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IEA Discussion Paper No.62

SWEET TRUTH:

Is there a market failure in sugar?

By Rob Lyons and Christopher Snowdon

July 2015

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About the authors

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Summary

- Government intervention in the market can only be justified if there is a market failure and if government action will make a positive difference. This paper looks at several potential failures in the sugar market. These include (a) consumers having imperfect information upon which to make purchasing decisions, (b) negative externalities, such as the cost of obesity-related diseases to healthcare services, and (c) consumer irrationality, including the possibility of addiction.
- Annual sugar consumption in Britain peaked several decades ago at over 50 kilograms per person and is now typically less than 40 kilograms per person. Britons today consume less sugar per head than they did in 1900. Patterns of obesity and diabetes have not followed patterns of sugar consumption at the population level.
- There is insufficient scientific evidence to label any common ingredient, including sugar, as addictive. Although 'eating addiction' may be a behavioural problem, it is not the result of inherently addictive substances in food. Similarly, there is insufficient evidence to suggest that a calorie from sugar is more fattening than a calorie from other foods.
- There is very little evidence of consumers being limited by choice in the food market. So-called 'food deserts' are almost non-existent. A wide range of fresh food is available within walking distance in almost all urban areas of the UK.
- Some food campaigners may be unhappy about the kinds of choices consumers are making, but the market is providing 'healthy' options for those who want to take them. There are many low-fat, low-sugar and low-calorie options available, not least in the controversial market for fizzy drinks. Nearly all soft drink companies produce low-calorie and

sugar-free varieties which are as widely advertised and widely available as the most sugary brands. Mandatory reformulation of food and soft drinks by government diktat with the simple aim of reducing sugar is unnecessary and would limit choice.

- Dietary information and sugar content is clearly marked on nearly all food products sold in British shops. Proposals to introduce 'traffic light' labelling would lead to food that is generally regarded as nutritious, such as cheese, being marked as dangerous and would detract from the more important message that diets matter more than individual items.
- A ban on television advertising for foods that are high in fat, salt or sugar (HFSS) before 9pm would effectively confine the promotion of a huge number of products, including cheese, bacon, cakes and biscuits, to a few hours late at night. Such a ban would have a detrimental effect on programming and would restrict useful commercial information about products which are generally considered to be safe. It would be a form of censorship.
- Limiting the availability of fast food outlets stifles competition, favours incumbents, and distorts the market by preventing supply meeting demand. It is therefore likely to result in higher prices and poorer quality.
- Taxes on food and soft drinks have been shown to be ineffective in reducing obesity due to inelastic demand and substitution effects. The cost to the taxpayer far exceeds any savings that might be made and the highest burden would fall on low income consumers. Moreover, it is extremely doubtful whether obesity, however caused, places an additional burden on public finances. Pigouvian taxes on sugar, soda or fat cannot therefore be justified on economic grounds. Such taxes are typically introduced as revenue-raising measures and should be seen as stealth taxes, not health taxes.
- There is vanishingly little evidence that there is a market failure in the food industry. If products which are high in sugar are widely available it is because they are big sellers, not vice versa. Consumers are no more irrational or ignorant when buying food than when buying any other product, and they are able to exercise a very significant degree of free choice when making purchasing decisions. When eating sugary products, individuals are maximising their welfare as judged by the only person who can best know their preferences: themselves. Health campaigners may believe that people should be maximising their longevity rather than optimising their taste buds, but in a free society that is not their decision to make.

Introduction

In January 2014, a lobby group was launched with the aim of pressurising food manufacturers and the government to cut the levels of sugar in food. Action on Sugar, another single-substance campaign from the people who brought you Consensus Action on Salt and Health (CASH), won banner headlines in the press, such as 'Sugar is the new tobacco' (Poulter 2014). The group's members have quickly become media favourites. One, Robert Lustig, a paediatrician from San Francisco, had already scored a YouTube hit with a lecture explaining why sugar is 'toxic' (Lustig, 2009). Another, Aseem Malhotra, an NHS cardiologist based in Croydon, has become a go-to guest for any media discussion related to the dangers of sugar and processed food. Shortly after the 'new tobacco' headlines, *Dispatches*, the Channel 4 current affairs series, ran an extremely sympathetic edition - featuring many of Action on Sugar's leading lights - which implied that mainstream researchers were unwilling to be critical of sugar due to their links with industry. This line of accusation was repeated and expanded in a feature article for the *British Medical Journal* in February 2015 (Gornall 2015). If there is an appetite for sugar, there is also an appetite for claims that sugar may be killing us.

