

# PUBLIC HEALTH POLICY: NUDGE THEORY IN A DISCOURSE OF BEHAVIOURAL ECONOMICS

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## ABSTRACT

*The aim of this paper is to present a discourse of behavioural economics with its nudge theory in public health policy. Considering the great number of papers dealing with this phenomenon in the past few years, the study identifies various focus areas and suggests areas for future research using peer-reviewed journal articles. They have been properly selected from the Web of Science and Scopus databases in the three-year period of 2018 to 2020 based on the approach of Hohenstein et al. (2014). The overall effectiveness of the reviewed nudging strategies was over 80%. A range of explored areas such as obesity or addictions is associated with high costs for the health care and social systems and with lowered quality of life. Therefore, this review suggests a movement towards more research and publications in all the focus areas and collecting more data of nudges so that health policymakers and other stakeholders may use their indisputable potential.*

**Keywords:** Behavioural economics, health policy, nudges, food habits, cognitive biases, treatment adherence, health prevention

**JEL Classification:** I12, I18

## 1 INTRODUCTION

The topic of behavioural economics is reflected in scientific discourse with increased frequency.

The psychological concept of homo oeconomicus as a rational and selfish individual with relatively stable preferences and the traditional approach that behaviour change should be achieved by informing, convincing, making incentives or penalizing people have been challenged (Thaler & Sunstein, 2009). Behaviour varies across time and space, and is subject to cognitive biases, emotions and social influences. Decisions are the result of less deliberate, less linear and less controlled processes. Behavioural economists identify an economic model and point out the violation of its assumptions due to human cognitive processes. They use these deviations to create an alternative theory, supplement an existing one or create a new model. This is followed by testing the implications and predictive ability of the new model in comparison with the original one (Camerer and Loewenstein, 2004).

The purpose of this paper is to provide a discourse of behavioural economics with its nudge theory in public health policy and identify possible future research opportunities.

### **The following research questions have been set:**

RQ1: How has the research of behavioural economics in health policy developed in the recent years?

RQ2: Where are the opportunities for future research?

This paper is organized in the following structure: Section 2 presents the state of the art of the behavioural theory of economics. Section 3 is devoted to the review method. The findings are given in Section 4. Section 5 includes a summary of the review and a discussion. The final Section 6 is the conclusion, containing recommendations and directions for future research in this area.

## 2 STATE OF THE ART

Kahneman (2011) uses a dual-system theoretical framework in order to explain why our judgments and decisions often do not conform to formal notions of ratio-

nality. Human behaviour tends to maintain the status quo bias unless the incentive to do otherwise is strong. (Kahneman; Knetsch and Thaler, 1991). Inertia, procrastination, and a lack of self-control are issues that make changes in default options from “opt-in” to “opt-out”. This way, for instance, people are more likely to donate organs when they opt-out, rather than opt-in (Johnson and Goldstein, 2004).

In spite of the fact that neoclassical economic theory claims that trust in strangers is irrational, trust and trustworthiness can be widely observed across societies. Trust is associated with the concept of betrayal aversion. People take greater risks when they are faced with a given probability of bad luck than when they are faced with the same probability of being cheated by another person. (Bohnet et al., 2008).

People typically value honesty, tend to have strong beliefs in their morality and want to maintain this aspect of their self-concept (Mazar et al., 2008). However, lack of social norms is a general driver of dishonest behaviour, along with high benefits and low costs of deception, a lack of self-awareness, as well as self-deception (Mazar and Ariely, 2006).

We often overestimate the probability of positive events and underestimate the probability of negative events happening to us in the future (Sharot, 2011). For example, the risk of getting a disease is underestimated whilst future success in the recovery is overestimated.

Gouldner (1960) claims that social norms signal appropriate behaviour or actions taken by the majority of people. Along with informational feedback (e.g., the amount of money saved by not drinking alcohol), descriptive normative feedback (e.g., how one’s drinking level compares to the national average) is often used in health behaviour change programmes (Diclemente et al., 2001).

Loewenstein (2000) coined the inability to appreciate fully the effect of emotional and physiological states on decision making as the hot-cold empathy gap. Hot states include negative emotions associated with high levels of arousal (e.g., anger or fear) to feeling states (e.g., pain) and drive states (e.g., hunger, thirst, craving related to addiction or sexual arousal).

Men in a “cold”, “unaroused” state often predict that they will use a condom during their next sexual encounter, but when they are in an aroused “hot state” they may fail to do so (Ariely and Loewenstein, 2006).

The prospect theory of Kahneman and Tversky (1999) experimentally challen-

ged the hypotheses of the models of expected utility in deciding on uncertainties and choices between the present and the future. It follows from the theory that the perceived loss is more significant than the equivalent gain, and that a certain gain is preferred to a more probable gain. Our willingness to take risks is context-dependent and thus it is influenced by the way in which choices are framed. Giving up is more painful than the pleasure from receiving. The loss aversion results in consumer self-control of spending (Prelec and Loewenstein, 1998). According to classical economics, consumer preferences should be independent of the initial state, complete, independent of the presented order, transitive and higher amounts of goods should always bring higher benefits (Slovic, 1995).

