

Chapter 13: Developing Effective Healthy Eating Nudges

Romain Cadario (Erasmus University, Rotterdam School of Management)

Pierre Chandon (INSEAD)

OK. You have heard the demand for change and want to help your customers eat better but without curtailing their freedom to indulge if they want to and without getting out of business. What can you do? A large number of interventions have been suggested to promote healthy eating.¹ However, many of these various “nudges” have only been tested in laboratory or online studies and, as we have heard in the first part of this book, there are several important reasons why they may not necessarily translate into successful behavioral change. It is also not easy to decipher the scientific literature.

This chapter, which is based on two of our recent articles, summarizes what we know about which healthy eating nudges are most effective at changing food choices in the field, in supermarkets or restaurants.² In addition, it examines another aspect of the debate: whether customers are likely to welcome these nudges.

Thinking, Feeling, Doing: The trilogy of nudges

Since Thaler won the Nobel prize in economics for his work on nudging, every marketing intervention has been rebranded as a nudge. However, a discount is not a nudge, and neither is traditional awareness or image-based advertising, for example. According to Thaler and Sunstein, a nudge can be defined as “any aspect of the choice architecture that alters people’s behavior in a predictable way (a) without forbidding any options, or (b) significantly changing their economic incentives.³ Putting fruit at eye level counts as a nudge; banning junk food does not”.

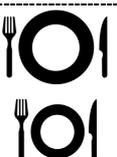
Even this restricted definition of nudges encompasses a wide variety of interventions, including various labeling schemes, changes to the visibility of different food or reductions of plate and portion size. In this first section, we provide a framework to classify nudges. We draw on the classic tripartite classification of mental activities into cognition (thinking), affect (feeling), and behavior (doing). This so-called trilogy of mind has long been adopted in psychology and marketing to understand consumer behavior and predict the effectiveness of marketing actions.⁴

We distinguish between (a) cognitively oriented nudges that seek to influence what consumers think, (b) affectively oriented nudges that seek to influence how consumers feel without necessarily changing what they know, and (c) behaviorally oriented nudges that seek to influence what consumers do (i.e., their motor responses) without necessarily changing what they know or how they feel. Within each type, we further distinguish subtypes that share similar characteristics, ending with seven nudges overall.

Thinking: Informing the brain about what is healthy with cognitive nudges

There are three types of cognitive nudges. The first type, “descriptive nutritional labeling,” provides calorie count or information about other nutrients, be it on menus or menu boards in restaurants, or on labels on the food packaging or near the foods in self-service cafeteria and grocery stores.

The second type, “evaluative nutritional labeling,” typically (but not always) provides nutrition information but also helps consumers interpret it through color coding (e.g., red, yellow, green as nutritive value increases) or by adding special symbols or marks (e.g., heart-healthy logos or smileys on menus) or simplifying schemes (e.g., Nutri-Score’s A to E categories).

