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TRUSTING NUDGES?
LESSONS FROM AN INTERNATIONAL SURVEY

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Abstract

In the past decade, policymakers have increasingly used behaviourally informed policies, including "nudges," to produce desirable social outcomes. But do people actually endorse those policies? This study reports on nationally representative surveys in five countries (Belgium, Denmark, Germany, South Korea, and the US) carried out in 2018. We investigate whether people in these countries approve of a list of 15 nudges regarding health, the environment, and safety issues. A particular focus is whether trust in public institutions is a potential mediator of approval. The study confirms this correlation. We also find strong majority support of all nudges in the five countries. Our findings in general, and about trust in particular, suggest the importance not only of ensuring that behaviourally informed policies are effective, but also of developing them transparently and openly, and with an opportunity for members of the public to engage and to express their concerns.

Keywords: behaviourally public policy, choice architecture, nudge, public approval, trust, online representative survey

Introduction

Background

In the past decade, choice architecture and behaviourally informed policies – including "nudges" (Thaler and Sunstein 2008) – have become a pervasive approach to public policy (Szaszi *et al.* 2017). To an increasing degree, governments are embracing nudges as a way of addressing a wide range of policy challenges. This holds true for policies covering a wide array of consumer decisions such as healthy food choices (Bauer and Reisch 2018), quitting smoking (Halpern *et al.* 2015), drinking alcohol (Brooks 2015), overeating (Arno and Thomas 2016), and organ donation (Rockloff and Hanley 2013), as well as environmentally relevant decisions such as switching to green energy (Sunstein and Reisch 2015). Nudging has also been applied to influence decisions of patients (e.g., uptake of vaccinations), commuters (e.g., using public or active transport), employees (e.g., pension plans) as well as citizens (e.g., voter turnout, uptake of higher education).[1] The domain of health may be the most studied to date,[2] followed by behavioural interventions to support more sustainable choices (Szaszi *et al.* 2017).

There is mounting evidence that these behavioural policies tend to be quite effective. One study of the relative effectiveness of such instruments (Bernartzi *et al.* 2017) found that the impact-to-cost ratio of various nudges is significantly higher than the ratio for traditional policies (such as monetary incentives). At the same time, the effectiveness of nudges is not the only issue relevant to whether they will be, or even should be, implemented in practice; we also need to know whether members of the public (and public officials) will endorse such instruments. It is safe to assume that public concerns will be less pronounced when people trust their government in general and the diverse public institutions that are implementing those nudges in specific. Recently, it has been suggested that nudging should develop a more bottom

up approach involving greater feedback and more engagement with citizens (John 2018) – an important point to which we will return.

Prior studies

In the past years, a handful of studies on public acceptance of nudges have been published (Arad and Rubinstein 2018; Branson *et al.* 2012; Diepeveen *et al.* 2013; Felsen *et al.* 2013; Hagman *et al.* 2015; Jung and Mellers 2016; Junghans *et al.* 2015, 2016; Reisch and Sunstein 2016; Sunstein *et al.* 2017; Tannenbaum *et al.* 2017). This literature has explored:

(1) whether people in different countries endorse nudges in policy fields such as environment, health, and safety, or as policy instruments in general;

(2) whether they prefer certain types of nudges (i.e., educative or noneducative nudges, and pro-self or pro-social nudges);

(3) whether political values are predictive of support for nudging and nudges;

(4) whether individual, psychological, and social factors influence levels of support.

With respect to the first question, a series of representative surveys have found that strong majorities of citizens in diverse countries approve of the nudges presented to them (e.g., Hagman *et al.* 2015; Jung and Mellers 2016; Reisch and Sunstein 2016; Sunstein *et al.* 2017). Comparing the approval rates of 15 environmental, safety, and health nudges in 14 countries worldwide, we found that these countries could roughly be grouped into three distinct categories:

(1) The "principled pro-nudge nations": These are mostly industrialized Western democracies (including our current study countries Germany and the US), where strong majorities approve of nudges, at least when they are seen to fit with the interests and values of most citizens and do not have illicit ends.

(2) The "nudge enthusiasts": A small group of nations where overwhelming majorities approve of nearly all nudges (South Korea and China).

(3) The "cautiously pro-nudge nations": A group of nations (including Denmark, Hungary, and Japan) that generally show majority approval on average, but also markedly lower approval rates (Sunstein *et al.* 2017).

As to the second question, there is preliminary evidence of a general preference for educative nudges. At least in the United States, people seem to prefer nudges, such as disclosure of information, that target deliberative and conscious "System 2" decision processes, as compared to "System 1" nudges (Jung and Mellers 2016; Sunstein 2016a, 2016b), such as default rules, that try to influence automatic, non-deliberative decisions (following the model introduced by Kahneman 2011). In the same vein, people seem to prefer nudges that target processes of which they are aware (e.g., educational campaigns) over those that target passive processes such as automatic enrolment or defaults (Jung and Mellers, 2016; Reisch and Sunstein 2016; Sunstein 2016b; Sunstein *et al.* 2017). The same concerns might be at play when people prefer nudges that overtly suggest a best choice (e.g., calorie labels on foods) over less salient ones such as choice architecture in cafeterias (Arad and Rubinstein, 2018; Felsen *et al.* 2013). (Recall, however, that even if educative nudges are preferred over noneducative ones, both tend to receive majority support.)

At the same time, recent studies suggest that people's preferences as between educative and noneducative nudges are malleable, and that the results of prior studies are influenced by the method of evaluation and the type of information presented. Davidai and Shafir (2018) found that while people exhibit a strong preference for traditional policies over nudges in *joint* evaluation (i.e., traditional policies and nudges presented together), they are more likely to endorse nudges in *separate* evaluation (i.e., nudges are evaluated on their own merits). It seems

that nudges appear significantly less attractive in joint than in separate evaluation. Interestingly, if presented with *information* on the relative effectiveness of nudges over traditional policies, study subjects endorse nudges even in joint evaluation. Davidai and Shafir (2018: 3) suggest that previous research – largely based on separate evaluation without effectiveness information – has therefore "inadvertently exaggerated the preference for deliberate policy interventions over ones that target non-deliberative processes."

For policy makers, it would be helpful to know not only *if* people approve of nudges, but also *who* does, i.e., which individual values, dispositions, attitudes, world-views, and thinking styles that lead to (dis)approval of these instruments. Socio-ecological models (e.g., Bronfenbrenner 1986) suggest that attitudes will depend both on individual factors (i.e., knowledge, attitudes, behaviours, personality traits) and on factors in the respondents' interpersonal, community, and wider socio-political environment (i.e., trust in governmental institutions, environmental threats, general wealth and health of the population). The societal, cultural, and political systems in which people are embedded and the social influences to which they are exposed influence their goals, their beliefs and attitudes, their outlook to the future, their adherence to social norms and whether they trust other people and their government.[3]

With respect to the third and fourth question above, little evidence – at least outside the US – has surfaced yet about which population groups support nudging and which factors shape those attitudes. In one of the few representative studies looking into these factors, Jung and Mellers (2016) found that Americans with greater empathetic concern tended to support (the presented list of) nudges. At the same time, individualists and conservatives were less likely to support the tested nudges. Reactant people and people with a high need for control opposed noneducative nudges only. Hagman and colleagues (2015) have found that in Sweden and the US, individuals with an individualistic worldview were less likely to approve of nudges, while

people prone to analytical thinking perceived nudges as less intrusive to personal freedom of choice.

In earlier studies (Reisch and Sunstein 2016; Sunstein *et al.* 2017), we offered preliminary explorations of the influence of individual factors such as socio-demographics and political attitudes on approval in Europe and in countries worldwide. While some correlations between individual factors and approval rates were found, they differed rather unsystematically between the nudges and between the different countries. Overall, the results were inconclusive, with exceptions for gender (women did systematically score higher in the approval rates than men in almost all nudges and almost all countries), age (operating differently for different nudges), and political attitudes (supporters of leftist parties were slightly more in favour of the tested nudges than conservatives).

On the basis of the same nationally representative surveys, we looked deeper into which population groups within four selected and easily comparable countries (Denmark, Hungary, Italy, and the United Kingdom) support nudges and why (Loibl *et al.* 2018). We used individual, household, and geographic characteristics as predictors of nudge approval, and the count of significant predictors as measures of controversy. In brief, lower approval rates of nudges in Denmark and Hungary were reflected in higher controversy about noneducative nudges, whereas the United Kingdom and Italy were marked by greater controversy about educative nudges, despite relatively high approval rates. High-controversy nudges tended to be associated with current public policy concerns, for example, meat consumption – a point supportive of the general view that substantive concerns, rather than nudging itself, drives people's evaluations (Tannenbaum *et al.* 2017).

The present study

For the present study, we collected additional data in four of our study countries (namely: Germany, Denmark, South Korea, and the US) in 2018. We chose one nation from each of the three categories of nudge endorsement, one from three different cultural clusters (Sunstein *et al.* 2017), and added comparable survey data from Belgium (Flanders).[4] In addition to the 15 nudges and the social-demographic variables, we asked participants to answer a large questionnaire including anthropometrics (to calculate Body Mass Index), lifestyle factors, consumption of specific products (alcohol, smoking, and meat), employment status and type, subjective health status and health satisfaction, social trust and trust in institutions, concerns about the environment, world-views and thinking styles (i.e., future outlook, belief in free markets, political attitudes, risk aversion), and several more variables. We speculated that these variables could help explain differences between social groups as well as across nations.

In particular, we were interested in the psychological concepts of social and institutional *trust*. These concepts have since long been depicted as important indicators of the strength and quality of societies, communities, and governments across the world. Validated measurement items as well as prevalence estimates are available for most countries worldwide -- for instance, from the World Values Survey[5] data set (Inglehart *et al.* 2014). In our study, we hypothesized that people who have a high trust in public institutions would be more willing to accept government nudging in our tested areas. We also speculated that strong believers in the free market might be less inclined to do so.

Beyond this focus on trust in government, we tested other variables. The influence of *environmental concern* on attitudes and behaviour has been studied in depth and in international contexts (e.g., Franzen and Vogl 2013; Poortinga *et al.* 2004). It seems intuitive that people who have a marked concern regarding the environment[6] will endorse environmental

policies in general and "green nudges" in specific.[7] For similar reasons, we speculated that a fragile individual *health status* and high *health concerns* for oneself and others might be positively correlated with approval of health nudges. A recent study (Bhawra *et al*. 2018) reported that a higher Body Mass Index (BMI) was positively correlated with support for menu labelling policies – which is Nudge 1 in our list of 15 nudges. We also explored the influence of *consumption habits* (i.e., meat, tobacco, alcohol, and mobility) on the approval of the respective nudges.

