

# A Scoping Review of Nudges for Healthier Eating and their Applicability in Developing Asia

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## ABSTRACT

‘Nudges’ are considered a subtle tool to influence human behavior without restricting their choices. It is gaining attention in public policies and the healthcare domain to help people adopt positive changes for better healthcare outcomes. This paper undertakes a scoping review of literature to understand the effectiveness of nudges in choosing healthier food among people that have long-term implications towards lower incidence of medical conditions and healthier lifestyles. It digs deeper into techniques of nudges to identify the most effective ones and also identify the ones that could be used in developing Asian countries. The paper concludes that there is a greater proportion of studies that emphasize the positive relation between nudges and positive human behavior towards healthier eating, though these are mostly conducted in developed countries. The Visual nudge technique is the most used in the reviewed studies. For Asia, labeling and positioning nudges are appropriate nudges as they do not entail many additional costs to governments and institutions.

## Introduction

‘Nudges’ or framing of information that may influence human behavior without restricting their choices is gaining attention in social and public policy. It is often used in healthcare systems to assist people in adopting positive changes for better healthcare outcomes. Helping people to alter their lifestyle with regular exercise or healthy eating is seen as a way to lower hypertension, diabetes, high cholesterol, and obesity – together referred to as non-communicable diseases (NCDs)- and is often used by governments and institutions for people’s good health and successful aging. This article undertakes a scoping review to understand the effectiveness of nudges in affecting people’s choices towards healthy eating that has long-term implications for a better lifestyle in the future. It offers a discussion on nudge techniques and identifies a viable option for developing countries in Asia that suffer from high levels of NCDs and have strained public resources.

Following the introduction, the next section sets the stage by introducing the concept of nudges (Section 2) and discussing the use of nudges for improving healthy eating habits that help in controlling NCDs. Section 3 provides the answer to the research question, i.e. whether nudges for healthier eating habits promote positive changes among individuals in different settings. A scoping review of literature is undertaken using the SPICE framework. This is followed (Section 4) by a discussion on nudge techniques, as observed in the studied literature, and advancing it to the context of Asia to raise understanding of health nudge application. It concludes that labeling and positioning nudges are the most cost-effective nudges for both government and firms in Asian settings as it does not entail much additional cost. The section also provides Singapore as a case study, where nudges are used to encourage a healthier lifestyle. Section 5 concludes the paper, bringing all the findings together.

## Setting the Stage

## The Concept of Nudge

The concept of ‘Nudge’ is part of behavioral economics, a term coined by Gary Becker in the 1970s (Wang, 2021), that combines economics and psychology to explain consumer choices and decisions (Kosasih et al. 2024). While traditional economics assumes that all consumers are rational- implying that they are utility maximizers with access to all information- behavioral economics rejects that notion (Posner, 1997) and instead brings in factors such as heuristics and biases.

‘Nudge’ originated from and was popularized by Richard H Thaler and Cass R Sunstein’s 2008 book, ‘Nudge: Improving Decisions About Health, Wealth, and Happiness’. They are considered as small interventions that can alter consumer thinking and certain decisions (Wytinski, undated) without infringing on their freedom of choice (Kuyer and Gordijn, 2023). They are thus delineated accordingly to capitalize on human cognitive biases (Cai, 2019).

Nudges may influence behavior in different settings as stated by Thaler and Sunstein (2008) with a common use being houseflies painted on urinals. The small flies do not tell the user where to aim, yet, users intuitively begin to aim better in the urinals leading to less spillage and lower unhappy toilet-goers. Another example can be found in the financing industry. Many institutions, taking advantage of the serial position effect (i.e. referring to the bias of the human mind while reading a list of items)<sup>1</sup> place important information at the start and end of their presentations, leveraging on the bias of consumer behavior (Level, undated). While complying with the information disclosure requirement of the industry, the financial institutions also use the serial position effect where customers might forget the information.

## NCDs and Nudges

An area where nudges are often found is in the healthcare setting. Making healthy food choices through nudges is important to alter lifestyle to limit the rise of NCDs. The section explains the gravity of NCDs as an issue and explains its connection with unhealthy diets before moving into a discussion about the general application of nudges by both Western and Asian governments.

