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Changing Health Behaviours: Behavioural Economics and Prospect Theory

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Over the last twenty years, behavioural economics research has generated a large volume of promising results; even more recently, such progress has been made in the field of healthcare. Such research is based on prospect theory – developed by two psychologists, Daniel Kahneman and Amos Tversky – which introduced the notions of reference points and loss aversion. These two notions have enriched the economic analysis of individual behaviours and helped create new tools to improve the impact of public policies.

In this article, we set out a synthesis of the principal lessons that can be drawn from behavioural economics when applied to the healthcare sector. What is the contribution of these new approaches to our understanding of health behaviours? What new tools might this provide for policies that encourage healthy health behaviours or, inversely, discourage detrimental health behaviours?

Behavioural economics is becoming increasingly present in the scientific literature. Prospect theory is one of the most emblematic developments in behavioural economics. Developed by D. Kahneman and A. Tversky, two psychologists and winners of the 2002 Nobel Memorial Prize in Economics, prospect theory introduced the notions of reference points and loss aversion, making it easier to understand individual decision-making. The graph shown on the following page, which was taken from a biometric analysis carried out on Google

Scholar using data from between 1990 and 2023, shows the gradual development of this discipline in the academic world. Three trends can be observed. The first of these trends retraces the evolution in the number of times per year that the terms "behavioural economics" or "prospect theory" have appeared in a study, regardless of the discipline (i.e., the red curve). The second shows the same trend as the first one but applies solely to the field of healthcare (i.e., the green curve)¹. The last trend indicates the annual evolution in the number of quotations taken from the pioneering article writ-

ten by D. Kahneman and A. Tversky (1979), all disciplines included (i.e., the blue curve).

The biometric analysis shows that in fact, studies were conducted on a larger scale as of 2002 and that behavioural economics has received Nobel Prize recognition². Nevertheless, these studies have largely remained outside the field of healthcare economics; it is only recently, i.e., since 2018–2019, that behavioural eco-

¹ A publication is considered to relate to the field of healthcare if the word 'health' is present in the journal title name.

nomics has seen a significant rise in its influence in the healthcare field.

Behavioural economics has also developed at the institutional level, as it has been incorporated, along with other behavioural sciences, within different organizations involved in public decision-making. In the United States, Barack Obama created the Nudge Unit in 2009, which was followed in 2010 by the development of the Behavioural Insight Team in the United Kingdom. In France, a department of behavioural sciences was created within the Department of the Ministry of Public Transformation (*Direction interministérielle de la transformation publique*, DITP) in 2017. The aim of all these organizations was to develop new tools that could improve the impact of their policies.

How does prospect theory help us understand individual behaviours?

The studies carried out by J. von Neumann and O. Morgenstern, which prolonged and formalised the "expected utility theory" developed by Bernoulli in the eighteenth century, constituted the founding elements that enabled the analysis of individual behaviours (Von Neumann and Morgenstern, 1947). This theory sup-

poses that an individual's choice is based on the decision that will result in, on average (or expectation*), the greatest degree of satisfaction (or utility*). To do so, before making each decision, the individual will assess all of the possible alternatives and make the choice that he or she believes will ultimately result in the greatest degree of satisfaction. These studies also introduced the notion of being risk averse* (or risk lover*), making it easier to analyse individual behaviours.