We also wanted to see whether approval rates of nudging depend on *political attitudes* of people. Earlier US studies have suggested that in a bipartisan system, Republicans are somewhat more sceptical about nudges than Democrats (Jung and Mellers 2016; Sunstein 2016a). However, this could as well be due to the studies choice of policy domains (Tannenbaum *et al*. 2017). In our earlier surveys, we had found no systematic correlation along approval and party affiliations (Reisch and Sunstein 2016; Sunstein *et al*. 2017). Finally, we speculated that risk aversion, job satisfaction, and subjective well-being might have an impact on approval.

In a nutshell: With this study, we aimed to understand *why* people in selected countries approve or disapprove of a set of 15 nudges, mainly in the field of environmental protection and health. Regarding explanatory variables, our principal focus is on trust in governmental institutions. Further, by replicating the surveys that have been conducted in 2015, 2016, and 2017 (Sunstein 2016a; Reisch and Sunstein 2016; Sunstein *et al*. 2017), we test the robustness of our earlier results regarding approval rates and socio-demographics, in particular the influence of gender. Finally, by compiling all available data on nudge approval rates from the three waves in overall 16 countries, we hope to shed light on the acceptance of nudges.

The remainder of this paper is organised as follows. We first present the methodology by describing the samples, the survey, the variables, as well as the multi-step statistical analysis. We then show the results in the five countries, emphasizing above all the relationship between the trust variables and approval rates. We also compare the present results with earlier survey waves in selected countries and provide an overall view of all surveys of all our respective empirical studies. We discuss the results and limitations of our study and conclude with comments on implications for nudging research and behavioural public policy. Our main emphasis, based on our findings about trust, involve the importance of public participation and consultation with respect to behaviourally informed policies.

Methods

Sampling

We employed an online representative survey in five countries, covering the three country categories sketched above: the U.S. and Germany[8], South Korea, and Denmark. As a new country in our database, we included (the Flemish part of) Belgium.[9] To ensure the same approach and level of quality of those surveys that we did not conduct ourselves, we developed a systematic Standard Operation Procedure[10] for the external partners to follow. The US market research firm Qualtrics[11] conducted the survey during six weeks between January and February 2018. We collaborated closely with Qualtrics, before, during, and after field time. Most importantly, we had permanent access to the survey data and could monitor the survey and the fulfilment of quota on a daily basis over several months. Table 1 provides an overview of the different samples and sampling of this survey.

- Insert Table 1: Samples and sampling in the five countries: Types of representativeness and methodology –

Survey instrument

We employed a questionnaire with 54 questions including: socio-demographic variables; the list of 15 nudges in a randomized order as employed in our earlier studies (Reisch and Sunstein 2016: 312-313); a measure of political attitudes; questions measuring psychological constructs (such as social trust and trust in government, perceived freedom of choice) as well as variables describing individual factors (such as perceived individual health, environmental concern, social trust as well as consumption practices such as smoking and drinking habits). The complete survey instrument is documented in Appendix A1. Appendix A2 shows the descriptive statistics of the underlying data set and the full list of variables employed.

The questionnaire was fully structured, and respondents were required to follow them as provided. Each item was shown on a single screen. Answering categories were adapted to the respective questions and ranged from Likert scales to binary schemes. Except for the basic sociodemographic questions, all items were randomised. Respondents were prompted with the question "Do you approve or disprove of the following hypothetical policy?" The answer categories were "approve" or "disapprove."

With respect to "trust in institutions," we used two different questions to reduce the risk of methodological artefacts (Appendix A1). The first was taken from the World Value Survey: "How much do you trust in the following institutions?" Then a set of public institutions was listed (namely: the armed forces; the police; the courts; the government; political parties; parliament; the civil service; universities; the European Union; the United Nations). The second item asked: "How much do you trust governmental institutions?" We also asked whether people believe in the free market as best way to solve environmental and economic problems, a question used in environmental research.[12] All items were to be answered on seven-point Likert scales.

Statistical equivalence

Statistical equivalence of the survey instrument was ensured by professional translation of the new questionnaire items from English in the respective languages, followed by a back translation into English.[13] The Flemish questionnaire was translated, back translated, and adapted in full. Online surveys are widely used and familiar to most respondents in the target countries, which all show a very high internet penetration rate; we could assume that answers were not systematically skewed due to lack of internet access or proficiency.

Statistical analysis

The statistical analysis took place in several steps and with several methodological approaches. In a first step, in order to get an overview of whether and how this large number of variables were interlinked, we drew a correlation heatmap indicating correlations among all variables. On the basis of the heatmap, we selected obviously correlating variables as identified by the map and looked into those more in depth. We then undertook a weighted linear regression of all variables and nudge approval, tested the robustness of the results with the help of a decision tree analysis, and estimated the size of the probabilities. For the regressions and the machine learning algorithms, the 15 nudges were categorized in five nudge clusters as categorized before (Reisch and Sunstein 2016): (1) (pure) governmental information campaigns, (2) information nudges, mandated by government; (3) default rules; (4) subliminal advertising (a pseudo-nudge, since not transparent by design and manipulative); (5) other mandates (e.g., choice architecture).

Results

Correlations of nudge approval, trust, and selected variables

The correlation heatmap as shown in Figure 1 suggest some expected descriptive correlations between nudge approval and a few variables.

-   Insert Figure 1: Correlation heatmap of all variables –

As in prior studies, gender and age showed significant correlations with approval. Moreover, the new variables "trust in institutions" and "as well as "environmental concern" were found to correlate strongly with higher nudge approval. Belief in markets was correlated with lower approval. Approval rates by gender, conditional on trust in institutions (*trustscore_inst*), are depicted in Figure 2. As shown, higher trust in institutions seems to be linked to higher approval on average, and more so for women than for men.

-   Insert Figure 2: Overall nudge approval: conditional on trust –

Interestingly, the concepts "social trust" and "trust in other people" were not correlated with approval rates. But that is not entirely surprising; our focus is on *governmental* policies, and higher trust in institutions is the more relevant question. Furthermore, and perhaps surprisingly, the heatmap did *not* suggest strong and significant correlations between overall nudge approval and a large set of variables, notably health status and health concern for oneself, subjective well-being, perceived freedom of choice, risk aversion, and BMI.

At the same time, the map does suggest some expected results. Meat consumption seems to be negatively correlated with approval of "a meat free day in public canteens" (Nudge 15); smokers disapprove government campaigns (and subliminal advertising) against smoking (Nudge 12), and people who drink a lot of alcohol disapprove nudging in general. To that extent, behaviour seems to play a role; people do not want to be nudged to stop doing something

that they like to do, and are now doing. In a way, that should not be surprising, but it might have been predicted that people engaging in harmful behaviour (such as smoking) might be especially supportive of efforts to reduce that behaviour.

Weighted regression and decision tree learning: trust in institutions

The relationship between trust in institutions and nudge approval were confirmed by a weighted regression analysis, where the effects were strong and significant. As expected, we also found a significant negative relationship between belief in markets and nudge approval. (Note parenthetically that we might have tested nudges that promote reliance on markets, in which case the relationship would be expected to be positive.) Column (1) in Table 2 below shows the regression results for all nudges together as well as for the five nudge clusters.

- Insert Table 2: Weighted OLS regression for different nudge clusters –

In particular, our main specification can be described by the following model

$$Y = X\beta + \varepsilon \qquad (1)$$

where X is a $N \times (K + 1)$ matrix of explanatory variables (as shown in Appendix A2) and Y is a $N \times 1$ vector which contains the mean outcome for all nudge questions $y_{i,t}$ for an individual $i \in \{1, \dots, N\}$ and question $t \in \{1, \dots, 15\}$, i.e. it is defined as follows:

$$\begin{pmatrix} y_1 \\ \vdots \\ y_N \end{pmatrix} = \begin{pmatrix} \frac{1}{15} \sum_{t=1}^{15} y_{1,t} \\ \vdots \\ \frac{1}{15} \sum_{t=1}^{15} y_{N,t} \end{pmatrix}$$

Since we used sample weights (given by the weighting matrix W) that adjust for the probability of being sampled, our coefficient vector β is given by:

$$\hat{\beta}_{WLS} = (X'WX)^{-1}X'WY$$

To test the robustness of the results regarding trust in institutions, we run a weighted decision tree analysis, a machine learning method used for classification. In order to get valid results for classification, we used rounded numbers, i.e. we transformed Y in the following way:

$$\tilde{Y} = \begin{pmatrix} \tilde{y}_1 \\ \vdots \\ \tilde{y}_N \end{pmatrix}, \ with \ \tilde{y}_i \begin{cases} 1 \ if \ \dfrac{1}{15}\displaystyle\sum_{t=1}^{15} y_{i,t} \geq 0.5 \\ 0 \ if \ \dfrac{1}{15}\displaystyle\sum_{t=1}^{15} y_{i,t} < 0.5 \end{cases}$$

Moreover, we implemented cross-validation as well as a grid search for hyper parameter tuning in order to improve the accuracy of our decision tree.

Again, results were confirmed. As depicted in Figure 3 below, trust in institutions is highly correlated with approval of nudges. The same is true of environmental concern.

- Insert Figure 3: Decision tree for approval of all nudges on average –

To predict marginal probabilities of nudge approval, i.e., the predicted size of the effects, we estimated a logistic model for each nudge question as independent variable separately. Predicted marginal probabilities for approval conditioned on institutional trust – as shown in Figure 4 - differ substantially between the lowest possible trust score (10) and the highest possible trust score (70). For instance, while (ceteris paribus) the probability to accept the nudge "Encouraging green energy" (Nudge 3) is estimated to be around 55% for individuals with the lowest possible value of institutional trust (for an average individual in the sample), this probability increases to almost 95% for the highest trust value. Similar effects were shown for environmental concern.

- Insert Figure 4: Predicted marginal probabilities for approval, conditional on institutional trust

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Further results

Other results from the regression analysis are worth reporting, though they are less significant. A higher formal education (years of schooling) is correlated with lower approval rates toward nudges on average. City dwellers tend to approve the tested nudges more than people who live in villages or on the countryside. The number of children is positively correlated with approval rates. Those who are left-of-centre seem to approve of the tested nudges more than conservatives do.

Some cautionary notes are important here. First, we are speaking of the 15 nudges that were tested here. Because reactions to nudges are greatly affected by their substantive content – by the direction in which they steer people – it would be easy to produce nudges that would have different levels of approval among the relevant groups, with patterns that might reverse. For example, conservatives would certainly approve of some nudges more than those who are left-of-centre. Second, our results here should be viewed as initial indications in which direction further research might search for answers; they should certainly be taken with caution and an analysis that is much more detailed would be needed to draw conclusions for policy.