NCDs are Chronic diseases that last for extended periods. According to Budreviciute et al., NCDs arise due to “genetic, physiological, behavioral, and environmental factors” (Budreviciute et al. 2020). Common examples of such diseases include cancer, diabetes, and asthma (WHO, 2023). Globally, these diseases are responsible for about 74% of total deaths per year (around 40 million), of which almost 50% of the deaths are of people below the age of 70 (around 16-17 million). Cardiovascular disease is responsible for most deaths (with around 18 million), followed by cancer (around 9 million), respiratory diseases (around 4 million), and diabetes (around 1.6 million) (Budreviciute et al., WHO, 2023). Almost all of these diseases are caused by poor diets, pollution, tobacco, lack of physical exercise, and excessive drinking of alcohol (WHO, 2023). While, for people, this implies greater suffering from deteriorating life conditions with a greater proportion of disposable income going for medical spending, for governments this translates to greater expenditure on healthcare services, little savings from which could be spent on other pressing matters improving people’s quality of life. Thus, governments in various parts of the world have been trying to mitigate these causes and more recently, they are using nudges as a way to tackle certain chronic medical conditions that are preventable.

However, of the causes of NCDs, unhealthy diets are arguably the biggest factor (NCD Alliance, 2021 and Branca et al., 2019). Caloric and fatty foods remain the biggest drivers of Obesity and Type 2 Diabetes. These include popular processed foods such as bacon, packaged beverages salami, and other fast foods like

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<sup>1</sup> The human mind has biases to remember items that are presented as the first and last in a list but not in the middle (Troyer, 2011)

burgers and french fries (Anarson, 2023). Other foods high in salt like potato chips and cheese lead to other complications including hypertension and high blood pressure (Al-Jawaldeh and Abbass, 2022). In countries like the Philippines where rice, pork, and oils remain the primary source of people's diets, NCD rates are far higher with 68% of the deaths in the Philippines arising as a result of them (Anageles-Agdeppa et al., 2019). Therefore, creating effective policies to prevent unhealthy diets is extremely important with nudges being a form of them.

Though nudges in public health have been around for a while, the one that gained traction was the United Kingdom's British Behavioural Insights Team (BIT), or Nudge Unit, established in 2010. BIT was set up to improve well-being while allowing people to maintain independence in their choices (Burgess, 2012).

Before BIT, the UK had begun using certain forms of nudges as early as 2006 (Local Government Association, 2013). To lower salt content in Fish and Chips, a local government in England, undertook a study where 17-hole saltshakers were replaced by 5-hole saltshakers. The study showed that the shops in the identified town that used 5-hole salt shakers delivered only 33.7% of the salt delivered by the 17 holers (Goffe et al., 2016). This has the potential of lowering overconsumption of salt directly attributable to increased blood pressure (Grillo et al. 2016), risk of stroke (Strazzullo et. al, 2009), and other cardiovascular diseases. This became a success story for the local UK government as it, without infringing on consumer choice, managed to lower the salt content of the meals, thus reducing the risks of NCDs in the future.

In Asia, Singapore has been extremely active when it comes to implementing nudges in public policy. In 2011, the first nudge unit, named the Environmental Behavioural Sciences and Economics Research Unit (EBERU), created by the Ministry of the Environment and Water Resources (MEWR) was set up. As of 2019, around 19 government agencies have used nudges in their public policy domain with applications ranging from public health, to finance, and environment (Detenber, 2021). In order to combat public smoking on the vibrant Orchard Road (Singapore's main shopping district), the EBERU created 5 Designated Smoking Areas and sealed all ashtrays on rubbish bins. While not required to smoke only in those areas, an observational study in 2016-17 found that the number of smokers reduced by a third<sup>2</sup>.

Japan has also recently raised momentum in applying nudges in policymaking. In 2015, Japan's Ministry of the Environment created its first nudge unit in 2015 ( Murayama et al., 2023) and in 2017 named it the "Behavioral Sciences Team" or BEST. This was to reduce household and transportation carbon emissions (JSF, 2018) but the Ministry of Environment (2017) further states that the unit would handle other pertaining issues such as education and health. One example of an application is in Japan's trains. Drawing from studies that prove that alarms make people rush and injure themselves while boarding trains, Japan instituted soothing music to inform people about departing trains (Morris, 2018) to prevent them from running towards closing doors. The government further forces all train operators to use hand gestures, stimulating their minds and preventing any mistakes on their side. Morris further mentions the use of calming blue lights placed on the platform to prevent suicide attempts.

