



Nudging in Public Policy and Public Management: A scoping review of the literature.

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ABSTRACT

As the topic of behavioural economics and nudging made its way to the public sector and into public policy, the academic literature on the topic grew simultaneously (Bogliancino et al., 2016). The question now, almost a decade after Thaler and Sunstein's seminal publication "Nudge: improving decisions about health, wealth, and happiness" (2008), is how far the research on nudging as a policy tool has come. Which policy areas are covered by research on the effectiveness and usage of nudging? What conceptual lenses are used in this research? Which methods are applied? What heuristics are most commonly focused on whilst applying and studying nudges? Which goals are nudges supposed to attain? What types of outcomes of nudging can be discerned from the literature? A scoping review technique is applied in this paper to find answers to these and other questions. Such a scoping study is defined as a "form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research [...] by systematically searching, selecting and synthesizing existing knowledge." (Colquhoun et al., 2014, p. 1294) Through this review of over 300 articles from the nudging literature, this paper informs researchers and practitioners about the current state of the literature around nudging as a novel policy tool.

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1. INTRODUCTION¹

The decision environment of citizens may be constructed in such a way that it enables them to make more desirable choices (Hollands et al., 2013; Thaler and Sunstein, 2008). One popular example of altering people's decision environment and nudging them towards healthier decisions is to strategically order the position of food items in the supermarket or a restaurant (cf. Arno and Thomas, 2016; Bucher et al, 2016). While nudge theory and more particularly, nudging is frequently applied for commercial purposes, in recent years it has also gained considerable momentum in the policy discourse. Central and local authorities across the world increasingly discover and debate over the use of nudge techniques for achieving policy goals (John, 2013). From a policy-instrumentation perspective, nudges constitute a less coercive form of government intervention compared to more traditional policy tools such as regulations and taxations (John, 2013; Kusters and van der Heijden, 2015).

Insights from nudge theory may allow policy makers to improve the design of public policies. In essence, this is because they provide a deeper understanding of human behaviour and how it can be influenced (Bubb and Pildes, 2014; European Commission, 2016). Whereas originally, the literature on policy instruments departs from the assumption that citizens make rational decisions, the literature on nudging assumes that most of the decisions people make are not rational, but subject to certain heuristics. This opens new opportunities for changing citizens' behaviour, and as a consequence it can also increase effective decision-making. Not surprisingly then, many decision-makers have recently embraced this new approach. This is especially true in a world where pressing societal problems such as obesity or climate change are urging governments to constantly rethink the ways in which to tackle these issues. Following the increased attention for nudge theory by practitioners and researchers alike, the literature regarding nudge policies has also started to grow considerably (Bogliancino et al., 2016). The purpose of this paper is to obtain a better understanding of how nudging is integrated in public policy and public management. More specifically, the paper answers the following research question: What is the current state of art of the literature regarding nudging in the field of public policy and public management?

The data are gathered through a scoping review technique of the literature regarding nudging in public policy and public management. Scoping studies are defined by Colquhoun et al. (2014) as a "form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching,

¹ This paper is based on, and an elaboration of Van Deun, H. (2017). Nudging in Public Policy and Public Administration: A scoping review of the literature. [Ma. Diss], Leuven: Faculty of Social Sciences.

selecting and synthesizing existing knowledge” (p. 1294). Since nudging in public policy and public management is a relatively new research area, the paper provides insights into the state of art of the current research field. In particular, it focuses on assessing the variety in policy sectors covered by research on nudging, the conceptual lenses and methods applied in these studies, and the heuristics focused on. Next to this, the analysis also covers the goals nudges are supposed to attain and the types of outcomes they are reported to have achieved. Over 300 articles are initially covered in the scoping review. In total 89 are selected and subjected to a more in-depth analysis, enabling us to point to missing linkages and to identify possible conceptual and methodological gaps in the literature. Additionally, by reviewing the literature in a transparent and reproducible way, the use and effectiveness of nudging as a policy tool is explored. As will become clear, nudging holds great potential for policy makers to address a number of societal issues, although several opportunities to further develop this field, that is at the intersection of various scientific disciplines, also arise from the scoping review.

The paper is structured as follows: First, the origins of nudging in behavioural economics are discussed, after which the linkages with the policy tool and public policy literature is elaborated upon. Next, the data collection method is explained in more detail, and the results from the scoping review are presented. Finally, the results are further discussed and some conclusory remarks are made, focussing on a future research agenda concerning nudging as a policy tool.

2. NUDGING AND ITS ORIGINS

The idea of nudging builds upon decades of research in the field of behavioural sciences and more specifically behavioural economics (Kosters and van der Heijden, 2015; Lunn, 2012). Behavioural economics is defined as the discipline that “applies psychological insights into human behaviour to explain economic decision-making” (Lourenço et al., 2016, p.10). Conflicting with behavioural economics, traditional economics idealizes that human beings are rational and constantly pursue their self-interests to maximize welfare (Bhargava and Loewenstein, 2015; Reiss, 2003; Thaler and Sunstein, 2008). However, the work of behavioural economist such as Kahneman and Tverski has shown that human behaviour is subjected to systematic biases and heuristics defined as “cognitive shortcuts or rules of thumb that simplify decisions and represent a process of substituting a difficult question with an easier one” (Kahneman, 2003). The literature on behavioural economics identifies many different heuristics. Examples are the present bias referring to “the human tendency to overemphasize immediate benefits relative to delayed benefits” (Liu et al., 2014, p. 8) and loss aversion referring to “people’s inherent propensity to strongly prefer avoiding losses to making gains” (Thaler and Sunstein,

2008, p. 33-34). These biases and heuristics produce deviations from the assumptions of traditional economics, and indicate that human rationally bounded (Kahneman, 2003; Kahneman and Tversky, 1981). As a result, people make decisions that run counter to their best, and rational, interests. Public policies that fail to take this into account and assume that people are rational decision-makers may fall short to achieve preferred outcomes or policy goals. If policy makers rely more on insights from behavioural economics to nudge people in a certain direction, policy outcomes can be improved (Calo, 2014; Lehner et al., 2016).