This is, however, denied by a number of effects. The “framing” effect proves that the way an individual’s possibilities are presented to them influences their preferences. People react in different ways depending on whether the choice is presented as a loss or a profit (Plous 1993). If the argument is positive, people tend to take risks, while if it is framed negatively, people avoid risk (Tversky & Kahneman 1981). The effects of option framing on consumer choices show that consumers choose a greater number of product features when they are in a “delete” rather than an “add” frame (Biswas, 2009).

This can be demonstrated by several findings below. Presenting framed calorie information led to an approximately 5 percent decrease in calories consumed (Gustafson and Zeballos 2020). Patients were less likely to miss a doctor’s appointment if they made a written commitment or if they received information about the participation of other patients (Martin et al., 2012). People protected themselves with sunscreen if the call to use it focused on its benefits (e.g., healthy, young-looking skin) rather than the risks (skin cancer, prematurely old skin) (Detweiler et al., 1999). Children who ate meat at the start of a meal were more likely to be overweight than those who started eating vegetables at the beginning of a meal (Tani et. al-, 2018).

The phenomenon of choice overload is another example of humans’ bounded rationality. Overchoice is associated with unhappiness (Schwartz, 2004), decision fatigue, taking the default option but also choice deferment including the decision on not purchasing a product (Iyengar and Lepper, 2000).

Chernev et al. (2015) identified four key factors (choice set complexity, decision

task difficulty, preference uncertainty, and decision goal) which reliably and significantly moderate the impact of the assortment size on choice overload. Choice overload can be mitigated by simplifying selection attributes or the number of available options (Johnson et al., 2012).

People sometimes deliberately choose not to obtain information or knowledge that is freely available (Golman et al., 2017). Active information avoidance includes physical avoidance, inattention, the biased interpretation of information and even some forms of forgetting (Golman et al., 2017). Information avoidance is sometimes strategic and may bring immediate benefits for people if it prevents the negative (generally psychological) consequences of knowing the information. More serious cases of information avoidance happen when people fail to return to clinics to get HIV test results (Sullivan et al., 2004).

Ariely (2008) also carried out a psychological experiment showing the effect of asymmetrically dominated choice (also known as the decoy effect). The decoy effect works when people's preference for one option over other changes as a result of adding a third (similar but less attractive) option.

By means of the decoy effect, Maltz and Sarid (2020) increased influenza vaccination uptake rates. Decisions depend on the starting point to which the alternatives are compared. This is referred to as the anchoring effect. As the starting point changes, preferences change too. This experience is applied in libertarian paternalism, based on the assumption that the appropriate setting of decision-making options (nudges) can circumvent the shortcomings of heuristics while maintaining freedom of decision (Thaler, 2015). According to Thaler and Sunstein (2008), a nudge is *“any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.”*

For instance, health nudges may promote healthier food choices and reduce the health care costs of obesity. They include, for instance, simplification of information and choices, framing and priming of messages, defaults, positioning of products in supermarkets and cafeterias, self-pledges, and multiple elements of purposeful choice architecture applied to physical or virtual contexts, educational messages

in movie theatres, calorie and warning labels, sweet-free supermarket cashiers or meat-free days in cafeterias. The salience of options can be handled, for example, by rearranging the environment. Moving water bottles closer to the cashier in a cafeteria increased the salience and convenience of this healthier drink choice and thereby significantly raised water sales (Thorndike et al. 2012).

Nudges generally can be defined by means of the “checklist of influences on our behaviour” – the so called MINDSPACE mnemonic (Dolan, 2010):

Messenger	We are heavily influenced by who communicates information.
Incentives	Our responses to incentives are shaped by predictable mental shortcuts, such as strongly avoiding losses.
Norms	We are strongly influenced by what others do.
Defaults	We “go with the flow” of pre-set options.
Salience	Our attention is drawn to what is novel and seems relevant to us.
Priming	Our acts are often influenced by subconscious cues.
Affect	Our emotional associations can powerfully shape our actions.
Commitments	We seek to be consistent with our public promises, and reciprocate acts.
Ego	We act in ways that make us feel better about ourselves.

### 3 DATA AND METHOD

The methodology used in this study is based on the review approach of Hohenstein et al. (2014). This approach comprises time horizon, database selection, article selection and article classification.

#### 3.1 TIME HORIZON

The literature review comprises the date of publication of the journal articles between the beginning of 2018 and the end of 2020. This time framework was selected on the grounds of an increase in academic journal publications in current years and the need to perform the review analysis.

### 3.2. SELECTION OF DATABASES

This paper employed the databases of Web of Science and Scopus to identify current sources on behavioural economics in health policy. The efforts were made to include the most relevant articles. The review, however, does not declare that the selected databases are exhaustive in nature.

