



Behavioural Economics and Human Decision Making: Instances from the Health Care System



Lara Carminati^{a,b}

^a Surrey Business School, University of Surrey, Guildford, UK;

^b Faculty of Behavioural, Management and Social Sciences, University of Twente, Enschede, The Netherlands

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ABSTRACT

Over the last two decades behavioural economics has gained much momentum among scholars because of its innovative and controversial ways of explaining processes and mechanisms underpinning individuals' judgements and decision making. Thanks to these features, behavioural economics has been applied to diversified domains, namely finance, public choice and marketing. Although the intrinsic characteristics of the health care sector, ranging from incomplete and asymmetrical information to high frequency of critical choices, make the sector a fertile ground for behavioural economics applications, research on the influences of behavioural economics on health care and clinical decision making are still rather fragmented. Therefore, through an interdisciplinary literature review integrating behavioural economics research with medical and behavioural decision-making studies, this article contributes to behavioural decision-making literature by providing a wide overview of how behavioural economics strategies may impact, and be implemented in, diverse health care circumstances. Examples of behavioural economics applications to health care circumstances include: organ donation and transplantation; habitual choices; individuals' loss aversion and trust; present-biased preference; decision fatigue and excessive choice. Hence, this article aims to promote the effective behaviour of both consumers and providers in health care.

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1. Introduction

Over the last two decades a new strand in the field of economics, namely behavioural economics, has gained much momentum among scholars [1] due to its innovative and controversial features in explaining human behaviour [2]. Emerging with the twofold intention of unravelling the contradictions between intentional and actual human behaviour, as well as the limits of traditional economic theory [3,4], behavioural economics aims to uncover the processes and the mechanisms behind individuals' judgements and decision making [5].

In order to pursue its goals, behavioural economics melds a thorough set of perspectives and tools stemming from several social sciences, such as psychology, sociology and politics [6,7]. Thanks to this multifaceted nature, behavioural economics has been applied to diversified personal and public domains, namely finance, public choice and marketing [8–10]. Characterised by limited and asymmetrical information and high frequency of critical and immediate choices [11], the inherent features of the

health care sector represent a burgeoning ground for behavioural economics research [2]. Although some studies have begun to focus their attention to health care and clinical decision making [12,13], more research needs to be conducted to explore the applications and influences of behavioural economics in medical care and practice. Therefore, through an interdisciplinary literature review integrating behavioural economics research with medical studies, this article contributes to behavioural economics literature by providing a wide overview of how behavioural economics strategies may impact, and be implemented in, diverse health care settings to promote the effective behaviour of consumers and providers.

This work is set out in three main sections. In the first section, a general overview of the assumptions and limitations of traditional and neoclassic economic models is introduced. The second section presents insights from behavioural economics to explain and justify the deviations from traditional economics. Lastly, examples of applications related to the health care system, namely organ donation and transplantation; habitual choices; individuals' loss aversion and trust; present-biased preference; decision fatigue and excessive choice, conclude the article.

E-mail address: l.carminati@utwente.nl

2. Assumptions and Limitations of Classic Economic Models

For decades, the notion of *homo economicus* has been one of the core assumptions of traditional and neoclassical economic theories. This notion of *homo economicus* depicts a person who is perfectly rational and self-interested and, as such, pursues a maximization of utility as a consumer, and maximization of profit as a producer [14]. This economic man, who has been labelled “rational fool” by Amartya Sen [15], represents individuals who are unemotional and calculating, with unbounded rationality, unbounded willpower and unbounded selfishness [16].

Such individuals are capable of consistently weighing costs and benefits of each possible action, are fairly aware of what they like, what their objectives are and how to attain them [4]. Thus, a *homo economicus*, who enters the marketplace with already formed and unchangeable preferences [7], not only is able to handle a vast amount of information and choice, but can also make logical and wise decisions based on probability, even under uncertain and dynamic situations [7,14]. As a consequence, since traditional economics assumes that individuals will always choose optimally by matching available information with their own preferences [16], the only interest is in the outcome, not in the decision-making process *per se* [7].

Nonetheless, the tenet of rationality, a benchmark for many economic applications [3], which also encompasses three main normative standards such as the principle of dominance, the principle of invariance and the sunk-cost principle [12], is not appropriate when seeking to understand many of the irrational mechanisms behind human behaviour, especially after the 2008 economic crisis [4]. In fact, rationality represents a rather limited approach to explaining the economic developments of recent times [13], since it is unable to fully grasp the discrepancy between economic theories and practices [7].