The element of ‘nudging people in the right direction’ merits further attention here. One of the most important contributions to the nudge literature is Thaler and Sunstein’s seminal book *Nudge* (2008). In this work nudges are defined as “any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives.” Importantly, the authors add: “To count as mere nudge, the intervention must be easy and cheap to avoid” (Thaler and Sunstein, 2008, p. 6). Important questions rising from this, are what actually constitutes a nudge, and what (government) interventions should, then, not be considered as such (Kosters and van der Heijden, 2015; Selinger and Whyte, 2011). The definition of Thaler and Sunstein (2008) states that nudges shall not alter economic incentives, because they should be “easy and cheap to avoid” (2008, p.6). Nevertheless, some nudge scholars and practitioners explore the use of financial incentives and consider them a monetary form of nudges (e.g. Bell et al. 2016; Hilton et al., 2014; Paloyo et al., 2015). Selinger and Whyte (2011) however identify these as *mistaken nudges*, based on the argument that financial incentives do not exploit heuristics or biases, and assume that people will respond to incentives in a rational manner. The reason for the existence of mistaken nudges may be found in the definition of nudging itself, which lacks clarity on how to operationalize nudges (Vlaev et al., 2016). Note that this research follows the definition of Thaler and Sunstein (2008), and disregards the use of “monetary nudges”.

3. NUDGING AS A POLICY INSTRUMENT

To further explore nudging as a policy tool, this paragraph examines to what extent the concept of nudging fits into the traditional typologies on policy instruments. Nudging pertains to the application of certain policy instruments that often share similarities with, but are also profoundly different from the instruments discussed in the traditional literature on policy instruments. These similarities and differences are treated in more detail here.

Firstly, Hood’s famous NATO-model (1986) divides policy instruments into four broad categories of means that the government has at its disposal in order to change societal behaviour, i.e. nodality,

authority, treasure and organization. The fourfold NATO-model shares similarities with Bemelmans-Videc et al. (1998) threefold typology of policy instruments as sticks, carrots or sermons. Sticks or regulatory policy instruments force behaviour on citizens; carrots involve economic policy tools seducing citizens to pursue a certain option, for instance, by handing out subsidies or imposing taxes; and sermons persuade citizens. Classifying nudging in these related typologies is not as straightforward, however. Considering the definition of nudges, it is clear that nudges are not sticks or regulations, since they do not limit any choices (Bekker et al., 2015), nor are they pure carrots since Thaler and Sunstein (2008) clearly state that nudges do not alter economic incentives. However, nudges do exhibit some similarity to carrots in the sense that carrots leave citizens free to choose whether they participate or not. The concept of nudging is, however, more strongly linked to Hood's first category of nodality, and it also touches upon the aspect of organization. Nodality assumes that the government has a distinctive position in information networks, which it can use to influence citizens' behaviour. A similar behavioural change can be achieved through nudges that use information to nudge citizens towards a certain policy goal (Bekker et al., 2015). While Hood still assumes that citizens make rational choices to alter their behaviour based on the information provided by the government, nudge theory departs from this assumption and focuses on the heuristics that subconsciously drive people's behaviour. In other words, nudges are not sermons since they do not try to openly persuade citizens by providing information, but they are nevertheless similar to sermons because they rely on information provision. Nudges in this sense lean more towards sermons than sticks but also taste a bit like carrots. Similarly, regarding Hood's fourth category of organisation, governments can nudge citizens and alter their behaviour in a very subtle way by changing the organizational structure, for example of roads or other public provisions. These nudges can achieve changes in societal behaviour without actually removing the possibility for individuals to display aberrant behaviour (Hansen and Jespersen, 2013).

The concept of nudging can also be linked to the five-fold typology of policy instruments by Schneider and Ingram (1990), and in particular to the incentive tools and capacity tools in their categorization (Bekker et al., 2015). Capacity tools provide "information, training, education, and resources to enable individuals, groups, or agencies to make decisions or carry out activities" (Schneider and Ingram, 1990, p. 517). In other words, tools such as education and training are explicitly aimed at improving the decision-making skills of citizens. Nudges can also be considered as capacity tools since they also have this aim. Yet, in contrast with the original classification, the underlying assumptions are different for nudges since they implicitly aim to improve citizens' ability to make decisions, rather than explicitly. Nudges also share similarities with incentive tools, defined by Schneider and Ingram (1990) as "tools that rely on tangible payoffs, positive or negative, to induce compliance or encourage utilization" (p.

515). Note again, that the original classification's assumption that human beings are utility maximizing strictly goes against nudge theory (Thaler and Sunstein, 2008). Instead, nudges implicitly influence the appeal or perception of certain options by altering the choice environment. The organ donation example (Manzano and Pawson, 2014) provides a good illustration of this. Instead of offering payoffs as an explicit incentive to increase utilization (or in this case, registration), nudging turns the incentive around, i.e. towards un-registering. To increase utilization it makes use of citizen's propensity to passively accept the default registration as donors.

In sum, it is not always easy to place nudges within the traditional typologies of policy tools, as they sometimes share traits of different categories of tools. Nudges do however complement the already rich governance toolbox (Kosters and Van der Heijden, 2015). Thereby, they do not adhere to the original assumptions of rationality and utility-maximizing behaviour of citizens, but assert that citizens are rationally bounded; their behaviour not relying on conscious and rational decision-making processes, but implicitly influenced or driven by cognitive heuristics.

In other words, as policy instruments, nudges change the 'choice architecture' of citizens, i.e. the "informational or physical structure of the environment which influences the way in which choices are made" (Lehner et al., 2016, p. 167). And as such four types of nudges or interventions can be discerned (House of Lords, 2011): 1) provision of information, 2) changes to the physical environment, 3) changes to the default policy, and 4) the use of social norms and salience. Firstly, the *provision of information* involves policies that provide information and feedback as well as policies that focus on framing and simplifying information. Secondly, *changes to the physical environment* include interventions that alter the setting or context, such as positional changes of food or beverages. Thirdly, the *changes to the default policy* pertains to shifting the default option, for instance, presumed consent in the case of organ donations. Finally, nudge policies that rely on *social norms and salience*, among others, provide comparative information about what others are doing (House of Lords, 2011, p. 10).

4. METHODOLOGY

The paper investigates the current state of art of the literature regarding nudging in the field of public policy and public management through a literature review. The technique applied here, is a scoping review which assesses the literature systematically and adds a narrative dimension to the presentation of the results (Arksey and O'Malley, 2005; Dijkers, 2015; Kelly and Moher, 2016). This approach has several advantages, in particular due to its ability to answer a broad and exploratory research question.

The scoping review maps various characteristics of nudging of 366 scientific articles, and moves on to identify 89 articles for a more in-depth analysis. It includes an investigation on the types of nudges applied, the types of heuristics assumed, and the outcomes put forward in the interventions in the studies. Furthermore, the review identifies the gaps and missing linkages within the current research on nudging from a public policy perspective. The methodology is explained further in the next sections.