### 3.3 ARTICLE SELECTION

The selection took place as follows. Keywords for search in the online databases contained “Behavioral Economics in Health Policy”. The abstracts and conclusions of each article were studied in order to determine the relevance to the researched field. Non-relevant articles, duplicates, literature reviews, conference articles and articles in languages different from English were excluded. This process resulted in 33 articles for review (8 in 2018, 9 in 2019 and 16 in 2020).

### 3.4. ARTICLE CLASSIFICATION

The articles were systematically structured into 14 focus areas (in alphabetical order): Alcohol, Breastfeeding, Covid-19 Restriction Adherence, Eating Habits, Gambling, Health Insurance, Health Prevention, Healthcare Data, Obesity, Prescription, Smoking, Suicide and Euthanasia, Treatment Adherence and Vaccination.

## 4 RESULTS

To explore the field of study, 33 articles were analyzed by journal, country of research, focus area and findings. Figure 1 and Table 1 in the appendix summarize the article selection process and the key features of the reviewed articles.

Over 40% of articles reviewed were elaborated in the United States, six were written in the United Kingdom, two in Spain, two in Iran and one in Australia, Japan, China, Canada, Italy, the Netherlands, Switzerland, Austria and Hungary each. The research for one study was carried out in the USA and Australia (Keane et al. 2020).

The majority of the studies focused on nudging interventions supporting healthy eating habits (Cerezo-Prieto and Frutos-Esteban, 2020; Hamdi et al., 2020; Roberto, 2020; Banerjee et al., 2020, Gustafson and Prate, 2019; Sogari et al., 2019, De Marchi et al., 2019; Krpan et al., 2019; Loeb et al., 2018; Polacsek et al., 2018; Acton and

Hammond, 2018), health prevention (Huf, 2020; Ali et al., 2018; Martin-Moreno et al., 2020; Askelson et al., 2018) and adherence to medical and therapeutic regimen (Emoto et al., 2020; Savani et al., 2019). These studies applied nudges changing the choice architecture with positive outcomes. According to Cerezo-Prieto and Frutos-Esteban (2020), the acceptance of public health policies is associated with healthy eating and the most socially committed behaviours.

A few articles dealt with tackling addictions (Petticrew et al., 2020; Swanton, 2019; Soofi et al., 2020; Ferrer et al., 2018; Witman et al., 2018; Németh et al., 2018) and obesity (Soofi et al., 2020; Smith and Toprakkiran, 2019; Graham et al.; 2019).

Three articles pointed out risks of behavioural approaches in health policy concerning community (the social and cultural contexts of the population) and organisational strategies (Martin-Moreno et al., 2020), abusing healthcare data for risk stratification or pricing (Prainsack, 2020) or overlooking the broader social, economic and political architecture shaping individual choices (Smith and Toprakkiran, 2019).

The reviewed articles were published in a wide range of journals. For instance, two were published in *Nutrients* and other two in *Policy Studies*.

The studies employed a wide range of behavioural economics approaches. In the following sections, the results of research will be summarized based on the focus areas.

#### 4.1. EATING HABITS AND OBESITY

The reviewed studies employed a wide range of nudging approaches (mainly financial as well as nonmonetary nudges, defaults, labelling, social norms and priming). Psychological health claims (Sogari, 2019) had potential to nudge people towards healthy choices.

Roberto (2020) discussed psychological vulnerabilities that made it difficult for people to maintain healthy eating habits in modern food environments. To reverse the worldwide obesity epidemic, policies are needed to make the food environment healthier.

Krpan et al. (2019) proposed the concept of behavioural spillovers and spillunders: “*behavioral spillovers refer to the influence that a given intervention targeting behavior 1 exerts on a subsequent, non-targeted, behavior 2. A nudge to exercise*



more, for example, could lead people to eat more or less. Spillovers can operate backward; that is, the expectation of behavior 1 influences behavior 0 that precedes it. We define such a possibility as a “spillunder. Any policy intervention directed at behaviors that are not undertaken immediately when the person encounters the intervention can therefore create spillunder effects.” Spillunders shape everyday actions ranging from exercise and healthy eating to pro-environmental behaviour and various intellectual and moral pursuits. Figure 2 in the appendix gives the overview of empirical findings on behavioural spillunders (Krpan et al. 2019).

Positive outcomes of nudges were also observed both in a school cafeteria environment by Hamdi et al. (2020) and in a supermarket by Polacsek et al. (2018). The pilot study of Polacsek et al. (2018) showed that financial incentives increased fruit and vegetables purchases among low-income families. Participants used loyalty cards that provided them with a 5% discount on all purchases during a 3-month baseline period. This was followed by a 4-month nudged intervention (a same-day coupon at checkout for half-off eligible fresh, frozen, or canned fruit and vegetables over four months). Financial incentives and taxes were applied by Banerjee et al. (2020). The authors showed that lower taxes (compared to 10% regular tax) and rebates (cash backs) on healthy food items positively impacted purchase of healthy food among low socioeconomic status parents. At the same time, Loeb et al. (2018) recorded positive results applying a healthier default option as a behavioural intervention to optimize elementary school lunch choices via parent-driven decisions.