In response to this putative health threat, a number of policy measures have been proposed to reduce the population's sugar consumption. Some of these proposals, such as taxes on sugar and soft drinks, involve pulling economic levers to effect behavioural change. Others, such as limiting the amount of sugar that food and drinks can legally contain, aim to alter the products themselves. All are intended to reduce consumption of sugar to bring it closer towards what is considered to be the optimal level from a health perspective.

The purpose of this paper is not to come to any definitive conclusion on the health implications of sugar consumption, especially given that scientists themselves have widely varying views on the subject, but to see whether it is appropriate for governments to intervene in the market for sugar and sugar-rich products.

For economists, government intervention in the market can only be justified if there is a market failure and if government action can make a positive difference. John Cawley notes that 'if there are no market failures, government intervention can only decrease social welfare' (Cawley 2011: 128-9), but he suggests that there are several potential market failures in the case of diet and obesity. These include (a) consumers having imperfect information upon which to make purchasing decisions, (b) negative externalities, such as the cost of obesity-related diseases to healthcare services, and (c) consumer irrationality. In the case of sugar, these issues are popularly presented in terms of (a) food products being inadequately labelled and consumers being misled by food companies, (b) obesity bankrupting the NHS, and (c) sugar being addictive and consumers being manipulated by advertising.

Before we assess these economic justifications for intervention in the food market, it is necessary to look at the background of current concerns about sugar. Until recently, the idea that sugar was toxic – 'Pure, White and Deadly', to use the title of a book published in the early 1970s (Yudkin 1972) - had largely been dismissed. If there was a health-wrecking element to our diets, we were told, it was fat - saturated fat, in particular. As recently as 2007, a review of the obesity literature concluded that the 'strongest evidence for an increased risk of obesity relates to diets that are high in dietary fat or low in fibre' (Jebb 2007).

The link with fat seemed so logical. A common health problem is atherosclerosis, which the NHS Choices website explains is 'a potentially serious condition where arteries become clogged up by fatty substances known as plaques or atheroma. The plaques cause affected arteries to harden and narrow, which can be dangerous as restricted blood flow can damage organs and stop them functioning properly.' A common consequence is myocardial infarction or 'heart attack', where the blood supply to the heart is blocked by a clot. Another major concern is obesity, which is the acquisition of too much body fat. With fat-related conditions, it made intuitive sense that the consumption of fat paved the way for the fat causing these health problems. Yet the evidence in support of this particular version

of the diet-health hypothesis has never been compelling. By July 2014, Michael Mosley, a doctor turned television presenter, could admit in the *Daily Mail* that, having spent much of his career advising people to steer clear of it, 'it is time to apologise for all that useless advice I've been dishing out about fat' (Mosley, 2014). Mosley's view is increasingly a mainstream one.

Just as fat seems to have been given an amnesty, so sugar is now in the dock. So what exactly is the evidence that sugar is deadly? Can one substance really be responsible for a plethora of chronic diseases? If so, are the calls for action to reduce sugar consumption - including taxes and regulations - justified? Given the current retreat from claims that saturated fat is harmful, could this be another example of researchers with a bee in their collective bonnet about one aspect of our diets giving advice which turns out to be wrong? Is this single-substance obsession a case of history repeating itself, first as tragedy, then as farce?

Sugar and health

There is no question that rates of obesity have shot up around the world in the past 40 years. In the UK, adult obesity - defined as having a body-mass index of over 30 - has increased from eight per cent of the population to around 25 per cent. The situation is even worse in the US, where the most recent estimate is that 34.9 per cent of the adult population is obese (Ogden 2014).

Obesity is strongly associated with a number of chronic health complaints, particularly type-2 diabetes, a condition in which levels of glucose in the blood become too high either because insulin - the hormone that regulates blood-sugar levels - is no longer being produced in sufficient quantities or because body tissues have become 'resistant' to its effect. According to the Health Survey for England, in 2003, 3.9 per cent of adults had been diagnosed with diabetes. By 2012, this had increased to 5.8 per cent, although the sharpness of that rise suggests that increased screening, greater awareness and changing definitions of the disease are factors in these extra diagnoses. A report by Public Health England in 2014 suggested that over 90 per cent of diabetes cases are type-2 - sometimes called 'adult-onset' diabetes, although a very small number of children are now being diagnosed with it - and that the direct costs of patient care in 2011-12 were £8.8 billion (Gatineau 2014).