3. Behavioural Economics

To bridge this discrepancy and solve the puzzles that have served as intellectual impasses [2], a large body of research has tried to draw alternative perspectives from other disciplines, especially psychology, and incorporate these new insights into the realm of economics [6]. Hence, from the marriage between economics and other social sciences, behavioural economics has been born [7].

Considered initially as a fringe discipline [17], behavioural economics has been growing in terms of importance and it is now seen as a complement [1] and a natural progression to the neoclassical economic approaches [3,4]. As Camerer, Loewenstein and Rabin (2004) have underlined in the introduction of their book, behavioural economics augments the explanatory power of traditional economics thanks to more realistic and empirical foundations. However, this augmenting explanatory power does not mean that irrationality has become the new *invisible hand* [17]. On the contrary, accepting the flaws of the axiom of rationality does not imply that neoclassical economic approaches are “useless, any more than Einstein’s findings render Newtonian mechanics useless. Newton’s mechanics are still quite adequate for almost all practical purposes” [4, p. 2]. Applying behavioural economics means having the opportunity to detect problems and behavioural deviations from the standard model and then design solutions and interventions for them [16].

As a consequence, beginning with Simon in the 1950s and successively developed by Kahneman, Tversky and Thaler in the 1980s, such solutions and tools have become a *corpus* of coherent notions which now includes chief concepts as bounded rationality and

satisfaction [18], dual system theory and prospect theory [19,20]. All these notions relate to the fact that individuals face rigid cognitive limitations regarding how much information they can acquire and remember. Hence, they can simply satisfy, rather than maximize, their needs [18].

Moreover, Simon introduced the idea of heuristic search, whose concern is to devise and identify measures which “will permit systems of limited computational capacity to make complex decisions and solve difficult problems” [21, p. 2]. Taking over from Simon’s works, Kahneman and Tversky further developed these themes. Concerning heuristics, albeit crucial in decision making, it has been noted that they may lead to cognitive biases and, thus, systematic errors both in judgement and choice [19,22]. The dual-system theory, instead, sheds some light on the reasons why the judgements and decisions of individuals sometimes do not attune to proper notions of rationality [23]. According to this theory, two opposite processes characterise individuals’ decision making. The first process, System 1, is a relatively unconscious and emotional thinking process and relates to intuitive and automatic responses. System 1 is fast, impulsive and experience-based, and its mental content is easily accessible since it relies on heuristics. On the contrary, the second process, System 2, provides a sort of check on mental operations and thus functions as a rational and cognitive thinking process. System 2 consists of more reflective, controlled, deliberative, and analytical mechanisms so that it can encompass a wider range of data than just individuals’ experience [23]. Since between the two systems the emotional and impulsive one is stronger than the rational and cognitive one, this would explain why individuals can pursue irrational decisions.

With regard to the prospect theory, individuals evaluate choices between alternatives that involve risk and uncertainty not on the base of the utility of the outcomes, but in terms of expected utility relative to a referent point [20]. Since people, on average, value losses about twice as much as gains, decisions are not always optimal: on the contrary, they are led by individuals’ loss aversion, so that the judgements of their value are often relative [19]. This can lead to further interesting developments which include Schwartz’s (2004) notion of “excessive choice”, and Thaler and Sunstein’s (2008) theory called “libertarian paternalism”.

The notion of excessive choice entails that too much choice, instead of being unconditionally good as in the traditional economics, may represent a threat to individuals’ satisfaction and happiness. The threat would be caused by the regret associated with the opportunity not chosen [24], recalling the concept of opportunity costs [25]. The theory of libertarian paternalism, grounded in the idea that individuals may fail to pursue their best interest, spurs governments into political context to assist citizens when facing critical decisions [26]. Indeed, according to this idea, private and public institutions can influence individuals’ behavior and, at the same time, respect their freedom of choice and initiative. Hence, libertarian paternalism is “libertarian” since it aims at ensuring that individuals may opt out of specified arrangements if they wish to do so, and “paternalism” since it tries to affect individuals’ choice providing them with the best alternative possible [26]. Therefore, to summarise what has so far been discussed, behavioural economics assumptions recognize that individuals: are not always rational and tend to make decisions without maximizing but simply satisfying their needs [18]; have a narrow capacity of information-processing which relies and depends on heuristics as short-cuts, informal algorithms, to deal with judgements and choices [19]; adopt present-biased preferences [7], which are also related to monetary incentives and inertia of actions -default- [13], salience of information and the way information is framed -framing- [27]; are loss-averse and respond to social pressure [26].