Nudge type	Icon	Definition and example
<i>Cognitive nudges</i>		
<i>Descriptive nutritional labeling</i>		Labels in supermarkets, cafeterias, and chain restaurants (such as McDonald's, Pizza Hut) with calorie and nutrition facts. For example, the shelf label or the menu board provide information about calorie, fat, sugar and salt content.
<i>Evaluative nutritional labeling</i>		Labels in supermarkets, cafeterias, and chain restaurants (such as McDonald's, Pizza Hut) providing color-coded nutrition information that easily identifies healthier foods. For example, the shelf label or the menu board provide information about calorie and fat content and a green sticker if the food is healthy or a red sticker if the food is unhealthy.
<i>Visibility enhancements</i>		Supermarkets, cafeterias, and chain restaurants (such as McDonald's, Pizza Hut) make healthy food more visible and unhealthy food less visible. For example, supermarkets place healthy food rather than unhealthy food near cash registers and cafeteria or restaurant make healthy food visible and easy to find on their menu and unhealthy food harder to find on their menu.
<i>Affective nudges</i>		
<i>Healthy eating calls</i>		Staff in supermarkets, cafeterias, and chain restaurants (such as McDonald's, Pizza Hut) prod consumers to eat more healthily. For example, supermarket or cafeteria cashiers or restaurant waiters ask customers if they would like to have fruits or vegetables.
<i>Pleasure enhancements</i>		Supermarkets, cafeterias, and chain restaurants (such as McDonald's, Pizza Hut) make healthy food more appealing and unhealthy food less appealing. For example, healthy foods are displayed more attractively in cafeteria counters or are described in a more appealing and appetizing way on menus.
<i>Behavioral nudges</i>		
<i>Convenience enhancements</i>		Cafeterias and chain restaurants (such as McDonald's, Pizza Hut) include healthy food as default in their menu and supermarkets to make unhealthy food physically harder to reach on the shelves. For example, vegetables are included by default in combo meals or in fixed menus in cafeterias and chain restaurants, but customers can ask for a replacement.
<i>Size enhancements</i>		Supermarkets, cafeterias and chain restaurants (such as McDonald's, Pizza Hut) reduce the size of the packages or portions of unhealthy food that they sell and to increase the size of the packages or portions of healthy foods that they sell. For example, cafeterias and restaurants serve smaller portions of fries and larger portions of vegetables or supermarkets sell smaller candy bars and larger strawberry trays.

Although the third type, “visibility enhancement,” does not directly provide health or nutrition information, it is a cognitively oriented intervention because it informs consumers of the availability of healthy options by increasing their visibility on grocery or cafeteria shelves (e.g., placing healthy options at eye level and unhealthy options on the bottom shelf) or on restaurant menus (e.g., placing healthy options on the first page and burying unhealthy ones in the middle).

Feeling: Seducing the heart with affective nudges

The first type of affectively-oriented interventions, which we call “pleasure appeals,” seeks to increase the hedonic appeal of healthy options by using vivid hedonic descriptions (e.g., “Twisted citrus-glazed carrots”) or attractive displays, photos, or containers (e.g., “pyramids of fruits”).

The second type of affectively oriented interventions, “healthy eating calls,” directly encourages people to do better. This can be done by placing signs or stickers (e.g., “Make a fresh choice,” or “Have a tossed salad for lunch!”) or by asking foodservice staff to verbally encourage people to choose a healthy option (e.g., asking “which vegetable would you like to have for lunch?”) or to change their unhealthy choices (e.g., “Your meal doesn’t look like a balanced meal” or “Would you like to take half a portion of your side dish?”).

Doing: Manipulating the hands with behavioral nudges

The third group consists of two types of interventions that aim to impact people’s behaviors without necessarily influencing what they know or how they feel, often without people being aware of their existence. “Convenience enhancements” make it physically easier

for people to select healthy options (e.g., by making them the default option or placing them in faster “grab & go” cafeteria lines) or to consume them (e.g., by pre-slicing fruits or pre-serving vegetables), or make it more cumbersome to select or consume unhealthy options (e.g., by placing them later in the cafeteria line when trays are already full or by providing less convenient serving utensils).

The second type, which we call “size enhancements,” modifies the size of the plate, bowl, or glass, or the size of pre-plated portions, either increasing the amount of healthy food they contain or, most commonly, reducing the amount of unhealthy food

Hands above hearts above Brains: Which type of nudge works best?