Revisiting our categorization of countries regarding nudge approval (Sunstein *et al.* 2017) and to see how stable approval rates in the three countries[14] (Denmark, Germany, and South Korea) have been over time, we compiled the results from the three study waves (2015, 2016, and 2017/18), including 16 countries. Appendix A3 gives an overview of samples and sampling in all 16 countries, with an overall N of 20,501 respondents. Appendix A4 presents the weighed OLS regression for the five nudge clusters. Confirming earlier results, the gender factor was again found to be highly relevant for nudge approval in each of the countries –

except for China, where male respondents significantly approve of the tested nudges more than women (Appendix A5). However, this should be interpreted in light of extremely high approval in China from both genders, with rates between 80% and 90%.

We also compared approval rates of the 15 nudges over time in Denmark, Germany, and South Korea. Overall, approval rates in these countries were largely stable as compared to our earlier studies. We found only small changes in magnitude between those waves, with modest changes in both directions, i.e., less and more approval by both genders (Appendix A6). The country categorizations – Denmark as a "cautiously pro-nudge country", Germany as a "principled pro-nudge nation", and South Korea as a "nudge enthusiast" – still applied three years later. This is particularly notable for the latter, since the country has undergone a dramatic democratisation process in these past three years. Finally, Flanders that followed our methodology to measure their national nudge approval rate exactly, turned out to be a principled pro-nudge nation. [15]

Discussion

Policymakers are increasingly aware of the potential advantages of using nudges in many policy domains, including health, safety, and the environment. At the same time, members of the media and the public seem also increasingly aware of such policies – even though they might come under another name and in different shapes – and will often have an opinion about those approaches. In some countries, policymakers have learned to tread around behavioural interventions with caution, in order to avoid being accused of being "national nannies" or even worse, of manipulating their citizens. Policy measures that lack public endorsement may well turn out to be less likely to succeed and to induce the intended behavioural changes without major unintended side effects. There are also questions about legitimacy, in the normative as well as the descriptive sense (John 2018).

The present study is based on a large original data set of nudge acceptance in 16 countries worldwide, including countries that have not been studied before with a comparable design. Our data provide empirical insights into how attitudes vary with individual and cultural differences, and our analysis sheds light on the factors that influence these variations, with particular attention to trust in institutions. As in earlier studies, we have found general approval of nudges alongside marked national differences in levels of support, with Denmark on the least positive side, South Korea the most positive, and Germany, Belgium, and the US somewhere in between.[16]

As expected, support seems to decrease as the level of state intervention increases, as estimated along our five "nudge clusters" of levels of intrusion. (We would take this finding with caution in view of the fact that people will approve of high levels of intrusion for certain kinds of misconduct, e.g., murder, assault, and theft.) In addition, acceptance is generally higher (or resistance is lower) for those nudges that are targeted to others – i.e., businesses – and lower for those that target people directly. (We would also take this finding with caution; some nudges, applied to business, would not receive approval.)

National differences should not be surprising, since state intervention in people's behaviour and choices is much more accepted in authoritarian countries such as China than in the democratic European countries. The US seems to be a special case, with a deeply rooted skepticism towards governmental intervention in general and sharply divided opinions along party lines. Surprisingly, we found a continued high overall public support for most nudges in question in most countries, including the US (see also Sunstein *et al.* 2017).

Our particular interest lay in the hypothesis that higher trust in public institutions will be correlated with stronger support of nudges. This has been confirmed. At the same time, people who believe in markets as the best institution to solve environmental and economic

problems, are more critical of nudges. Female gender was again found to be correlated with approval of nudges. Further, people's own health concern and health status had no influence on acceptance, and meat consumption only on the (non)acceptance of the Nudge "meat-free days in cafeterias." The fact that approval rates in earlier tested countries have barely changed in the past three years is noteworthy, particularly in the case of South Korea where severe political changes have taken place.

For policymakers, our results convey relevant insights. Trust in public institutions in general and environmental concern might be useful allies in communicating about nudging and nudges. As has been suggested (John 2018), endorsement of nudges in general might increase when citizens are invited to participate, actively choose, and give feedback to planned interventions. If they expect, beneficial results in specific domains (health, environment, and safety) or with respect to specific consumption habits (meat, alcohol, or smoking) might be helpful in communicating with the public.

For purposes of both effectiveness and legitimacy, close engagement with the public, and attentiveness to its concerns, can be exceedingly important. It has been urged (OECD 2017; Troussard and van Bavel 2018) that a "one-nudge-fits-all" approach to behavioural public policy is unlikely to be successful. Rather, effective and publicly accepted nudges will more likely be developed with a process that includes early participation of the affected groups, public scrutiny, and deliberation -- as well as transparent processes in governmental institutions. In addition to public participation, the "test-learn-adapt-share" approach called for by leading policy labs worldwide (e.g., Haynes *et al.* 2012; Sousa Lourenco *et al*. 2016), is a prerequisite for success.

Our data also support the idea of what has been called "cognitive polyphasia" in public opinion research (Jovchelovitch 2002). Applied to government interventions and nudges:

People want the government to stop other people's bad behaviour (e.g., smoking) – but not necessarily their own. Our data suggest that approval rates are higher for nudges that are targeted at others than for those that are targeted to oneself. For instance, smokers do not show, on average, scepticism about nudges as a whole – but on average, they disapprove of the anti-smoking nudge.

Limitations

We note several limitations to our study. If the goal is to understand people's true beliefs, let alone their actual reactions to real world polices, we might not obtain a full picture simply by asking people, in surveys, what they think would be acceptable. Among other things, political dynamics might end up moving people in particular directions. Moreover, the design of the study was deliberately simple: We did not try to compare acceptance to other policies (such as taxes or bans) and importantly, we did not provide information on their respective effectiveness. Others (e.g., Branson *et al.* 2012) have used such studies.

In principle, using an online tool necessarily excludes those parts of the population that have no internet access or do not use the internet often enough. Acknowledging this limitation, we took great care to fulfil agreed-on quotas for representativeness. Another weakness of online surveys is that study subjects use shortcuts and might be less attentive in online survey situations than in face-to-face interviews. For that reason, we applied several attention and time filters in the questionnaire and excluded inattentive responses. Further, the literature on intercultural comparisons and use of instruments in different countries in general points at the problem of measurement invariance, something that also we cannot avoid but can (and did) take into consideration when interpreting our results.

Conclusions

We offer four points by way of conclusion. First, the study presented here confirms the existence of high levels of approval for nudges as policy tools across different countries and cultures. Second, Belgium (Flanders) joins the large set of democratic nations whose citizens generally embrace nudging, but with important exceptions and qualifications. Third, levels of public acceptance are reduced as nudges become more intrusive. Fourth, trust in government institutions is highly correlated with approval of nudges.

We underline the last point. The best way to obtain trust is to earn it. In that light, it is important not only to make behaviourally informed policies effective and cost-effective, but also to develop processes to ensure that such polices are adopted transparently, with ample opportunity for public engagement, and with openness to citizens' objections and concerns.

Disclosure statement

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Note on contributors

Cass R. Sunstein is a Robert Walmsley University Professor, Harvard University (US). Lucia A. Reisch is a Full Professor for Consumer Behaviour and Consumer Policy at Copenhagen Business School (Denmark). Micha Kaiser is a postdoctoral researcher at the Research Center Consumers, Market & Politics, Zeppelin University, Friedrichshafen (Germany).

Tables

Table 1: Samples and sampling in the five countries: Types of representativeness and methodology

Table 2: Weighted OLS regression for the different nudge clusters

Figures

Figure 1: Correlation heatmap of all variables

Figure 2: Overall nudge approval conditional on institutional trust, by gender

Figure 3: Decision tree for approval of all nudges on average

Figure 4: Predicted marginal probabilities for nudge approval, conditional on institutional trust

Appendix

A1: The complete survey questionnaire (English master version)

A2: Descriptive statistics: Variables of the questionnaire (English master version)

A3: Samples and sampling in all 16 countries, all studies: types of representativeness and
methodology

A4: Weighted OLS regression for the five nudge clusters, all studies, all countries

A5: Approval rates by gender, all studies, all countries

A6: Nudge approval – changes between different time periods (D, DK, S K)

Notes

1. A recent overview is provided in John (2018); a collection of the classic studies in those fields is compiled put into perspective in Sunstein and Reisch (2017).

2. The application of behavioural insights to financial behaviour is a distinct research field (Behavioural Finance) developed and institutionalized since decades; this is why it is not listed here.

3. Worldwide differences in attitudes are, for instance, yearly covered by the *Global Attitudes Survey* by the Pew Research Center (http://www.pewglobal.org/).

4. This data has been provided by the Flemish government, following exactly the same survey procedure as in the other countries. A paper on this data is in preparation.

5. Social trust was measured by the questions from the World Values Survey (WVS): "Would you say that most people can be trusted?" (Q47) and "How much do you trust people from the following various groups" (Q46). See full list of questions with sources in the Appendix A1.

6. Measured by the question: "How much are you concerned about the environment?" (Q48).

7. Note that the aim of this research was not to compare the approval of different policy tools such as legislation, taxes, or behavioural nudges, nor the different ways nudges are framed, e.g., as win or loss. Other studies have done that.

8. Since we were specifically interested in specific federal states of Germany, we oversampled in the State of Baden-Württemberg which explains the larger sample size in Germany.

9. This Standard Operation Procedure is available on request from the authors.

10. https://www.qualtrics.com/.

11. Q51: "Would you say that the free market is the best way to solve environmental and economic problems?

12. A detailed description of this procedure was published elsewhere (Reisch and Sunstein 2016).

13. The first US survey was conducted already in 2014 (Sunstein 2016a). However, due to differences in sampling, a time series comparison seems not appropriate.

14. Possible reasons, including a methodological artifact due to the Chinese system of Social Scoring and governmental monitoring of internet use, have been discussed elsewhere (Sunstein *et al.* 2017).

15. We also had access to the recent data of online representative surveys covering our list of 15 nudges in Mexico (2018) and Ireland (2017). Since we did not oversee the sampling ourselves, and since only a few additional variables were covered, we could not include them fully in our database. Still, it is quite clear that Mexico belongs to the group of the "nudge enthusiasts", and Ireland ranks somewhere in the middle of all countries regarding approval.