4. Application of Behavioural Economics to the Health Care System

Because of the aforementioned, behavioural economics may offer some concepts and analytical tools that lend themselves well to applications in the health care sector [4,7]. The intrinsic features of the health care sector make it a fertile ground to apply behavioural economics theories [2], especially considering the undeniable importance of medical care in individuals' human lives, and the much reduced rationality of health care actors in their everyday clinical practice [11]. Indeed, the doctor-patient relationship within a decision-making context –which is characterised by a restricted and asymmetrical amount of information [2], high levels of fear and anxiety, uncertainty, essential but also precarious degrees of trust [28,29] and a myriad of critical choices– is well suited to the concerns of behavioural economics [11].

However, even though there is a high potential for behavioural economics to improve patients' welfare [12], enhance quality of care and public health care policy [6,30] as well as reduce costs associated with medical decision making [25], little research has been conducted on the influence of behavioural economics on health care and clinical decision making [13]. Therefore, the following sections will try to give a flavour of this influence, by reviewing some of the theoretical concepts and practical applications of behavioural economics and linking them to the decision making of both consumers and providers in health care.

4.1. Organ Donation and Transplantation

Organ donation and transplantation is one of the best candidates for analyzing the successful results of some applications of behavioural economics to health-related issues [7,31,25]. Two specific types of behavioural effects underlined by behavioural economics are of great interest here. The first is the behaviour known as endowment effect, which refers to individuals' reluctance to change options even when advisable; the second and similar behavioural effect is called *status quo* bias, which indicates a predilection for the maintenance of a current state of affairs [23]. The effects on human behaviour are related to the concepts of routine and inertia in individuals' human lives [23].

In general, it can be noted that in the majority of people's decisions individuals are supposed to opt in, since the default option is to do nothing [22]. Nonetheless, well-aware of individuals' propensity to avoid change in favour of stability, behavioural economics overturns the logic and suggests the employment of one of its most important strategies: the opt-out system [22]. Such strategy, which is more effective when individuals do not hold strong preferences [32], makes individuals participate in an arrangement by default and can be extremely useful for governments trying to increase the rate of organ donations.

This topic is incredibly delicate considering the scarcity of organs for transplants and that, on average, 11 people in the European Union [60] and 18 people in the United States [33] die every day whilst officially placed on the waiting lists for a transplantation. With this regard, it has been estimated that in 2013, 4,100 patients died while waiting for organ donations in the 28 Member States of the European Union. If patients from Iceland, Norway and Turkey had been included, the esteem would have risen to 6,000 patients [60].

Research has clearly shown that there is a strong relationship between the default option (opt-in/opt-out) and the overall national percentage of organs donations [31,34]. More specifically, countries with lower rates of donations have an opt-in default, whereas countries with higher rates adopt an opt-out system. Therefore, depending on the way donation choices are framed, there are huge differences between countries in the numbers of

donors [31,34]. For instance, in their panel study, Shepherd et al. [35] have recently confirmed the same conclusions. Albeit mainly focused on livers and kidneys donations from deceased donors, opt-out consent was found to be incredibly efficient in almost doubling the total number of livers and kidneys transplanted. Thus, behavioural economics default options may be an ingenious and strategic tool to significantly influence individuals' behaviour towards their society's well-being [13].

4.2. Habitual Choices

An additional example that is still related to inertia and the endowment effect, but from a provider point of view, refers to physicians who, for instance, may prescribe an overuse or inappropriateness of antibiotics [36] or lean towards habitual choices regarding prescriptions of pharmaceutical agents, even when they may not be the most effective, updated or available drugs [37]. The reasons behind such an irrational behaviour may be due to a long familiarity with that specific medicine stemming from previous medical training or pharmaceutical promotions [25], the high cost of learning and updating procedures and the external pressure imposed by shared social norms [37].

This last point about shared social norms is of a particular interest since conforming to local knowledge due to social pressure allows doctors to lower personal responsibility and maintain professional competence [26]. In fact, a hallmark in clinical decision making is uncertainty about the outcomes and the processes, the effectiveness of the treatments on heterogeneous patients and the efficacy of technology [2]. Because of this unpredictability, caution is fundamental for doctors to avoid loss in reputation. Similarly, the influence of contextual cues, or channel factors [6], may determine patients' behaviour and the appropriateness of their choice [8].

Behavioural economics shows that patients are often reluctant to carry the consequences of their own decisions and therefore may be keen to revert to a convenient default option, provided by others, even when that alternative is not in their best interest. For this reason and because of moral and professional duty, practitioners should encourage and persuade patients to follow a specific clinical course [12]. A way of reaching this goal could be, for instance, adjusting individuals' perception of social norms: the more people see others taking certain actions, the more they may think those actions are correct and should be replicated to avoid mistakes and losses [6,8].