Inspired by the Arksey and O'Malley (2005), the scoping review consists of four steps. A first step is to identify potentially relevant studies within the literature. Two scientific databases were explored: *Web of Science* and *Scopus*. An electronic search was conducted using the following search term:

TS=(Nudg*) AND TS=(Polic*) AND PY=(2008-2016) AND LANGUAGE=(English)

The term *nudg** is used in combination with *polic**, thereby limiting the search to the concept of nudging or nudges. Not included are 'behavioural economics' or 'behavioural insights'. Although related, both differ fundamentally from each other and can cause confusion (Selinger and Whyte, 2011; Vlaev et al., 2016; Kusters and van der Heijden, 2015). Although the three concepts are definitely related, they differ fundamentally from each other (Lourenço et al., 2016). While behavioural economics is the discipline in which nudging originated, behavioural insights refer to the "results from multi-disciplinary research in fields such as economics, psychology and neuroscience to understand how humans behave and make decisions in their everyday life" (Lourenço et al., 2016, p.10). Nudging is just one of these insights. Behavioural economics and behavioural insights both refer to something broader than nudging.

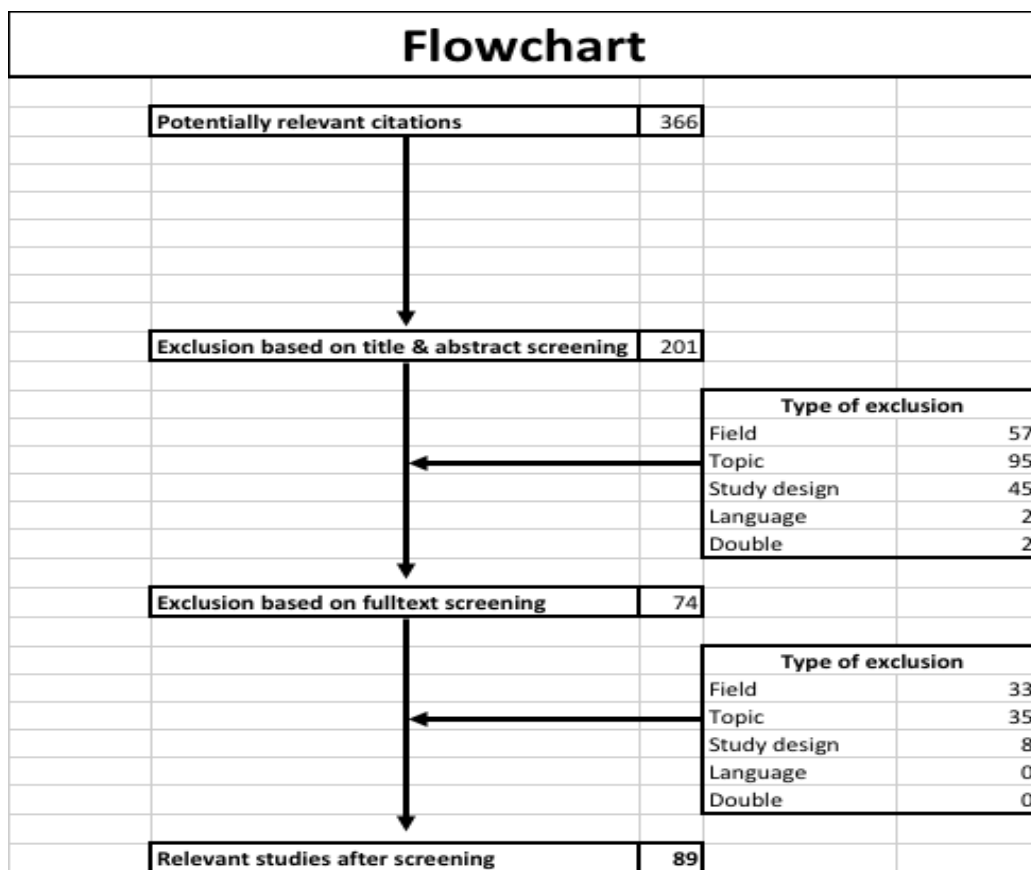
The search term *polic**, then, is added for the simple reason that the paper aims to study nudging in the context of public policy and public management. As mentioned, 366 potentially relevant articles were identified. To further focus the analysis, irrelevant articles were excluded in the second step. In particular, the articles' title and abstract were screened for certain criteria. If these were met, the remaining articles were further subjected to a full-text screening and permanently included or excluded in the scoping review.

As to the criteria used for screening, articles had to cover the application of nudges in a policy sector and had to be published between 2008-2016. The year 2008 is chosen as a starting point because of the publication of Thaler and Sunstein's seminal book on nudging. The focus on policy sectors implies that articles with a particular political philosophical focus were excluded, since they only treat the political philosophy that underpins nudge theory and do not refer to applications of nudges. Related articles exploring normative/philosophical topics were also excluded from the review. The latter explore issues such as public attitudes and preferences regarding different types of nudges. For

reasons explained above, the topic of the studies consists of nudg* and polic*. Since Thaler and Sunstein’s definition is used (2008), articles on monetary nudges that change financial incentives were not included. Neither were grey literature and conference papers. The scoping review focuses only on peer reviewed and English written studies, and no restrictions were introduced in relation to the research methods applied in the articles, since this is part of the focus of the analysis.

Figure 1 presents the screening process visually. All potentially relevant articles (not including the doubles between *Scopus* and *Web of Science*) were screened using the eligibility criteria.

Figure 1: Screening Proces Results



The screening based on title and abstract resulted in 201 exclusions. The remaining 165 articles were subjected to a full-text examination, resulting in another 76 articles being excluded. From the flow chart it becomes clear that articles were not included for several reasons. The aspect of ‘Field’ pertains to studies which are not transferable to the public sector. They were not relevant to our scoping

review. Similarly, ‘Topic’ indicates that articles were in fact not focussing on nudge policies, despite what their titles or abstract made us believe. These articles were sometimes also normative in nature. Articles were also excluded because of their ‘Study design’, referring to articles that were not empirical studies but commentaries, or responses to studies.

After this first screening, a total number of 89 articles were found to fit the eligibility criteria and were subjected to the full scoping review.

The third step of the research consisted of charting the data in an excel file. More specifically, it involved listing author(s), year of publication and all other relevant information on the article such as policy fields, heuristics, types of nudges etc. In step four the results are presented in accordance with the analytical framework. This framework is guided by the four stages of the policy design cycle (Swanson and Bhadwal, 2009). As shown in table 1, each of the stages in the design cycle put forward relevant questions for the scoping review.