Despite the strong association between obesity and type-2 diabetes, the view that type-2 diabetes is simply an obesity-related disease is simplistic. In fact, in those with type-2 diabetes aged 16-54, 63 per cent have a body mass index (BMI) of over 30, but this proportion falls to 47.6 per cent in those over 55 (Gatineau 2014). So, it would seem that obese people are more likely to develop type-2 diabetes and to develop it at a younger age, but eliminating obesity would certainly not eliminate type-2 diabetes.

International comparisons further illustrate the complexity of the link between obesity and diabetes. Between 2000 and 2010, Sri Lanka's diabetes prevalence rate rose from three per cent to eleven per cent, while its obesity rate remained static at 0.1 per cent. Meanwhile, diabetes prevalence in New Zealand fell from eight per cent in 2000 to five per cent in 2010 while the country's obesity rate rose from 23 per cent to 34 per cent (Basu 2013).

An important point here is that the blood sugar in question - glucose - is not the same as what is commonly called 'sugar' or 'table sugar' - sucrose. In fact, sucrose is a combination of two simpler sugars, glucose and fructose, which quickly become separated when sucrose is digested. Sucrose is thus an important source of glucose in Western diets, but it is by no means the only one. In fact, the starch in foods such as potatoes, rice, pasta and bread also breaks down into glucose once consumed. Another product which is essentially the same as sucrose, high-fructose corn syrup (HFCS), has also become popular in the past forty years - mainly in the US, where low-price sugar imports face high tariffs and corn production is subsidised - as a cheaper alternative to sucrose. The US government allows a comparatively small amount of sugar to be imported at a low tariff, currently 0.625 cents per pound. Beyond this quota, tariff rates leap, making imported sugar expensive, currently between 15.36 and 16.21 cents per pound (US Department of Agriculture 2014). Subsidies for commodity crops, through commodity programmes and subsidised crop insurance under the 2014 Farm Bill, are estimated at $134 billion over the next 10 years, not including subsidies farms receive for conservation or the benefits in extra sales through the food stamps and nutrition programmes, which alone will cost $756 billion over the next decade (Plumer 2014). Those factors do not apply in the EU, which heavily restricts HFCS production, so HFCS is far less commonly used here.

Since diabetes is the inability to control glucose in the blood, sharply reducing all of these glucose-producing foods in the diet is one method of treatment. None of these foods is essential to good health, though they are a cheap source of dietary energy. It is entirely possible to live without them. It is also the case that, in response to concerns about fat, consumption of fat-rich foods has declined, to be replaced by greater quantities of carbohydrate-rich foods. That switch in the balance of our diets from fat towards carbohydrate was official advice for forty years.

Yet jumping from this observation to the conclusion that carbohydrate *per se* must be the cause of obesity and diabetes is problematic. For example, the Japanese diet contains large quantities of carbohydrate, yet obesity is a far smaller problem in Japan than in the West. On the other hand, diabetes rates are on the rise in Japan, too. The *IDF Diabetes Atlas*, most recently published in 2013, suggests diabetes is more common in Japan (5.12 per cent) than in the UK (4.92 per cent) using a measure designed for international comparison (International Diabetes Federation 2013). At the very least, there is little difference between age-adjusted diabetes rates, according to these figures, between the UK and Japan, despite the large differences in obesity rates.

If sugar is to be subject to increased regulation, over and above that applied to other foods, the crucial question is this: is there something specific in sugar that triggers the problem of controlling blood sugar, encourages the laying down of body fat and increases the risks of the chronic and costly diseases typical of the West, such as diabetes, heart disease and cancer?

According to anti-sugar campaigners, that specific factor could be sucrose - or more specifically, the other simple sugar contained in sucrose: fructose. This is central to Robert Lustig's argument. Fructose, he says, is metabolised in a completely different way to glucose. Whereas glucose can fuel every cell in the body, fructose is almost entirely metabolised by the liver. This process, he says, is very similar to the way that alcohol (ethanol) is processed, producing a variety of unhealthy side effects, including laying down fat in the liver. In short, says Lustig, 'the primary (though not the sole) villain, the Darth Vader of the Empire, beckoning you to the dark side' is fructose (Lustig 2014).

