

Nudging workers to make healthier food choices

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Abstract

This article describes a nudging-type behaviour change intervention as part of an organization's global initiative promoting healthier life-style and eating habits for employees. Consumption was influenced by re-arranging food in the canteen so that healthier foods were more visible and accessible; activating mental representations associated with eating. Outcomes showed increased consumption of nuts and fruit during the intervention revealing the usefulness of behavioural science in assistance of corporate policies. This is one the first reports of the effects of a nudging-type intervention in an organizational setting.

Introduction

Recent years have seen enormous interest amongst researchers, psychologists, managers and policy makers for new insights from behavioural sciences. This includes behavioural economics where sophisticated techniques promise an unparalleled window into the engine of our motives and choices (Glimcher, Camerer, Fehr & Poldrack, 2009; Vlaev & Dolan, 2015). In contrast to economic models of rational choice that suggest we respond to information and price signals; insights from behavioural economics advise that human behaviour is greatly influenced by the context or environment within which many of our decisions are taken. This is because the human brain uses a number of heuristics to simplify our decision-

making; but these rules can also lead people into predictable systematic biases and errors (Kahneman, 2003; 2011) in their choices.

Increasingly new developments in behavioural economics are becoming matched by a willingness of behavioural scientists to translate the practical implications of their work. Since Thaler and Sunstein's (2008) book *Nudge: Improving Decisions about Health, Wealth, and Happiness* the applied interest towards behavioural economics has drastically increased. The authors describe Nudge theory as a type of behaviour change approach that uses different psychological effects to influence our choices. Nudges are a class of behaviour change techniques (Michie et al., 2013) defined as "Any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein 2008, p. 6). Hollands and colleagues (Hollands et al., 2013, p. 3) define nudges as techniques involving altering stimuli within micro-environments with the intention of changing behaviours in that environment, that require minimal conscious engagement, and are not individually tailored. For example, changing the size of plates or placing less healthy foods further away from customers may influence the amounts and types of food consumed (Rozin et al., 2011). Similarly, King and colleagues (King et al., 2016) show that the smell of washing liquid can motivate hand hygiene compliance in clinical environments. In terms of the dual-process theory of human cognition (Evans, 2008; Evans & Stanovich, 2013) nudges are thought to work through automatic rather than reflective, psychological processes.

In recent years nudging has become a popular subject of academic study and policy initiative (Dolan et al., 2012; Vlaev, King, Dolan, & Darzi, 2016). Derived from behavioural economics nudging seeks to improve people's welfare-related choices by using environmental design instead of legislation. Today we can see usage of nudging interventions regularly in governmental policies concerning, for example, health or environmental issues (Dolan et al. 2010; 2012; Marteau, Hollands & Fletcher, 2012) in the: financial field and loan collection (Hallsworth, List, Metcalfe & Vlaev, 2015); correcting risky life-style behaviours (Burgess, 2012); and in charitable giving (Small et al., 2007). However, the art of nudging is still searching for a place in the corporate world as part of Human Resource (HR) activities.

The encouragement of healthy eating, and nudging healthy food choices in particular, are issues gaining in importance; not just because of the obesity syndrome, but also because many governments are assuming that the healthier their citizens, the more efficiently they can function and contribute to the public good (Marteau, Ogilvie, Roland, Suhrcke & Kelly, 2011). The same logic will be relevant for the health and welfare of employees in any company or organization.

During 2012-2013 the managerial board of Liebherr group agreed a global strategy for improving health, wellness and life-style among their employees. The strategy included easy access to various sport and wellness activities. An important part of that strategy was modification of dining in the factory; including the meals provided in them. The fridge factory, employing over 1,000 people in Radinovo, Bulgaria implemented the global strategy in detail. Many staff took up sports' activities like yoga lessons, football, table tennis tournaments, and dancing. The canteen menu

was improved offering the workers a wider selection of healthy foods and drinks. For better traceability of staff eating habits the company issued plastic cards holding credits for free meals available at the beginning of every month. If credits were not used by the end of each month for meals; employees could take some snacks, sweets, soft drinks and foodstuffs instead. Despite all the improvements, however, the consumption of the healthy foods, such as fresh fruit and nuts, remained low and did not increase from the first month of the programme implementation until its end in 2013. In order to increase the consumption of healthier food the HR department supported by external consultants applied a nudge-type intervention.