Table 1: Methodological Framework

POLICY DESIGN CYCLE STAGE	RELEVANT QUESTIONS
<p style="text-align: center;">STAGE 0: EXPLORATORY STAGE</p>	<p style="text-align: center;">What research method is applied? In what journals are the articles published? Which country does the article relate to? What policy sector does the article cover?</p>
<p style="text-align: center;">STAGE 1: UNDERSTANDING THE ISSUE</p>	<p style="text-align: center;">What heuristics are addressed in the article?</p>
<p style="text-align: center;">STAGE 2: OBJECTIVE SETTING</p>	<p style="text-align: center;">What goals are set out?</p>
<p style="text-align: center;">STAGE 3: INSTRUMENT DESIGN</p>	<p style="text-align: center;">What types of nudges are applied?</p>
<p style="text-align: center;">STAGE 4: MONITORING, EVALUATION AND IMPROVEMENT</p>	<p style="text-align: center;">What are the outcomes of nudges?</p>

For the purposes of this research an additional stage 0 is included in the analysis. Stage 0 explores the general features of the selected articles, and considers the research methods, as well as the journal, country(ies) and policy field(s) that were covered. The other stages pertain to nudging in particular. Stage 1, *understanding the issue*, focuses on the types of heuristics found in the articles. Stage 2, *objective setting*, explores the different types of goals set out for the application of nudges in the articles. Stage 3, *instrument design*, maps the types of nudges applied in the studies. The final stage 4

relates to the *evaluation stage* of the policy design cycle and covers the extent to which nudges achieve particular policy outcomes such as effectiveness and efficiency.

5. SCOPING REVIEW RESULTS

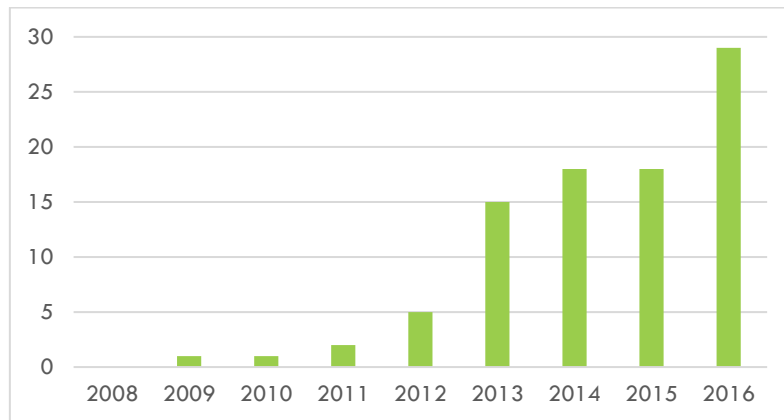
This section treats the scoping review results, and discusses general trends and observations that can be derived from this. The exploratory pre-phase shows that research on nudging in policies is in full development. Despite articles being spread out across a variety of journals, the majority of them are published after 2012. Currently, the field is shaped by research on a small group of countries and policy sectors; offering a predominantly qualitative and exploratory view of the subject. The subsequent analytical phases allow us to identify important gaps in the literature. The analysis shows that the underlying heuristics of nudges are underexplored, that the potential for expanding nudge policies beyond information provision is real, that nudges have proven their worth in terms of effectiveness, and that the efficiency of nudges merit much more attention from academics who study these policies, as well as by governments who set them up.

5.1 Exploring a new field in public policy and public administration

The 89 articles in the scoping review are dispersed across various academic disciplines and published in 57 different journals. While most articles are thus found in a single journal, six -mostly sector specific- journals published 14 articles on nudging (i.e. *Applied Economic Perspectives and Policy* (4), *Economia Politica* (2), *Journal of Transport Geography* (2), *BMC Public Health* (2), *Journal of Consumer Policy* (2) and *Journal of Health Organization and Management* (2)). Other outlets range from public management journals such as *Public Administration Review* and *International Review of Administration Sciences* to more field-specific journals such as the *International Journal of Obesity and Energy Policy*.

Figure 2 shows an increase in the number of publications on nudging per year. Nudge research has started to grow considerably since 2013. This indicates and confirms that the field is still new and research on nudging constitutes a fairly new endeavour. Most of these articles also use qualitative research methods. Qualitative studies include, among others, literature reviews (e.g. Barnes et al. 2015), systematic reviews (e.g. Bucher et al., 2016), meta-articles (e.g. Kusters and Van der Heijden, 2015) as well as descriptive studies (e.g. Vermeer et al., 2014) or case studies (e.g. Valatin et al., 2016). Some of this qualitative research is theoretical in nature (e.g. Grüne-Yanoff and Hertwig (2016), whereas other articles are more evidence-oriented (e.g. Lehner et al., 2016).

Figure 2: Number of publications per year



Quantitative studies account for about a quarter (28%) of the articles in the scoping review. Almost half of the quantitative research relies on field (e.g. Costa and Kahn, 2013) and laboratory experiments (e.g. Czap et al., 2015). Survey data (e.g. Doberstein et al., 2016) are also often relied upon. The comparative importance of experiments might be attributed to the fact that nudging is also related to behavioural psychology, a field of study that is more experienced with carrying out experimental research than public policy and public administration, for instance.

Overall, however, the large share of qualitative approaches may point to the fact that nudge policies constitute a new field of study, where a lot of exploratory research is still taking place. Of course, since the application of nudges in public policy is limited overall, there just may not be enough data widely available for research in the first place. The small number of field experiments in particular also seems to suggest that researchers are only limitedly involved in applying nudges in public policies, and in testing the effects of interventions.

Table 2: Types of Research

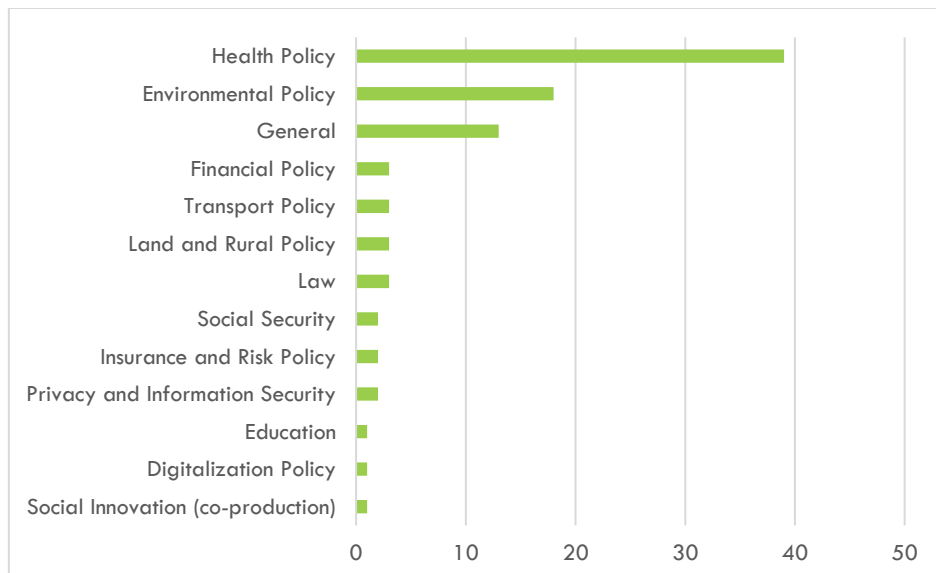
TYPE OF RESEARCH	N (%)
QUALITATIVE	64 (72 %)
QUANTITATIVE	25 (28 %)
<i>QUANTITATIVE – ONLY EXPERIMENTS</i>	12 (13 %)

Of course, the application as well as the study of nudges differs between countries and across policy sectors. Single-country studies are found most, and cover a wide range of countries across the globe.