But the idea that sugar causes diabetes without first causing obesity is not the mainstream view. Most scientists believe that obesity leads to diabetes rather than the other way round. Sugar is problematic not for some special chemical properties, but because it is an easy way to consume calories to excess. The charity Diabetes UK (2014) is unconvinced by the alternative view held by Lustig and Action on Sugar, saying 'we want to reduce sugar consumption because having too much can easily lead to weight gain, as is true with foods high in fat. So reducing the amount of sugar in our diets is not all that we need to do to reduce our risk of Type 2 diabetes. The evidence that sugar has a specific further role in causing Type 2 diabetes, other than by increasing our weight, is not clear.' A draft

report from the Scientific Advisory Committee on Nutrition (SACN), published in June 2014 (SACN 2014), also concluded that 'there is insufficient evidence to demonstrate that fructose intake, as consumed in the diet, leads to adverse health outcomes independent of any effects related to its presence as part of total and free sugars'. In other words, consumption of sugars in general could have negative effects on things like triglycerides (essentially, fat levels in the blood), but there was not enough evidence to suggest that fructose has a special effect in this regard.

Nonetheless, it is widely agreed that high sugar consumption increases the risk of obesity and ill-health. It provides no other nutrition besides energy - it represents so-called 'empty calories' - so could be eliminated from the diet without any harmful effect. If anti-sugar campaigners and mainstream doctors agree on one thing, it is that we should consume less sugar, and sugary drinks in particular. Both the World Health Organisation (WHO) and the SACN report authors think sugar should provide no more than five per cent of dietary energy (although this is mainly in order to prevent tooth decay rather than obesity).

In summary, high-carbohydrate diets - whatever form that carbohydrate takes - may well be a problem for some people, increasing the risk of diabetes (or making diabetes more difficult to manage), causing weight gain and leading to higher levels of triglycerides, which appear to be a better guide to heart disease risk than total cholesterol. If that were true, it would represent a startling reversal of thinking on diet from the past few decades, where dietary fat has routinely been demonised. It is too early to give a definitive conclusion, but there is enough evidence to warrant more extensive research.

That said, deciding the question may be tricky. The field of nutrition is more prone to fashionable hypotheses and fads than most fields of science, in part because testing hypotheses is so difficult. Changing one factor in a subject's diet – for example, the number of calories or the proportion of fat – inevitably means changing other aspects, too. Proving which change in the diet was causative in terms of changing body weight is therefore logically very difficult. Added to this, there is a whole industry of authors and publishers cashing in on the public's desire to find a magic bullet for obesity.

Nevertheless, the mainstream view continues to be that an excess of calories from any source causes obesity and that obesity is a risk factor

for type-2 diabetes. According to mainstream thinking, if sugar is a particular problem, it is because it is dense in calories and, unlike fat, can be added to drinks. Otherwise, a calorie is a calorie, regardless of whether it comes from salad or sugar. Logically, therefore, the same measures being proposed to reduce sugar consumption should be applied to all calorie-dense food or to none at all. However, campaigners may believe that sugar is as good a place to start as any, particularly with regards to sugary drinks which provide calories without, it is argued, satiating hunger.

Sugar consumption

Epidemiological evidence to support the view that sugar is uniquely likely to promote weight gain and diabetes is thin on the ground. A paper by Lustig and colleagues in 2013 compared the availability of calories in general, and sugar in particular, with rates of diabetes internationally (Basu 2013). It concluded that each increase of 150 calories per day in food supply was associated with an increase of 0.1 per cent in diabetes prevalence. However, each additional 150 available calories in the form of sugar was associated with an increase of 1.1 per cent in diabetes prevalence, even after controlling for weight gain, obesity rates, GDP and calorie intake. In conclusion, the authors argued that 27 per cent of the increase in diabetes worldwide over the past 10 years could be blamed on sugar. Another study found that countries with wide availability of high fructose corn syrup (HFCS) tended to have higher rates of diabetes (Goran et al. 2013). Intriguingly, though, these countries did not have higher rates of obesity.

This is back-of-an-envelope research, however, comparing some fairly crude measures to try to find an association. The researchers were only able to measure the *availability* of sugar/HFCS, which is a weak proxy for actual consumption. Government statisticians make educated guesses based on production figures, imports, exports and estimates of wastage. For any specific country, where a consistent methodology is maintained, such figures may be useful for identifying trends, but whether the figures between countries are comparable is another matter. Such statistics usually come with ‘health warnings’ about the limitations of data collection and methodology. These ecological studies are, at best, a starting point in understanding the effects of sugar-sweetened beverages on diabetes.

