

Judging nudging: can nudging improve population health?

Nudging has captured the imagination of the public, researchers, and policy makers as a way of changing behaviour, with the UK and US governments embracing it.

Theresa Marteau and colleagues ask whether it stands up to scientific scrutiny



If people didn't smoke, drank less, ate healthier diets and were more active, the huge burden of chronic diseases such as cancer, heart disease, and type 2 diabetes would be much reduced.¹ The prospect of being able to nudge populations into changing their behaviour has generated great interest among policymakers worldwide, including the UK government.² We explore what nudging is and assess the prospect of nudging our way to a healthier population.

Understanding behaviour change

Most people value their health yet persist in behaving in ways that undermine it. This can reflect a deliberate act by individuals who happen at different moments in time to value other things in life more highly than their health. It can also reflect a non-deliberate act. This gap between values and behaviour can be understood by using a dual process model in which human behaviour is shaped by two systems.³ The first is a reflective, goal oriented system driven by our values and intentions. It requires cognitive capacity or thinking space, which is limited. Many traditional approaches to health promotion depend on engaging this system. Often based on providing information, they are designed to alter beliefs and attitudes, motivate people with the prospect of future benefits, or help them develop self regulatory skills. At best, these approaches have been modestly effective in changing behaviour.⁴

The second is an automatic, affective system that requires little or no cognitive engagement, being driven by immediate feelings and triggered by our environments. Despite wishing to lose weight, for example, we still buy the chocolate bar displayed by the checkout till. Such environmental cues combine with the power of immediate and certain pleasure over larger, less certain and more distant rewards to make unhealthy behaviour more likely. This suggests an approach to behaviour change that focuses on altering environmental cues to prompt healthier behaviour. Such an approach is readily embraced by advertisers and retailers and, increasingly, by public health specialists. Nudging mainly operates through this automatic, affective system.

What is nudging?

The term "nudge" was first used in a book of the same title to describe "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."⁵ It is exemplified by a simple intervention that substantially increased the amount that people saved for their retirement: an opt-in system in which people had to make a positive choice to set aside savings from their salaries was replaced by an opt-out system in which savings were made by default.

The original definition of nudging excludes legislation, regulation, and interventions that alter economic incentives. Aside from these exclusions, nudging could include a wide variety of approaches to altering social or physical environments to make certain behaviours more likely. These might include providing information about what others are doing ("social norm feedback") framed to make healthy behaviours more salient, changing the defaults that surround the serving of food and drinks, or altering the layout of buildings to cue physical activity (table). However, there is no precise, operational definition of nudging. This may reflect a reality—namely, that nudging is at best a fuzzy set intended to draw attention to the role of social and physical environments in shaping our behaviour and not to inform a scientific taxonomy of behaviour change interventions.

Nudging is not new. It builds on psychological and sociological theory dating back over a century that shows how environments shape and constrain human behaviour—often far more than we like to believe.⁶ Its novelty lies in two features. Firstly, it draws on behavioural economics and social psychology to explain why people behave in ways that deviate from rationality as defined by classical economics.⁵ Secondly, it is embedded in libertarian paternalism, a political philosophy in which people's choices are actively guided in their best interests but they remain at liberty to behave differently.

The appeal of nudging is self evident: it proposes a set of seemingly simple, low cost solutions that do not require legislation and can be applied to a wide array of problems arising from our behaviour. The absence of legislation holds particular appeal for governments and others wanting a smaller role for the state in shaping the behaviour of its citizens.

Does nudging work?

Nudging certainly works. Shaping environments to cue certain behaviours is extremely effective, unfortunately often to the detriment of our health. The ready availability of foods that are packaged, presented, and engineered to stimulate our automatic, affective system has led us to consume more than we need—consumption that is further primed by advertising.⁷ The doubling in alcohol consumption in young people over the past 50 years is

Examples of nudging and regulating actions

	Nudging	Regulating
Smoking	Make non-smoking more visible through mass media campaigns communicating that the majority do not smoke and the majority of smokers want to stop	Ban smoking in public places
	Reduce cues for smoking by keeping cigarettes, lighters, and ashtrays out of sight	Increase price of cigarettes
Alcohol	Serve drinks in smaller glasses	Regulate pricing through duty or minimum pricing per unit
	Make lower alcohol consumption more visible through highlighting in mass media campaigns that the majority do not drink to excess	Raise the minimum age for purchase of alcohol
Diet	Designate sections of supermarket trolleys for fruit and vegetables	Restrict food advertising in media directed at children
	Make salad rather than chips the default side order	Ban industrially produced trans fatty acids
Physical activity	Make stairs, not lifts, more prominent and attractive in public buildings	Increase duty on petrol year on year (fuel price escalator)
	Make cycling more visible as a means of transport, eg, through city bike hire schemes	Enforce car drop-off exclusion zones around schools

attributed in part to its marketing and ready availability, and the design of many neighbourhoods supports car driving over walking or cycling.