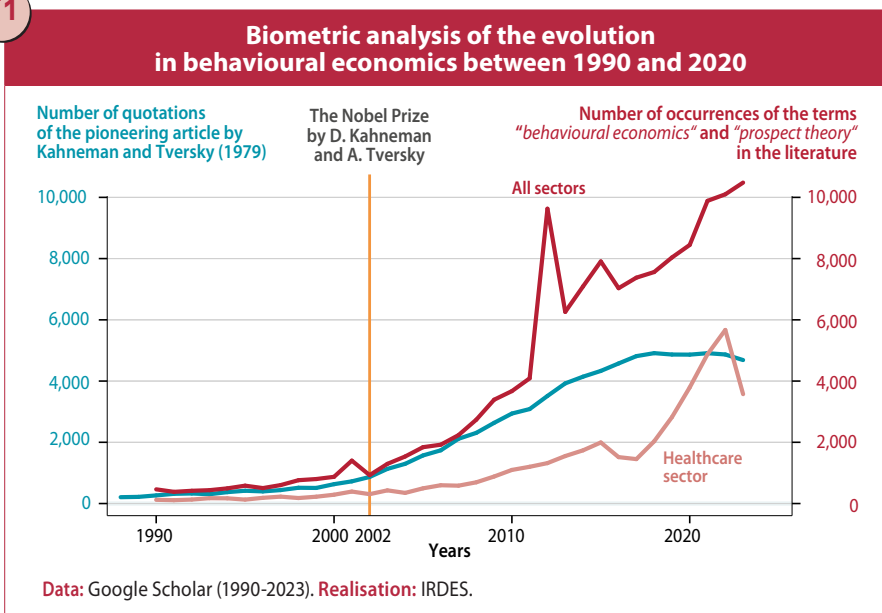
Other studies, particularly those conducted by D. Kahneman and A. Tversky, have enriched the previous approach (Kahneman and Tversky, 1979). They have proposed, via their prospect theory, that certain individuals' psychological inclinations should be accounted for in analyses of the decision-making process. They have demonstrated that it is not only the final satisfaction that is assessed in the decision-making process but also that the initial situation (or "reference point") also plays an important role. Hence, an individual assesses the consequences of a choice not only in terms of the final level of satisfaction but also in terms of the changes in relation to this reference point. The following example situations illustrate the significance of the reference point in the decision-making process (Kahneman, 2011):

- Situation 1: Aside from what you already possess, you are given 1,000 euros. You are then asked to select one of the following options: a 50% chance of winning 1,000 euros or the certainty of winning 500 euros.
→ Which option would you choose?
- Situation 2: Aside from what you already possess, you are given 2,000 euros. You are then asked to select one of the following options: a 50% chance of losing 1,000 euros or the certainty of losing 500 euros.
→ Which option would you choose?

Both situations have the same result. In the first case, if the individual chooses certainty, then he or she will have 1,500 euros; if the individual decides to take the bet, he or she will have 2,000 euros if he or she wins or 1,000 euros if he or she loses. In the second situation, if the individual chooses certainty, then he or she will have 1,500 euros; if the individual decides to take the bet, he or she will have 2,000 euros if he or she wins or 1,000 euros if he or she loses. Hence, the individual will have 1,500 euros if certainty is chosen in either case or either 1,000 or 2,000 euros depending on the result of the bet.

If only the final satisfaction provided by the outcomes of each situation is considered important during the decision-making process, then the gains or losses should have no bearing on the individual's choices. An individual who believes that his or her level of satisfaction would be the greatest with an amount of 1,500 euros (either 1,000 euros with a probability of 1/2 or 2,000 euros with a probability of 1/2) should choose for certainty (the bet) in the first and second situations. In other words, the individual should

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² A more detailed analysis would show the evolution in the number of quotations compared with other concepts or in the most influential publications. In addition, the number of quotations does not remotely indicate if a study was mentioned for critical or complimentary reasons.

* All the terms marked with an asterisk are defined in the «Definitions» inset on p. 4.

be risk averse (risk lover) in both situations.

However, this was not observed for most of the participants in the above-mentioned experiment. The results showed that most of the participants were risk averse in the first situation, as they decided to secure their gains (or a choice of certain gains), and risk lover in the second situation, when they decided to take the bet, which gave them a chance to avoid loss.

Two reasons were given by D. Kahneman and A. Tversky to explain

this. The first reason is that not only the final outcomes that are assessed during the decision-making process but also the gain or loss compared with a reference point are important. Hence, the authors distinguished whether the final satisfaction obtained is the consequence of a loss or a gain compared with a reference situation. The second reason is due to what the two authors called "loss aversion". This refers to the fact that a loss has a greater psychological impact than a gain with the same absolute value. Hence, the decrease in satisfaction following a loss is greater than the increase in satisfac-

tion provoked by a gain of the same size (Kahneman and Tversky, 1992)³ (see Inset 1).