Much of the evidence behind the contention that sugar is the major cause of obesity and diabetes comes from the simple observation that sugar

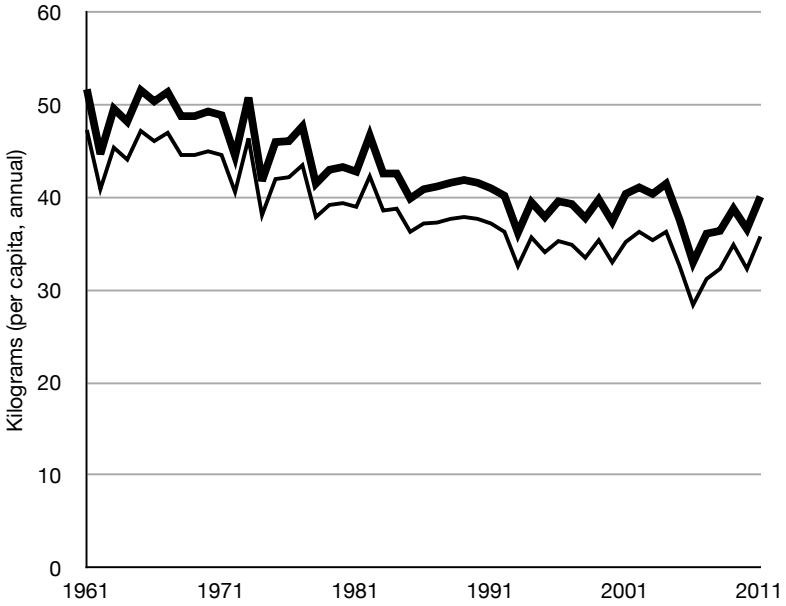
consumption has risen at the same time as rates of obesity and diabetes have risen. But whilst this is broadly true of the USA, it does not stand up in countries such as Britain. To be a satisfactory explanation for the sudden rise in obesity and diabetes rates, sugar consumption at current levels would have to be high and rising. This is true if one takes a very long view. Sugar was extremely unusual in Europe 500 years ago. It was a highly priced and highly prized product in the way that spices were. (In fact, the word 'spice' referred at one time to any luxury product imported from the rest of the world.) The anthropologist Sidney W. Mintz notes that the first mention of sugar in historical documents in the UK was in the twelfth century, when it was treated in the same manner as spices like pepper, mace, nutmeg and ginger (Mintz 1985). Mintz suggests that during sugar's early usage in Europe, it served five purposes: 'as medicine, spice-condiment, decorative material, sweetener and preservative'. At a time when most people's diets were grindingly monotonous, adding small quantities of such flavours made food more palatable. Sugar was also regarded as important both as a medicine and to mask the flavour of other, bitter medicines. An increase in sugar usage went hand in hand with the rise in popularity of tea, coffee and chocolate, with sugar used as a sweetener. This trend was clear certainly by the late seventeenth century, but there simply wasn't enough sugar in use to make any significant impact on calorie intake.

Sugar prices started to fall in the UK with the Sugar Duties Act of 1846, which ended preferential tariffs and allowed the import of cheaper sugar, along with the rise of sugar beet produced domestically. As a sweetener in drinks and as the major ingredient of jam, sugar became an important part of very narrow diets for working people. According to Mintz, sugar's contribution to calorie intake rose from an estimated two per cent at the start of the nineteenth century to 14 per cent, or perhaps even more, a century later. It is still about 15 per cent of UK calorie intake today.

In other words, such estimates suggest that there has been no great take-off in sugar consumption. On the contrary, annual sugar consumption in Britain peaked several decades ago at over 50 kilograms per person and is now typically less than 40 kilograms per person. Figure 1 shows data from the Food and Agricultural Organisation of the United Nations; the bottom line shows all refined sugars, the top line shows total sugar and sweeteners. Britons today consume less sugar per head than the 90 pounds (41 kilograms) Mintz says were consumed in 1900 (Mintz 1985: 143). Survey data, till receipts and sugar industry sales data all confirm

that there has been a significant decline in per capita sugar consumption since the 1960s. The UK, like the USA, saw rates of obesity and diabetes rise sharply after the 1970s, but unlike America this coincided with a decline in sugar consumption, not a rise.