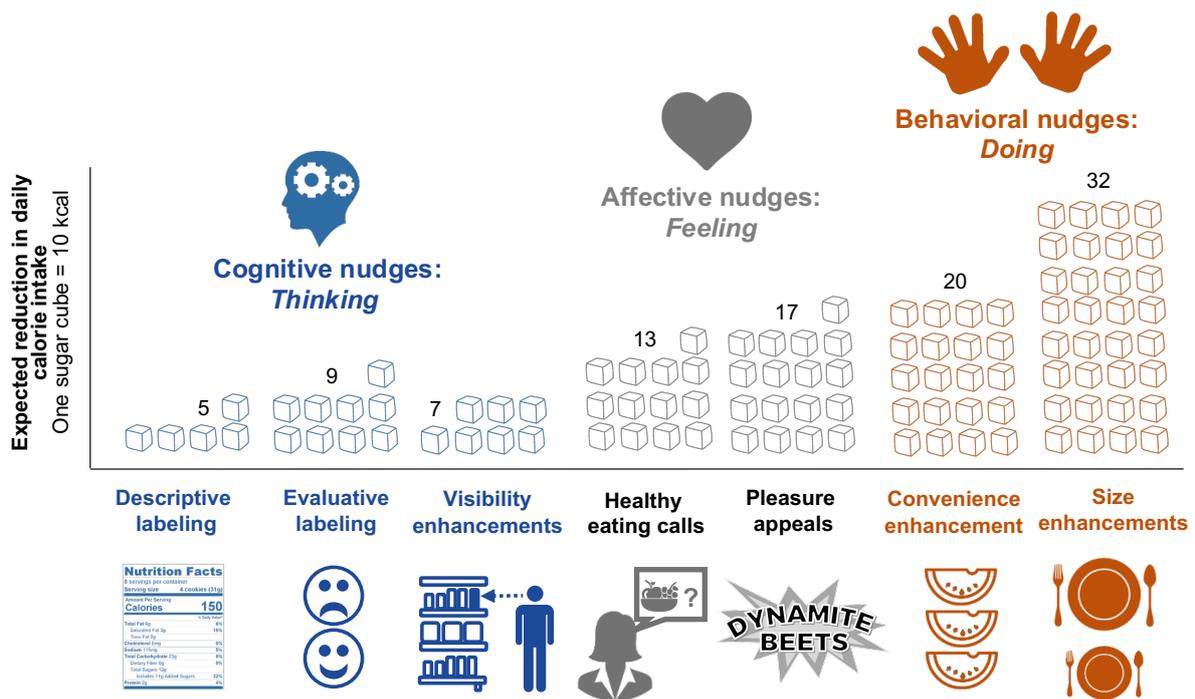
We tested this framework with a meta-analysis of published field experiments, which allows us to measure the average effectiveness of a given nudge type across many studies.⁵ Our meta-analysis reviewed real-life experiments rather than lab- or online-based studies because, when it comes to food choices, there's an important intention-action gap between what people say they eat and what they actually eat when no one is watching. Overall, the meta-analysis covered 96 field experiments published in 90 academic articles.

We collated information about the experiments and measured the effectiveness of each type of nudge using the standardized mean difference (also known as Cohen’s d), which allows us to pool the results across various units of measurements and foods. To get a more intuitive grasp of nudge effectiveness, we converted them into the daily energy equivalent, expressed in number of sugar cube. For example, if a nudge can reduce consumption by 100 calories a day, it’s the equivalent of ten fewer sugar cubes.

Our key finding is that the effectiveness of nudges increases as they shift from cognition/thinking ($d = 0.12$, -64 kcal) to affect/ feeling ($d = 0.24$, -129 kcal) to

behavior/doing ($d = 0.39, -209$ kcal). In other words, the hand is stronger than the heart, which is stronger than the brain. Figure 1 summarizes the average effectiveness of our seven identified healthy eating nudges, measured in daily decrease in energy intake transformed into sugar cube equivalents.

Fig 1. Average nudge effectiveness from the meta-analysis (source: Cadario & Chandon 2020)



The disappointing effects of cognitive nudges

Descriptive labeling. Information alone, that is nutritional facts with no color-coding or symbols to help people interpret the numbers, do not move the dial very much in terms of making healthy choices. Expected calorie reduction = five sugar cubes.

Evaluative labeling. When we know how healthy something is in relation to something else, in the form of a summary score, a smiley face or traffic light food labelling, the information has some impact on our choices. We understand that a red light means “stop”, even in the grocery store. In fact, a large randomized controlled trial in 60

supermarkets showed that simplified front-of-pack nutrition labels help sell good foods.⁶ However, they did not reduce the sales of “bad” foods and there was a significant “voltage-drop): their effects were 17 times lower overall than in comparable laboratory studies. Expected calorie reduction = nine sugar cubes.