Nudging can certainly trigger behaviours that worsen our health, but can it also be used to cue behaviours that improve it? There are various descriptions of nudges being used to change behaviour to improve health outcomes (table). For example, putting yellow duct tape across the width of supermarket trolleys with a sign requesting shoppers to place fruit and vegetables in front of the line doubled fruit and vegetable purchasing,⁸ and placing fruit by the cash register increased the amount of fruit bought by school children at lunchtime by 70%.⁹ Providing information on the healthy behaviour of others (social norm feedback) is the most extensively studied form of nudging, particularly in the context of alcohol consumption among students. Interventions have been delivered using a range of methods including social marketing campaigns and giving feedback in groups and to individuals, delivered in letters or through the internet.¹⁰ While there is evidence of effectiveness for internet feedback, there is little for the others.

To date, few nudging interventions have been evaluated for their effectiveness in changing behaviour in general populations and none, to our knowledge, has been evaluated for its ability to achieve sustained change of the kind needed to improve health in the long term. It has been suggested that nudging is likely to offer good value for money,¹¹ but this cannot be assumed because the cost effectiveness of nudges has not been evaluated. Some environmental changes are potentially very expensive, and individualised feedback of social norms may also be costly.

It may, of course, be misguided to expect evidence of such outcomes from individual nudges: more realistically, cumulative nudges in a wide range of contexts may be required, within enabling legislative and policy environments. Effective nudging may require legislation, either to implement healthy nudges (such as displaying fruit at checkouts) or to prevent unhealthy nudges from industry (such as food advertising aimed at children). Voluntary agreements can sometimes be modestly effective. For example, daily salt consumption in the UK has been reduced by 0.9 g per person as a result of agreements by food manufacturers and led by the Food Standards Agency, although these were reinforced by a threat of legislation.¹² This achievement contrasts with reductions of 5 g per person in Finland and Japan after legislation. In general, self regulation by the food, alcohol, and tobacco industries has historically been less effective than legislation as a means to improve population health.¹³⁻¹⁵

“Effective nudging may require legislation, either to implement healthy nudges ... or to prevent unhealthy nudges from industry”

At present, the evidence to support the view that nudging alone can improve population health is weak. We therefore need both primary research and synthesis of existing evidence to examine the effectiveness and acceptability of nudging interventions. Given the diversity of interventions involved, evidence synthesis should place different types of nudges within a more comprehensive taxonomy of approaches to behaviour change. Furthermore, this work should not be limited to asking what works but should adopt a more realist position (what works, for whom, in what circumstances, and for how long?), comparing the effects of different types of nudges in different regulatory environments. Nudging may help to promote a culture that is accepting of legislation to promote health, suggesting a role for historical and anthropological critiques in understanding its possible contribution to altering long term behaviour trends in populations. The effect sizes obtained from nudging in different regulatory environments could also be compared with those of other approaches such as regulating pricing and advertising, with outcomes including effects on health inequalities and cost effectiveness. We could then begin to judge what nudging contributes to the existing policy toolbox for improving population health and reducing inequalities.

Could nudging be harmful?

As with any intervention, a public health strategy based on nudging has the potential to generate harms as well as benefits. Direct harm may arise from perverse response to nudges. For example, labelling foods as healthy, or making healthier side dishes the default, can lead to a “halo” effect resulting in underestimation of energy content and consequent excess consumption. In one study participants estimated that a hamburger contained 697 calories when it was presented alone but 642 calories when it was presented with three celery sticks, an effect that was greatest among people concerned about managing their weight.¹⁶ These findings illustrate why evaluations must include the capacity to identify paradoxical or unexpected effects of seemingly benign nudges.