De Marchi et al. (2019) focused on nonmonetary incentives to raise children’s vegetable consumption during school lunch. The positive effect persisted even after the provided incentives ended. The authors conclude that “*Gaining a better understanding of effects of nonmonetary incentives can help in the design of nutrition and health policies aimed at improving the dietary behavior of children and potentially reducing childhood obesity.*” (De Marchi et al., 2019)

Considering labelling, Gustafson and Prate (2020) argued that tailoring labels to high-risk communities which have higher rates of diet-related diseases than the overall population may increase the label’s effectiveness. On the other hand, Acton and Hammond (2018) observed that the overall effect of front-of-package nutrition labelling was much less statistically significant than taxation, which profusely reduced the consumption of sugary drinks.

Smith and Toprakkiran (2019) analyzed the development of the policy debate and measures around obesity in the UK, concluding that policy measures are predominantly focused on choice despite growing recognition of the structural determinants of obesity, and the governments are thus able to avoid threatening free markets and existing economic interests. Graham et al. (2019) assessed the effect of general practitioners' behavioural interventions to obese patients on socioeconomic equity. More deprived people seem more likely to accept support but attend less frequently and lose less weight than more affluent patients. However, when general practitioners offer advice to lose weight, subsequent use of support does not differ by levels of socioeconomic deprivation, but weight loss is more statistically significant among more deprived population.

Soofi et al. (2020) observed that the long-run patience and time inconsistent preferences were significant determinants of obesity. The probability of being obese increased by 11 percentage points in present-biased individuals compared to future-biased individuals.

#### 4.2. ADDICTIONS

*Smoking.* Time and risk preferences are important determinants of smoking behaviour. (Soofi et al., 2020). For people higher in behavioural disengagement may be difficult or stressful to cease smoking because they do not expect to succeed (Carver et al., 1989) or because they are motivated to fulfil craving and avoid nicotine withdrawal (Loewenstein, 1999). However, individuals low in behavioural disengagement may effectively manage stress through other means (Hall et al., 2002) or may be more comfortable experiencing stress (Tamir, 2009), negating the need to rely on smoking for stress reduction. Successful smoking cessation interventions were performed in two reviewed articles. Nudged participants were more likely to use proactive telephone support (the Quitline) and complete counselling sessions. Whilst Witman et al. (2018) tested the effectiveness of financial incentives across 12 programmes in five US states with the goal of reducing the burden of smoking-related chronic diseases, Németh et al. (2018) evaluated potential health and economic returns from implementing smoking cessation interventions in Hungary.

*Alcohol.* Petticrew et al. (2020) claim that “*policymakers should be aware of how dark nudges and sludge are used by the alcohol industry to promote misinformation*”

*about alcohol harms to the public.*” Such approaches include social norming (using statements that “most people” are drinking) and priming drinkers by offering verbal and pictorial cues to drink but at the same time they warn about alcohol harms. Sludge, such as the use of particular fonts, colours, and design layouts, appears to use cognitive biases to make health-related information about the harms of alcohol difficult to access, and enhances exposure to misinformation.

*Gambling.* In order to mitigate the issue of gambling expenditures, Swanton et al. (2009) suggest that financial institutions could implement products for customers to enhance management of expenditure employing behavioural economics and psychological approaches.

#### 4.3. OTHER HEALTH BEHAVIOURAL AREAS

*Health prevention.* Huf et al. (2020) showed that text message reminders improve screening participation. This trial was used to design effective policy for cervical screening. The National Health System implemented text message reminders across all London boroughs between September 2018 and March 2019. According to figures published by Public Health England, attendance increased by 4.8%, which was the equivalent of 13,400 additional screenings (Ruwende, 2019). To improve cancer prevention and reduce morbidity and mortality, Martin-Moreno et al. (2020) advised to opt for multilevel strategies based on the social and cultural determinants of health, using structural and behavioural approaches, rather than only the latter, as has been done until now.

*Prescription.* Interventions to prevent from overprescribing antibiotics performed by Gong et al. (2019) were all cost-effective relative to the control group, assuming an existing electronic health record is in place.

*Healthcare data.* Patient data help to improve individual and population health outcomes. Yet they should be used not for risk stratification or pricing, but to target services and improve infrastructures. Exposing people to data-driven practices such as personalized marketing is highly problematic when it could interfere with the satisfaction of people’s fundamental needs (Prainsack 2020).