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Table 1*: Samples and sampling in the different countries: Types of representativeness and methodology

| .Country	Data provider	Sample year	Unmodified sample Size	Representativeness	Survey method	Weighting method	Sample	Recruiting for the panel	Census/Population	Frame of the survey
Belgium	GfK	2017/2018	1,002	Online representative for gender, age, region and education	CAWI	No weighting	Quota sampling	Online	10 mio internet users, 18+ years	No frames
Denmark	Qualtrics	2017/2018	966	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	5.4 mio internet users, 18+ years	No frames
Germany	Qualtrics	2017/2018	1,535	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	55 mio internet users, 18+ years	No frames
South-Korea	Qualtrics	2017/2018	1,017	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	43.9 mio internet users, 18+ years	No frames
USA	Qualtrics	2017/2018	1,012	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	272.4 mio internet users, 18+ years	No frames
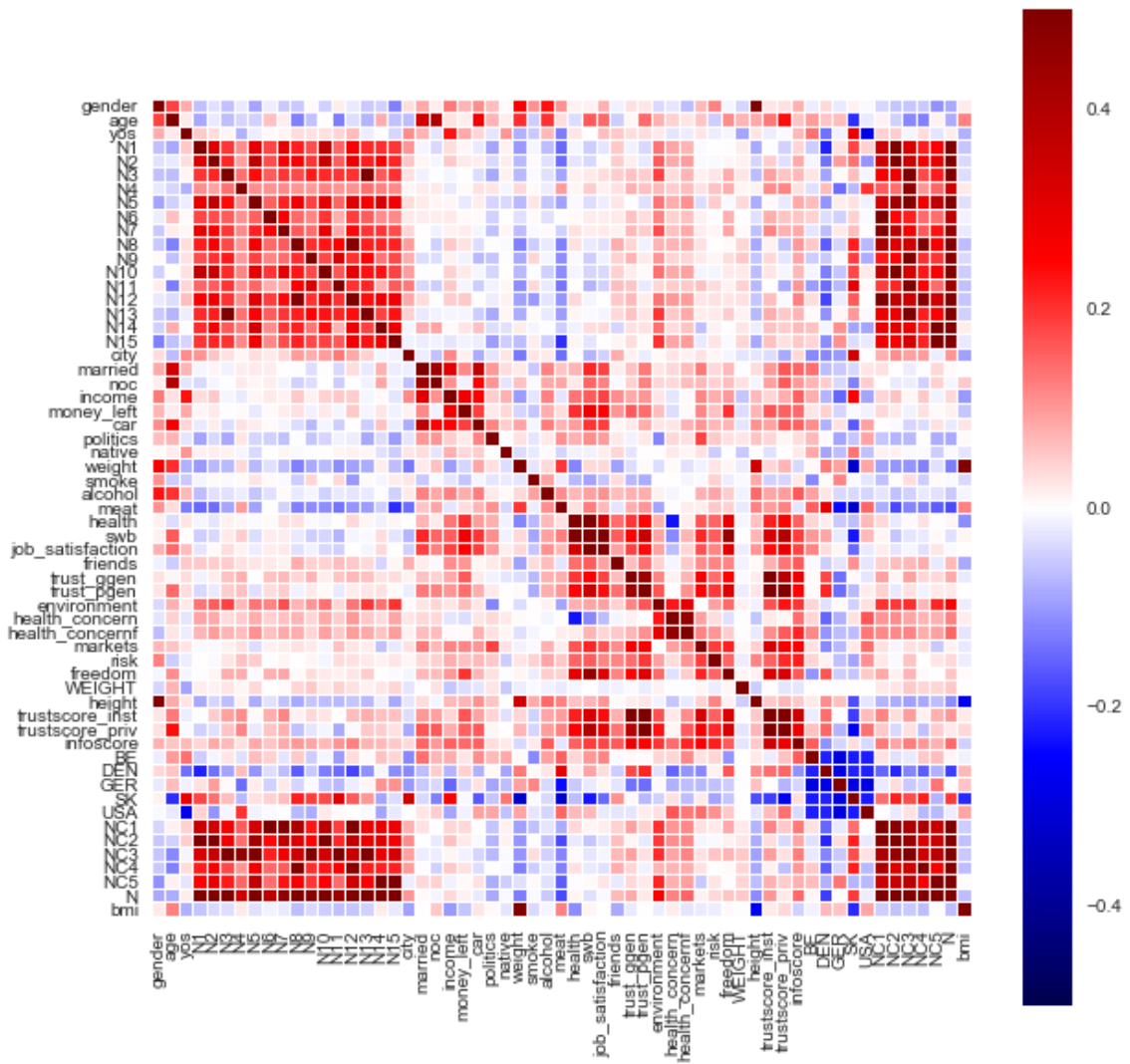
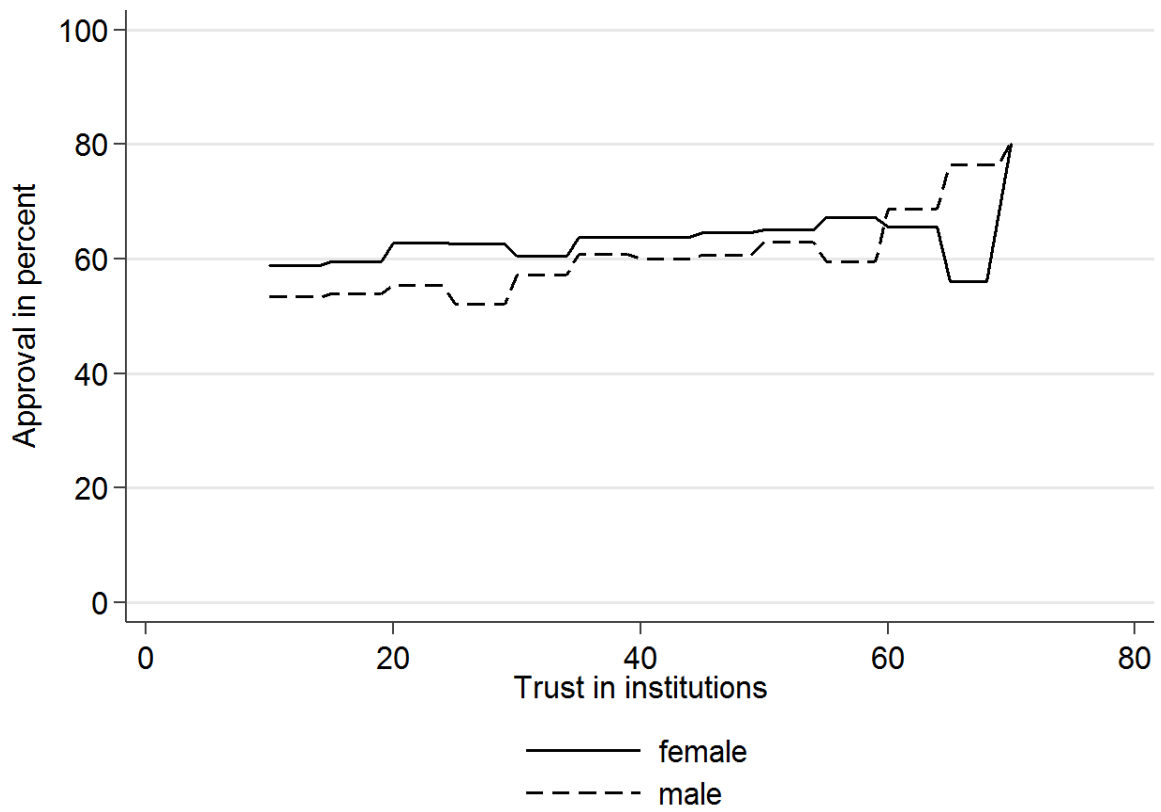**Figure 1:** Correlation heatmap of all variables.

Figure 2: Overall nudge approval, conditional on trust. Note: The graph uses *trustscore_inst* as explanatory variable.

Table 2: Weighted OLS regression for different nudge clusters.

	Clusters					
	(1)	(2)	(3)	(4)	(5)	(6)
	Overall Approval	Government Campaigns	Information nudges	Default rules	Subliminal ads	Other mandates
GER	0.0316***	0.0165	0.0494***	-0.0169	0.0986***	0.1394***
	(0.012)	(0.014)	(0.015)	(0.014)	(0.025)	(0.020)
DEN	-0.0689***	-0.0800***	-0.1041***	-0.0776***	-0.0540**	0.0193
	(0.011)	(0.014)	(0.017)	(0.014)	(0.024)	(0.020)
KOREA	0.1390***	0.1289***	0.1961***	0.1257***	0.3433***	0.0064
	(0.014)	(0.017)	(0.018)	(0.018)	(0.031)	(0.027)
BE	0.0413***	0.0334**	0.0219	0.0046	0.1728***	0.1267***
	(0.011)	(0.014)	(0.016)	(0.014)	(0.024)	(0.020)
male	-0.0188***	-0.0130	-0.0169*	-0.0104	-0.0124	-0.0590***
	(0.007)	(0.009)	(0.010)	(0.009)	(0.016)	(0.013)
age	-0.0006**	0.0007**	-0.0000	-0.0014***	-0.0024***	-0.0004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
yos	-0.0032***	-0.0015	-0.0031***	-0.0034***	-0.0060***	-0.0040***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
city	0.0045**	0.0052*	0.0068**	0.0036	0.0079	0.0011
	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.004)
married	0.0055	0.0065	-0.0053	0.0053	0.0162	0.0154
	(0.008)	(0.010)	(0.011)	(0.010)	(0.019)	(0.014)
noc	0.0060*	0.0003	0.0022	0.0082**	-0.0003	0.0165***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)
income	-0.0015	-0.0005	0.0009	-0.0036**	-0.0038	0.0009
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)
money left	0.0000	0.0077	0.0127	-0.0142	0.0215	0.0012
	(0.008)	(0.009)	(0.010)	(0.009)	(0.016)	(0.013)
Car	0.0047	-0.0086	0.0198	0.0011	0.0079	0.0116
	(0.009)	(0.011)	(0.012)	(0.011)	(0.019)	(0.015)
politics	-0.0053**	-0.0068**	-0.0047	-0.0065**	0.0088	-0.0077*
	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.004)
native	-0.0349***	-0.0200	-0.0361**	-0.0219	-0.0824***	-0.0705***
	(0.012)	(0.015)	(0.016)	(0.015)	(0.028)	(0.019)
smoke	-0.0100	-0.0331***	-0.0102	0.0133	-0.0749***	-0.0122
	(0.008)	(0.009)	(0.010)	(0.010)	(0.017)	(0.014)
alcohol	-0.0092***	-0.0101**	-0.0152***	-0.0085**	-0.0032	-0.0038
	(0.003)	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)
meat	-0.0120***	0.0054	-0.0087*	-0.0102**	-0.0128*	-0.0481***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.008)	(0.006)
health	0.0007	0.0075*	-0.0040	-0.0021	0.0146**	-0.0009
	(0.003)	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)
swb	-0.0057	-0.0092**	-0.0037	-0.0059	0.0003	-0.0057
	(0.003)	(0.004)	(0.005)	(0.004)	(0.008)	(0.006)
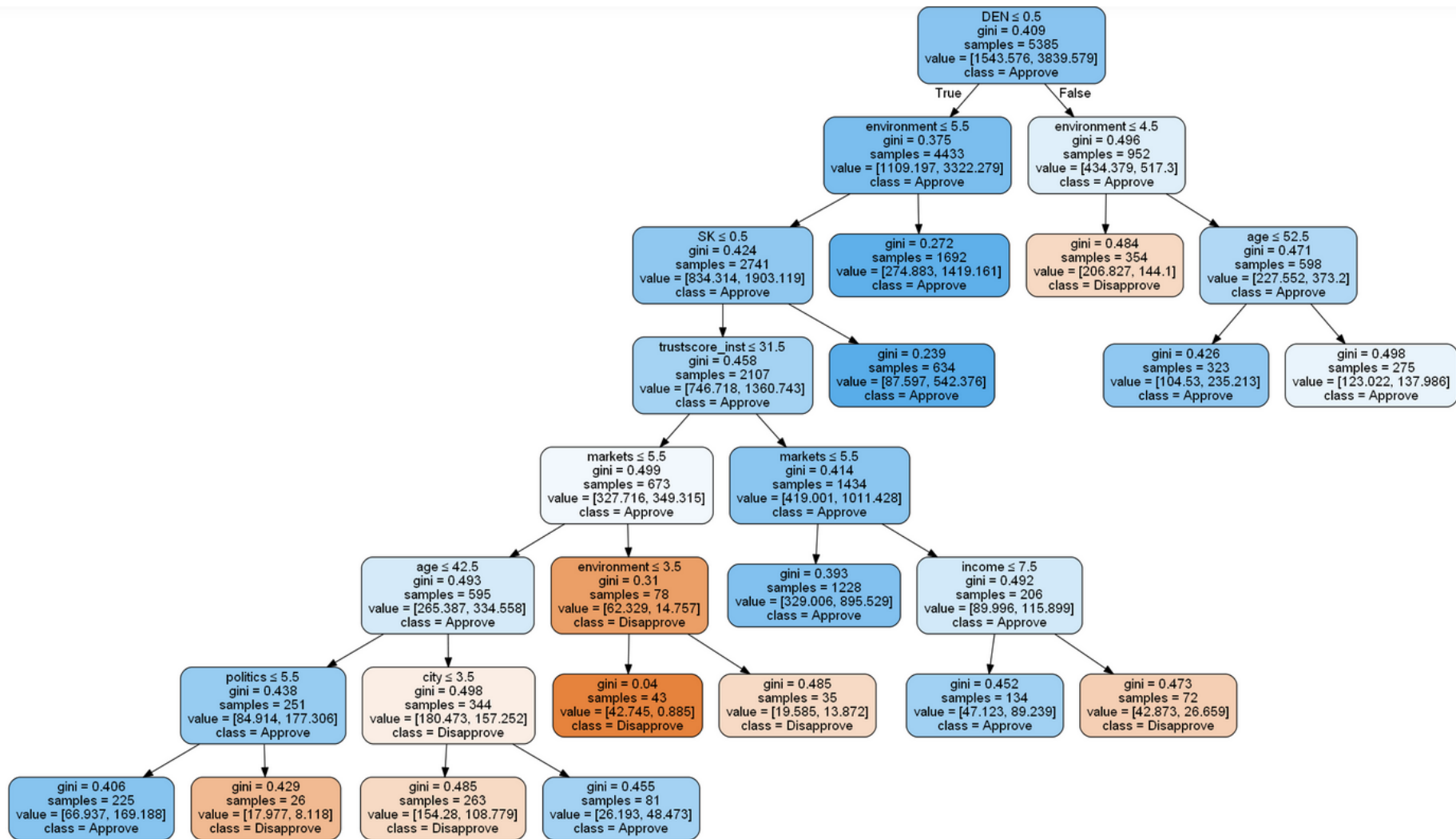
Figure 3: Decision tree for approval/disapproval of all nudges on average.