Owing to the existence of this reference point and loss aversion, the way in which a situation is presented influences the decision-making process. Two situations that have the same outcomes are not perceived in the same way by an individual, accord-

³ This greater sensitivity to loss than to gain has also been observed in the field of neuroscience (Camerer, Loewenstein, and Prelec, 2005; Camerer, 2007). One hypothesis put forwards to explain this is that the organisms that consider threats as more urgent than opportunities have a better chance of survival was mentioned for critical or complimentary reasons.

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Illustrating and explaining the choices made by individuals via the notions of reference points and loss aversion

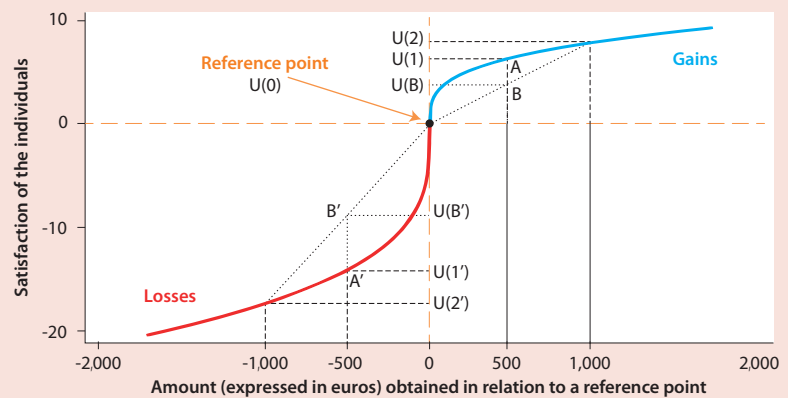
The S curve on the graph provides a graphic representation of the notions of reference points and loss aversion. The blue curve (red curve) represents the satisfaction of the individual when he or she makes gains-related choices (losses). The blue curve is concave, which means that the increase in the satisfaction drawn from a gain decreases as the gains increase. The red curve is convex and steeper,

which means that a loss will therefore provoke a much greater reduction in satisfaction and do so much more rapidly than in the gains zone. The intersection of the abscissa axis and the ordinate axis represents the reference point, that is, the situation on which an individual's choice is based.

Representation of the notions of reference points and loss aversion

Note : The ordinate axis (the vertical straight line) represents the satisfaction of the individuals. The more the values on this axis move upwards (downwards), the greater (smaller) the degree of satisfaction is. The abscissa axis (the horizontal straight line) represents the amount of euros that individuals may receive. The more the values on this axis move towards the right (left), the larger (smaller) the amount is. The satisfaction derived from the different options is given by U(0), U(1), U(2), U(1'), and U(2'). The first refers to the satisfaction of the individual when he or she is at the reference point. The second and third (the fourth and fifth) correspond to the utility derived from certainty and the bet in the area of gains (losses). U(B) and U(B') represent the satisfaction derived from the lottery in the area of gains and losses, respectively.

Conclusion: A loss has a greater psychological impact than a gain of the same absolute value. For example, a gain of 500 euros represents far less satisfaction than the



dissatisfaction provoked by the loss of the same amount (the absolute value of U(1) is lower than the absolute value of U(1')). **Realisation:** IRDES.

Hence, these two notions explain the choices made by individuals. According to prospect theory, options are no longer envisaged in absolute terms but rather in relation to a reference point. In the first situation, this reference point corresponds to 1,000 euros. The options available to the individual are therefore assessed in accordance with this amount. If the individual chooses certainty, he or she will have 500 euros more than their reference point. If the individual chooses the bet, he or she will have 1,000 euros more (if the bet is won) or will have nothing extra and will remain at the reference point (if the bet is lost). The satisfaction gained by winning 500 euros (U(1)) is greater than the weighted average of the satisfaction gained by winning 1,000 euros (U(2)) and by winning nothing at all (U(0)). The individual will therefore choose for a certain gain, as this is the option that will provide the greatest satisfaction.