Overall, the UK and the United States stand out. Not unsurprisingly, they are the two countries in which most of the nudge research is carried out. This may be explained by the comparatively wider attention within academia and the government for the subject, and the establishment of ‘nudge units’ in both countries. Only about 5% of the articles carries out cross-country studies. Examples of quantitative research across a number of European countries are Codagnone et al. (2016) and Rodriguez-Priego et al. (2016). Multi-country perspectives seem to be more prevalent in qualitative research, however.

Figure 3 indicates that nudge research can be found predominantly in two policy sectors. About 40% of the articles is linked to health policies and almost 20% relates to environmental policies. Other sectors are much less covered. Rural policies (e.g. Barnes et al., 2013), financial policies (e.g. Agarwal et al., 2009) transport policies (e.g. Avineri, 2012) or digitalization policies (e.g. Jansen et al., 2016), each account for only 1%-3% of the nudge research available. Several studies also examine nudges from a legal perspective, although overall this is still less than 5% of the articles in the scope review (e.g. Galle, 2014). A number of articles do not refer to any specific subsector but explore nudge policies in general terms (e.g. Grüne-Yanoff, 2016). These articles are categorized under the heading *general* and constitute about 13% of the total.

Figure 3: Number of Studies per Policy Field



5.2 Underlying mechanisms and implied behavioural change

After the general overview of the literature under examination in our scoping review, this section discusses the elements related to the first two stages of the design cycle: understanding the issue (stage 1) and objective setting (stage 2). When applied to nudging, the analysis presented here, covers 1) the degree to which the nudge literature addresses the heuristics and biases that underpin nudge policies and drive human behaviour, and 2) the behavioural change that nudge policies actually aim to accomplish.

Firstly, nudging assumes that human behaviour is subject to heuristics and biases, causing nudge policies to be based on these underlying mechanisms in order to effectively change human behaviour. The literature on nudging deals with these heuristics and biases to different extents. Table 3 provides an overview of this. It shows that, generally, not much attention is paid to the mechanisms of human behaviour underpinning nudge policies. In fact, the overall majority of articles does not cover heuristics at all, or only discusses them from a very general point of view. To be precise, one third of the articles (33%) does not make any reference to heuristics at all (e.g. Keyworth et al., 2015; Manzano and Pawson, 2014). Another 39% makes mention of them, but does not discuss the underlying mechanisms of nudge policies in detail. For example, some articles state that people are irrational or suffer from bounded rationality (e.g. Arno and Thomas, 2016; Barile et al., 2015). Or they stress the importance of cognitive factors but do not further explore these heuristics or how nudges exploit them (e.g. Czarnezki, 2015; Downs et al., 2015). These articles are categorized in the table as *general*. The category also includes articles that discuss broad theories about the cognitive functioning of human decision-making, such as the dual process model (e.g. Rodriguez-Priego et al., 2016; Vlaev et al., 2016).

Table 3: Investigated Heuristics

HEURISTIC	DESCRIPTION	N (%)
GENERAL	Articles that do not discuss specific heuristics or bias but refer to general virtues (heuristic cues/bounded rationality)	35 (39%)
NOT MENTIONED	Articles that make no reference to heuristics or biases.	29 (33%)
DISCUSSED	Articles that do discuss heuristics and biases	25 (28%)

Following the previous findings, only 28% of all articles do discuss heuristics or cognitive biases. An extensive overview of these heuristics, and examples of articles in the scoping review that deal with

them, is provided in the annex. Overall, a wide variety of heuristics is found in the literature *if* heuristics are treated. It even often happens that more than one heuristic is covered in the same article. At first glance, this seems to imply that the literature deals with heuristics in a broad and at times extensive manner. Nevertheless, we find that a select number of heuristics are treated much more than others. A large subset of articles focuses on three well-known heuristics in particular. Out of the 21 heuristics found in total, the ‘present bias’ (10%), ‘loss aversion’ (10%) and the ‘status quo bias’ (9%) are covered very frequently. They make up about one third of the instances in which heuristics are dealt with in the literature. In contrast, 10 other heuristics and biases only show up once in our scoping review of 89 articles. Each constitutes 1% of the instances in which heuristics are discussed, and 10% of the total.

These findings point to a gap in the literature. The lack of attention for heuristics can suggest that researchers have a limited knowledge about these underlying mechanisms, or it could mean that popular biases are more suitable for nudge policies than less treated heuristics, or it could simply imply that these heuristics are easier to address via nudging than others. In any case, the underlying heuristics upon which nudge policies are based deserve more attention in future studies.

While heuristics influence people’s behaviour, nudges are of course implemented to change this behaviour. In this second part, we investigate the change that nudge policies aim to accomplish. The scoping review indicates that nudges are often implemented to provoke a single response. The study by Shu (2012) illustrates this clearly. The article investigated how the government can use nudges in order for citizens to fill out their tax forms *honestly*. Honesty is the single response looked for. Nudge policies can also attempt to achieve *sustainable* behavioural changes. To illustrate, Czap (2015) explores nudges that steer polluters towards more environmentally conscious actions, aiming to establish behavioural changes on the long-term.

In all, most behavioural changes targeted via nudging are found to be very context-specific. They also vary between policy sectors. Given the large focus on health and environment, most of the studies in the scoping review covered goals relating to e.g. organ donations, child immunizations, recycling, sustainable travelling etc. In more detail, nudges in health policy mainly focus on encouraging healthier consumption decisions and the problem of obesity. This includes Kang and Ikeda (2016) who examine nudges to correct unhealthy behaviour; or Kersh (2015) who focuses on improving nutrition and tackling obesity via nudging. In the case of environmental policy, nudges are aimed at reducing energy demands, or strengthening energy conservation (e.g. Costa and Kahn, 2013; Hahn and Metcalfe, 2016). Other environmental studies focus on the creation of woodlands via nudging (cf. Valatin et al., 2016) or recycling food waste (cf. Barile et al., 2015).