Visibility enhancements. Another nudge that informs our brains is one that puts the healthiest product in the most visible place – at eye level on a shelf or on the best place in the middle of a menu. Still, it didn’t have a significant impact on making better choices. Expected calorie reduction = seven sugar cubes.

In conclusion, targeting thinking is not enough! Cognitive nudges are trying to inform us about the healthiness of the food options, either by displaying nutrition information or traffic light symbols or by placing the healthiest food right where we will see them. Clearly, they are not ideal. Nudges that inform only have a small impact on our food decisions, reducing our intake by the equivalent of five to nine sugar cubes per day. This is not as surprising as it sounds since people already know that they should replace calorie-dense snacks with fruits and vegetables or sodas with water. The difficulty is converting this knowledge into action, and that requires the motivation to act and aids that help to follow through on one’s intentions. This is where affective and behavioral nudges can help.

Affective nudges: Social pressure and pleasure as allies of healthy eating

Healthy eating calls. This type of nudge can be implemented by asking the cashier to ask customers if they want a salad with their burger or by placing signs up encouraging people to “make a fresh choice”. On average, these nudges can expect a daily calorie reduction of nearly 13 sugar cubes.

Pleasure appeals. These nudges emphasize the taste or the sensory characteristics of the food. Instead of telling us that carrots are rich in antioxidants, they are described as “twisted citrus-glazed carrots” to draw attention to how they might taste or feel. Expected calorie reduction = 17 sugar cubes.

Instead of informing people about nutrition or the availability of healthier options, as cognitive/thinking nudges do, affective nudges try to motivate us to eat foods that we already know are better for us by playing up their delicious taste or texture or by leveraging social pressure? These tend to be effective, reducing our calorie intake by the equivalent of 13 to 17 sugar cubes.

Behavioral nudges: When doing beats seducing and informing

Convenience enhancements. These nudges make selecting or consuming healthier foods the easy option. It can be done by placing indulgent foods at the end of the cafeteria line, when our tray is already full of healthier foods. Another convenience enhancement is to pre-cut, pre-plate fruit or vegetables. After all, it’s much easier to eat peeled and chopped pineapple than a whole one. Expected calorie reduction = nearly 20 sugar cubes.

Size enhancements. The most effective nudges directly change how much food is put on plates or the size of the bottle. This is still technically a nudge as long as the unit price stays the same. Although there have been inconsistent results, simply reducing the size of the plate or glass may also help, if people use it as a cue to decide how much to serve themselves. Expected calorie reduction = 32 sugar cubes.

In conclusion, behavioral nudges try to influence what we do directly, without changing what we know or what we want. They are by far the most effective as they can save us up to 32 sugar cubes worth of calories. At least when it comes to eating, feelings beat

thinking and doing beat feelings. If public policy and food businesses want to help consumers eat better, our findings suggest focusing on developing behavioral nudges.

Manipulative but effective: Consumer approval of healthy eating nudges

If behavioral nudges are so much more effective than cognitive or even affective ones, why are most policy debates about how to best inform people, for example, with nutrition labels, rather than about how to shrink package size or downsize restaurant food portions? The answer is fear of consumer reactance. Developing effective healthy eating nudges should not only be driven by effectiveness considerations. We must take into account consumer approval. This is what we did in a second study, for which we recruited American participants to evaluate the seven healthy eating nudges presented in the previous section.⁷

Measuring consumer approval of nudges

Each nudge was presented with a specific scenario, as shown in the table below. We first showed the nudge type, logo, and description of one the seven nudges, selected in random order. We then measured nudge approval using binary scales (“Do you approve or disapprove of the following policy?”, Approve/disapprove) and perceived effectiveness (“Do you think that this policy will make people eat better?”, Yes it will/No it will not). We obtained similar results when asking people to rate the nudge on a 13-point scale labeled from to A+ to F. Last, we asked people who would be the primary beneficiary of each nudge, from three options: 1) “Primarily consumer health (little or negative impact on business),” 2) “Primarily business (little or negative impact on health),” 3) “It will be a win-win (both health and business will benefit)”.

