder (2016), "The Who and How of Nudging: Cross-national Perspectives on Consumer Approval in Eating Behaviour," Unpublished Manuscript,Utrecht University.

Kahneman, Daniel (2011), *Thinking, Fast and Slow*, New York: Farrar, Strauss, and Giroux.

Kelly, Sarah, Steven Martin, Isla Kuhn, Andy Cowan, Carol Brayne, and Louise Lafortune (2016), "Barriers and Facilitators to the Uptake and Maintenance of Healthy Behaviours by Individuals at Mid-Life: A Rapid Systematic Review," *PLoS ONE*, 11(1): e0145074. doi:10.1371/journal. pone.0145074

Loewenstein, George, David A. Asch, J. Y. Friedman, L. A. Melichar, and Kevin G. Volpp (2012), "Can Behavioural Economics Make us Healthier?" *BMJ*, 344, e3482.

Loewenstein George, Cindy Bryce, David Hagmann, and Sachin Rajpal (2015), "Warning: You Are About To Be Nudged," *Behavioral Science and Policy,* 1(1), 35–42.

Ly, Kim and Dilip Soman (2013), "Nudging Around the World" (Research Report Series). Retrieved from the Rotman School of Management, University of Toronto web site: http://inside.rotman.utoronto.ca/behaviouraleconomicsinaction/files/2013/12/Nudging-Around-The-World_Sep2013.pdf.

Matjasko, Jennifer L., John H. Cawley, Madeleine M. Baker-Goering, and David V. Yokum (2016), "Applying Behavioral Economics to Public Health Policy: Illustrative Examples and Promising Directions," *American Journal of Preventive Medicine,* 50(5S1), S13–S19.

Milkman, K, J Minson, and KG Volpp (2014), "Holding the Hunger Games Hostage at the Gym: An Evaluation of Temptation Bundling," *Management Science*, 60(2), 283–99.

Ng, Marie, Tom Fleming, Margaret Robinson, Blake Thomson, Nicholas Graetz *et al*. (2014), "Global, Regional, and National Prevalence of Overweight and Obesity in Children and Adults During 1980-2013: A Systematic Analysis for the Global Burden of Disease Study 2013," *The Lancet*, 384, 766–81. doi: 10.1016/S0140-6736(14)60460-8.

Nielsen (2015), *Nielsen Global Health & Wellness Survey*, New York: Nielsen.

Obama, Barack (2015), *Using Behavioral Science Insights to Better Serve the American Individuals* (Executive Order 13707), Washington, DC: The White House. Retrieved from the White House: https://www.whitehouse.gov/the-press-office/2015/09/15/executive-order-using-behavioral-science-insights-better-serve-american

Petrescu, Dragos C., Gareth J. Hollands, Dominique-Laurent Couturier, Yin Lam Ng, and Theresa M. Marteau (2016), "Public Acceptability in the UK and USA of Nudging to Reduce Obesity: The Example of Reducing Sugar-Sweetened Beverages Consumption," *PLoS ONE*, 11(6), e0155995. doi:10.1371/journal.pone.0155995.

Reisch, Lucia A. and Wencke Gwozdz (2016), "Consumer Policy, Childhood Obesity and Sustainable Development," in *Children's Rights in International Sustainable Development Law*, ed. Claire Fenton-Glynn, Cambridge (UK): Cambridge University Press (forthcoming).

Reisch Lucia A. and Cass R. Sunstein (2016), "Do Europeans Like Nudges?" *Judgment and Decision Making*, 1(4), 310–25.

Schröder, Monica and Phil Lyon (2013), "Embedding Healthy Eating: Nudging or Toolbox?" *Nutrition & Food Science*, 43(4), 330–8.

Schwartz, Shalom H. (2012), "An Overview of the Schwartz Theory of Basic Values," *Online Readings in Psychology and Culture*, 2, 1–20.

Social and Behavioral Sciences Team [SBST] (2015), *Annual Report, 2015,* National Science and Technology Council, Executive Office of the President, Washington, DC. Retrieved from: https://sbst.gov/assets/files/2015-annual-report.pdf

Sousa Lourenco, Joana, Emanuele Ciriolo, Sara Rafael Rodrigues Vieira de Almeida, and Xavier Troussard (2016), "Behavioural Insights Applied to Policy," Report No. EUR 27726 EN, Joint Research Centre (JRC), Brussels.

Sunstein, Cass R. (2014), "Nudging: A Very Short Guide," *Journal of Consumer Policy,* 37, 583–8.

Sunstein, Cass R. (2016a), "The Council of Psychological Advisers," *Annual Review of Psychology,* 67, 713–37.

Sunstein, Cass R. (2016b), "Fifty Shades of Manipulation," *Journal of Marketing Behavior,* 1(3–4), 213–44.

Sunstein, Cass R. (2016a), "Do Individuals Like Nudges?" *Administrative Law Review* (forthcoming).

Sunstein, Cass R. (2016b), *The Ethics of Influence: Government in the Age of Behavioural Science*. New York, NY: Cambridge University Press (forthcoming).

Sunstein, Cass R. (2016c), "Individuals Prefer System 2 Nudges (Kind of)," *Duke Law Journal,* 66 (forthcoming).

Sunstein, Cass R. and Lucia A. Reisch (eds.) (2016), *The Economics of Nudge*. London: Routledge (forthcoming).

Tannenbaum, David, Craig R. Fox, and Todd Rogers (2014), *On the Misplaced Politics of Behavioral Policy Interventions* (Working Paper), retrieved from the University of Chicago web site: http://home.uchicago.edu/davetannenbaum/documents/partisan%20nudge%20bias.pdf.

Thaler, Richard H. and Cass R. Sunstein (2008), *Nudge: Improving Decisions about Health, Wealth, and Happiness,* New Haven, CT: Yale University Press.

Trieu, Kathy, Bruce Neal, Corinna Hawkes, Elizabeth Dunford, Norm Campbell, Rodrigo Rodriguez-Fernandez, Branca Legetic, Lindsay McLaren, Amanda Barberio, and Jacqui Webster (2015),

"Salt Reduction Initiatives Around the World: A Systematic Review of Progress Towards the Global Target," *PLoS One*, 10, e0130247. doi: 10.1371/journal.pone.0130247.

Wansink, Brian (2013). *Slim By Design: Mindless Eating Solutions for Everyday Life*, New York: Harper Collins.

Wansink, Brian, David R. Just, and Collin R. Payne (2009), "Mindless Eating and Healthy Heuristics for the Irrational," *American Economic Review*, 99(2), 165–9; Papers and Proceedings of the 121st Meeting of the American Economic Association (May, 2009).

Whitehead, Mark, Rhys Jones, R Howell, R Lilley, and Jessica Pykett (2014), "Nudging All Over the World," ESRC Report, Economic and Social Research Council, Swindon and Edinburgh.

Wilson, Amy L., Elisabeth Buckley, Jonathan D. Buckley, and Svetlana Bogomolova (2016), "Nudging Healthier Food and Beverage Choices Through Salience and Priming. Evidence from a Systematic Review," *Food Quality and Preference*, doi: http://dx.doi.org/10.1016/j.foodqual.2016.02.009.

World Health Organisation [WHO] (ed.) (2013), *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020,* Geneva: World Health Organisation. Retrieved from: www.who.int/nmh/events/ncd_action_plan/en/

Funding

This study was supported by grants from the Governing Responsible Business Research Environment at Copenhagen Business School (Denmark). The research was conducted independently of the funders, and the views expressed in this paper are those of the authors and not necessarily those of the funders.