N9

N10

N11

N12

N13

N14

N15
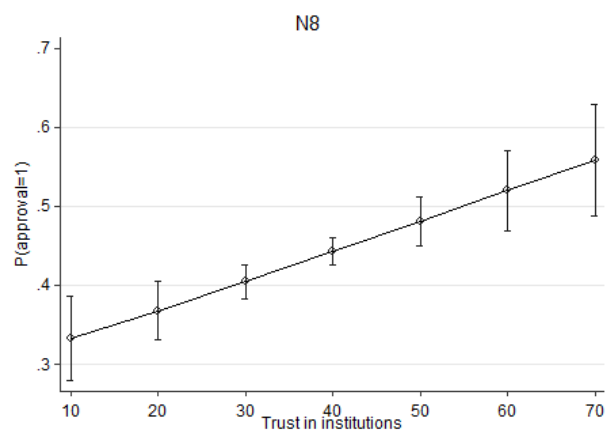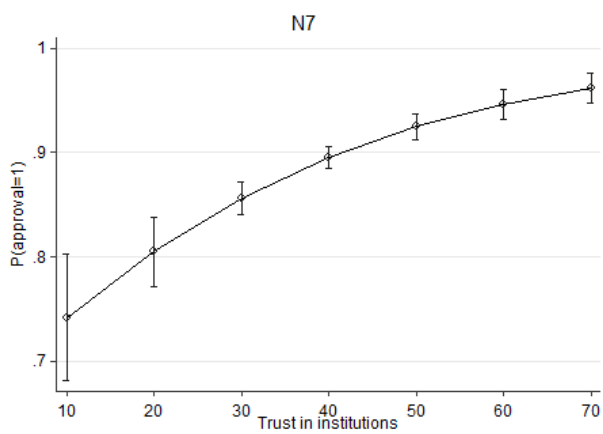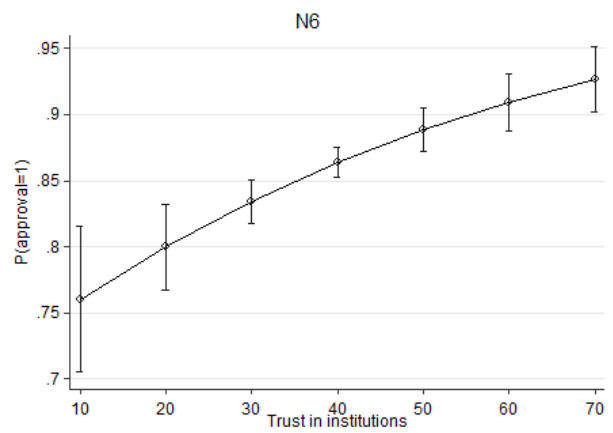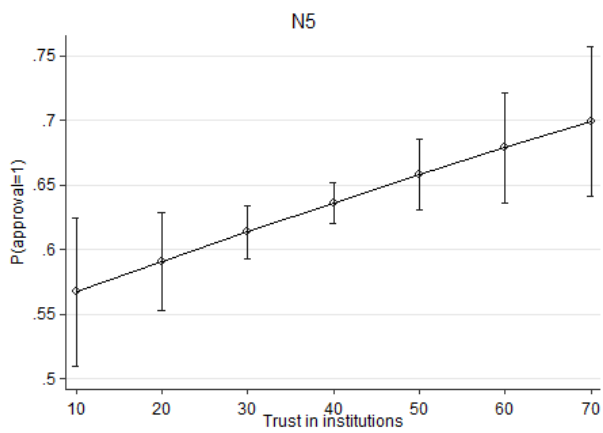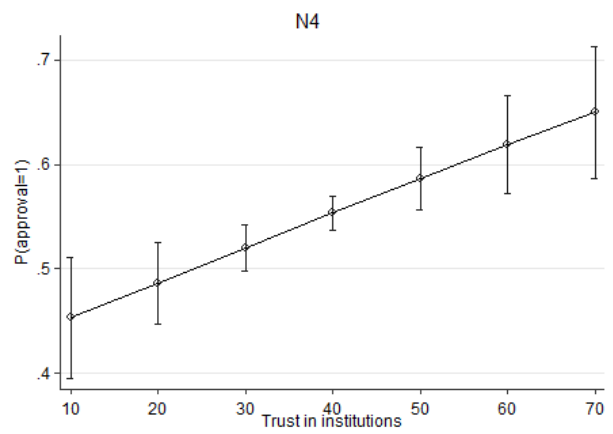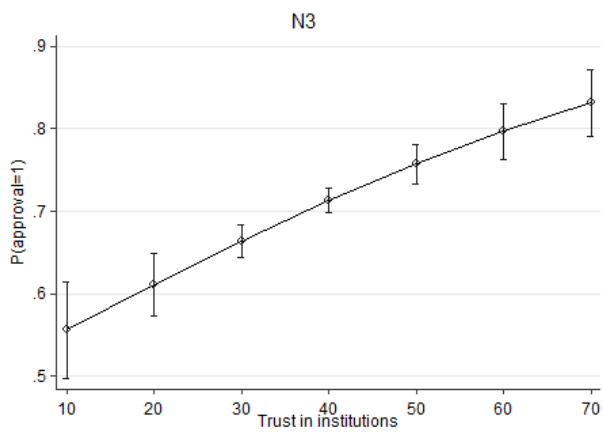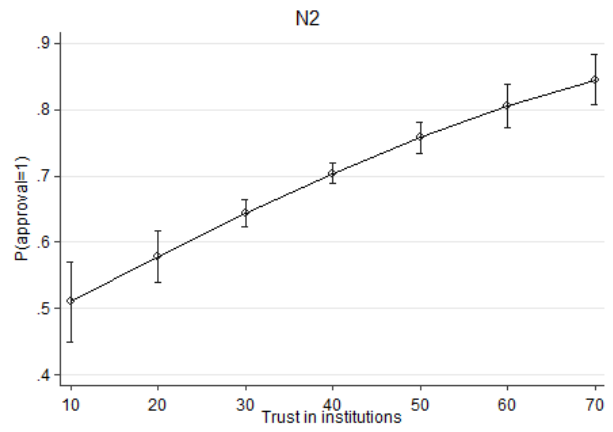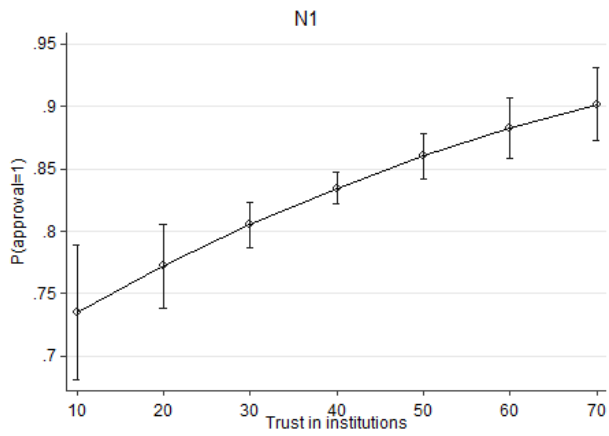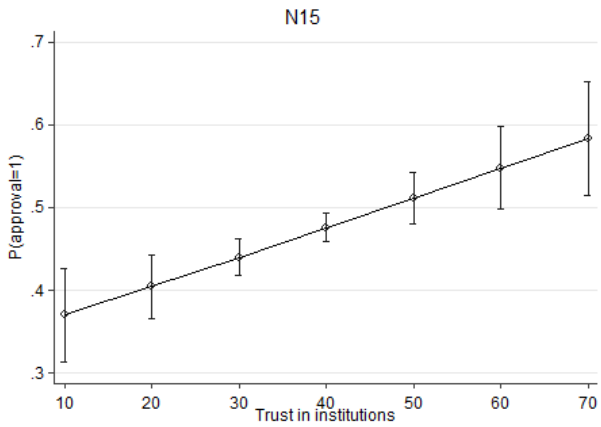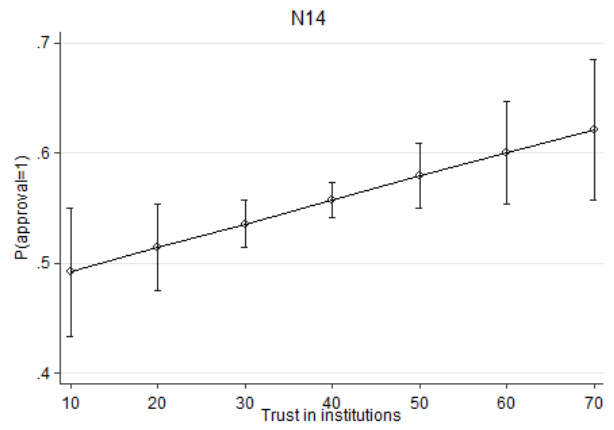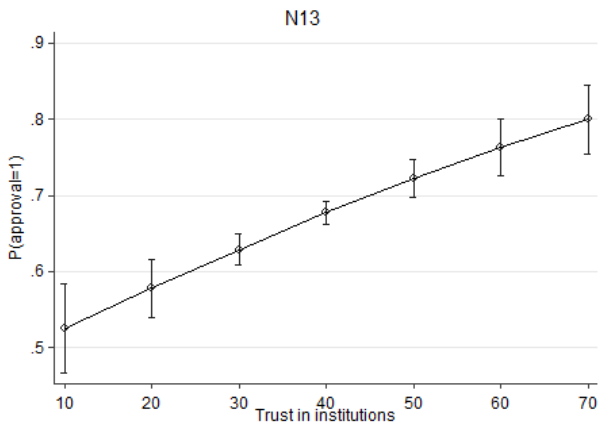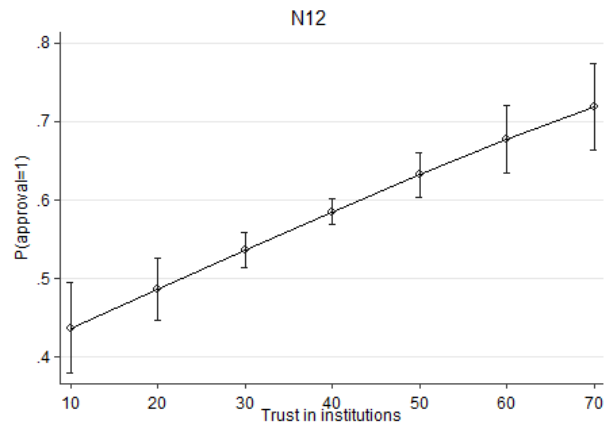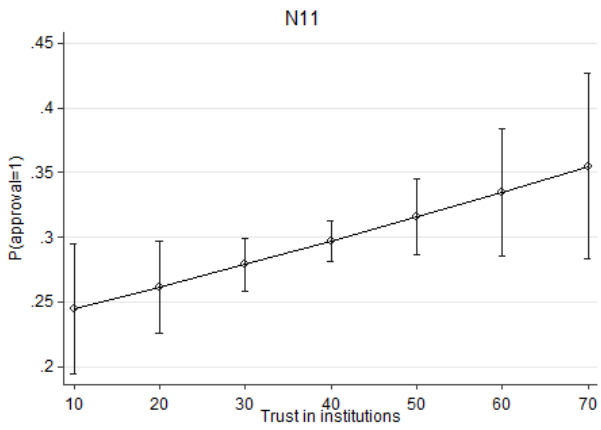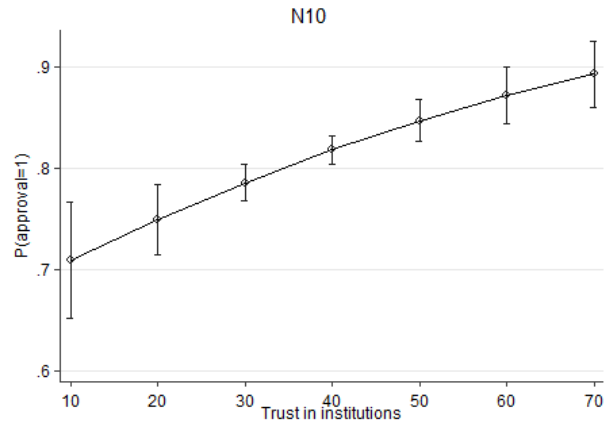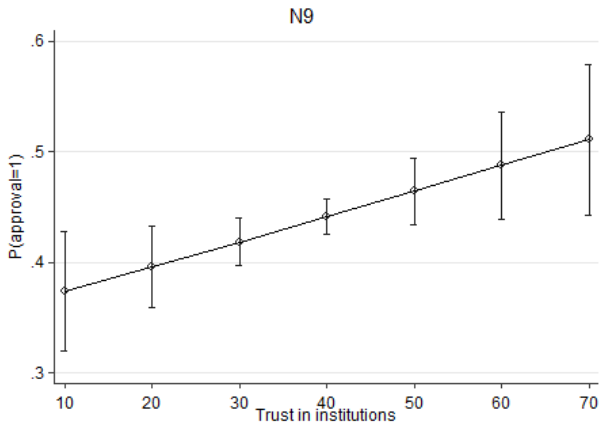
Figure 4: Predicted marginal probabilities of nudge approval, conditional on institutional trust. Note: Marginal probabilities are calculated using sample means.