From the above, it is clear that nudges have already been used in Asia from as early as 2011, though the case studies of Singapore and Japan are of more developed or rich countries in Asia. Therefore, it is important to investigate the kind of nudges that could be feasible for less developed countries of Asia, that also suffer from high NCDs.

While the section below undertakes a scoping review of literature to identify effectiveness and kind of nudges for promoting healthier eating, further discussion of nudge techniques and Asia is presented in Section 4.

## **Nudges for Healthier Eating: The Review**

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<sup>2</sup> This was prior to the establishment of no-smoke zones in 2019. See Detenber(2021)

The section provides a framework, methodology, and discussion of results from a scoping review of 24 articles that covered nudges implemented in people's daily lives for healthier eating habits. It attempts to answer whether nudges promote healthier eating habits among people that have long-term implications in terms of a lower incidence of NCDs in a country.

## Framework

The scoping review uses the SPICE framework (Booth 2006). The SPICE framework comprises of five elements- Setting, Perspective, Intervention, Comparison, and Evaluation. While 'Setting' refers to 'where', i.e. the location of the study (country, city, and environment such as university canteen, worksite cafeteria, etc.), 'Perspective' denotes 'for whom', meaning the group that the nudge (intervention) has been targeted towards. 'Intervention' defines 'what' and in this case is the kind of nudge itself, and 'Evaluation' is the studies' findings. Comparison is the alternative outcome or actions of the concerned intervention.

## Methodology

A database search was conducted on Google Scholar in January 2024. The search words used include (Nudge\* OR Presentation OR choice architecture) AND (health\*, consumption, nutrition) AND (Effect\* OR Impact). Search words such as "Asia", and "LEDC" (Lower Economically Developed Nation) were also used to identify articles in these geographies, though, it should be noted that few relevant studies were found using them. Most studies chosen were open source, however some were found on Science Direct. The following set of criteria was set to choose a study to be part of the review.

- Must be published between 2010-2023
- Specific mention of a particular nudge/choice architecture
- The nudges are used to affect food consumption
- The results must mention a change in consumption by unit (No., weight of food item, etc.) and no other indicators

Studies that met the criteria were then read fully. Table 1 (Annex: See additional file submitted) represents the assessment process of the review, using the SPICE framework, as discussed above. The time period of 2010 and 2023 is chosen as it gives a couple of years for public institutions to use nudges since the 2008 publication of Thaler and Sunstein's book. The period is capped at 2023 as that's ample period for academics to undertake empirical studies on its effectiveness. The period also covers the COVID-19 pandemic, which brought greater realization among governments to proactively address the issue of NCDs in their economies.

## Discussion of Results

In all, 24 publications were included. Fourteen studies (58.3%) reported a definite positive effect of nudges, nine provided mixed findings (37.5%), and only one (4.17%) stated a negative effect. Seven out of the twenty-four identified papers came from the Netherlands (29.1%), four came from North America (16.7%) and the rest, except two, came from the rest of Europe. Notably, all studies were either from highly developed or large economies. Twelve of the studies were situated in a worksite/university canteen (50.0%), four in supermarkets (16.7%), five in a lab setting (20.8%), two in a served food/restaurant setting (8.33%), and one in a miscellaneous setting (4.17%). All literature reviewed, apart from one interview study, were analytical studies. The number of participants in each study varied, the lowest being merely 31 while the highest reaching 1,636.

Broadly, nudges act positively in promoting a healthy lifestyle. There is a lot for Asia to learn from this, as it is one of the regions that suffer from high NCDs. Inculcating good behavior towards active lifestyle and healthy eating among all age groups will have positive outcomes both for individuals and governments of the countries. The following section, thus, provides the discussion from Asia's perspective.

## **Discussion on Nudge Techniques and an Asian Perspective**

This section looks deeper into nudge techniques, derived from the literature above, and provides a discussion of a feasible option for developing Asian countries, that may lack resources to implement different kinds of nudges. The section provides a case study of Singapore which has been active in using nudges to inculcate good eating habits and lowering salt and sugar content in food and beverages.