Finally, although most articles focus on context-specific behaviour, some do specify general goals for nudge policies. This is mainly the case for articles that do not cover a specific policy sector, or articles that deal with nudges from the legal perspective. For example, Alemanno and Spina (2014) analyse how nudges can be integrated into a regulatory framework. Similarly, Calo (2014) investigates the degree to which nudges can achieve better policy outcomes in comparison to regulation.

5.3 A variety of nudges applied

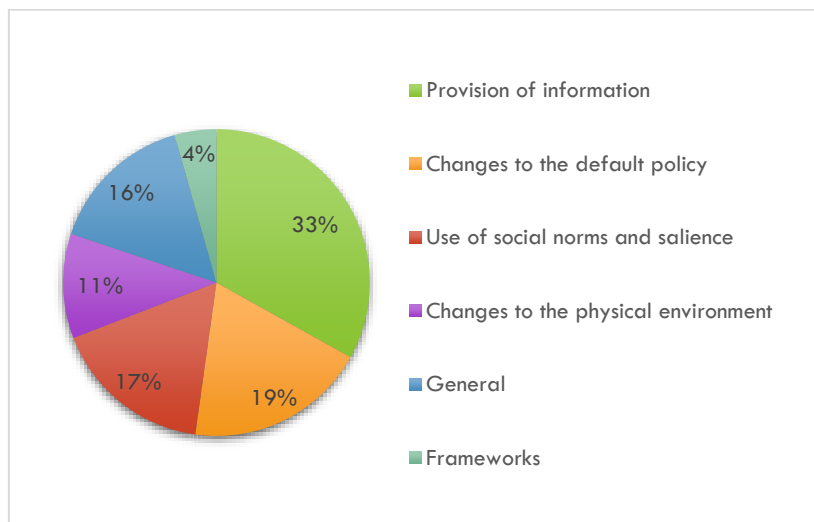
A next step in the scoping review (stage 3 of the design cycle) pertains to the analysis of the nudges found in public policies. Four types of nudges considered here are *provision of information; changes to the default policy; use of social norms and salience; and changes to the physical environment*. For this, the paper relies on the typology of House of Lords (2011) of ‘choice architecture interventions’, combining the insights from the literature on policy instruments (Hood, 1984; Schneider and Ingram, 1990; Bemelmans-Videc, 1998). Two categories have been added to this classification. The first is labelled as ‘*general*’ and includes articles that do not refer to specific (types of) nudges. The second category of ‘*frameworks*’ refers to the articles that discuss nudging frameworks and their application in public policies.

Figure 4 provides an overview of the different types of nudge policies found in the selected articles. It shows that a variety of interventions is investigated in the literature, although a preference exists for policies that are simple and easy, and therefore perhaps also implemented more frequently than other nudges. To be precise, the literature on nudge policies mainly pertains to the provision of information. One third of the articles discusses this type of nudge (33%). Examples are articles on *labels* for fuel economies, CO2 emissions and green issues (cf. Codagnone et al., 2016); or labels that identify the calories in food (cf. Kersh, 2015). Another example is the use of positive messages about the benefits of increased housing density (cf. Doberstein et al., 2016). The focus on information as a tool to change behaviour is not surprising since these interventions are considered to be fairly easy and cheap to set up. In this sense, they can be expected to be frequently implemented by governments or researchers (eg. in an experimental design), and are subsequently frequently investigated. The large emphasis on information, however, also leaves room to expand the research on other types of nudges.

Secondly, the scoping review reveals that about one fifth (19%) of the articles on nudging in public policies treat nudge policies that entail changes to the default policy. For instance, Ebeling and Lotz (2015) examine changing the default rule to more expensive ‘green energy’. Similarly, Galle (2014) explores changes to the default policy with respect to retirement savings. The organ donation example mentioned above (Manzano and Pawson, 2014) constitutes perhaps the most famous example of this type of intervention. It is perhaps a bit surprising that such a significant subset of the articles in the

scoping review treat this type nudge. In comparison to the provision of information, changing the default option may not be widely applicable to all types of policy problems, or in all sorts of contexts. Also, this type of nudge seems to touch more (explicitly) upon the issue of ‘manipulation of behaviour’ than the mere provision of information which is said to constitute a ‘manipulation of choice’ (Hansen and Jespersen, 2013). Changing the default option, then, can be considered as slightly more controversial as a means to change people’s behaviour in comparison to other types of nudges. On the other hand, this can also explain why academics still pay relatively much attention to this nudge in the first place.

Figure 4: Types of Nudges



Other types of nudges are also found via the scoping review, although they are treated comparatively less frequently in the literature. Changes to the physical environment (e.g. Vermeer et al., 2014) and the use of social norms and salience (e.g. Czap et al., 2015) are studied in 11% and 17% of the cases, respectively. Furthermore, the two additional categories also take up a substantial share of the articles in the scoping review. About 16% of the literature on nudge policies deals with these interventions from a *general* perspective. The articles do not discuss particular types of nudge policies in detail, but apply, for example, a theoretical perspective to nudge policies (e.g. Grune-Yanoff and Hertwig, 2016), or discuss policy recommendations following the implementation of nudge policies (e.g. Clarke and Grenham, 2013). The smallest subset of articles treat various *frameworks* regarding nudge policies. These studies do not deal with one particular type of intervention or nudge, but consider a coherent framework of nudges to tackle policy problems. The articles that deal with frameworks make up 4% of the total in the scoping review. The frameworks discussed are the Mindspace framework (eg. Vlaev

et al., 2016, who examine Mindspace in the health domain), the Nuffield ladder of intervention (eg. with respect to bio security policies by Barnes et al., 2015), and the EAST categorization (eg. discussed by Valatin et al., 2016 in the context of environmental policy).

5.4 The effectiveness and efficiency of nudges assessed

The final stage of the design cycle constitutes the evaluation of results, which entails an overview of the outcomes of nudges when applied to the articles in our scoping review. We find that effectiveness is focused upon most by scholars in their studies on nudging in public policies. Other outcomes, such as efficiency are also assessed in the literature albeit much less frequently. The limited attention for outcomes other than effectiveness can become a problem when these effects are accepted as a given rather than approached critically.

Table 4 presents an overview of the findings. Sometimes, two or more outcomes are treated in the same article, resulting in more than 98 instances in which outcomes were found to be discussed in the 89 selected articles. In all, however, about 10% of the studies do not assess any outcomes. This seems counterintuitive, considering that all studies cover nudging in a public policy context. Ozturk et al. (2016), for example, do not address the outcomes of nudges, but investigate matters of implementation regarding particular types of nudges to increase the quality of primary school foods. They focus more on the methods, than on the outcomes of public policies, presumably based on the assumption that nudges will be more effective and efficient.