Appendix A1: Full questionnaire

Sociodemographics - Part 1

Q1 What country do you currently live in?
- ○ USA (1)
- ○ Germany (2)
- ○ Denmark (3)
- ○ South Korea (4)
- ○ Mexico (5)
- ○ Belgium (6)

Q2 In which region do you currently live in?
- ○ *Rural*
- ○ *Urban*

Q3 What is your gender?
- ○ Male (1)
- ○ Female (2)

Q4 What is your age?
_____ Years

Q6 What is the highest level of school you have completed or the highest degree you have received?
- ○ 3rd Grade or less (1)
- ○ Associate Degree (2)
- ○ College Degree (such as B.A., B.S.) (3)
- ○ Completed some college, but no degree (4)
- ○ Completed some graduate, but no degree (5)
- ○ Completed some high school (6)
- ○ Doctoral degree (7)
- ○ High school graduate (8)
- ○ Master's degree (9)
- ○ Middle School - Grades 4 - 8 (10)
- ○ Other post high school vocational training (11)
- ○ None of the above (12)

Q7 How many years did you attend school and/or university?
_____ Years

Nudges 1-15

Q8 Do you approve or disapprove of the following hypothetical policy? The federal government requires calorie labels at chain restaurants (such as McDonald's and Burger King).
- ○ Approve (1)
- ○ Disapprove (2)

Q9 Do you approve or disapprove of the following hypothetical policy? The federal government requires a "traffic lights" 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.
- ○ Approve (1)
- ○ Disapprove (2)

Q10 Do you approve or disapprove of the following hypothetical policy? The federal government encourages (without requiring) electricity providers to adopt a system in which consumers would be automatically enrolled in a "green" (environmentally friendly) energy supplier, but could opt out if they wished.
- ○ Approve (1)
- ○ Disapprove (2)

Q11 Do you approve or disapprove of the following hypothetical policy? A state law requiring people to say, when they obtain their drivers' license, whether they want to be organ donors.
- ○ Approve (1)
- ○ Disapprove (2)

Q12 Do you approve or disapprove of the following hypothetical policy? A state law requires all large grocery stores to place their most healthy foods in a prominent, visible location.
- ○ Approve (1)
- ○ Disapprove (2)

Q13 Do you approve or disapprove of the following hypothetical policy? To reduce deaths and injuries associated with distracted driving, the national government adopts a public education campaign, consisting of vivid and sometimes graphic stories and images, designed to discourage people from texting, emailing, or talking on their cellphones while driving.
- ○ Approve (1)
- ○ Disapprove (2)

Q14 Do you approve or disapprove of the following hypothetical policy? 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.
- ○ Approve (1)
- ○ Disapprove (2)

Q14 This is an attention filter. Please click "Disapprove" to go on with the survey.
- ○ Approve (1)
- ○ Disapprove (2)

Q15 Do you approve or disapprove of the following hypothetical policy? The federal government requires movie theaters to provide subliminal advertisements (that is, advertisements that go by so quickly that people are not consciously aware of them) designed to discourage people from smoking and overeating.
- ○ Approve (1)
- ○ Disapprove (2)

Q16 Do you approve or disapprove of the following hypothetical policy? The federal government requires airlines to charge people, with their airline tickets, a specific amount to offset their carbon emissions (about 10€ per ticket); under the program, people can opt out of the payment if they explicitly say that they do not want to pay it.
- ○ Approve (1)
- ○ Disapprove (2)

Q17 Do you approve or disapprove of the following hypothetical policy? The federal government requires labels on products that have unusually high levels of salt, as in, "This product has been found to contain unusually high levels of salt, which may be harmful to your health."
- ○ Approve (1)
- ○ Disapprove (2)

Q18 Do you approve or disapprove of the following hypothetical policy? The federal government assumes, on tax returns, that people want to donate 50€ to the Red Cross (or to another good cause) subject to opt out if people explicitly say that they do not want to make that donation.
- ○ Approve (1)
- ○ Disapprove (2)

Q19 Do you approve or disapprove of the following hypothetical policy? The federal government requires movie theaters to run public education messages designed to discourage people from smoking and overeating.
- ○ Approve (1)
- ○ Disapprove (2)

Q20 Do you approve or disapprove of the following hypothetical policy? The federal government requires large electricity providers to adopt a system in which consumers would be automatically enrolled in a "green" (environmentally friendly) energy supplier, but could opt out if they wished.
- ○ Approve (1)
- ○ Disapprove (2)

Q21 Do you approve or disapprove of the following hypothetical policy? To halt the rising **obesity problem**, the federal government **requires large supermarket chains to keep cashier areas free of sweets**.
- ○ Approve (1)
- ○ Disapprove (2)

Q22 Do you approve or disapprove of the following hypothetical policy? For reasons of public health and climate protection, the federal government **requires canteens** in public institutions (schools, public administrations and similar) to have **one meat-free day per week**.
- ○ Approve (1)
- ○ Disapprove (2)

