

BEHAVIORAL ECONOMICS: “NUDGING” PEOPLE INTO MORE ACTIVE HEALTH CONSCIOUS BEHAVIORS THROUGH WEARABLE TECHNOLOGY

Alina Maria Neațu

Ph.D. Student, Bucharest University of Economic Studies, Romania

Email: alina_neatu@yahoo.com

Abstract

Public health has always been a matter of great concern for a great number of stakeholders, such as: governments, ministries, health groups, non-governmental organizations, political leaders, private partners, health professionals or various business communities. Long-term improvements in the overall health and wellbeing of the population can now be more easily achieved by encouraging people towards a healthier, more active life-style using innovative prevention and monitoring tools and technologies. Among many other given benefits, wearable technology entails the potential to deliver public health support on a previously unimaginable scale, for example by helping individuals autonomously manage their eating, sleeping and physical activity and reducing pressure on their personal health and the healthcare systems created to support them. Behavioral economics provides the means to potentially increase awareness, reduce disparities, inform people and motivate them in this regard. Focusing on the relatively predictable mind paths and mental shortcuts (heuristics) humans employ to make decisions, the emerging field of behavioral economics can provide valuable insights for policy makers when developing strategies to motivate people in leading a healthier life. The present paper aims to show how various concepts in behavioral economics may be used to influence people’s behaviors, determining healthier habits and positive life-style attitudes. Moreover, it provides an overview on how wearable technology can be employed by policy makers and health practitioners to make recommendations and improve the decisions making, monitoring and feedback. The conclusions of the paper summarize some of the downsides, limitations and technical challenges when implementing modern wearable technologies into everyday life and list several recommendations and future research questions.

Keywords: behavioral economics, nudging, decision-making, public health, wearable technology

JEL Classification: I12, I18, O33, P46

Introduction

The worldwide number one increasing health condition is obesity; statistics show that figures have nearly doubled since 1980. According to World Health Organization estimates, more than 1.9 billion adults, 18 years and older, were overweight in 2014, with more than over 600 million of them being obese. Percentagewise this means 39% of adults aged 18 years and over were overweight and 13% were obese in 2014 (WHO, 2015). Moreover, a significant extent of the world's population concentrates in countries where overweight and obesity kill more people than underweight does. Even so, obesity is a preventable condition.

Many policy makers, governments and member states of the World Health Organization keep busy in designing health plans and strategies meant to alleviate what is considered to be one of the most threatening public health problems of our time. As expected, in most public healthcare plans, increased physical activity together with dietary modification is advised. Which seem to be a very sensible and effective recommendation not only in tackling excess weight problems, but also in lowering the occurrence of many non-contagious and less evident health conditions such as cardiovascular disease, cancer and diabetes.

Despite all this, a global concern still remains; one in three adults does not exercise or move their body sufficiently. Bearing this in mind, it should be noted that physical inactivity is the fourth leading risk factor for death worldwide, causing over 3.2 million deaths annually (Lim et al., 2010).

The present paper hopes to provide a deeper understanding of behavioral economics principals and how the advancements in the field of behavioral studies may help to reduce these disparities and identify useful tools to increase physical activity and health monitoring through the usage of wearable technology. The aim of the research is primarily to describe general concepts of behavioral economics and to demonstrate practical use when applying behavioral insights to the modeling of individual decisions by suggesting appropriate behavioral methods. For this purpose, the relevant literature in the field has been reviewed in order to identify and present the most representative concepts and ideas; another scope of the research is to make suggestions and recommendations of how such findings could be implemented.

The structure of the paper is closely tied to these objectives. The first and second part briefly present research and evidence from recent literature confirming the high interest in the study of behavioral economics. The third part explains important concepts and ideas in the field of nudging and the utility of knowledge and implementation of such results. In the fourth part, wearable technology is described and behavioral insights methods are suggested as ways for improving individuals' health behaviors through the usage of such instruments, also to be found here are limitations and concerns regarding the research. In the end of the paper a brief conclusion summarizes suggestions and future research opportunities.