*Health insurance.* Keane et al. (2020) developed an econometric mixture-of-experts model that incorporates heterogeneity in consumers’ preferences and in their health insurance choice processes. Ali et al. (2019) argued that financial incentives

and disincentives in insurance designs might have a wide range of effects on health seeking, behaviours and medication use, and health outcomes among people with diabetes, at least in the short term.

*Vaccination.* Guo et al. (2020) assume that understanding behavioural differences in the vaccination decision and preference for a vaccine is crucial for designing more effective policy to increase the vaccination rate. The risk of side-effects, duration of protection and protection rate were shown to influence adults' vaccination decisions and preferences for HBV vaccination. High risk aversion was positively associated with the decision to be vaccinated.

*Treatment adherence.* Commitment contracts help people make better choices in the face of their inherent biases (Savani, 2019). The risk preferences of patients with diabetes have profound effects on the progression of complications (Emoto et al., 2020).

*COVID-19 restriction adherence.* Soofi et al. (2020) argue that myopic individuals (i.e., those with present bias who put a greater emphasis on the here and now) are less likely to adhere to COVID-19-preventive behaviours, including staying at home, adherence to social distancing, wearing masks and hand washing. To reduce the spread of the virus in the short term by encouraging people to adhere to the stay-at-home policies, the researchers proposed providing free internet access at home, temporary suspension of loan repayments and benefit packages for vulnerable groups.

*Breastfeeding.* Perez-Escamilla (2020) reminds that although there is abundant knowledge on the major health and social benefits of breastfeeding, breastfeeding behaviours are still suboptimal on a global scale. Behavioural economics principals and social marketing interventions via social media should be included in a solution to this health policy problem.

*Suicide and euthanasia.* Psycho-social indicator factors such as moral and social norms, religious and political ideology or social identity (Sunstein, 1996) determine policy directions for suicide and euthanasia. Proulx and Savage (2020) assume that the reflection of religious and cultural attitudes and beliefs of society determines and will determine policy directions for (assisted) suicide and euthanasia.

## 6 CONCLUSION

The study shows that nudges are relatively new problem emerging in contemporary behavioural economic theory. An important part of this is health nudging which has significant potential for positive decisions. It may encourage the individuals to change their behaviour and preferences, and to improve their health through this change. The growing importance is matched by the dynamic growth of scientific publications in the past years (Table 2 and Graph 1 in the appendix). High obesity levels are an increasing concern for policymakers as they are associated with high costs in the health care system and reduced well-being and quality of life. The relevant findings of the research studies were accentuated, emphasizing their conceptualization, determinants as well as positive, negative and mixed outcomes.

The following research questions (RQ) have been set: *How has the research of behavioural economic in health policy developed in the recent years? Where are the opportunities for future research?* The collected data suggest that the research is subject to rising interest in more economically developed countries combating the problem of obesity, nutrition-related diseases, health prevention, treatment adherence and addiction quitting. The study suggests a movement towards more research and publications in all these focus areas and collecting a greater deal of data on interventions so that health policymakers and other stakeholders may employ their indisputable potential. The research should be developed in depth also in Central and Eastern European countries, Asia, or Latin America (such as Mexico), where the rate of overweight and obesity is high.

Considering the overall effectiveness of the behavioural strategies, positive outcomes prevailed. In this place, however, it is necessary to mention timely limitations of nudge-based interventions (Ozturk et al., 2020). Arno and Thomas (2016) also point to the possible fact that only positive results are published, whilst insignificant findings remain uncovered. This fact cannot be ruled out. The author is aware of certain limitations of this research. First of all, it is a fact that we focused only on the Web of Science and Scopus databases and on a three-year period. The reasons for this choice are given in the article. The fact that we use qualitative analysis may also be a limiting factor. This choice was influenced by the objective size of the research set. Despite these limitations, the results of the research show

that behavioural economics is becoming an important instrument for increasing the effects of public health policy in combating diseases of civilization and addictions, related to unhealthy lifestyle, promoting citizens to prevention, vaccination or treatment adherence. Although the solutions offered by the behavioural theory of economics and its nudge theory cannot be omnipotent, appropriately chosen health nudges can have a positive effect on health policy. In addition, if they are shown to lead to the required behavioural change and improve quality of life while reducing the economic burden on the public health and social systems, then the benefits to society are potentially high. Detailed knowledge of the problem opens new opportunities for public health policies to “nudge” the individuals concerned towards a socially and personally desirable change in their behaviour.