In the second situation, the reference point corresponds to 2,000 euros, and the options are thus assessed in relation to this

amount. If the individual chooses certainty, he or she will have 500 euros less than their reference point. If the individual chooses the bet, he or she will have 1,000 euros less (if the bet is lost) or will lose nothing (if the bet is won), thereby remaining at the reference point. The dissatisfaction caused by the loss of 500 euros (U(1')) is in this case greater than that caused by the weighted average of dissatisfaction caused by the loss of 1,000 euros (U(2')) and that of losing nothing (U(0)). The individual will therefore choose the bet, as it is the option that will provide the greatest satisfaction.

^a Formally, this corresponds to $U(1) > 0.5 \cdot U(2) + 0.5 \cdot U(0)$. The line that links U(0) and U(2) is lower than the utility function, as the latter is concave in the area of gains. The expected utility of the gain is therefore higher than its expected utility.
^b Formally, this corresponds to $U(1') < 0.5 \cdot U(2') + 0.5 \cdot U(0)$. The line that links U(0) and U(2') is higher than the utility function, as the latter is convex in the area of losses. The expected utility of the gain is thus lower than its expected utility.

ing to whether they are presented as losses or gains. The individual will tend to be more risk averse when the situation is presented in the form of gains rather than losses. Hence, risk taking is different even when the outcomes are the same. Inset 2 illustrates how framing influences an individual's decisions via a healthcare-related example.

D. Kahneman and A. Tversky also focused on the cognitive process that underlies the decision-making process. They postulated that the decision-making process occurs in two phases, namely, initially in an "edition phase" and then in a subsequent

assessment phase. The aim of the first phase is to simplify and reformulate the different options available to the individual when he or she makes a decision. This simplification enables an individual to consider some but not all of the possible options⁴. Furthermore, an individual reformulates by subjectivising the probabilities of the occurrence of certain events. An individual very often makes a decision according to what he or she believes will be the probability of a event and not according to its objective probability (i.e., "the real probability"). During the second phase, the individual assesses and classifies the various options, retaining the one that will produce the greatest satisfaction. The first of the two phases – i.e., the edition phase – distinguishes prospect theory from expected utility.

The two authors also reported that there is a difference between the subjective and objective probabilities. The events that occur with a low level of objective probability are subjectively perceived as having a higher level of probability. Conversely, the events that occur with a high level of objective probability are subjectively seen as having a lower level of prob-

ability. Hence, individuals tend to underestimate those that occur more frequently.

How the notion of loss aversion can be used in the design of health interventions?

Much of the available literature focuses on the effects of financial incentives on the behaviours of individuals. The interventions that implement these incentives provide a financial reward on the condition that the participant attains a goal. These interventions assume that the financial incentive will motivate the individual to adopt a behaviour that he or she will maintain even after the incentive period.

In the field of healthcare, the interventions that offer financial incentives are focused mainly on the possibility of gaining something in exchange for adopting healthier behaviour. However, although individuals are more sensitive to loss than to gain, new forms of financial incentives may be put forwards

⁴ These are either the options that immediately come to mind or those that do not require much thinking about.

CONTEXT

This article is part of the research conducted by the IRDES into the applications of economic theory in the field of health economics, with the aim of establishing ways in which to develop better public health policies. It is based on the thesis by Antoine Marsaudon entitled: "Impact of Health Shocks on Personality Traits, Economic Preferences, and Risky Behaviours", produced at the Université Paris 1 Panthéon-Sorbonne and at the Ecole d'Economie de Paris, and directed by Lise Rochaix (Paris 1, PSE) and Mattéo M. Galizzi (LSE).

DEFINITIONS

Expectation: An indicator corresponding to the sum of all of the possible values weighted by their probability of occurrence. It is interpreted as an average. For example, the expectation of winning 100 euros if a die lands with the uppermost face on an even number and 0 euros if it lands with the uppermost face on an odd number is expressed as $100 \times (3/6) + 0 \times (3/6) = 50$ euros.