In *The Strategy of Preventive Medicine*, Rose contrasted two approaches to improving population health.¹⁷ The first involves targeting people at high risk—for example, by identifying and treating individuals with high blood pressure to reduce their risk of stroke. The second involves shifting the population distribution of a risk factor—for example, by reducing population salt intake—and therefore mean blood pressure—with the aim of reducing the overall incidence of stroke. Although these two

fig. 1. How to make stairs more ATTRACTIVE (& lifts less APPEALING)

MALCOLM WILLET



strategies are not mutually exclusive, there is growing evidence that whole population approaches may be more effective both in improving population health and in reducing health inequalities, with strategies that target only high risk individuals tending to widen health inequalities.¹⁸

While nudging relates more closely to whole population approaches to disease prevention, indirect harm might arise if an emphasis on nudging resulted in neglect of population level interventions that were potentially more effective. Recent reports highlight the continuing importance of tackling the economic and regulatory environments in the areas of alcohol, obesity, and tobacco control. For example, regulations to limit the availability of alcohol are more effective than voluntary agreements with the alcohol industry in reducing alcohol related harm¹⁹; a review of measures to tackle obesity has concluded that pricing interventions and regulation of food labelling and marketing to children are likely to produce the largest health gains in the shortest times²⁰; and the balance of evidence suggests that increasing the price of tobacco may be more effective in reducing smoking among adults on lower incomes and in manual occupations than among those with higher incomes and non-manual occupations, which cannot be



said for other approaches such as printing health warnings on cigarette packets.²¹

Conclusions

Nudge and similar recent popular texts have stimulated policymakers to think about altering environments to change behaviour. These developments are to be welcomed. Evidence to support the effectiveness of nudging as a means to improve population health and reduce health inequalities is, however, weak. This reflects absence of evidence as well as evidence of little or no effect.

Without regulation to limit the potent effects of unhealthy nudges in existing environments shaped largely by industry, nudging towards healthier behaviour may struggle to make much impression on the scale and distribution of behaviour change needed to improve population health to the level required to reduce the burden of chronic disease in the UK and beyond.

Theresa M Marteau director, Behaviour and Health Research Unit, University of Cambridge Institute of Public Health, Cambridge CB2 0SR, UK

David Ogilvie clinical investigator scientist, MRC Epidemiology Unit and UKCRC Centre for Diet and Activity Research, Institute of Public Health, Cambridge

Martin Roland professor of health services research, Behaviour and Health Research Unit, University of Cambridge Institute of Public Health, Cambridge CB2 0SR, UK

Marc Suhrcke professor of public health economics, School of

Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK

Michael P Kelly director, Public Health Excellence Centre, National Institute for Health and Clinical Excellence, London, UK

Correspondence to: T M Marteau
theresa.marteau@medschl.cam.ac.uk

Accepted: 9 January 2011

Contributors and sources: This article was prepared following a review of the literature and discussions with colleagues (notably Simon Cohn, Simon Griffin, Susan Jebb, Ann Louise Kinmonth, Tom Ling, and Daniel Zizzo) in preparation for a programme of empirical reviews of the effects of altering choice architecture to change behaviour to improve population health. TMM had the idea for the paper, with all authors contributing to the literature review, analysis and drafting. TMM is guarantor.

Funding: Department of Health policy research programme (107/0001—Policy Research Unit in Behaviour and Health). The views expressed are not necessarily those of the department.

Competing interests: None declared.

Provenance and peer review: Not commissioned; peer reviewed.