Secondly, 90% of the studies in the scoping review mention the desired outcomes of the nudge policies. Almost all of them (89%) discuss the effectiveness of nudge policies, although the extent to which differs. Policies are understood to be effective when “the intervention makes a difference to the variable of interest under some ideal experimental conditions” (Grüne-Yanoff, 2016, p. 472). In almost half of all articles (43%) the effectiveness of nudge policies is assessed and found to be effective (e.g. Arno and Thomas, 2016). In about one fifth (21%) of the articles, the authors argue that nudging has at least the potential to be effective. This is of course different from assessing the actual effectiveness of interventions, and provides the opportunity in follow-up research to further investigate these claims. The category, however, does not really investigate effectiveness. Other studies that do, do not find conclusive results. There is no real consensus about the effectivity of policies that apply nudges to change societal behaviour. As Lehner et al. state: “the size of the effects of policy interventions and the actual outcomes of interventions in different contexts are very diverse” (2016, p.166). Contrary to the 43% of articles that establish positive effects, about 20% of the articles find limited results. They claim that nudge policies have a restricted capacity to achieve the desired outcomes, or that they are only effective when combined with other policy instruments. Yet another

5% of the articles find no proof of effectiveness. Some of these studies were not able to establish any effect (e.g. Momsen and Stoerk, 2014; Kosters and Van der Heijden, 2015), whereas other articles claim that the effects of nudges are unproven and still need to be revealed by future research (e.g. Oliver and Ubel, 2014).

Efficiency, then, is considered in a much smaller number of articles. It refers to the ability of nudges to produce results in the most optimal way. Only 16% of the total deals with this outcome in one way or another. Less than half of the articles that explore it, find evidence for the efficiency of nudges as policy tools. They amount to only 4% of the total. Some articles claim, for example, that nudge policies are more efficient than traditional policy tools. To illustrate, Fujimi and Tatano (2013) argue that nudging is more efficient than providing subsidies in order to encourage homeowners to retrofit their house against earthquakes. Another set of studies covering efficiency, merely discuss the potential of nudges rather than actually measuring their efficiency. About 6% of the total number of articles does this. In addition, the scoping review shows that there is no consensus among scholars as to the degree to which nudges are efficient. Some studies find limited efficiency (4%), and Milne (2012) even claims the exact opposite of what many other scholars find or believe. The author argues that nudging in health is actually an expensive policy tool in comparison to imposing regulation. His dissonant voice, however, only accounts for 1% of the total number of studies.

Table 4: Nudge Outcomes

OUTCOMES	N (%)
NONE MENTIONED	9 (10%)
MENTIONED	80 (90%)
	<i>Effectiveness</i>
	79 (89%)
	<i>Effective</i>
	38 (43%)
	<i>Potential to be effective</i>
	19 (21%)
	<i>Limited effects</i>
	16 (18%)
	<i>Ineffective</i>
	3 (3%)
	<i>Unproven</i>
	2 (2%)
	<i>Efficiency</i>
	14 (16%)
	<i>Efficient</i>
	4 (4%)
	<i>Potential to be efficient</i>
	5 (6%)
	<i>Limited efficiency</i>
	4 (4%)
	<i>Inefficient/Unproven</i>
	1 (1%)
OTHER	5 (6%)

In light of these results, it needs to be noted that the efficiency of nudge policies is treated much less frequently by scholars than their effectiveness (i.e. 16% of all articles vs. 89%, respectively). Efficiency is generally one of the main arguments put forward by governments and proponents of nudging to introduce nudge policies. What is more, it is considered an essential characteristic of nudges (see also Thaler and Sunstein's (2008) definition that nudges should be easy and cheap to avoid). Based on the findings here, this assumption does not seem to be put to the test very often by researchers, whereas the effectiveness of policies is much more often the topic of research. Moreover, the available evidence on the efficiency of nudges is inconclusive at best. Less than half of the studies that cover efficiency actually find evidence for it. This puts the basic assumption of nudge policies into question, and emphasizes the need for more research on the efficiency of nudges as policy tools.

For good measure, other outcomes discussed in the literature and discerned via the scoping review are also presented here. Two studies analyse the *feasibility* of nudge policies. First, Vermeer et al. (2014) explore the feasibility of labelling portion sizes and offering a larger variety of portions. Their research on nudging in health policies finds positive results for this outcome. Similarly, Aggarwal et al. (2016) establish that nudges are generally more feasible than other types of policy instruments in health policies. In addition, a small part of the literature focuses on the *distributive effects* of nudges, relating to the general level of welfare or income of people or in societies. For example, Bao and Ho (2015) find that nudges can have both a negative and positive effects on the social welfare of citizens. Galle (2014) compares the effects of nudges to sticks and carrots on individual levels of income and on the distribution of wealth in society. The author finds that nudges can be situated between carrots and sticks, and that they can even outperform them given the right context. Overall, however, studies that treat outcomes other than effectiveness (and efficiency) are very limited.

6. CONCLUSION AND FURTHER RESEARCH

The purpose of this paper was to obtain a better understanding of how nudging is integrated in public policy and public management. More specifically, the paper looked at the current state of art of the literature regarding nudging in the field of public policy and public management. The data for this, have been gathered through a scoping review. This analytical technique allowed us to address an exploratory research question, and to map key concepts, types of evidence, and gaps in the research related to nudging by systematically searching, selecting and synthesizing insights in the literature (see also Colquhoun et al., 2014). Following the careful pre-screening of 366 potentially relevant articles, a total of 89 articles was investigated in depth via the scoping review and key questions set out in the

analytical framework. The results of this review identify important gaps in the literature, and they reveal opportunities for researchers to further expand our knowledge of nudging from a public policy perspective.

Firstly, the scoping review establishes that the research on nudging in policies is still in full development. While articles are spread across a variety of journals, the majority of the literature on nudging, and on the application of nudges in public policies is published after 2012. The field of study is not only young, it is also characterized by a certain degree of lumpiness. To be precise, insights on nudge policies are obtained within a fairly small group of countries, and most of the research findings pertain to only a handful of policy sectors, i.e. health and environment. The novelty and lumpiness of the field may pose limits to our current understanding of nudges, as well as how nudge policies can or should be implemented and policy goals can be achieved. So far also, most studies offer a qualitative and exploratory view of nudge policies. In this sense, there is (much) more room for systematic, quantitative, and even experimental design when studying nudging, offering in turn a wide range of opportunities for further developing our insights into this matter.