Sociodemographics - Part 2

Q24 What size is the city you live in?
- ○ Up to 5,000 inhabitants (1)
- ○ More than 5,000 up to 10,000 inhabitants (2)
- ○ More than 10,000 up to 100,000 inhabitants (3)
- ○ More than 100,000 up to 500,000 inhabitants (4)
- ○ More than 500,000 up to 1,000,000 inhabitants (5)
- ○ More than 1,000,000 inhabitants (6)

Q25 What is your relationship status?
- ○ Married/ civil relationship (1)
- ○ Long term relationship (2)
- ○ Single (3)
- ○ Divorced (4)
- ○ Widowed (5)
- ○ Other (6)

Q26 How many children do you have?
_____ Number of children

Q27 What is your total monthly household income in Euros, before taxes? Please include income from wages and salaries, remittances from family members living elsewhere, farming, and all other sources.
- ○ *below 1,000 € (1)*
- ○ *1,000 € up to under 1,500 €*
- ○ *1,500 € up to under 2,000 €*
- ○ *2,000 € up to under 2,500 €*
- ○ *2,500 € up to under 3,000 €*
- ○ *3,000 € up to under 3,500 € (2)*
- ○ *3,500 € up to under 4,000 € (3)*
- ○ *4,000 € up to under 4,500 € (4)*
- ○ *4,500 € up to under 5,000 € (5)*
- ○ *5,000 € up to under 6,250 € (6)*
- ○ *6,250 € up to under 7,500 € (7)*
- ○ *7,500 € up to under 8,750 € (8)*
- ○ *8,750 € up to under 10,000 € (9)*
- ○ *10,000 € up to under 12,500 € (10)*
- ○ *12,500 € and more (11)*
- ○ *Do not want to answer this question (20)*

Q28 Do you usually have a certain amount of money left at the end of the month that you can put aside or into a savings account?
- ❍ No (0)
- ❍ Yes (1)

Q29 Do you have a car?
- ❍ No (0)
- ❍ Yes (1)

Q30 When you think about the last national election, which party did you vote?
- ❍ *Democratic Party (1)*
- ❍ *Republican Party (2)*
- ❍ *Others (3)*
- ❍ *Did not vote (4)*
- ❍ *Do not know (5)*

Q31 On a scale from 1 to 7: On which of the political views that people might hold would you place yourself? (1 indicates extremely liberal (left) and 7 indicates extremely conservative (right)).
_____ Political Ideology (1-7)
- ❍ Do not want to answer this question (8)

Q32 Are you born in your current country of residence?
- ❍ No (0)
- ❍ Yes (1)

Q33 In which industry do you work?
- ❍ Not applicable (0)
- ❍ Do not work currently (1)
- ❍ Agriculture, Forestry and Fishing, Mining (2)
- ❍ Construction and Manufacturing (3)
- ❍ Transportation, Communications, Electric, Gas and Sanitary service (4)
- ❍ Wholesale and Retail Trade (5)
- ❍ Finance, Insurance and Real Estate (6)
- ❍ Services (without health, social and educational services) (7)
- ❍ Health services (8)
- ❍ Educational services (9)
- ❍ Social services (10)
- ❍ Public Administration (11)

Q34 This is an attention filter. Please click "Approve" to go on with the survey.
- ❍ Disapprove (1)
- ❍ Approve (2)

Health and satisfaction

Q35 What is your height?

_____ cm

Q36 What is your weight?

_____ kg

Q37 Do you smoke?
- ○ Yes (1)
- ○ No (2)

Q38 On how many days per week do you drink alcohol?
- ○ Never (0)
- ○ 1-2 days per week (1)
- ○ 2-4 day per week (2)
- ○ 4-6 days per week (3)
- ○ Daily (4)

Q39 On how many days per week do you eat meat?
- ○ Never (0)
- ○ 1-2 (1)
- ○ 2-4 day per week (2)
- ○ 4-6 days per week (3)
- ○ Daily (4)

Q40 On a scale of 1 to 7: How would you describe your current health? (1 indicates a very poor health state and 7 indicates excellent health)

_____ (1-7)

Q41 On a scale of 1 to 7: How would you describe your satisfaction with your life in general? (1 indicates no satisfaction at all and 7 indicates complete satisfaction)

_____ (1-7)

Q42 On a scale of 1 to 7: How would you describe your satisfaction with your current job position in general? (1 indicates no satisfaction at all and 7 indicates complete satisfaction)

_____ (1-7)

Q43 Do you have close friends in your city or local community?
- ○ No (0)
- ○ Yes (1)

Q23 This is an attention filter. Please click "Approve" to go on with the survey.
- ○ Disapprove (1)
- ○ Approve (2)

Trust, risk and concerns

Q44 On a scale of 1 to 7: How much do you trust the following institutions? (1 indicates no trust at all and 7 indicates complete trust)
- ○ The armed forces _____(1-7)
- ○ The police _____(1-7)
- ○ The courts _____(1-7)
- ○ The government_____(1-7)
- ○ Political parties_____(1-7)
- ○ Parliament_____(1-7)
- ○ The Civil Service_____(1-7)
- ○ Universities_____(1-7)
- ○ The European Union_____(1-7)
- ○ The United Nations_____(1-7)

Q45 On a scale of 1 to 7: How much do you trust governmental institutions, in general? (1 indicates very low trust and 7 indicates very high trust)?
_____ (1-7)

Q46 On a scale of 1 to 7: How much do you trust people from the following various groups? (1 indicates no trust at all and 7 indicates complete trust)
- ○ Your family _____(1-7)
- ○ Your neighborhood _____(1-7)
- ○ People you know personally _____(1-7)
- ○ People you meet for the first time_____(1-7)
- ○ People of another religion_____(1-7)
- ○ People of another nationality_____(1-7)

Q47 On a scale of 1 to 7: Would you say that most people can be trusted? (1 indicates no trust at all and 7 indicates complete trust)
_____ (1-7)

Q48 On a scale of 1 to 7: How much are you concerned about the environment? (1 indicates almost no concerns and 7 indicates high concerns)
_____ (1-7)

Q49 On a scale of 1 to 7: How much are you concerned about your personal future health status? (1 indicates almost no concerns and 7 indicates high concerns)
_____ (1-7)

Q50 On a scale of 1 to 7: How much are you concerned about the future health status of your friends and relatives? (1 indicates almost no concerns and 7 indicates high concerns)
_____ (1-7)

Q51 On a scale from 1 to 7: Would you say that the free market is the best way to solve environmental and economic problems? (1 indicates no trust in the free market at all and 7 indicates complete trust)
_____ (1-7)

Q52 On a scale of 1 to 7: How much are you willing to take risks? (1 indicates high risk aversion and 7 indicates no risk aversion at all)
_____ (1-7)

Q53 On a scale of 1 to 7: How much freedom of choice and control you feel you have over the way your life turns out? (1 indicates almost no choice and 7 indicates a high level of choice)
_____ (1-7)

Q54 On a scale of 1 to 7: For each of the following sources, please indicate to what extent you use it to obtain daily news and information? (1 indicates never and 7 indicates always)
- ❍ Printed newspaper and magazines _____(1-7)
- ❍ Online newspaper and magazines _____(1-7)
- ❍ TV news _____(1-7)
- ❍ Radio news_____(1-7)
- ❍ Social networks_____(1-7)
- ❍ Blogs_____(1-7)
- ❍ Podcast_____(1-7)

Questions are based on:

German Socio-Economi*c* Panel[1]:
- Q28, Q29, Q38, Q39, Q40, Q41, Q42, Q52

World Value Survey[2]:
- Q32, Q41, Q42, Q44, Q46, Q47, Q53, Q54

Carpiano and Fitterer[3] , Poortinga, Steg and Vlek[4] and Franzen and Vogl[5]:
- Q43, Q45, Q51

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[1] TNS Infratest Sozialforschung (2016). SOEP 2016 – Erhebungsinstrumente 2016 (Welle 33) des Soziooekonomischen Panels: Personenfragebogen, Stichproben A-L3. SOEP Survey Papers 345: Series A. Berlin: DIW/SOEP.

[2] World Values Survey Wave 6 2010-2014 Official Aggreggate v.20150418. World Values Survey Association (www.worldvaluessurvey.org).

[3] Carpiano, R. M. and Fitterer, L. M. (2014) Questions of trust in health research on social capital: what aspects of personal network social capital do they measure? *Social Science & Medicine* 116: 225-234.

[4] Poortinga, W., Steg, L. and Vlek, C. (2004) Values, environmental concern, and environmental behavior: A study into household energy use. *Environment and Behavior* 36(1): 70-93.

[5] Franzen, A. and Vogl, D. (2013) Two decades of measuring environmental attitudes: A comparative analysis of 33 countries. *Global Environmental Change* 23(5): 1001-08.

Appendix A2: Descriptive statistics – all variables.

	N	μ	σ
Country	5,385.000	2.889	1.386
Gender	5,385.000	0.505	0.500
Age	5,385.000	46.676	16.391
Yos	5,385.000	12.297	4.989
N1	5,385.000	0.789	0.408
N2	5,385.000	0.668	0.471
N3	5,385.000	0.683	0.465
N4	5,385.000	0.537	0.499
N5	5,385.000	0.615	0.487
N6	5,385.000	0.843	0.364
N7	5,385.000	0.864	0.343
N8	5,385.000	0.429	0.495
N9	5,385.000	0.425	0.494
N10	5,385.000	0.777	0.416
N11	5,385.000	0.301	0.459
N12	5,385.000	0.558	0.497
N13	5,385.000	0.651	0.477
N14	5,385.000	0.542	0.498
N15	5,385.000	0.460	0.498
City	5,385.000	3.124	1.575
Married	5,385.000	0.480	0.500
Noc	5,385.000	1.179	1.250
Income	5,385.000	5.574	3.241
money_left	5,385.000	0.584	0.493
Car	5,385.000	0.753	0.431
Politics	5,385.000	3.945	1.360
Native	5,385.000	0.904	0.295
Weight	5,385.000	77.603	19.720
Smoke	5,385.000	0.286	0.452
Alcohol	5,385.000	1.949	1.070
Meat	5,385.000	3.342	1.110
Health	5,385.000	4.826	1.315
Swb	5,385.000	4.882	1.397
job_satisfaction	5,385.000	4.552	1.887
Friends	5,385.000	0.776	0.417
trust_ggen	5,385.000	3.490	1.517
trust_pgen	5,385.000	4.101	1.322
Environment	5,385.000	4.940	1.439
health_concern	5,385.000	4.479	1.570
health_concernf	5,385.000	4.595	1.505
Markets	5,385.000	3.958	1.414

Risk	5,385.000	3.795	1.435
Freedom	5,385.000	5.012	1.374
Height	5,385.000	171.425	9.661
trustscore_inst	5,385.000	37.462	12.162
trustscore_priv	5,385.000	25.926	6.493
Infoscore	5,385.000	23.866	7.278
N	5,385.000	0.609	0.235
NC1	5,385.000	0.755	0.282
NC2	5,385.000	0.745	0.325
NC3	5,385.000	0.535	0.283
NC4	5,385.000	0.429	0.495
NC5	5,385.000	0.501	0.400
Bmi	5,385.000	26.307	6.003

Appendix A3: Samples and sampling in the different countries: Types of representativeness and methodology (16 countries, all samples, all waves).