The Intervention

The intervention was based on the influence of priming, or triggering, aiming to influence impulsive consumption by the re-arrangement of meals at the food board; so that the healthier foods are more noticeable and accessible. Visibility of food stimuli can activate (or prime) specific mental representations associated with eating. Priming stimuli send excitatory signals between perceptual features and motor programmes in connection with behavioural schemata or motor habits (Strack & Deutsch, 2004). Thus, a behaviour can be altered when an intervention exposes the individual to priming stimuli such as words, sights and smells (see Dolan et al., 2012). A key finding informing our design is the importance of impulsive behaviour in creating healthy eating habits (Ng, 2012; Verdejo-Garcia, 2014); which is, paradoxically, based on the assumption that impulsivity is often prerequisite for overeating (Guerrieri, Nederkoorn, Jansen, 2008). The essence of impulsive eating is the urge to take the first food in the range of vision, often because the feeling of hunger is experienced subjectively stronger (Guerrieri, Nederkoorn, Schrooten, Martijn, & Jansen, 2009; Meule, 2013). Following this logic the healthy foods were lined up first in the canteen display. In that way, we targeted the employees with most impulsive behaviour or ravenous appetite, nudging them to have healthy foods as their first choice; thus targeting their impulsive (as the opposite to reflective) system for decision-making (Strack & Deutsch, 2004).

There is already developing evidence that making the healthy choice options more visible and accessible have proven effective in field settings. Recent studies have focused on provoking healthier eating in schools showing the effect of special buffet rearrangements. Hanks and colleagues (Hanks et al., 2012) conducted an experiment in which the healthy foods were placed on shelves with easy excess compared to less healthy foods. This study reports an 18% increase of healthy food sales as an effect of such rearrangements. Rozin and colleagues (Rozin et al., 2011) achieved similar results proving that with placing the unhealthy foods on difficult to reach places their consumption can be reduced. Related evidence is seen in the sales impact of displaying alcoholic and non-alcoholic beverages at end-of-aisle locations (Nakamura, Pechey, Suhrcke, Jebb, & Marteau, 2014). However, there are still few studies of interventions in organizational settings.

Method

Re-arrangements were made in presenting foodstuffs in the factory canteen. Healthy options of nuts and fruit were placed on front shelves, while soft and soda drinks, biscuits and sweets were placed on the bottom shelves where they were less easy to

see. These arrangements were maintained for the whole period of the intervention (19 working days); with control measurements for 19 days being made when the previous presentation arrangements were in place. Thus, the study was carried out using a before and after design over two consecutive months.

On average 200 employees used the canteen every day; so following each employee's daily choice of food purchases would have been difficult. Instead we measured the aggregated purchases of fruit and nuts in the canteen. The primary outcome measures, as indicators of the effect, were the quantity (in terms of kilograms) of fruit and nuts sold in the canteen. Data was collected daily during the month before the intervention (i.e., serving as a control measure) and also during the month of the intervention. For the purpose of the data analysis, the unit of analysis was the day (i.e., 19 observations in each condition, 38 in total), while the outcome measure was the quantity of purchased foods in each category.

Analyses

Differences between the control condition and the intervention condition were examined with non-parametric statistical analyses, because the outcome variables (quantity of purchased foods), measured daily, were not normally distributed according to the Kolmogorov-Smirnov test of normality for Fruit during Control ($D = 0.28$, $p < .001$) and Intervention respectively ($D = 0.25$, $p = .003$); and also for Nuts during Control ($D = 0.21$, $p = .026$) and Intervention ($D = 0.22$, $p = .013$).

In line with the hypothesis that in the intervention condition consumption of healthy foods would increase, a one-tailed non-parametric test was used to test the null hypothesis that one population median was greater than or equal to the other; allotting all of the alpha to testing the statistical significance in the direction of interest and thus increasing the power of detection. A significance level of 0.05 was chosen (the p -value provides an objective measure of the strength of evidence which the data supplies in favour of the null hypothesis, and is the probability of getting a result as extreme or more extreme than the one observed if the proposed null hypothesis is correct).

Ethical approval

All procedures were performed in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments of ethical standards. Informed consent was obtained from all participants included in the study.

Results

The intervention effect was measured by comparing the purchase of fruit and nuts before and during the intervention. Table 1 below presents the daily consumption of fruit and nuts during the month before the intervention and for the month during intervention.