Thus, once again, when correctly employed without abuse, behavioural economics strategies, such as defaults and social norms pressure, may be seen as useful behavioural techniques to affect individuals' behaviour [2].

4.3. Individuals' Loss Aversion and Trust

Individuals' loss aversion is another key issue introduced by Kahneman and Tversky [20]. According to them, individuals have a natural tendency to avoid losses, since they weigh them twice as much as gains. A behavioural economic strategy that tries to deal with this behaviour is framing: depending on the way a sentence is worded, i.e. in terms of gains or losses, it will influence individuals' choice, thus violating the fundamental assumption of invariance [19]. In fact, regardless the level of education [11], no individual is immune to framing [13]. Since research has clearly shown that this tendency occurs also in individuals' choices related to health behaviour [38], Moses [39] argued that messages to patients regarding their health should be accurately framed as a daily doctors' practice. In particular, the author suggested that loss-framed messages should be used to promote detection and monitoring procedures, specifically for cancer-related screenings, and to reduce unnecessary exams or treatments involving radiations.

In this regard, a crucial aspect which, among other things, depends on uncertainty, scarcity of information and patients' vulnerability is trust [28]. As previously mentioned, the human mind works primarily through heuristics, such as availability, representativeness and affect [19]. Availability heuristic, called salience by Akerlof [40], is maybe one of the most universal shortcuts and depicts the tendency to evoke and rely on vivid memories to shape a prior about the likelihood an event will occur based on the ease in which it comes to mind [20].

In the medical setting, availability heuristic may be the elaboration of a judgement about the probability that a doctor will be highly competent and will behave according to peoples' expectations [12]. Silvester et al. [41] have shown that patients, whilst accurately reporting information about doctors' attentiveness, fairness, empathy and respectfulness, were not likewise meticulous in spotting the technical features of medical care. According to Rabin and Schrag [42], this happens because trust filters the relationship through a confirmation bias, which is the tendency to look for clues which can confirm one's beliefs or hypotheses [43].

Moreover, reports and opinions of family and friends on the professionalism of a doctor count the most in creating a judgement [2]. Once trust is established, the power it can exert on patients may facilitate adherence to medications [28,29] and help doctors and nurses to maintain a long-lasting alliance with patients [44]. In this sense, trust can be regarded as one of the most powerful behavioural economics tools. With this perspective, trust may thus function "as a non-market institution that increases efficiency by reducing the disutility and inefficiency from the uncertainty and the anxiety of illness, as well as the agency problems associated with the asymmetry of information between doctor and patient" [2, p. 3].

An interesting instance of how trust can destabilise and outperform rationality in health care is provided by Frank [2]. In his article he reported and illustrated a programme initiated in 1989 in the New York State Department of Health aiming to enhance the quality of Coronary Artery Bypass Graft (CABG) surgery, through market forces and a standardised, transparent and reliable set of information, available to everyone, on doctors and hospital specific outcomes. Great effort was made to constantly update the media and major newspapers with the latest information. One major puzzle particularly sparked health economists' interest. Even though it would have been the most rational and logical choice to make, there was no significant shift in the number of patients from hospitals with higher rates of mortality to institutions with lower rates [45]. It is quite evident, as the data showed, that patients placed more weight on trust, personal opinions and recommendations from family and friends than objective and scientific information [2].

4.4. Present-biased Preference

Another curious phenomenon introduced by behavioural economics is the present-biased preference [7] or myopia towards the future [17]. The underpinning concept of present-biased preference is that individuals, because of lack of self-control, tend to favour the present rather than the remote future [11]. In terms of health implications, the consequences of this tendency are rather significant. From a consumer point of view, an example may be the failure to foresee the importance of preventive check-ups [25] or the negative impact of excessive and addictive behaviours, such as smoking, obesity or drug consumption, both at individual and public level [46,47]. Being able to tackle these problems in advance would benefit not only the patients themselves, but also would lead to savings in government spending [6]. Therefore, if "prevention is better than cure", it is in the government's own interest to pro-

mote these kinds of solutions. Two might be potential behavioural economics strategies.

The first strategy would be the use of monetary incentives. Even if some studies have shown that the use of incentives can be considered a good motivator for organ and blood donations [48], this strategy is rather debatable and controversial [11,49], as it undermines the humanist conception of reciprocity as well as of social policy as a way to protect society from exploitative economic interests [50]. Indeed, some research has reported that, whilst there was insufficient evidence to assess the quality of the blood provided, offering incentives did not increase the quantity of the blood donated and introduced additional costs [50]. This could be explained by the fact that taxes and financial incentives (both positive and negative) pose a threat to individual freedom of choice due to the price increase and cost burden [51].