1. Behavioral Economics

Using behavioral economics principles in regulating preferences and decisions of individuals is not a newly adopted practice, but more likely, an increasingly global trend. The methods characteristic to behavioral economics are often used to shape public policies in the sense of designing behavioral changing strategies based on the actual behavior of individuals and not a hypothetical one. Governments like the ones in the United States, Australia and Great Britain have been successful in implementing such policies and

opening new ways of thinking and regulating public policies based on behavioral economics insights, choice architecture and nudging.

Still considered a relatively young branch of the economic discipline, behavioral economics seeks to identify and explain the ways in which individuals make decisions by employing theories derived from psychology and sociology in studying the human economic behavior. Additionally, behavioral economists are interested in researching the motivations and factors determining such, often considered irrational, behaviors (anchoring, overconfidence, framing, herd mentality, etc.) observed in different socio-economic backgrounds.

Behavioral economics concepts like social norms, individual preferences, judgment, decision-making, choice architecture could prove useful in enhancing existent public health strategies that target improvements in the overall wellbeing, exercising, dieting, screening and monitoring, by providing new insights into people's behavior and decision-making patterns when engaging (or not) in activities of the kind.

Many important research concepts in behavioral economics study people's tendency to subjectively assess the probability of an outcome or event (Kahneman, 2003). Extended psychological and behavioral economics studies have shown that such judgments, notably those in situations where people have insufficient experience or information, are often likely to be influenced by presumably irrelevant factors. (Tversky & Kahneman, 1974)

When analyzing judgments from a behavioral perspective, various mental biases such as availability, representativeness or unrealistic optimism can be considered responsible for hindering the decision to engage in healthy behaviors, like fitness and exercising, in order to improve physical shape and prevent the likelihood of bodily illnesses in the future.

The tendency to estimate the probability of an event occurring in the future, such as a heart condition diagnosis, based on the power of imagining that event taking place or recalling similar events from the memory is known as the *availability* bias (Tversky & Kahneman, 1974). For example, someone who recently found out about a family member suffering from diabetes is more likely to consider dieting and exercising as the probability of getting ill as well becomes highly "available" in memory.

Representativeness is known as the judgmental bias that enables peoples to "foresee" the probability or recurrence of a future event by simply assuming its probability or recalling it from one's past experiences (Kahneman, 2013). Moreover, policy-makers can use the information on biases like availability and representativeness to raise awareness for potential risks and point out the benefits. Practitioners could use knowledge on both availability and representativeness biases to improve the perception of risk and highlight the benefits of constant health-conscious behaviors and monitoring, by providing memorable information about the benefits of regularly performed workout activities, technological diffusion and adoption of health monitoring wearable devices among peers.

Illusion of control is the tendency to overestimate the influence one may have over other external events. This bias occurs when people experiences a sense of control over outcomes that they demonstrably do not influence, for example personal state of health. (Thompson, 2004).

Overconfidence effect is a well-known bias describing people's excessive confidence in their own answers to questions, it occurs when subjective confidence in the own personal judgments is reliably greater than the objective accuracy of those judgments. For example, for certain types of questions, answers that people rate as "99% certain" turn out to be wrong 40% of the time (Lichtenstein et al, 1982).

Unrealistic optimism is a frequent bias that occurs when individuals manifest exceptionally low estimates of their own susceptibility to harm or tend to exceedingly estimate of their

chances of success or benefit (Weinstein et al, 2005). It is very often, that people tend to underestimate their chances of getting sick in the future.

Ambiguity effect, a cognitive bias where decision making is affected by a lack of information, or "ambiguity" and is characterized by the tendency to avoid options for which missing information makes the probability seem "unknown". (Frisch & Baron, 1988) Relevant social marketing campaigns that provide accurate information about life-threatening conditions caused by insufficient physical activity and the popularity of new technologies available should increase self-conscious monitoring and prevention among population and, to a certain degree, counter fight the tendency for unrealistic optimism.

Decision-making is concerned with how information is presented.