### **Identified Techniques**

The first of these is positioning. Two papers of the fourteen successful studies used a positioning nudge. Kroese et al. (2015) investigated using a positioning nudge in a Dutch snack bar. In this scenario, healthier items were positioned near the cashier in the nudge condition and this resulted in a 73% increase in the consumption of the healthier item. Another study took place at a University in Zurich (Keller et al.), where cereal snack bars of different calorie amounts were positioned in different orders on a counter. By positioning the lowest-calorie bar on the left-hand side, it was consumed more, showing a positive result of a positioning nudge. Mistura et al.'s study however showed a mixed result. They stated that despite a positive trend when the nudge was in place at a university in British Columbia, external factors such as finances and restaurant staff caused baseline uncertainty suggesting that external factors may play a bigger role than nudges.

The second technique was the visual nudge. A successful effect was seen in three papers. Two of the three were conducted using supermarket trollies (Huitinik et al. (2020) and Gonçalves et al. (2021)) in Denmark and Portugal respectively where a pictorial nudge was placed inside the cart to effectively increase the choice of healthier groceries. The third study was a pictorial nudge on a children's plate (Sharps et al., 2020). Despite targeting a different age demographic, this nudge was very effective at increasing fruit consumption. Yet, Gilebaart (2023), who used a similar shopping cart nudge like Huitinik and Goncalves, found that consumers without healthy eating goals were not influenced by the nudge meaning that those who should be even more encouraged to eat healthier were not being affected. At the same time, Kawa et al. (2022) found that a visual social norm nudge of a thin body increased the consumption of unhealthy items over healthy ones, the only paper that was seen as having a negative effect. Lastly, Biom's 2021 study on the effect of a salience nudge on participants under time pressure gave a mixed impression. No matter the time pressure, participants purchased the same amount of nutritious items under a salience nudge so it suggests nudges do not provide further aid in a short period.

Default choice was the third approach used. This was demonstrated by Hansen (2019) where visitors of three conferences in Denmark were presented with different menu options. The control conference was presented with a default choice of non-vegetarian with an option to switch to vegetarian while the nudge conference was presented with the opposite. The nudged conference had a remarkable 87% of participants taking the vegetarian option with only 6% of the control group choosing the same. This is the most significant effect seen in this study, however, since this is only one paper this is not conclusive.

The fourth method was labeling which was seen in four different instances all of which were successful. Mazza et al. and Montagni et al. both used worksite canteens as the setting using a traffic light health indicator and a green labeling system respectively. Cioffi et al. (2017) used nutrition labeling on pre-packaged food in a University canteen instead and found an increase in the purchase of low-fat foods and a decrease in the purchase of high-fat food, resulting in a total reduction of fat consumption by 7%. Shin et al., the only Asian

study found in this review, used the Singaporean health grading symbols on a pseudo-virtual supermarket. All four studies showed an increase in the consumption of more nutritious items, however, Shin does note that the overall calorie consumption of the consumers in the study did not decrease and therefore her paper is categorized as a mixed effect.

Several papers utilized a mixture of nudges in their nudge conditions. Winkler et al. and Friis et al. used similar nudges that heavily impacted the consumption environment. De Vet (2020) used traditional nudges that included salience, availability, scarcity, and default choice. Vermote et al. (2020) used a mixture of labeling, visual, and social norm nudges all of which successfully increased fruit consumption in the participants studied. However, van der Laan and Orcholska's 2022 study states that additional, evaluative nudges did not have an effect and just made consumers feel self-conscious about themselves.

The penultimate category is sizing. Qi et al. (2022) and Venema et al. (2020) attempted to investigate how a smaller plate size and a smaller teaspoon size respectively can reduce unhealthy consumption. In Qi's study, vegetable intake increased by 50% in the nudge condition, and in Venema's study the nudge teaspoon reduced sugar consumption by 27%. These two studies are very similar to default choice nudges but because they do not directly alter the choice architecture, they have been categorized as sizing nudges

The remaining approaches can be categorized as miscellaneous as they either had a non-traditional nudge or lacked similar studies. Marchao's 2019 study on a music nudge was not effective but due to a small number of participants was inconclusive. Velema et al.'s (2018) trial used the '4 "P"s of marketing' to nudge consumers. The nudge condition successfully increased consumption of three out of 7 nudge products, suggesting that this technique may not work for all products. Cunha's 2013 study, the final study of this section, investigated a school in Brazil where students were directly taught about healthy eating. Although the use of BMI was not a satisfactory measure of healthy eating in Cunha's paper due to a lack of change in a short period, however, food habits did change which is a mediocre effect.