Effective or accepted: Tradeoffs in selecting nudges

Our results found only moderate acceptance of the 7 healthy eating nudges. The average approval rate was 64% for women and 52% for men. To further examine the relationship between these scores and the actual effectiveness of the nudge, we plotted on the Y-axis of Figure 2 the percentage of respondents who approved the nudge. The X-axis shows the actual effect size of each nudge estimated in the meta-analysis presented in the previous section. The cognitive nudges are presented in blue, the affective nudges in green, and the behavior nudges in red.

Fig 2. Nudge effectiveness is inversely related to consumer approval
(Source: Cadario & Chandon 2019)

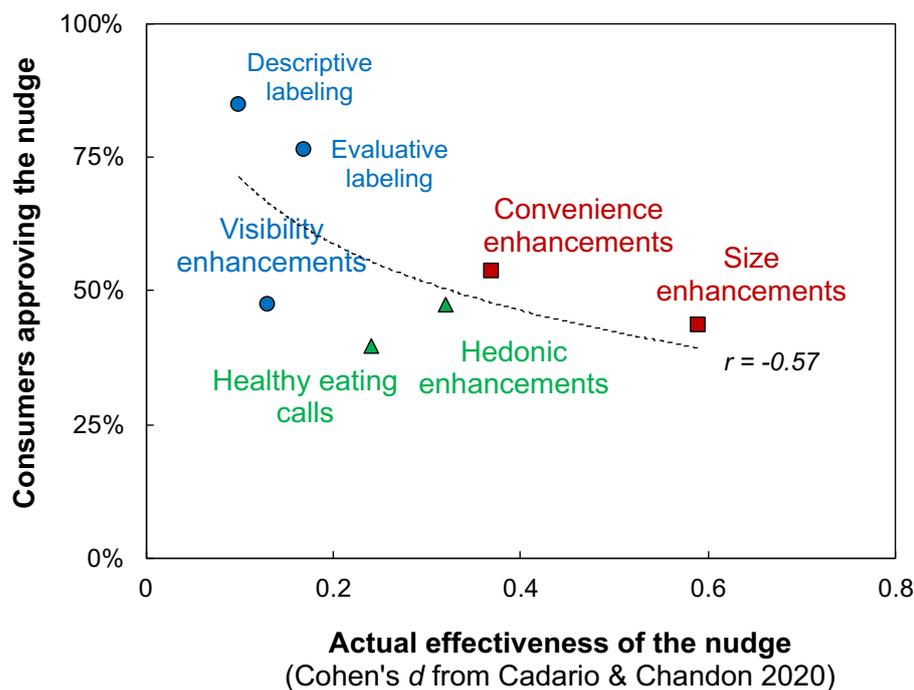


Figure 2 shows that the actual effectiveness of these nudges was inversely related to their mean approval rating ($r = -.57$). Whereas 85% approved of descriptive labeling, the least effective nudge, only 43% approved portion size changes, the most effective intervention. In

additional analyses, we examined the drivers of consumer approval, as function of actual nudge effectiveness, perceived nudge effectiveness, as well as perceived beneficiary of the nudge. We found that that approval was positively associated with the perceived effectiveness of the nudge. Importantly, we found that healthy eating nudges perceived as a “win-win” for business and health had higher approval than interventions perceived as benefiting either health or business, and that there were no differences in approval between each of these respectively. That is, the more people expected a nudge to be effective, and the more they perceived it to be a win-win for both business and health, the more likely they were to approve of the nudge.

Key takeaways and implications

In conclusion, we find clear evidence that not all nudges are created equal. This is true in terms of their effectiveness and their acceptance by citizens and consumers alike. In our view, it is time to move beyond discussing the value of nudging in general to consider both the expected effectiveness and public acceptance of specific types of nudges.