Utility: This term designates the satisfaction or well-being derived by an individual from the consumption of a good or service. We use the terms 'utility', 'well-being', or 'satisfaction' indiscriminately herein, even though these terms have different theoretical anchors.

Risk tolerance or risk prone: When an individual makes a choice in a risky situation, an economist distinguishes three major individual profiles: those with an aversion, those who are neutral, and those who are attracted to risk. Those with an aversion (attraction) to risk always (never) prefer certain amounts to ex-

pected but uncertain equivalent amounts. For example, suppose that an individual is given the following choice: receive 82 euros (a certain choice) or have an 80% chance of winning 100 euros and a 20% chance of winning 10 euros (an uncertain choice). Risk-averse persons will choose certainty, those who are risk lover will bet, and risk-neutral persons will be indifferent to the two options.

Random assignment: This method measures the effects of a programme on one or more interest variables (such as, for example, the probability of stopping tobacco consumption or of eating more fruit and vegetables) by forming two groups of individuals. Only one of the two groups will be assigned to receive the programme, and they will be called the 'treatment group'; the other group, which will not receive the programme, will be called the 'control group'. The major advantage of using this method is that it is able to remove, as far as possible, the selection biases that might have existed if the assignment were performed in

another way. For example, the programme could have been joined on a voluntary basis. In this case, only individuals who have particular characteristics (for example, the most motivated or educated individuals) would take part in the programme. Hence, the two groups would be composed of different individuals. The assessor would no longer be able to distinguish whether the effect of the programme or the effect of the characteristics of the volunteers had an impact on the interest variable(s). Random assignment enables the creation of two similar groups, thereby making them comparable. In other words, the only difference that exists between these groups is that one of them is 'treated' while the other is not. Any difference observed in the interest variable(s) may be reasonably attributed to the programme, as all the other dimensions are similar.

Valence: A term borrowed from chemistry and used to designate the force of attraction (positive valence) or repulsion (negative valence) to an object or activity.

(Rice, 2013; Matjasko et al., 2016; Halpern et al., 2016; Vlaev et al., 2019; Crainich, 2022).

This was the object of the experiment conducted by Patel et al. in 2018. The aim of the authors was to test the effectiveness of three types of incentives aimed at motivating obese or overweight persons to walk at least 7,000 steps per day (with the help of a smartphone application). To do so, the participants were randomly assigned* to one of the following four groups. The first group was given no financial incentive and therefore constituted the control group*. The other three groups were given a financial incentive and therefore corresponded to the treatment groups*. One of the three groups was given a financial incentive in the form of a certain gain of 1.40 dollars for each day that the 7,000 steps were taken. Another was given an incentive in the form of an uncertain gain (a lottery in which the expected gains were equal to the certain gain of the previous group) as soon as the objective was attained. This lottery enabled an individual to earn 5 dollars with a probability of 18% or 50 dollars with a probability of 1%⁵. Last, the final group was given a loss-framed incentive. This group had a hypothetical capital of 42 dollars (corresponding to 1.40 dollars x 30 days) per month that they could only have at the end of the experiment. This capital was reduced by 1.40 dollars each day such that the objective was not attained. Additionally, all the groups – including the control group – received advice via their smartphone application about the benefits of practising a regular physical and sports activity.

The three treatment groups had the possibility of earning, on average, the same sum of 1.40 dollars per day. Hence, they received the same reward if the goal was reached. The difference between the groups was related to the way in which the incentive was offered. The results showed that the persons who were given financial incentives through certain gains, as

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Behavioural asymmetry regarding risk

To illustrate the behavioural reversal with respect to risk according to the prospect of gains or losses, D. Kahneman and A. Tversky provided an example based on the following two situations:

• Situation 1

Country X is preparing to deal with a rare epidemic, which may lead to the deaths of 600 people. Two alternative programmes have been proposed to combat this disease. Suppose that the precise scientific estimations of the consequences of the programmes are as follows:

- Programme A: 200 people will be saved
 - Programme B: There is a 1/3 chance that 600 people will be saved but there is, a 2/3 chance that no one will be saved
- Which programme would you choose?