## Feasibility and Effectiveness in Asia

Nudges, as observed in the earlier review section, have been primarily deployed in developed countries in Europe or North America. In Asia, where fiscal revenue and spending are lower<sup>3</sup> (Go et al., 2022), nudges can be useful as a cost-effective (Tummers, 2022) method to discourage unhealthy eating practices, thus saving costs over the long run.

Asian economies, particularly, have much higher NCD rates than the advanced economies. In Southeast Asian economies, for example, NCDs are responsible for 62% of all deaths and the reason for the high rates of these diseases is the high caloric diets in the region. In Indonesia specifically, many households are not even aware of the issues related to the consumption of processed foods, with some having challenges in terms of affordability (WHO, 2021). Therefore, this section discusses the aforementioned techniques in an Asian setting and analyse whether they are good fits or not.

Olivier et al.'s (2019) randomized cluster trial on school children mentions that the positioning nudge was very cost-effective. As it is purely re-positioning food items, possibly healthier ones towards cashiers in supermarkets, there is no cost involved and therefore has no impact on the government budget. Although nudges

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<sup>3</sup> There is a significant difference in government expenditure as a percentage of GDP between Asian economy and the highly developed Western economy. In countries like the Philippines and Indonesia, the fiscal expenditure is as low as 20% of the country's GDP while in the Western economies, this number reaches at least 30% with countries like France and Italy spending as high as 51% (Our World in Data, 2020).

have been associated with unpredictability (Mullet, 2022) and positioning nudges arguably rely on the most subtle signals, this solution does not rely on fiscal spending by the respective governments.

Visual nudges may pose a challenge as they would require significant investment to implement. If the Philippines were to implement Huitinik's intervention on shopping carts, it would need to repaint or replace all the shopping carts across the country. With about 6240 supermarkets (Smartscrapers, 2024) which contain an average of 200 shopping carts each (Lower bound of estimate by Flippin, 2023), replacing all of them would cost about USD 106,080,000 (USD 85 per cart from Wu, 2023), a government budget that can be used for other forms of intervention such as subsidies and infrastructure investment. However, Asian governments can pilot them at a small scale before a country-wide implementation. Take Sharps' (2020) study on pictorial nudges on plates. His trial was contained to a singular primary school. The same action can be taken in a developing Asian Nation. By implementing this nudge in a few schools or worksite cafeterias, they can understand if the nudge works in their demographics and then decide if having a nationwide policy is adequate. Similarly, Huitinik performed her trial in an economically deprived area of Netherlands, conditions of which matches with many developing Asian countries. The positive result of the Netherlands study can be observed in Asian setting as well, particularly that have high cases of NCDs. Therefore, a visual nudge, which may entail some additional cost, can be positive for Asia, provided it is initially implemented on a pilot basis. Upon success of the pilot case, Asian countries may consider scaling it up further.

Labeling is a far more cost-effective version of the visual nudge especially from a budgetary standpoint. Singapore has recently instituted Nutri-grade (HealthHub Singapore), a labeling nudge, as a form of government legislation (discussed later as a case study). Restaurants were required to place the nudges on their menus and beverage companies on their packaging. The low-cost nature of adding a label, generally 1.30 USD or less (Avery, 2024), makes firms far more receptive to implementing this nudge in the first place. Simultaneously, there would be little to no cost to the government as may make it mandatory for all firms to print a standardized label on their products. The government may also consider offering small incentives, such as a subsidy, to share the additional cost burden with the firms. The efficacy of the nudge, although not at the level of the visual nudge, could be positive to be considered by Asian nations. However, as noted by Shin (2023) and Cioffi (2017), labeling nudge may not always give the best outcome, possibly due to small print for most of the cases. Yet, the ease of implementation and cost-effectiveness are a clear indication that this is one of the most suitable on for Asian countries.

Default choice and a mixture of nudges can be trialed but they may lack suitability in the broader Asian setting, hindering their effectiveness. Despite the significant success of Hansen et al.'s (2022) default choice intervention (87% chose the intended choice in the experimental condition), it is difficult to see where this form of intervention can be applied. While countries such as the Philippines could utilize the Singaporean model of a default choice on sugar in drinks, it will not be able to curb overall fat consumption from food. Simultaneously, a mixture of nudges can be useful as most of the papers reviewed earlier had notable results. Yet, the limited amount of literature on this may mean that the nudge will not be optimized.