Table 1. Daily Consumption of Healthy Food Before and During the Intervention

Healthy Food	Daily Consumption			
	Before Intervention		During Intervention	
	Mean	SD	Mean	SD
Nuts (kg)	3.23	0.73	3.82	1.33
Fruits (kg)	128.11	34.82	145.06	29.97

The Mann–Whitney U test revealed that the employees consumed significantly more fruit during the intervention condition compared to the control period, $Z = 2.32$, $p = .011$ (1-tailed) and significantly more nuts during the intervention period, $Z = 1.91$, $p = .026$ (1-tailed) when compared to the control period.

Discussion

The intervention showed a significant increase in consumption of fruit and nuts during the month of the intervention suggesting factory workers were encouraged to make healthier decisions. Even though we did not follow individual workers to measure whether the manipulation affected healthy eating overall, increasing the overall consumption of healthier food is known to improve health in the long-term (Oyebode, Gordon-Dseagu, Walker, Mindell, 2014). This outcome is in line with the organizational policy our intervention was aiming to support suggesting nudge approaches can be applied to support organizational strategy and intervention.

Retention of higher levels of consumption of fruit and nuts could be interpreted as an indication for habit formation. We recognise as a working definition of habit formation as the repetition of behaviour in stable context, indicating the extent of which decision-making about that behaviour is reduced to automation (Wood & Neal, 2007). Commonly accepted methods of measuring habits is by assessment of past behaviour repeatability, manifested at the present situation (Ajzen, 2002). However, repeating a pattern for a month is not a proof for such automatised behavioural responses. But, how long does it take to form a habit? We have not come across clear evidence, or a solid definition, and several authors debate this issue (Verplanken, 2006; Lally, van Jaarsveld, Potts, & Wardle, 2010). However, in the organizational field there are many factors that will distort, twist, intensify or enhance the effects of this type of intervention; meaning such a debate could not easily be resolved. On the other hand, using specially designed nudge interventions we have an opportunity to influence behaviours related with issues important for many different organizations. They could be in the area of safety procedures in heavy industries, or supporting ‘green causes’, or volunteering in charity initiatives embraced by the socially active organizations. In each of those cases influencing even small percentage of the employees could be a major factor for implementation of corporate rules, initiatives or policies.

A research limitation of this study is the absence of a control group comparison who were not subjected to the effects of the nudge intervention. However, in the real line of consulting work, it is almost impossible to follow all the requirements applicable for laboratory experiments conducted in controlled environments. After all, the purpose of our intervention was to influence the healthy behaviour of as many employees as possible, and taking away that opportunity for any of the employees would have been against the company's values and culture. Nevertheless, we used the findings of the 'before' period as a control; an activity used in large group interventions in a non-controlled environment (Kirk, 1982). Future research should use longer follow-up measures (e.g., three to six months later) in order to establish that behaviours have been maintained.

Conclusion

More and more often, modern organizations are facing different challenges associated with internal values, missions or strategies that employees are not overly enthusiastic to embrace and follow. The specialist working in the field of Business Psychology or HR have already understood that directive approaches rarely produce any significant effect in terms of behaviour change, in that context. Therefore, there is growing need for different unconventional methods to trigger different behavioural responses; including techniques that influence at a subconscious level such as priming. We have described a priming intervention that was, in the short-term, successful at changing factory workers eating habits in their canteen food selection. We conclude there are many possibilities for application methods of modern behavioural science to support corporate change policies.

References

- Ajzen, I. (2002). Residual effects of past on later behavior: Habituation and reasoned action perspectives. *Personality and Social Psychology Review*, 6, 107-122.
- Burgess, A. (2012). 'Nudging' healthy lifestyles: The UK experiments with the behavioural alternative to regulation and the market. *European Journal of Risk Regulation*, 1, 3-16.
- Dolan, P., Hallsworth, M., Halpern, D., King, D., & Vlaev, I. (2010). MINDSPACE: Influencing behaviour through public policy. Report for the Cabinet Office, UK.
- Dolan, P., Hallsworth, M., Halpern, D., King, D., Metcalfe, R., & Vlaev, I. (2012). Influencing behaviour: the mindspace way. *Journal of Economic Psychology*, 33, 264-277.
- Evans, J. St. B. T. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology*, 59, 255-278.
- Evans, J. St. B. T., & Stanovich, K. E. (2013). Dual-process theories of higher cognition: Advancing the debate. *Perspectives on Psychological Science*, 8, 223-241.
- Glimcher, P., C. Camerer, E. Fehr, & R. Poldrack (2009). *Neuroeconomics: Decision making and brain*. New York: Academic Press.
- Guerrieri, R., Nederkoorn, C., Jansen, A. (2008). The effect of an impulsive personality on overeating and obesity: Current state of affairs. *Psychological Topics*, 2, 265-286.
- Guerrieri, R., Nederkoorn, C., Schrooten, M., Martijn, C., & Jansen, A. (2009). Inducing impulsivity leads high and low restrained eaters into overeating, whereas current dieters stick to their diet. *Appetite*, 53, 93-100.