The second, more innovative, behavioural economics strategy, would consist of the idea that it is more feasible to get people to engage in a similar behaviour rather than completely erase their habit [7]. This is what in 2010, the Cameron government, forming the Behavioural Insight Team (BIT, [59]), tried to put into action in order to encourage people to stop smoking: by promoting the use of electronic cigarette -thus condoning addiction to a narcotic-, the aim was to reduce the adverse health effects of conventional smoking [7]. In this sense, the aid provided by the government can be interpreted as the libertarian paternalism proposed by Thaler and Sunstein [26] in their book "Nudge". Hence, it is not a surprise that Cameron's BIT has been dubbed the "Nudge Unit" [30]. However, in order to avoid ethical issues in relation to maintaining individual freedom of choice and autonomy, government's interventions should be "easy and cheap to avoid" [26, p. 6]. In this way, on the one hand, the preferred choice from a public health perspective is put forward the most often, and, on the other hand, alternative choices are possible at no substantial costs [51].

4.5. Decision Fatigue and Excessive Choice

One last phenomenon is strictly related to decision fatigue and the presence of excessive choice. The concept of decision fatigue concerns the inconsistency of individuals' choices over time [6]. Even though people should make the same decisions under similar circumstances since they should be reference-independent, in reality this is not what happens [19].

In a very peculiar study on justice procedures conducted by Danziger et al. [52], the authors found that, depending on the time of the day, in particular if it was before or after a morning/lunch/afternoon break, the chances of a previous offender being paroled varied considerably: nearly zero just before the breaks, rising to two-thirds right after. The reasons behind such a result may be numerous, but certainly the principal reason is individuals' ego depletion [53]. It is plausible to translate the concept in health care situations. Doctors and nurses, because of stress and exhaustion from a demanding and frantic environment, long and over-night shifts and the need to constantly perform with efficiency [54], are highly subjected to ego depletion, which consequently may affect their decision-making processes [55].

With regard to the second concept, presence of excessive choice, the possibility of choosing from among a remarkable number of options is not always the optimal idea [26]. In fact, cognitively bounded individuals are overwhelmed by too much choice and information overload. As a consequence, they may struggle or fail to make a satisfying decision [6]. Once again, thinking of medical circumstances, instances may arise both in relation to automatic insurance plan enrolments [56] and simplification of drug prescriptions [30]. Concerning this last point, different behavioural interventions have been proposed to solve individuals' inability to make good choices [24]. Together with a reduction of the number

of alternative information about each drug plan, so that individuals may actually focus on the content salient to them [30], the introduction of symbols, such as stars, in lieu of numbers, has been also suggested to facilitate people's comprehension of medical therapies [57].

5. Conclusion

Through an interdisciplinary literature review integrating behavioural economics research with medical studies, the aim of this article has been to address how behavioural economics is able to explain individuals' behaviour thanks to new insights and viewpoints, embedded primarily in psychological approaches. As such, this article has made a contribution to the behavioural economics literature by providing a broad overview of how behavioural economics strategies may impact, and be implemented in, diverse health care settings to promote the effective behaviour of consumers and providers.

By integrating and complementing the limitations of traditional economic theory, behavioural economics may be seen not as a fifth column, but rather as an essential and empirically accurate contributor to the arsenal of modern economics [1]. However, far from being a panacea, behavioural economics alone is not a feasible alternative to the extensive and large-scale policies needed to tackle challenges at national level [46]. Indeed, behavioural economics by itself cannot offer an efficient framework for public health interventions. In this sense, taxes functioning as economic disincentives – which should not be considered acceptable within the realm of behavioural economics because limiting individuals' freedom of choice – are found to be more effective in their scope than behavioural economics tools [51,58].

Nevertheless, behavioural economics may help in pointing out fruitful directions towards innovative reforms and experimentations, which may use behavioural tools such as framing techniques and default options to improve individuals' decision making. Since both health care professionals and their patients do not always act according to the principle of *homo economicus*, such directions may be incredibly useful in the health care service. Here, a behavioural perspective can offer an opportunity to identify those theoretical implications and features of policy that deserve re-examination and further investigation [6]. By doing so, it would be possible to design specific interventions which may motivate individuals to follow behaviour that would benefit both their own interest and society as a whole. Thus, although significant model uncertainty still exists, taking into account behavioural factors may allow not only offering a better overall coverage, but also directing public resources towards those individuals that would benefit effectively from them the most.

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