Secondly, our step-by-step analysis indicated that the underlying heuristics of nudges are underexplored in the literature. There is generally very little attention to the mechanisms that drive or influence people's behaviour. It seems that more research is needed to provide us with an accurate understanding of this, in order to set up nudges in policies. Thirdly, the analysis also pointed out that most research focuses on the implementation of one particular type of nudge in particular, i.e. the provision of information. While this, admittedly, is a fairly easy and perhaps also cost-efficient type of intervention, the scoping review reveals that there is still much potential for expanding the application of nudges beyond this type of nudge. In other words, as a policy instrument and means to strengthen public policies, nudging still seems much underexploited; its full potential not yet reached.

Finally, it is also of importance to investigate what that potential actually refers to itself. In our study, we provided an overview of the outcomes of nudges discussed in the literature, and the degree to which these outcomes are assessed. Several observations can be made that are of importance to the field of research. Firstly, there are generally very little other objectives aside from effectiveness and efficiency in the literature. By merely looking at effectiveness and efficiency, the research on nudging covers only partially the potential societal effects of these new policy tools. Secondly, effectiveness is without a doubt covered most in the literature. It is not surprising that the literature predominantly focuses on investigating the actual effect of nudges on the behaviour of citizens, and as such on the achievement of policy objectives via these innovative policy tools. Positive interventions can further establish the role and position of nudges, and their value-added to public policies. And most of the

available evidence indeed confirms that nudges are effective, at least to a certain extent (for example, in combination with other traditional tools). The results regarding the efficiency of nudges are, however, inconclusive at best. Less than half of the studies that cover efficiency actually find evidence for it. What is more, efficiency seems to be considered more as a basis characteristic of nudges, than it is the subject of investigation by scholars. It seems to be even accepted as a given, rather than put to the test. As such, the literature on nudging lacks proof of its efficiency, as well as general critical research on this topic. Finally, it should be kept in mind that in order to draw conclusions on effectiveness and other evaluation criteria, more advanced research techniques such as meta-analyses are required.

In sum, the scoping review revealed several strengths and weaknesses in the literature on nudging in public policies, and more importantly, it allowed us to identify many opportunities for further research in this interdisciplinary field of science in full development.

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8. ANNEX

HEURISTIC	DESCRIPTION	N (%)
GENERAL	Articles that do not discuss specific heuristics or bias but refer to general virtues (heuristic cues/bounded rationality)	35 (39%)
NOT MENTIONED	Articles that make no reference to heuristics or biases.	29 (33%)
DISCUSSED	Articles that do discuss heuristics and biases	25 (28%)
<i>PRESENT BIAS AND HYPERBOLIC/ TEMPORAL /DISCOUNTING</i>	"The human tendency to overemphasize immediate benefits relative to delayed benefits" (Liu et al., 2014, p. 8).	9 (10%)
<i>LOSS AVERSION</i>	"People's inherent propensity strongly to prefer avoiding losses to making gains" (Thaler and Sunstein, 2008, p. 33-34)	9 (10%)
<i>STATUS QUO BIAS</i>	"The general tendency to stick within: the current situation" (Thaler and Sunstein, 2008, p. 34).	8 (9%)
<i>FRAMING</i>	"The tendency to be influenced by the way in which information is presented" (Thaler and Sunstein, 2008, p. 36).	4 (4.5%)
<i>OMISSION BIAS</i>	"The tendency to judge harmful actions as worse, or less moral, than equally harmful omissions (inactions)" (Alemanno and Spina, 2014, p. 434).	4 (4.5%)
<i>LIMITED ATTENTION</i>	"Referring to the serious limitations on the amount of information to which people can attend at any point in time" (Loewenstein, Sunstein and Golman, 2014, p. 398-399).	2 (2%)
<i>SUNK COST FALLACY</i>	"People to avoid feelings of regret; thus, they invest more money and time in a project with dubious results rather than give up and admit they were wrong" (Alemanno and Spina, 2014, p. 434).	2 (2%)
<i>AVAILABILITY BIAS</i>	"The tendency to assess the likelihood of a fact depending on how readily examples come to mind" (Thaler and Sunstein, 2008, p. 25).	2 (2%)
<i>AFFECT HEURISTIC</i>	"The tendency to judge something with affect, i.e., based on emotions (fear, pleasure...)" (Laskowski, 2016, p. 612-613).	2 (2%)
<i>ANCHORING AND ADJUSTMENT</i>	"The use of an anchor, i.e., a number or a fact you know, to estimate something that is unknown" (Thaler and Sunstein, 2008, p. 23).	2 (2%)
<i>CONFIRMATION BIAS</i>	"The tendency to search for or interpret information in a way that confirms one's preconceptions or hypothesis. As a result, this leads to over- confidence in personal beliefs and can maintain or strengthen beliefs in the face of contrary evidence" (Alemanno and Spina, 2014, p. 434).	2 (2%)

<i>BETRAYAL AVERSION</i>	“This bias causes people to select inferior products (in terms of overall risk exposure over those that were associated with a slim chance of betrayal” (Laskowski, 2016, p. 614).	1 (1%)
<i>COGNITIVE CONSISTENCY</i>	“Referring to the tendency that people want to achieve that consistency between their beliefs and their behaviour. However, when belief and behaviour people tend to alter their beliefs instead of their behaviour” (Moseley and Stoker, 2013, p. 6).	1 (1%)
<i>REPRESENTATIVENESS</i>	“The tendency to compare something with images or stereotypes. For instance, in the case of making assumptions or categorizations” (Thaler and Sunstein, 2008, p. 26).	1 (1%)
<i>SATISFICING</i>	“The tendency to choose not necessarily the best option or solution to a problem, but rather the first available option or solution that suffices or satisfies the minimum requirements” (Frederiks, Stenner and Hobman, 2015, p. 1387).	1 (1%)
<i>SPOTLIGHT EFFECT</i>	“The tendency to exaggerate how much people are looking at them” (p. 404, article 132).	1 (1%)
<i>HYPOTHETICAL BIAS</i>	The difference between what a person indicates they would pay in the survey or interview and what a person would actually pay (Valatin, Moseley and Dandy, 2016).	1 (1%)
<i>MENTAL ACCOUNTING</i>	"The process through which people code, categorize and evaluate different economic events and their associated outcomes" (Codagnone et al., 2016, p. 412).	1 (1%)
<i>MORAL LICENSING</i>	“The tendency to be driven by other-regarding motivations such as altruism and fairness and to desire oneself as a good person” (Loewenstein, Sunstein and Golman, 2014, p. 402).	1 (1%)
<i>PROBABILITY NEGLECT</i>	“The tendency to completely disregard probability when making a decision under uncertain circumstances” (Alemanno and Spina, 2014, p. 434).	1 (1%)
<i>OPTIMISM BIAS</i>	“The tendency to be over-optimistic, overestimating favourable and pleasing outcomes” (Alemanno and Spina, 2014, p. 434).	1 (1%)