Framing bias refers to the disposition of people to change their individual preferences based on the manner available choices are displayed (framed). Personally tailored information such as that made available on wearable devices can be very useful when physicians address and encourage healthy behaviors among the general population.

Ostrich effect is a judgmental biased referring to the tendency of people to ignore an obvious (negative) situation. Implementing dieting and physical exercise programs, breaking health goals into chunks, monitoring progress and receiving feedback from professionals are now easier to achieve through the usage of wearables. Adequately presenting these options may counteract this effect.

Multiple studies show that when a person perceives a public policy or a system as unjust or uncertain she is more inclined to mistrust, even reject its recommendations. According to Economics Prof. Matthew Rabin messages about one's behavior of constantly monitoring and improving his personal health, can also be formulated (by using the framing bias) to address individuals' sense of fairness (Rabin, 1993).

Reactance is a bias referring to individuals' urge of rejecting what is advised by doing exactly the opposite, also know as reverse psychology (Brehm, 1966). This is a fairly important bias that needs to be taken into account when designing healthcare policies and recommendations, as it may often trigger the opposite undesired effects. According to Slovic et al *the affect*, known also as the emotional response bias, may as well be held responsible for influencing the decisions-making processes. Their work underlines the importance of framing recommendations in a way that induces positive affect regarding positive behaviors or counter troubling perceptions regarding down-sided conditions. In the health sector, this bias may prove useful, for example, when describing the peace of mind a person will experience when being able to monitor her health and keep a good health record. Also stimulating the sense of pride that comes with taking care of her health may be more effective than addressing a person's fear of developing a threatening condition.

Promoting mechanisms that aim to address and resolve various issues of trust by employing improved communication methods, competence and engagement may benefit the health sector and better the decision-making processes. By providing complete clear information regarding preventive options, policy makers and practitioners can fire up people's desire to autonomously commit to personal wellbeing and physical shape improvement. Under such methods, we can account undergoing a healthy diet and exercise.

2. Nudging

One of the key aspects relating to behavioral economics is how it can be used to better the decisions of individuals and organizations. The idea of providing a guiding hand in the decision making process has come to be known as a nudge, due in no small part to the book with the same name written by Thaler and Sunstein.

A *nudge* is defined as ‘an aspect of choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. Therefore, in order for a certain policy to be considered a nudge it must abide by the following conditions: 1) proper alignment of incentives, 2) appreciation of how individuals understand the consequences of their decisions, 3) sensible default options, 4) appropriate feedback, 5) allowance for expected errors, and 6) clear presentation of information for making complex choices.’ (Thaler & Sunstein, 2008, p. 109)

Thaler & Sunstein (2008) define *choice architecture* as the measure of “organizing the context in which people make decisions” and argue it represents a significant starting point for policy makers when designing measures to improve public health. From their point of view, choice architecture should also track performance and offer feedback. The present paper argues that wearable technologies can allow practitioners to identify, remind and provide feedback to both providers and users and increase health awareness.

A human trade often studied in behavioral economics is the tendency of people to accept the status quo when an option is presented as standard, also known as the *default option* bias. From the nudging perspective, defaults are considered powerful instruments in promoting healthy behaviors. In the same register, Madrian & Shea (2001) argue that while guiding people into a pre-designed direction, it is still possible to respect individual preferences by presenting an opt-out option.

Moreover, according to Thaler & Sunstein, when designing ways to raise awareness and promote healthy behaviors, policy makers should include elements of choice architecture, such as default options, feedback, incentives, and allowance for errors. Also when considering improvements in public health through wearable technology, practitioners may include a “default option” (with an opportunity to opt out) to integrate and financially support wearable devices as a feature for keeping and updating electronic medical records, particularly for the lower-class population might be inclined to use such technologies but cannot yet afford to purchase them.

Offering bonus plans and financial incentives (like monetary discounts on health insurance premiums), rankings or stimulating a sense of pride can also prove useful measures for promoting long-term health improvement; such actions could counteract the tendency of individuals to discount future rewards by adding immediate benefits.