Figure 1: Per capita sugar consumption (UK)



Source: Food and Agricultural Organisations of the United Nations

Lustig's arguments about high fructose corn syrup (HFCS) also have little relevance to the UK. While Americans consume about 25 kilograms of HFCS a year, Britons consume less than half a kilogram as a result of strict EU restrictions on production and very different tariff schemes as regards sugar. Some British commentators have nevertheless attributed Britain's relatively high obesity rate to HFCS, seemingly unaware that this form of sugar is virtually non-existent here (Perretti 2012; Malhotra 2012). This, perhaps, is an instance of British pundits importing narratives from America, where many of the most prominent anti-sugar advocates are based, without checking the facts. The appeal of Lustig's theory lies in HFCS being a relatively new mass market product that has seen a surge in consumption that roughly coincides with the rise of obesity, but this only applies to the USA. The rise of obesity in Britain cannot reasonably be attributed to HFCS since Britons eat very little of it. Moreover, the decline

in sugar consumption on this side of the Atlantic makes it difficult to portray sugar as a new or growing threat. Correlation does not equal causation, but the UK does not even have correlation, leaving us with the question of how sugar could be the cause of the rapid rise in obesity and diabetes in recent decades.

Food 'addiction' – is the consumer sovereign?

In a free society, government intervention of the type proposed by some 'public health' campaigners can only be justified if there is evidence of market failure. The mere fact that some people are overweight or make choices that are suboptimal from a health perspective is not sufficient cause for coercion. Whereas health campaigners assume that people seek to maximise their health and longevity, economists assume that people seek to maximise their utility. Utility can be very broadly defined but it certainly includes the pleasure of eating tasty food and drinking more sugary drinks than doctors might recommend. Given that longevity and utility (or, put simply, pleasure) are often in conflict, it is for individuals rather than the state to decide on the right balance. They know their preferences better than bureaucrats and single-issue campaigners.

Public health lobbyists may consider heavy eaters (or heavy drinkers and heavy smokers) to be acting irrationally but, as Cawley (2011: 131) notes, 'irrationality is in the eye of the beholder. One does not judge whether an individual is rational based on his weight or whether one agrees with his choices, but by whether the individual is capable of acting in his own interest (in economics jargon, maximising his utility).' However, intervention could be justified if consumers are prevented from pursuing their interests by systematic deception, product adulteration, artificially high prices, lack of information or - more controversially - addiction.

A familiar trope amongst food campaigners and commentators is the notion that the food industry is either deliberately supplying dangerous food or is reckless about the problem, preferring profits to long-term health. Notable examples of this outlook appeared in the BBC documentary *The Men Who Made Us Fat* and the recent book *Salt Sugar Fat: How the Food Giants*

Hooked Us. In the latter, *New York Times* journalist Michael Moss examines the history of processed food, looking at the lengths to which manufacturers have tweaked and tinkered with their products, using the best available science, to produce foods that we will crave (Moss 2013). Moss discusses a presentation in 1999 in which food industry executives discussed precisely the claim made specifically about sugar today: that Big Food could end up facing the same kind of billion-dollar negligence claims as Big Tobacco. The business risk of such litigation would have been well understood by those present at the meeting; at one point, two huge food corporations, Kraft and General Mills, were owned by tobacco giant Philip Morris.

The big idea that Moss puts forward is that food companies have got us hooked on their products, which hit the sweet spot or 'bliss point' in terms of the combination of salt, sugar and fat. Our nerve-endings are so stimulated that we are forced to eat more and more of the product in question to satisfy our cravings. Throw in the recent enthusiasm for explaining every human trait through looking at brain scans, and the argument made by Moss and others, like former US Food and Drink Administration (FDA) boss David A. Kessler in *The End of Overeating*, seems to have the credibility of science behind it.

While the science of taste is a fascinating one, as Moss explains, the magic formula for making a successful food product seems to have alluded the food scientists. If Big Food companies are really a cabal of drug pushers, they are not very good at getting customers addicted. The American food journalist and veritable guru of the 'food movement', Michael Pollan, claims in his book, *Food Rules,* that 17,000 new products arrive in supermarkets each year. The vast majority will disappear again just as quickly. The reasons why a particular product becomes successful are myriad - from good promotion to convenience to finding a gap in the marketplace. For example, one of Moss's chief examples is Lunchables - effectively, a ready-made packed lunch for children. It's pretty obvious that the chief benefit of the product is convenience for parents rather than some addictive alchemy. Personal tastes are just too varied to allow many new blockbuster food products to emerge, yet the myth of corporate eggheads concocting ingenious, neuron-tantalising products would suggest otherwise.