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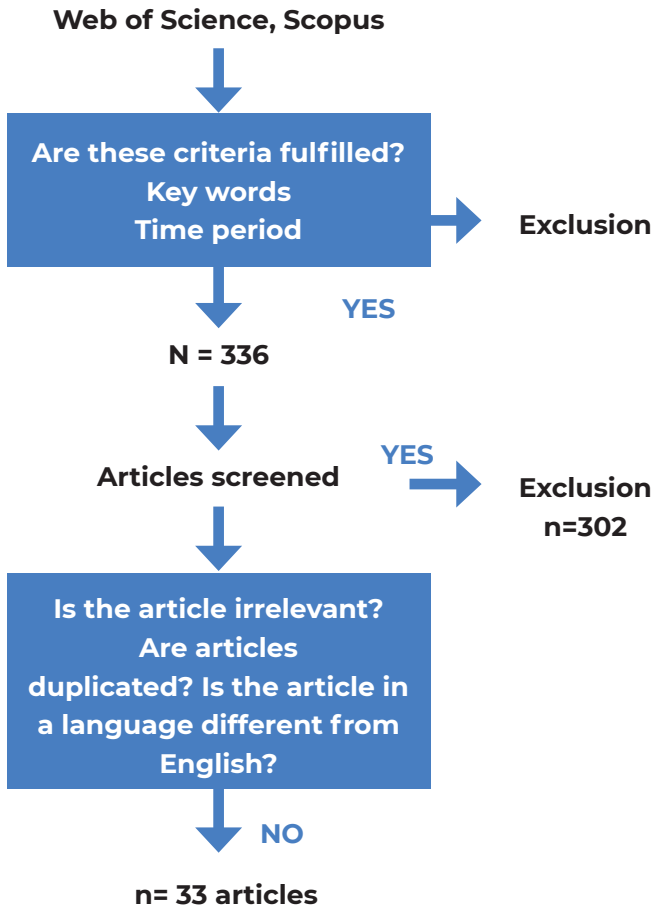
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## APPENDICES

**Fig. 1:** »Summary of article selection process



**Fig. 2:** »Overview of empirical findings on behavioural spillunders

Study	Behavior 0	Behavior 1	Finding	Spillunder Type
Masicampo and Baumeister, 2011	Solving anagrams	Generating names of sea creatures without forming a plan (unfulfilled goal) vs. generating names of sea creatures with forming a plan (fulfilled goal) vs. generating names of sea creatures with vague description of the generation task (control)	Participants expecting to generate names of sea creatures without forming a plan (unfulfilled goal group) solved fewer anagrams than those in the control group and in the fulfilled goal group	Extinguishing
Tamir and Ford, 2012	Listening to angry music clips	Confronting a tenant about paying the rent vs. nurturing a healthy relationship with the tenant (control)	Expecting to confront a tenant about paying the rent makes people more likely to listen to angry music than in the control group	Enhancing
Polyv et al., 1994	Eating cookies	Engaging in an anxiety inducing behavior (delivering a 2-min speech) vs. rating fabrics on tactile dimensions (control)	Expecting to give a 2-min speech vs. control increases cookie consumption, but only for restrained eaters	Enhancing
Morsella et al., 2010	Meditation	Generating names of all the states of the United States	Expecting to write down the names of all US states made people less able to meditate due to experiencing intrusive thoughts	Extinguishing
Urbszat et al., 2002	Eating cookies	Diet vs. no diet	Expecting to start a diet immediately after the experiment increased cookie consumption, but only for restrained eaters	Enhancing
Kopp et al., 2015	Assessment of reading comprehension of a scientific text	Focusing on behaviors that participants need to undertake after the experiment vs. removing attention from those behaviors (e.g., by making a list of the components of an automobile)	Participants who were thinking about the short-term plans they aimed to accomplish after the experiment (vs. control) performed worse on reading comprehension of a scientific text	Extinguishing
Cascio and Plant, 2015	Deciding on whether to endorse a black or a white candidate for the position of a new police officer	Engaging in a moral behavior (e.g., taking part in a fundraiser or donating blood) vs. absence of anticipated moral behavior (control)	Participants who anticipated performing a moral action in the future were more likely to reveal their racial prejudices and to discriminate a job candidate on a racial basis	Enhancing
Cody et al., 2015	Word recall task	Anticipating to undertake an anxiety inducing behavior (delivering a 5-min speech in front of the experimenter and a video camera) vs. no expectations to engage in anxiety inducing behaviors (control)	Participants with social anxiety who anticipated giving a 5-min speech falsely recalled more anxiety-related words compared to those in the control group	Enhancing

Source: Krpan et al. (2019)

**Tab. 1:** »Behavioural Economics in Health Policy (Source: Own processing)

Authors	Year	Journal	Country	Focus area	Findings
Petticrew, M. et al.	2020	Milbank Quarterly	United Kingdom	Alcohol	Alcohol industry bodies use dark nudges and sludge, which utilize consumers' cognitive biases to make health-related information about the harms of alcohol difficult to access.
Perez-Escamilla, R.	2020	Social Science & Medicine	United States	Breast-feeding	To support breastfeeding, social marketing interventions through social media need to be designed following social network science and behavioural economics principles.

Pokračování tabulky na straně 80.