In accordance with the aforementioned behavioral principals, health recommendation made by policy-makers should acknowledge room for errors, help individuals to correct the “absence” of a self-conscious health behavior and offer support in joining such programs anytime.

In conclusion, by including appropriate framing in policy design and social communications, policy makers and practitioners can promote the benefits of self-conscious dieting and exercise and make recommendations regarding health self-monitoring. One way this could be accomplished is through usage of wearable devices.

3. Wearable technology

In this paper, it is argued that behavioral economics principles can prove to be useful to practitioners when generating innovative and effective public health strategies that target behavior change. One exhilarating and fast spreading trend in literally “touching people’s hearts” and improving their health behavior could be achieved through the employment of wearable technology in healthcare policy architecture. In the process of promoting, guiding and monitoring public health individualized, contextually-responsive, behavior changing solutions can be delivered, as wearable devices hold the potential of getting that close to their users as no one ever imagined before.

First, what is as wearable technology? In most experts' acceptance – but not all – it represents any body-worn computer that is “designed to provide useful services, while the user is performing other tasks”. Here we can refer to nearly all strapable devices such as fitness monitors, music players, smart watches, sport garments, HUD systems, and even smartphones (depending on how they are used).

All these devices come with both advantages and disadvantages for the average inexperienced user, moreover they come with certain technical limitation and challenges such as: power and heat, on and off-body networking, mobile input, display, etc. Privacy represents such a significant challenge, that it deserves its own article. Due to the intricacies involved, at this time, the topic will not be discussed in greater detail. However, this present paper only focuses on the usage and implementation of wearable technologies as a tool to improve, encourage and monitor public health, stimulate health awareness and preventive behaviors.

Wearable technology is becoming more and more spread in people's everyday life. The real impact of wearable technology is only expected to increase, according to the latest report available on researchandmarkets.com the “wearable technology market will be worth USD 22.7 billion in 2015 rising to USD 173.3 billion by 2020”.

Wearable technology has the potential to improve life-standards and make healthcare more efficient, convenient and effective for multiple stakeholders. Whereas physicians would typically rely on patients to communicate their state of health, wearables would make it possible for medical professionals to appreciate the general health condition of their patients even before they walk into the exam room. Insurance companies can also benefit by allowing practitioners to leverage data from users and provide discounts on premiums. Many of these devices are already available for everyday use, but integrating this information into electronic medical records will be a time costly complicated process. Challenges like standardizing the information, reporting it, saving it and secure it, in a way that makes it easily accessible for medical professionals across different departments will have to be considered.

Indubitably, data ownership and privacy will constitute other major concerns around any such implementations. Even so, an increase in usage of wearable technology is easily foreseeable, especially as shown above, in the medical sector where it can be used as an effective tool for doctors and hospitals to work and experiment with it. Although, it is yet premature to expect doctors to officially use biometric data collected by wearables of their patients for diagnosis, it is safe to assume that the relationship between the doctor and patient will continue to change in the future.

Conclusion

As people become more aware of the possibilities offered by the wearable technology, they will start to understand their own bodies better and acquire a deeper sense of control and responsibility in consciously measuring physical parameters and autonomously monitoring overall health.

Using behavioral findings to enhance population's awareness and generate self-conscious behaviors regarding personal health improvement through the usage of wearable technology (for example, such as self-monitoring of physical activity, sleeping and dieting) will only lead to faster developments and advancements benefiting both social and economical environments.

Acknowledgements

This paper was co-financed from the European Social Fund, through Sectoral Operational Programme Human Resources Development (SOP HRD) 2007-2013 under the coordination of The Bucharest University of Economic Studies and The Romanian Ministry of Labour, Family and Equal Opportunities, project POSDRU number 159/1.5/S/138907 “*Excellence in scientific, interdisciplinary, doctoral and postdoctoral research in economic, social and medical fields – EXCELIS*”.