Finally, the miscellaneous nudges and sizing nudges are examples of nudges that are adjustable depending on the setting. Due to differences in eating habits (Ishige, 2008) all across Asia, miscellaneous and sizing nudges are ways to directly adjust normal nudges to fit an Asian setting. For example, a sizing nudge can be applied in fast food restaurants in the Philippines. In Jollibee, the Philippines' most popular fast-food chain, the popular ChickenJoy (Jollibee, 2024) is served with a side of gravy. Generally, the gravy is served in a 5.0-ounce tub which on its own is worth 50 calories (MyNetDiary, 2024). If the size of the tub is instead standardized at a lower amount such as the 2.7-ounce tub provided in the US (But not the Philippines)(Jollibee, 2024), it can automatically reduce calorie consumption. This nudge does not directly follow Qi's successful trial on reducing plate sizes as it is adjusted to the Philippines' eating habits, but the principle remains the same and would arguably be far more effective due to its suitability. However, a possible disadvantage of this policy is public approval. In poorer countries where the amount of food served is far more scrutinized by consumers, by

automatically reducing the size of the gravy tub, consumers may feel that this was a breach of their choice sovereignty and therefore disapprove of such a nudge. Yet, it is arguable that the good outweighs the bad in this form of nudge and the choice of ordering more tubs would still be available so people are not restricted from consuming more.

From this section, it is clear that different nudges have a different degree of suitability to lesser-developed Asian countries. Labeling and positioning nudges are the most cost-effective nudges for both government and firms and their relative effectiveness is what pushes them to be the best techniques for the Asian setting. Visual nudges, despite being one of the most successful methods in this study, may be far too expensive depending on where they are applied. While default choice and a mixture of nudges can be effective, they lack enough data points to give a conclusive result on their effectiveness. On that account, the best nudge for Asian economies can only be created by adjusting the above techniques to the diets of the respective countries. Whether it be gravy tubs in the Philippines or Nutri-grade symbols in Singapore, nudges can only be optimized if they match the setting they are in.

The penultimate section below discusses Singapore as a case study of an Asian country that has implemented nudges. This serves as an example of how an Asian country has been able to implement this form of intervention and that it can be translated to other nations in the region.

### Case Study of Singapore: State, Effectiveness, and Lessons

Currently, around one in twelve Singaporeans (MOH, 2023) suffer from diabetes which could be related to other health problems, such as heart and kidney diseases. It is predicted that in the absence of any preventive measures, one million (Diabetes Singapore, 2022) Singaporeans will suffer from diabetes by 2050. This has adverse consequences both for individuals and the government. Individuals will suffer from deteriorating life conditions with a greater proportion of disposable income going for medical spending. For the government, in 2017, the Ministry of Health reported that almost one billion (MOH, 2019) dollars were spent on diabetes alone, accounting for 11% of the 2017 healthcare budget. The same could be spent on other pressing matters improving people's quality of life. A reduction in diabetes thus has potential benefits for both.

To address the above, 'nudges' are used by Singapore's government to help its people to be aware of healthier choices and hence help them with better decision-making in the future. Two popular nudge techniques that are regularly observed in Singapore to lower sugar intake are: a) mandatory nutri-grade (NG) labeling, and b) presenting options for low sugar levels in beverages. The National Nutrition Survey Singapore 2022 (Health Promotion Board, 2022) has found that sugary drinks alone are responsible for 52% of daily total sugar intake.

Regarding nutri-grade labeling, it is a system in Singapore where certain foods with high sugar and saturated fat content should follow a certain way of labeling. Often these are called the 'Healthier Choice' (HCS) and the 'Nutri-Grade'. The HCS is added to all products in supermarkets and foodcourts that meet the HCS healthy food guidelines, one of which includes drinks having a maximum of 5 grams of sugar per 100 grams. Meeting this requirement for a drink will enable it to gain the HCS label. Similarly, the NG, showing a label A, B, C, and D, reflecting levels of sugar content, is used for all pre-packaged and fresh drinks throughout Singapore. Beverages with a grade of C or D on the packaging label (Health Screening @Anson) signal a high saturated fat/sugar content. Beverages with grade D are also barred from advertising in Singapore, a famous example being Yakult (Balan, 2023), a Japanese Yoghurt drink high in sugar that is very popular with children and adults alike. Consequently, Yakult created a new low-sugar flavor called Gold (Coconut Singapore, 2023) which would fall under grade 'B'. While these symbols are subtle ways of informing people of healthier choices, observing them in supermarkets and hawker centers helps the consumer with a choice to stay away from unhealthy products.