Country	Data provider	Sample year	Unmodified sample Size	Representativeness	Survey method	Weighting method	Sample	Recruiting for the panel	Census/Population	Frame of the survey
Australia	Qualtrics	2016	1,001	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	21 mio internet users, 18+ years	No frames
Belgium	GfK	2017/2018	1,002	Online representative for gender, age, region and education	CAWI	No weighting	Quota sampling	Online	10 mio internet users, 18+ years	No frames
Brazil	Qualtrics	2016	1,000	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	93 mio internet users, 18+ years	No frames
Canada	Qualtrics	2016	1,137	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	29.5 mio internet users, 18+ years	No frames
China	Qualtrics	2016	985	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	533 mio internet users, 18+ years	No frames
Denmark	Qualtrics	2017/2018	966	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	5.4 mio internet users, 18+ years	No frames
Denmark	GfK	2015	1,000	F2f representative for gender, age, region	CAWI omnibus	Target	Quota sampling	Offline	4.54 mio internet users, 18+ years	About consumer goods (soft drinks, coffee machines, hearing aids) and crossing the Great Belt Bridge

France	GfK	2015	1,022	F2f representative for gender, age, region	CAWI omnibus	Target	Quota sampling	Online	41.05 mio (population of 16–64 years)	About views on the Ukraine
Germany	Qualtrics	2017/2018	1,535	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	55 mio internet users, 18+ years	No frames
Germany	GfK	2015	1,012	Online representative for gender, age, region	CAWI omnibus	Rim	Quota sampling	Offline and online	55.06 mio internet users, 14+ years	About views on the economy
Hungary	GfK	2015	1,001	F2f representative for gender, age, region	CAWI omnibus	Rim	Quota sampling	Offline	7.35 mio, 15–69 years	Ad hoc, no other frames
Italy	GfK	2015	1,011	Online representative for gender, age, region	CAWI omnibus	No weighting	Quota sampling	Offline and online	35 mio internet users, 18–64 years	No frames
Japan	Qualtrics	2016	1005	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	99 mio internet users, 18+ years	No frames
Russia	Qualtrics	2016	918	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	70 mio internet users, 18+ years	No frames
South Africa	Qualtrics	2016	949	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	43.9 mio internet users, 18+ years	No frames
South-Korea	Qualtrics	2017/2018	1,017	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	43.9 mio internet users, 18+ years	No frames

South Korea	Qualtrics	2016	932	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	11 mio internet users, 18+ years	No frames
UK	GfK	2015	2,033	F2f representative for gender, age, region	CAWI omnibus	Rim	Quota sampling	Online	50.9 mio internet users, 18+ years	About saving and spending habits
USA	Qualtrics	2017/2018	1,012	Online representative for gender, age, region and education	CAWI	Target	Quota sampling	Online	272.4 mio internet users, 18+ years	No frames

Appendix A4: Weighted OLS regression for different nudge clusters.

	Clusters					
	(1)	(2)	(3)	(4)	(5)	(6)
	Overall Approval	Government Campaigns	Information nudges	Default rules	Subliminal ads	Other mandates
Male	-0.0304***	-0.0133***	-0.0240***	-0.0266***	-0.0544***	-0.0653***
	(0.003)	(0.004)	(0.005)	(0.004)	(0.008)	(0.006)
age	-0.0002	0.0008***	0.0004***	-0.0011***	-0.0013***	0.0009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Higher education	-0.0108***	0.0065	-0.0022	-0.0192***	-0.0563***	-0.0015
	(0.004)	(0.005)	(0.005)	(0.005)	(0.009)	(0.007)
Belgium	-0.0720***	-0.0508***	-0.1186***	-0.0780***	-0.0090	-0.0479**
	(0.012)	(0.014)	(0.016)	(0.015)	(0.026)	(0.020)
Brazil	0.0908***	0.0643***	0.0427***	0.1394***	0.1392***	0.0326*
	(0.009)	(0.010)	(0.011)	(0.012)	(0.023)	(0.017)
Canada	-0.0218**	-0.0137	-0.0205	0.0029	-0.0756***	-0.0829***
	(0.010)	(0.012)	(0.013)	(0.013)	(0.022)	(0.017)
China	0.1578***	0.0883***	0.0799***	0.2071***	0.3974***	0.1113***
	(0.009)	(0.010)	(0.011)	(0.011)	(0.020)	(0.017)
Japan	-0.1419***	-0.0841***	-0.1485***	-0.1158***	-0.0710**	-0.3320***
	(0.012)	(0.016)	(0.015)	(0.016)	(0.029)	(0.024)
Russia	0.0118	0.0737***	0.0324**	0.0228*	-0.0406	-0.1186***
	(0.010)	(0.012)	(0.017)	(0.013)	(0.030)	(0.022)
South Africa	0.0618***	0.0562***	0.0257**	0.0837***	0.0708***	0.0538***
	(0.009)	(0.010)	(0.011)	(0.012)	(0.024)	(0.018)
South Korea	0.0403***	0.0343***	0.0567***	0.0570***	0.1989***	-0.1050***
	(0.010)	(0.011)	(0.011)	(0.012)	(0.021)	(0.017)
Denmark	-0.1829***	-0.1703***	-0.2395***	-0.1466***	-0.2597***	-0.1875***
	(0.009)	(0.011)	(0.012)	(0.012)	(0.021)	(0.016)
France	-0.0385***	-0.0401***	-0.0162	-0.0644***	-0.1089***	0.0434***
	(0.009)	(0.011)	(0.012)	(0.012)	(0.023)	(0.016)
Germany	-0.0709***	-0.0652***	-0.0712***	-0.0879***	-0.1042***	-0.0109
	(0.009)	(0.011)	(0.012)	(0.012)	(0.022)	(0.016)
Hungary	-0.1488***	-0.1819***	-0.1685***	-0.1077***	-0.1470***	-0.1941***
	(0.011)	(0.013)	(0.014)	(0.013)	(0.023)	(0.017)
Italy	0.0105	0.0015	-0.0246**	0.0337***	0.0382	-0.0072
	(0.010)	(0.012)	(0.013)	(0.013)	(0.023)	(0.017)
United Kingdom	-0.0217**	-0.0350***	0.0101	-0.0398***	-0.0445**	0.0165
	(0.009)	(0.010)	(0.011)	(0.011)	(0.021)	(0.015)
USA	-0.0847***	-0.0625***	-0.1090***	-0.0524***	-0.1494***	-0.1464***
	(0.012)	(0.014)	(0.016)	(0.015)	(0.026)	(0.021)
2015/2016	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(.)	(.)	(.)	(.)	(.)	(.)
2017/2018	-0.0142**	-0.0250***	-0.0070	-0.0027	-0.0042	-0.0479***
	(0.006)	(0.008)	(0.008)	(0.008)	(0.013)	(0.011)
_cons	0.7333***	0.8129***	0.8429***	0.6870***	0.6287***	0.6402***
	(0.009)	(0.010)	(0.012)	(0.011)	(0.021)	(0.016)
N	20501	20501	20501	20501	20501	20501

| adj. R2 | 0.148 | 0.087 | 0.089 | 0.116 | 0.089 | 0.088 |

Note: Regressions use sample weights. Robust standard errors in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01.

Appendix A5: Nudge approval by gender.
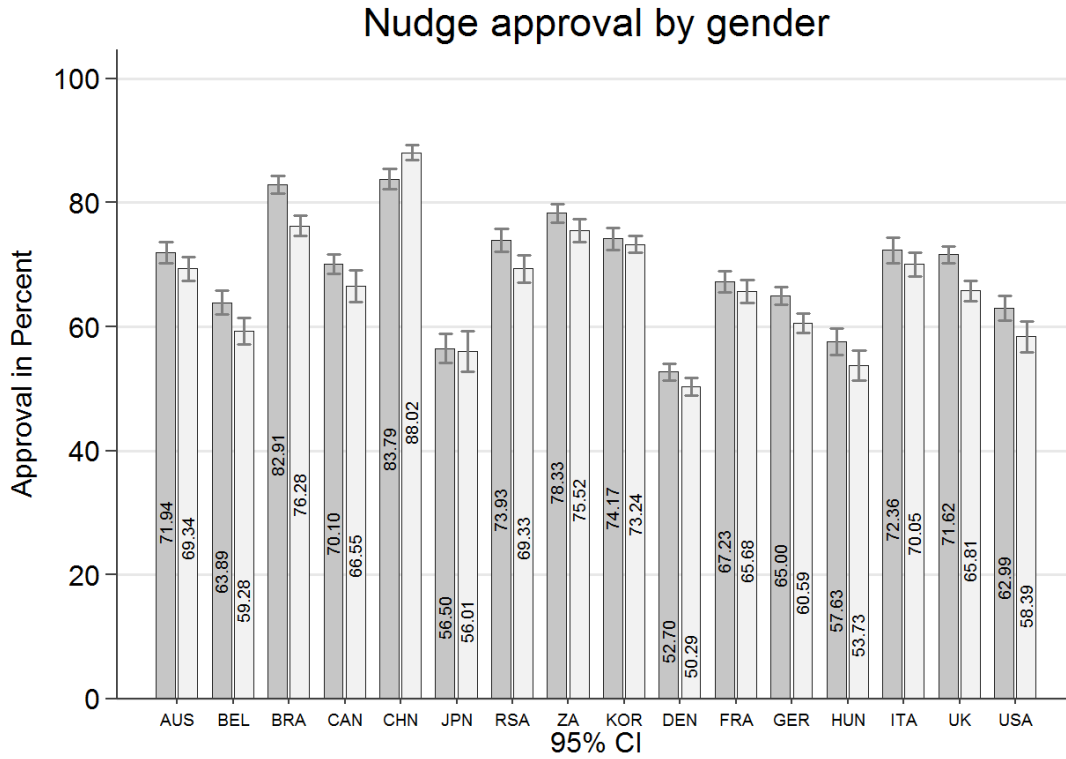
Note: White shading indicates average male approval

Appendix A6: Nudge approval among different time periods for South-Korea (K), Denmark (DK) and Germany (G).

N7 approval

N8 approval

N9 approval

N10 approval

N11 approval

N12 approval

N13 approval

N14 approval

N15 approval