Authors	Year	Journal	Country	Focus area	Findings
<b>Soofi, M. et al.</b>	2020	Applied Health Economics and Health Policy	Switzerland	Covid-19 restriction adherence	People may behave irrationally during the COVID-19 pandemic due to present bias, status quo bias, framing effect, optimism bias, affect heuristic and herding behaviour. It may be helpful in developing and implementing nudges to reduce the spread of COVID-19.
<b>Cerezo-Prieto, M., Frutos-Esteban, F. J.</b>	2020	Revista Española de Salud Pública	Spain	Eating habits	The youngest students who were more supportive of the political right and the religious practitioners had the worst eating habits.
<b>Hamdi, N. et al.</b>	2020	International Journal of Environmental Research and Public Health	United States	Eating habits	Nudge interventions consisting of cafeteria decorations, creative names, social norming taste tests, and flavour station components can improve vegetable selection and fruit consumption in school meal programs.
<b>Roberto, C. A.</b>	2020	American Psychologist	United States	Eating habits	Supporting healthy eating habits and reversing the worldwide obesity epidemic will occur only if our food environments are changed in substantial ways, largely through policy changes. Such policies include restrictions on food marketing, requiring uniform front-of-package nutrition labelling, changing unhealthy food and beverage defaults to healthy ones, and taxing unhealthy foods and beverages.

*Pokračování tabulky na straně 81.*



Authors	Year	Journal	Country	Focus area	Findings
Gustafson, C. R. and M. R. Prate	2019	Nutrients	United States	Eating habits	Front-of-package labels that are tailored to the local community are more effective than generic labels.
De Marchi, E. et al.	2019	Journal of Consumer Affairs	Italy	Eating habits	Nonmonetary incentives in increasing children's vegetable consumption during lunch at school persisted several weeks after the provision of the incentives ended.
Krpan, D. et al.	2019	Frontiers in Psychology	United Kingdom	Eating habits	Spillovers have implications for any policy directed at behaviours that involve future anticipation. They are spillovers operating backward (i.e., the expectation of behaviour 1 influences behavior 0 that precedes it) through six representative mechanisms: executive functions, moral licensing and moral cleansing, emotion regulation, energization, construal level, and savouring and dread.
Loeb, K.L. et al.	2018	Journal of School Health	United States	Eating habits	Making the default lunch option healthier, while providing parents the opportunity to access and choose from the standard school menu for their child, would yield more frequent selection of healthier items than when the default option was suboptimal.

*Pokračování tabulky na straně 82.*

Authors	Year	Journal	Country	Focus area	Findings
Banerjee, T. et al.	2020	Scientific Reports	United States	Eating habits	Under the lower tax and rebate treatments, low socioeconomic status parents bought more healthy food and less unhealthy food.
Polacsek, M. et al.	2018	Journal of Nutrition Education and Behavior	United States	Eating habits	Financial incentives for F&V are an effective strategy for food assistance programs to increase healthy purchases and improve dietary intake in low-income families.
Acton, R. B. and D. Hammond	2018	Appetite	Canada	Eating habits	There was a trend for the "high sugar" label to reduce the likelihood of selecting a sugary drink ( $p = 0.11$ ) and encouraging participants to select drinks with less free sugar ( $p = 0.11$ ).
Sogari, G. et al.	2019	Journal of School Health	United States	Eating habits	Making the default lunch option healthier, while providing parents the opportunity to access and choose from the standard school menu for their child, would yield more frequent selection of healthier items than when the default option was suboptimal.
Swanton, T.B. et al.	2019	International Gambling Studies	Australia	Gambling	Behavioural economics may provide promising frameworks to guide the development of policies to assist customers in limiting their gambling to affordable levels.
Keane et al.	2020	Journal of Econometrics	United States, Australia	Health insurance	Policies that simplify consumers' choices of Medicare Part D plans offer small average benefits (helping some people but harming others).

*Pokračování tabulky na straně 83.*

Authors	Year	Journal	Country	Focus area	Findings
Huf et al.	2020	Preventive Medicine	United Kingdom	Health Prevention	Text message reminders improve cervical screening participation.
Ali, M. K. et al.	2018	Current Diabetes Reports	United States	Health prevention	Low-intensity nudges (telephonic coaching based on exercising, modifying diets, and quitting smoking) resulted in with small improvements in weight but large improvements in screening and testing for diabetes and quit rates of smoking.
Martin-Moreno, J. M. et al.	2020	Molecular Oncology	Spain	Health prevention	Individual interventions should be complemented by community and organisational strategies, considering the social and cultural contexts of the population and ensuring equity of access to healthy living.
Askelson, N. M. et al.	2018	Health Promotion Practice	United States	Health prevention	School-based policy, systems and environmental interventions targeting healthy eating behaviours may play a role in preventing obesity in children and adolescents.
Prainsack, B.	2020	Policy Studies	Austria	Healthcare data	Healthcare data should be used to build better institutions, instead of trying to solve problems through tackling individual behaviour.
Soofi, M. et al.	2020	International Journal of Social Economics	Iran	Obesity	There was a significant correlation between obesity and both the long-run patience and present-biased preferences of participants.