• Situation 2

Imagine that Country X is preparing to deal with a rare epidemic, which may lead to the deaths of 600 people. Two alternative programmes have been proposed to combat this disease. Let us suppose that the precise scientific estimations of the consequences of the programmes are as follows:

- Programme C: 400 people will die
 - Programme D: There is a 1/3 chance that no one will die, but there is, a 2/3 chance that 600 people will die
- Which programme would you choose?

The results of the study showed that 73% of the respondents chose programmes

A and D, 24% chose programme A (B) and programme C (D), and 3% chose programmes B and C.

This result may seem to be paradoxical from the viewpoint of the theory of expected utility. The respondents should have made the same choices, as both situations have the same outcomes. An individual who wished to save 200 persons (save 600 persons or no one), because this is what he or she believed to be the option that would provide the greatest satisfaction, should have chosen programmes A and C (B and D). However, this was only the case for 24% of the participants.

This choice is less paradoxical if one accounts for the loss aversion of individuals. While both situations offer the same outcomes, they are not presented in the same way; the first formulation is expressed in terms of gains (the number of persons who will be saved), while the second formulation is expressed in terms of losses (the number of persons who will die). According to prospect theory, the consideration of gains or losses has an effect on satisfaction and therefore, ultimately, on the decision-making process. Individuals are risk averse when they are in the area of gains and risk prone when they are in the area of losses. This explains why 73% of the respondents chose programme A and programme D. Hence, the way in which a situation is presented has an impact on the decision-making process.

Source: Kahneman, 2011

well as those who were given financial incentives via uncertain gains, did not attain the goal of 7,000 steps more often than the persons in the control group did. However, the persons who were given a loss-framed financial incentive attained the assigned goal more frequently than the individuals in the control group did.

Compared with other types of financial incentives, loss-framed financial incentives have also been shown to be effective in other contexts. They have been effective in encouraging weight loss (Volpp et al., 2008; Cawley and Price, 2013), reducing tobacco consumption (Halpern et al., 2015), and even increasing the physical activity of people suffering from heart problems (Chokshi et al., 2018). Nevertheless, it is difficult to prove that these and the other incentives have a lasting effect beyond the experimental period (Gneezy, Meier,

and Rey-Biel, 2011). Their generalisable nature with respect to other health behaviours and other populations also remains to be proven. Finally, a prerequisite of their effectiveness is their level of acceptability by the participants.

Greater sensitivity to loss than gain has also been used to design new information campaigns. For example, Rothman and Salovey (1997) aimed to determine whether adhesion to various public health programmes is greater when they are expressed in a negative way (by placing emphasis on losses) or when they are framed in a positive way (when emphasis is placed on gains).

⁵ More precisely, the participant had to select a number somewhere between 0 and 99. If he or she found two good numbers (1% chance), then he or she won 50 dollars; if he or she found only one of the two numbers (18% chance), then he or she won 5 dollars.

Studies conducted in the United States aimed at reducing the rate of non-use of Medicaid⁶ have provided some answers (Bhargava and Manoli, 2015; Wright et al., 2017). Researchers have previously tested the effectiveness of three types of letters that were randomly sent to eligible persons and related to signing up for Medicaid. The first letter provided neutral information about the programme, a brief decision of the benefits and the address to send the application form (provided with the letter). The second letter contained the same information as the first but had the following additional message: "You will lose your chance to get free healthcare if you do not complete the application". In this letter, the information was phrased in such a way as to introduce the notion of loss for the person if he or she did not sign up for Medicaid. Finally, a third and last letter contained the same information as the second but also offered personal assistance to help the person with the signing-up process.

The results of the study showed that the persons who received the second and third letters were, on average, 14 percentage points more likely than those who received the first letter to sign up for Medicaid. No significant difference in the percentage of individuals who signed up was detected between the second and third letters. Hence, the persons who were given personal assistance were no more likely to sign up for Medicaid than those who did not receive it. Thus, public authorities may only use the content of the second letter, with an insistent message about the loss of opportunity, to reduce the non-use of the scheme.