Another, wisely crafted 'choice architecture' to reduce sugar consumption in Singapore is the design and presentation of choices to consumers without affecting their options to decide. Coffee shops in Singapore



provide options for the sugar level: regular, less sugar (siu dai), no sugar (kosong), and more sugar (gah dai). A consumer with greater awareness of healthier choices can opt for a lower sugar option than a regular one that contains 22.5 grams (Ching, 2022) of sugar. Taking a step further, more recently, the default choice of consuming coffee in some shops in Singapore is less sugar which equates to only 16.25 grams of sugar. Assuming that an average man in Singapore drinks two cups of tea or coffee per day, the new practices will help him to consume about 33 grams of sugar versus 45 per day. This means that people can remain under the recommended maximum of 37.5 grams (American Heart Association News, 2018).

Shin's article is referenced in section 4.2 and the study analysed the efficacy of the NG mark by observing spending patterns in their trial grocery store 'NUS Mart'. 138 participants used the website for the study with some seeing the NG mark while others did not. Those who bought beverages on the site with the NG consumed 1.5 grams of sugar per serving less than those with the original site. Although the study stated that the total calories of what was bought did not significantly decrease (Beverages are not the bulk of the shopping basket), it did shine a positive light on reducing the consumption of high-sugar beverages.

The approval rating of this policy remains high as well. A study (Tan et al., 2022), regarding public opinion on behavioral-driven policies such as nudges, confirms that it is appreciated by people. Those surveyed were first faced with the question of government information campaigns. About 89.9% of surveyors endorsed Government public education campaigns, an encouraging sign for nudge policies overall. When questioned about "Government Mandated Information" which includes NG marks, about 85.1% expressed approval for the NG labeling system. A notable observation from the survey is that surveyors preferred the less intrusive methods of intervention by the government. This underscores the advantage that nudging policies have over other such methods.

Going forward, more can be done both within Singapore and with other countries that have similar challenges. Within Singapore, nudges or choice architecture to attain a goal of lowering sugar intake and hence diabetes can be devised on its own or can be bundled with other interventions to attain greater impact. For example, lowering sugar intake through the NG system and combining it with incentives for people to walk more through the National Steps Challenge (Rohaidi, 2018) can bring a greater impact. Using both policies concurrently may help Singapore attain a rapid reduction in chronic diseases and more health benefits.

Singapore can also advance its policy learnings of 'nudges' for better health to other countries in the region. Indonesia (Siswati et al.), for example, is said to have one of the highest rates in the world at about 69%. In 2018, NCDs accounted for about 73% (Arifin, et al., 2022) of deaths in Indonesia. A study by the World Economic Forum (2015) estimated that the NCDs would cost the government an estimated \$4.47 trillion between 2012 to 2030. In these circumstances, by implementing a somewhat proven cost-effective policy of simple nudges, Indonesia may be able to change its trajectory for the better, allowing for a healthier nation with low rates of NCDs.

## Conclusion

The paper contributed to discussion in three areas. First, it sets the stage by explaining the concept of nudges and providing a discussion on the usefulness of nudges in the healthcare domain and its linkage to lowering NCDs. Second, it took a scoping review of 24 papers to understand whether nudges for healthier food choices can generate positive change in human behavior. Most of the studies originated from developed countries, with many of the trials being successful. The review exercise identified a gap in the literature, particularly the discussion of nudges and healthcare benefits for developing countries and Asia. This could be due to many reasons, including a lack of awareness and/or resources among governments to apply nudges in their economies.

Third, the paper provides a deeper discussion on nudge techniques and identifies visual nudges as the most successful one. Advancing the discussion to Asia, labeling and positioning appear to be optimal solutions

given their ease of implementation and its lesser pressure on strained government resources. It was also important that nudges in Asia should be mindful of people's culture and diet requirements. Talking about Singapore, the default choice of less sugar in tea and coffee implemented recently can be a successful nudge among other Asian countries. That said, it is important to note that these are preliminary values and further research needs to be conducted in this area to have definitive proof of which is the best nudge.

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