Bibliography

- Brehm, J. W., 1966. *A theory of psychological reactance*. Academic Press.
- Centers for Disease Control and Prevention, 2013 *The guide to community preventive services*. Atlanta (GA): Centers for Disease Control and Prevention.
- Clark, E., 2014. *Patents in a Wearable Tech World*. WWD, [online] Available at: <<http://wwd.com/retail-news/trends-analysis/>>, [Accessed 3 April 2015].
- Frisch, D. and Baron, J., 1988. Ambiguity and rationality. *Journal of Behavioral Decision Making*, 1 (3): 149–157.
- Gigerenzer, G., 2008. Why heuristics work. *Perspect Psychol Sci*, 3(1): 20–9.
- Gilovich, T., Griffin, D. and Kahneman, D. eds. *Heuristics and biases: the psychology of intuitive thought*. New York (NY): Cambridge University Press, p. 397–420.
- Halpern, S.D., Ubel, P. A. and Asch, D. A., 2007. Harnessing the power of default options to improve health care. *N Engl J Med*, 357(13): 1340–4.
- Kahneman, D., 2003. A perspective on judgment and choice: mapping bounded rationality. *American Psychology*, 58(9): 697–720.
- Lichtenstein, S., Fischhoff, B. and Phillips, L.D., 1982. Calibration of probabilities: The state of the art to 1980. In Kahneman, D., Slovic, P., Tversky, A. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge University Press. pp. 306–334.
- Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K. and Adair-Rohani, H., 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380(9859): 2224-2260.
- Madrian, B. and Shea, D., 2001. The power of suggestion: inertia in 401(k) participation and savings behavior. *Q J Econ*. 116(4): 1149–87.
- Mann, S., 1997. Wearable Computing: A First Step Toward Personal Imaging. *Computer*, 30(2), [online] Available at: <<http://wearcam.org/ieeecomputer/r2025.htm>>, [Accessed 3 April 2015].
- Rabin, M., 1993. Incorporating fairness into game theory and economics. *American Economic Review*. 83(5): 1281–302.
- Researchandmarkets.com, n.d. *Wearable Technology. Report: 2015*, [online] Available at: <<http://www.researchandmarkets.com/research/hgdx6p/wearable>>, [Accessed 3 Apr 2015].
- Slovic, P., Finucane, M., Peters, E. and MacGregor, D., 2002. The affect heuristic. In: *Sunstein C. Selective fatalism. J Legal Stud* 1998, 27(S2):799–823.
- Thaler, R. H. and Sunstein, C. R., 2008. *Nudge: improving decisions about health, wealth, and happiness*. New Haven (CT): Yale University Press.

- Thompson, S.C. (2004), "*Illusions of control*", in Pohl, Rüdiger F., *Cognitive Illusions: A Handbook on Fallacies and Biases in Thinking, Judgement and Memory*, Hove, UK: Psychology Press, pp. 115–125.
- Turner, J.C., 1991. *Social influence*. Milton Keynes: Open University Press.
- Tversky, A. and Kahneman, D., 1974. Judgment under uncertainty: heuristics and biases. *Science*, 185(4157): 1124–31.
- Visiongain.com, 2015. *Wearable Technology Market Forecast 2015-2020. Leading Companies in Smartwatches, Fitness & Activity Trackers, mHealth, Cameras, AR Glasses & e-Textiles*. Publication date: 25/03/2015, [online] Available at: <<https://www.visiongain.com/Report/1421/Wearable-Technology-Market-Forecast-2015-2020>>, [Accessed 30 March 2015].
- Wearabledevice.com, n.d. *What is a Wearable Device?* [online] Available at: <<http://www.wearabledevices.com/what-is-a-wearable-device/>>, [Accessed 3 April 2015].
- Weinstein, N. D., Marcus, S. E. and Moser, R. P., 2005. Smokers' unrealistic optimism about their risk. *Tob Control*, 14(1): 55–9.
- World Health Organization, 2015. *Obesity and Overweight*, [online] Available at: <<http://www.who.int/mediacentre/factsheets/fs311/en/>>, [Accessed 8 April 2015].