These results may be relevant to the French context, in which the rate of non-use of certain schemes is still high. This applies particularly to the Complementary Health Solidarity (*Complémentaire santé solidaire*, CSS) scheme – with and without financial participation – for which the rates of non-use reached

67% and 30%, respectively, in 2021 (Caro, Carpezat, and Forzy, 2023). It could be interesting to determine whether information campaigns similar to those developed for Medicaid are effective with the French public. This examination could be integrated into the framework of recommendation number 1 of the avenues for improvement identified by Caro, Carpezat and Forzy (2023). This recommendation, which was taken from a study conducted by the French Ministry of Health and Prevention, aims to "reinforce the communication to the general public about the CSS" and develop more appropriate communication messages. This call goes hand-in-hand with the results of studies that have sought to identify the determinants of the non-use of a former scheme, namely, the Health Insurance Voucher Plan scheme (*Aide à la complémentaire santé*, ACS), which merged with the free complementary health insurance scheme (*Couverture maladie universelle complémentaire*, CMU-C) in 2019 to create the CSS. Ignorance of the existence of the scheme, despite letters sent by the Primary Health Insurance Fund (*Caisse primaire d'Assurance maladie*, CPAM), along with uncertainty about eligibility, are two factors that help explain the non-use of the ACS (Guthmueller et al., 2011; 2013; 2014). This experiment highlighted that inviting potential beneficiaries to an information meeting may have contrasting effects. In the study, although participation in the meeting improved the use of the scheme, the beneficiaries of the invitation to the meeting who did not attend (largely in the majority) exhibited less use than did those who were not invited. This outcome highlights the difficulty of adopting the adequate communication methods to encourage take-up. One might deduce from the lessons provided by behavioural economics that future interventions that account for loss aversion, by insisting, for example, on the risk of having to pay more for healthcare in the case of non-use, may improve access to the CSS.

Finally, other studies have shown that the valence* of informational messages may also influence individuals' adherence to certain preventive campaigns (O'Keefe and Jensen, 2007). This applies, for example, to breast cancer screening (Schneider et al., 2001; Bertoni et al., 2020). Messages expressed in a negative way ("Scientific studies show that nonparticipation in breast cancer screening programmes may have significant negative effects on the treatment of a disease diagnosed late") are more effective in increasing the number of women who have mammographs than messages phrased in a positive way ("Scientific studies show that nonparticipation in breast cancer screening programmes may have significant positive effects on the treatment of a disease diagnosed early on").

What other types of interventions, emanating from behavioural economics, can be implemented?

Other examples of interventions that emanate from an extension of prospect theory have emerged. This is particularly true of "nudges", which is a notion popularised by R. H. Thaler, who was awarded the Nobel Memorial Prize in Economic Sciences in 2017. Numerous countries in the Organisation for Economic Cooperation and Development (OECD) have set up organizations that have developed various "nudges", which are now used as instruments of public action. For example, the concept of "nudges" is used in France in various fields, such as those of the environment, transport, ecological transition, and defence.

This notion is based on the distinction made by D. Kahneman and A. Tversky between system 1 and system 2 of the human brain⁷. System 1

⁶ Medicaid is a health insurance scheme dedicated to low-income individuals in the United States. In 2021, it covered almost 19% of the American population (Keisler-Stankey and Bunch, 2021).

⁷ These terms are borrowed from Keith Stanovich and Richard West, who are also psychology researchers.

functions rapidly and automatically, with little or no effort. It makes decisions without a sensation of deliberate control. However, system 2 is slower and more controlled and logical. This is the system used to address more complex situations that require some reflection.

A nudge aims to make the most of the brain's capacity to use system 1 rather than system 2 when making decisions. A nudge policy guides the individual towards a choice that is largely considered beneficial by the population as a whole (for example, being in good health) but that he or she would not have chosen spontaneously. To achieve this outcome, the nudge modifies the choice architecture, that is, the way in which the different options are presented. Hence, the individual always has the same number of options – whose content remains unchanged – but the option seen as the most preferable is highlighted (Thaler and Sunstein, 2003).