At first glance, our results seem to lead to a conundrum. On the one hand, we find that the effectiveness of healthy eating interventions increases as their focus shifts from cognition to affect to behavior. On the other hand, we find that consumer approval of the nudges decreases with their effectiveness. Unless one is a benevolent dictator, a parent for example, this suggests that managers or public servants that are beholden to the support of their clients or citizens cannot simply go with “what works best”. Simply being transparent about nudges can impair their implementation as the majority of people are likely to disapprove of them.

Yet, our results also offer a solution. The crux of the problem is not that people dislike being nudged, or that they disapprove of nudges that help businesses, but that they are poor

judges of which nudges are effective. So, the first conclusion is that we first need to listen to consumers, to find out what they think of the nudges that we intend to implement. The second conclusion is that we must frame nudges appropriately, highlighting their effectiveness as well as highlighting that they can be a win-win for all.

Given this, priority should go to nudges that achieve multiple goals, such as “Epicurean nudges” focused on the pleasure (vs. health benefits) of portion control, which deliver both business and health benefits because pleasure in food does not increase with quantity, but with quality and savoring.⁸ Since people tend to approve of the nudges that they perceive to be effective, approval rates for powerful nudges like size and convenience enhancements can be improved if people learn that they are three times more effective than descriptive or prescriptive labeling.

Overall, healthy eating nudges are a valuable addition to the traditional public policy toolbox of tax incentives and regulations.⁹ However, the controversy over the newsfeed experiments conducted at Facebook without explicit consent reminds us that we can no longer assume that people will accept to be nudged as long as the objective of the nudge is commendable.¹⁰ Rather than framing the debate as nudging versus traditional tools, specific nudges should be compared to specific tools on both their effects and their acceptance.

Notes

¹ Hollands, G.J., et al., *Portion, Package or Tableware Size for Changing Selection and Consumption of Food, Alcohol and Tobacco*. Cochrane Database Syst Rev, 2015. **9**: p. CD011045.

² See Cadario, R. and P. Chandon, *Which Healthy Eating Nudges Work Best? A Meta-Analysis of Field Experiments*. Marketing Science, 2020. **39**(3): p. 465-486; and Cadario, R. and P. Chandon, *Effectiveness or consumer acceptance? Tradeoffs in selecting healthy eating nudges*. Food Policy, 2019. **85**(May): p. 1-6.

³ Thaler, R.H. and C.R. Sunstein, *Nudge: Improving Decisions about Health, Wealth, and Happiness*. 2008, New York: Penguin Books. 312 pages.

⁴ See, for example, Hanssens, D.M., et al., *Consumer Attitude Metrics for Guiding Marketing Mix Decisions*. Marketing Science, 2014. **33**(4): p. 534-550.

⁵ Cadario, R. and P. Chandon, *Which Healthy Eating Nudges Work Best? A Meta-Analysis of Field Experiments*. Marketing Science, 2020. **39**(3): p. 465-486.

⁶ Dubois, P., et al., *Effects of front-of-pack labels on the nutritional quality of supermarket food purchases: evidence from a large-scale randomized controlled trial*. Journal of the Academy of Marketing Science, 2021. **49**: p. 119-138.

⁷ Cadario, R. and P. Chandon, *Effectiveness or consumer acceptance? Tradeoffs in selecting healthy eating nudges*. Food Policy, 2019. **85**(May): p. 1-6.

⁸ Cornil, Y. and P. Chandon, *Pleasure as a Substitute for Size: How Multisensory Imagery Can Make People Happier with Smaller Food Portions*. Journal of Marketing Research, 2016. **53**(5): p. 847-864.

⁹ Benartzi, S., et al., *Should Governments Invest More in Nudging?* Psychological Science, 2017. **28**(8): p. 1041-1055.

¹⁰ Verma, I.M., *Editorial Expression of Concern: Experimental evidence of massivescale emotional contagion through social networks*. Proceedings of the National Academy of Sciences, 2014. **111**(29): p. 10779-10779.