- Hallsworth, M., List, J., Metcalfe, R., & Vlaev, I. (2015). The Behaviouralist as tax collector: Using natural field experiments to enhance tax compliance. *Journal of Public Economics* (forthcoming).
- Hanks, A., S. et al. (2012). Healthy convenience: Nudging students toward healthier choices in the lunchroom. *Journal of Public Health*, *34*, 370-376.
- Hollands, G. J., Shemilt, I., Marteau, T. M., Jebb, S. A., Kelly, M. P., Nakamura, R., Suhrcke, M., Ogilvie, D. (2013). Altering micro-environments to change population health behaviour: towards an evidence base for choice architecture interventions. *BMC Public Health*, *13*, 1218.
- Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. *American Economic Review*, *93*, 1449-1475.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus and Giroux.
- King, D., Vlaev, I., Everett-Thomas, R., Fitzpatrick, M., Darzi, A., & Birnbach, D. (2016). Priming hand hygiene compliance in clinical environments. *Health Psychology*, *35*, 96-101.
- Kirk, R. E. (1982). *Experimental design: Procedures for the behavioral sciences*. Monterey, CA: Brooks/Cole.
- Lally, P., van Jaarsveld, C., Potts, H., & Wardle, J. (2010). How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology*, *40*, 998-1009.
- Levitt, S. D., & List, J. A. (2009). Field experiments in economics: The past, the present, and the future. *European Economic Review*, *53*, 1-18.
- Marteau, T. M., Hollands, G. J., & Fletcher, P. C. (2012). Changing human behavior to prevent disease: the importance of targeting automatic processes. *Science*, *337*, 1492-1495.
- Marteau, T. M., Ogilvie, D., Roland, M., Suhrcke, M., & Kelly, M. P. (2011). Judging nudging: Can nudging improve population health? *British Medical Journal*, *342*, d228.
- Meule, A. (2013). Impulsivity and overeating: a closer look at the subscales of the Barratt Impulsiveness Scale. *Frontiers in Psychology*, *4*, 177-187.
- Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W. et al. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine*, *46*, 81-95.
- Nakamura, R., Pechey, R., Suhrcke, M., Jebb, S. A., & Marteau, T. M. (2014). Sales impact of displaying alcoholic and non-alcoholic beverages in end-of-aisle locations: An observational study. *Social Science & Medicine*, *108*, 68-73.
- Ng, J. (2012). *The relation of impulsivity and obesity: a neuroimaging analysis*. University of Oregon.
- Oyebode, O., Gordon-Dseagu, V., Walker, A., Mindell, J. (2014). Fruit and vegetable consumption and all-cause, cancer and CVD mortality: analysis of Health Survey for England data. *Journal of Epidemiology and Community Health*, *68*, 856-862.
- Rozin, P., Scott, S., Dingley, M., Urbanek J.K., Jiang, H., Kaltenbach, M. (2011). Nudge to nobesity I: Minor changes in accessibility decrease food intake. *Judgment and Decision Making*, *6*, 323-332.
- Small, D. A., et al. (2007). Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes*, *102*, 143-153.
- Strack, F., & R. Deutsch (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, *8*, 220-247.

- Thaler, R., & C. Sunstein (2008). *Nudge: Improving decisions about health, wealth and happiness*. New Haven: Yale University Press.
- Verplanken, B. (2006). Beyond frequency: Habit as a mental construct. *British Journal of Social Psychology*, 45, 639-656.
- Verdejo-Garcia, A. (2014). Reward, reinforcement, and impulsivity in obesity. In Kushner, Robert F., Bessesen, Daniel H. (Eds.), *Treatment of the Obese Patient* (pp. 23-35). Springer.
- Vlaev, I., & Dolan, P. (2015). Action change theory: A reinforcement learning perspective on behaviour change. *Review of General Psychology*, 19, 69-95.
- Vlaev, I., King, D., Dolan, P., & Darzi, A. (2016). Theory and practice of 'nudging': Changing health behaviors. *Public Administration Review*, 76, 550-561.
- Wood, W., & Neal, D. T. (2007). A new look at habits and the habit-goal interface. *Psychological Review*, 114, 843-863.