- 1 WHO. Global health risks: mortality and burden of disease attributable to selected major risks. WHO, 2009.
- 2 Department of Health. Healthy lives, healthy people: Our strategy for public health in England. DH, 2010.
- 3 Strack F, Deutsch R. Reflective and impulsive determinants of social behavior. *Pers Soc Psychol Rev* 2004;8:220-47.
- 4 WHO Regional Committee for Europe. Behaviour change strategies and health: the role of health systems. WHO, 2008.
- 5 Thaler RH, Sunstein C. *Nudge: improving decisions about health, wealth, and happiness*. Yale University Press, 2008.
- 6 Ross L. The intuitive psychologist and his shortcomings: distortions in the attribution process. In: Berkowitz L, ed. *Advances in experimental social psychology*. Academic Press, 1977:174-221.
- 7 Harris JL, Bargh JA, Brownell KD. Priming effects of television food advertising on eating behavior. *Health Psychol* 2009;28:404-13.
- 8 Grocery cart choice architecture, 2010. <http://nudges.org/2010/08/13/grocery-cart-choice-architecture/>.
- 9 Just D, Wansink B. Smarter lunchrooms: using behavioral economics to improve meal selection. *Choices* 2009; 29(3). www.choicesmagazine.org/magazine/article.php?article=87.
- 10 Moreira MT, Smith LA, Foxcroft D. Social norms interventions to reduce alcohol misuse in university or college students. *Cochrane Database Syst Rev* 2009(3):CD006748.
- 11 Dolan P, Hallsworth M, Halpern D, King D, Vlaev I. MINDSPACE: influencing behaviour through public policy. Institute for Government, Cabinet Office, 2010.
- 12 Food Standards Agency. Salt reduction targets. FSA, 2009.
- 13 Sharma LL, Teret SP, Brownell KD. The food industry and self-regulation: standards to promote success and to avoid public health failures. *Am J Public Health* 2010;100:240-6.
- 14 Anderson P. Global alcohol policy and the alcohol industry. *Curr Opin Psychiatry* 2009;22:253-7.
- 15 ASH. The smoke-filled room: how Big Tobacco influences health policy in the UK. ASH, 2010.
- 16 Chernev A. The dieter's paradox. *J Consumer Psychology* doi:10.1016/j.jcps.2010.08.002
- 17 Rose G. *The strategy of preventive medicine*. Oxford University Press, 1992.
- 18 Capewell S, Graham H. Will cardiovascular disease prevention widen health inequalities? *PLoS Med* 2010;7:e1000320.
- 19 NICE. Alcohol-use disorders: preventing the development of hazardous and harmful drinking: NICE Public Health Guidance 24. NICE, 2010.
- 20 Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *Lancet* 2010;376:1775-84.
- 21 Thomas S, Fayer D, Misso K, Ogilvie D, Petticrew M, Sowden A, et al. Population tobacco control interventions and their effects on social inequalities in smoking: systematic review. *Tob Control* 2008;17:230-7.

Cite this as: *BMJ* 2011;342:d228

BLOG Annabel Ferriman

Nudging, fudging, and politics

Would you rather be nudged or nannied? Health secretary Andrew Lansley clearly thinks the first is infinitely preferable to the second. And *BMJ* columnist Nigel Hawkes thinks that nudging is much nicer because it assumes you are an adult rather than a recalcitrant child.

But I don't like being nudged. I don't like being touched by anyone whom I don't know well. I regard it as an invasion of my personal space. And it assumes that I am slow on the uptake, that I need to be steered in one direction or another, as if I don't know my own mind.

I also don't like talking in metaphors so I will stop this comparison. But behind it is a serious point. People do not like the idea of politicians or "experts" telling them what to do. Everyone feels that they have the right to live their life in exactly the way they want to, with the possible proviso that they should not hurt anyone else.

But this raises many questions. If doctors or scientists discover that smoking causes lung cancer, or that eating a great deal of sugar and fat causes obesity, which increases the risk of diabetes, don't they have an obligation to spread that message? And if someone else's cigarette smoke exacerbates your asthma and increases your risk of lung cancer, don't you have the right to breathe clean air?

The fact is that over the last 13 years, the Conservatives have won a lot of support from disgruntled smokers and fatties who don't want their freedom curtailed, or who don't want to be reminded of the risks from their way of life. Many sections of the population have resented any suggestion that they should change their habits, regardless of whether their obesity costs the NHS a fortune or their speeding kills children.

The Conservatives have been able to benefit from the feeling of persecution that the *Daily Mail* (the chief scourge of Nanny) has encouraged in smokers, speeding drivers, and drinkers. But now they are in government, the Conservatives realise that they would rather leave a legacy of lower levels of heart disease, diabetes, and road deaths rather than a nation of cancer riddled fatties.

So they have had to find a new way of encouraging people to live healthily. Thus they have invented the nudge.

So although the Conservatives have announced that Labour's free swimming scheme for the under 16s and over 60s has to end because England can no longer afford it, they have been talking about GPs giving out swimming vouchers. And while Labour passed a law saying that tobacco packets should not be on display, the Conservatives have suggested that cigarettes might have plain packaging.

Can you tell your nudge from your nanny? I must admit that I can't.

Annabel Ferriman is news editor, *BMJ*.

Read this and other blogs at bmj.com/blogs