Nudge policies are described as "paternalist libertarians". They are considered "paternalist" because their aim is to guide individual choices towards a decision that a third party would consider better for themselves. They are considered "libertarian" because each person can also make a different decision than that proposed by a third party. Hence, these policies are based on the idea that it may legitimately influence individual behaviours without compromising individuals' freedom to do otherwise. Thus, regulation policies (by legally prohibiting) and taxation (by financially discouraging the consumption of something) are not considered nudges.

An example of a nudge policy in the field of healthcare could be the one put forwards by Hanks et al., 2012. These authors focused on the way in which the consumption of healthy meals in a school canteen could be made more appealing while not preventing the consumption of less healthy meals. As individual choices are influenced by system 1, the authors decided to make

healthy meals more noticeable. Their results revealed that by altering the position of self-service meals (healthy meals were placed at eye level on the lowest shelf, whereas less healthy foods were placed on the upper shelf), individuals consumed more healthy foods. Hence, this was indeed found to be a modification of the choice architecture, which remained the same in terms of content, while the option that seemed to be the best in terms of public health was promoted.

Another example of the "nudge" principle was put forwards by Crozier et al., 2020. The authors carried out tests to determine whether different labelling systems for food wrapping influences individuals' choices with respect to buying healthier products. Thus, the authors invited 691 individuals to shop online via a virtual supermarket. The catalogue of the 290 products on sale at this supermarket provided information about the price per kilo (or per litre), the ingredients, and the nutritional tables of each product. To assess the effects of the labelling systems, the authors randomly placed the participants in different groups. The first group was given no labelling system and therefore had none of the basic information provided in the product catalogue. The other groups were given one of the five labelling systems (i.e., "NutriScore", "NutriMark", "NutriCouleur", "NutriRepère", or "Sens") and were provided with the same information as the previous group; however, the information they were provided with was summarised or made more legible. The different labelling systems therefore provided a rapid signal of the overall nutritional value of a food product. The results of this study showed that all the labelling systems significantly improved the consumption of healthier products. The system that provided the best results was "NutriCouleur", which is a system that was adopted by France in 2017.

Other examples of nudging have proven to be effective – at least over the short term – regarding the pre-

scription of medicaments, the probability of being vaccinated for the flu, and the reduction in the number of failures to keep dental appointments (Halpern, Ubel, and Asch, 2007; Altmann and Traxler, 2014; Patel, Volpp, and Asch, 2018).

All the same, and to avoid potential manipulation abuses, it is important that nudge policies are systematically accompanied by information that explains the reasoning behind the intervention. Public interventions must be guided by content rather than design.

* * *

Behavioural economics, and more specifically prospect theory, have helped to improve knowledge about the economic approach of the decision-making process. The examples outlined in this article suggest that small changes in the design of messages or in the way incentives are created may have positive effects on health behaviours.

A possible approach – based on the notion of loss aversion – would consist of formally informing eligible persons (who have no cover) about the cost of their healthcare with and without health cover. As part of its missions⁸, the health insurance system (*Assurance maladie*) aims to reduce the non-use of healthcare by focusing on existing schemes such as the CSS and by developing a "proactive" policy that targets vulnerable populations via healthcare support missions that have existed since 2014. From this perspective, developments in behavioural economics may inspire public policy. ♦

⁸ See in particular the 2023-27 Planning and Management Agreement signed by the French State and the National Health Insurance Fund (*Caisse nationale de l'Assurance maladie*, CNAM); https://www.assurance-maladie.ameli.fr/qui-sommes-nous/publications-referance/assurance-maladie/convention-objectifs-gestion#text_48028

Daniel Kahneman, a psychologist and winner of the 2002 Bank of Sweden Prize in Economic Sciences, passed away on 27 March 2024. We would like to pay him this modest tribute for all of his work that has inspired generations of researchers.

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