Authors	Year	Journal	Country	Focus area	Findings
Smith, M. and N. To-prakkiran	2019	Policy Studies	United Kingdom	Obesity	The overall effectiveness of nudge policies is limited because the broader social, economic, and political architecture shaping individual choices is ignored.
Graham, J. et al.	2019	BMC Medicine	United Kingdom	Obesity	When general practitioners actively offer brief opportunistic interventions to unselected patients who are obese, more deprived people seem more likely to accept support but attend less frequently and lose less weight than more affluent patients. But when GPs offer advice to lose weight, subsequent use of support does not differ by levels of socioeconomic deprivation, but weight loss is greater among the more deprived people.
Gong, C. L. et al.	2019	Journal of General Internal Medicine	United States	Prescription	Behavioural economics interventions effectively reduced the rates of inappropriate antibiotic prescriptions for acute respiratory infections. Each intervention led to lower costs and higher QALYs.
Soofi, M. et al.	2020	Iranian Journal of Public Health	Iran	Smoking	Time and risk preferences had statistically significant direct correlations with smoking. Policies that increase the immediate costs of cigarette smoking or the immediate benefits of smoking cessation are likely to have a greater impact on reducing the prevalence of cigarette smoking.

*Pokračování tabulky na straně 85.*

Authors	Year	Journal	Country	Focus area	Findings
Ferrer, R. et al.	2018	Journal of Economic Psychology	United States	Smoking	Cigarette taxes may be most effective for facilitating cessation when accompanied by supplementary interventions to deter goal disengagement.
Witman, A. et al.	2018	Health Services Research	United States	Smoking	Financial incentives are a promising policy lever to motivate behavioural change for smoking cessation.
Németh, B. et al.	2018	Addiction	Hungary	Smoking	The introduction of a social marketing campaign and the doubling of the reach of existing group-based behavioural support therapies and proactive telephone support seem cost-effective in smoking cessation.
Proulx, D. and D. A. Savage	2020	Social Indicators Research	Netherlands	Suicide and euthanasia	The legal system reflects the religious and cultural attitudes and beliefs of society which is consequential in determining policy directions for suicide and euthanasia.
Emoto, N. et al.	2020	Diabetes Metabolic Syndrome and Obesity-Targets and Therapy	Japan	Treatment adherence	The incidence of irrational responses increased with age and was associated with educational level. It was significantly higher in diabetes patients with retinopathy than in those without retinopathy.
Savani, M. M.	2019	Journal of Behavioral and Experimental Economics	United Kingdom	Treatment adherence	The commitment contract can significantly improve attendance ( $p = 0.05$ ) and completion rates ( $p = 0.032$ ). The contract works especially well for people with more myopic health attitudes.

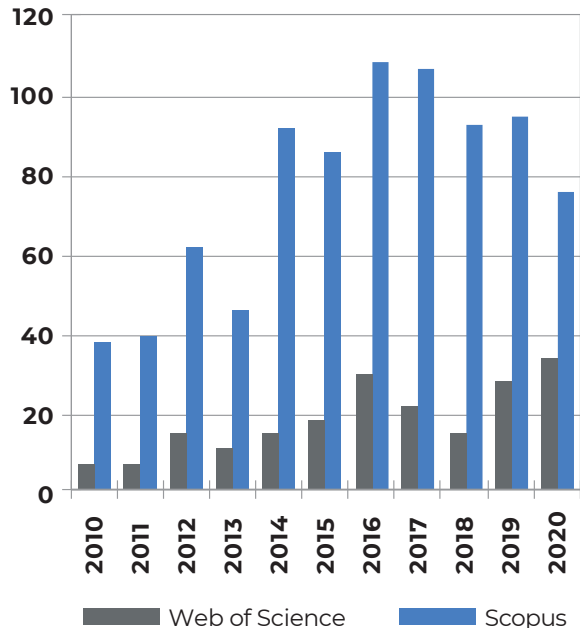
*Pokračování tabulky na straně 86.*

Authors	Year	Journal	Country	Focus area	Findings
Guo, N. et al.	2020	Vaccines	China	Vaccination	Individuals with lower time discount rates, non-overconfidence, or higher risk aversion were more likely to choose a hepatitis B vaccine. Lower risk aversion individuals showed a higher preference for lower risk of side-effects. Lower time discount rate individuals showed a higher preference for longer protection duration. Non-overconfidence individuals preferred higher hepatitis B protection and were willing to pay more.

**Tab. 2»**Search Results of “Health Nudges”

Year	Web of Science	Scopus
2010	6	37
2011	6	38
2012	14	61
2013	10	45
2014	14	91
2015	17	85
2016	29	108
2017	21	106
2018	14	92
2019	27	94
2020	33	75

**Graph 1»**Search Results of “Health Nudges”



Source: Own processing