As for the neuroscience of food - which also featured in the *Dispatches* edition about sugar - the argument is that certain foods, like sugar, 'light up' areas of the brain that are also associated with drugs like cocaine.

Indeed, the programme's presenter, Anthony Barnett, was eager to push a neuroscience researcher to say that sugar had a similar effect to cocaine – something she refused to do.[1] Nonetheless, critics of sugar are happy to grasp on to the most circumstantial evidence of sugar causing addiction. But that gets the effect the wrong way round. For sound evolutionary reasons, we find food pleasurable, particularly when it is energy-dense, and our brains 'reward' us for eating and other beneficial behaviours. Over time, we have found chemicals that similarly affect these reward systems (for example, hard drugs), but that doesn't mean that sugar is like cocaine, rather it means that cocaine acts like sugar (and other food) by hijacking - for pleasurable effect - those reward systems.

In any event, even class A drugs like heroin and cocaine are by no means inevitably addictive. Human beings are not lab rats and the reasons why habits are formed are complex. Some people may develop an obsession with sugar, but may equally develop compulsive behaviours around all sorts of things, including drinking coffee, reading Facebook and exercising. There is little about the chemical makeup of sugar, or how it is used in manufactured food products, that suggests it is especially conducive to the formation of such a compulsion. A recent study found that 'there is currently insufficient scientific evidence to label any common food, ingredient, micronutrient, standard food additive or combination of ingredients as addictive.' The authors of this study concluded that 'eating addiction' was a behavioural problem rather than the result of inherently addictive substances in food (Hebebrand et al. 2014).

The discussion about sugar and addiction really only highlights the degraded discussion about addiction today. Once confined to serious, detrimental and compulsive behaviour - hard drugs, alcoholism, gambling - now almost any habit or substance can be described as addictive. If there is any truth in that view, it is only that the sheer variety of addictive substances and behaviours shows that the 'addiction' is in the mind of the addict. The particular object of that addiction is secondary and, to a degree, arbitrary.

In *The End of Overeating*, Kessler describes the problems of a rotund former war correspondent, who he calls 'Andrew', who is constantly battling with his weight. Kessler writes: 'He has spent time with jihadists, suicide bombers, and war-hardened soldiers, and he hasn't flinched. But when I

1 This question was asked of the same neuroscientist and with the same answer in the BBC documentary *The Truth About Sugar* in March 2015.

placed M&Ms on the table before him, Andrew felt barely able to cope.' Andrew, it seems, is constantly battling against the desire to eat. 'I wake up in the morning knowing food is my enemy and that I am my own enemy… It's uncontrollable' (Kessler 2010). 'Andrew' may be battling against social expectations about his weight and, as Kessler describes, some psychological issues about his father, but there is nothing in the M&Ms that means he must desire them.

‘Food deserts’ and the perceived lack of choice

But perhaps the problem of choice is not that sugar is addictive but that it is ubiquitous, that many consumers simply have no option but to buy unhealthy products, including those with a high sugar content. While most consumers in the UK have access to large supermarkets with broad ranges of both processed foods and raw fruit, vegetables and meat, it may be that there are some pockets of the country that are so-called ‘food deserts’ without easy access to nutritious food. In bigger countries, such as the US, it may be that such food deserts are more common, especially in poor urban areas or in rural areas where people have no access to motorised transport.

However, the evidence for such claims seems thin. Poor urban districts – usually cited as the main geographical areas for problems like obesity – still usually have access to food retailers as well as takeaway food outlets. In a study published in 1999 looking at Glasgow, the authors ‘did not find any evidence for the existence of food deserts, and found that food stores were more numerous in the more deprived localities and postcode districts in the study site’ (Cummins 1999). Only by creating quite narrow definitions of availability – for example, having to walk more than 500 metres to a shop with more than ten items of fresh produce, as one researcher has done – can there be any serious talk of food deserts in urban areas. Even then, these may be in well-to-do suburban areas where access to cars is commonplace. A similar picture can be found in the US, although rural access to a wide range of food may be trickier without a car. Nonetheless, the places with the highest rates of obesity often have plenty of access to fresh food. As a US academic often critical of the food industry, Kelly Brownell of Yale University, told the *New York Times* in 2012: ‘It is always easy to advocate for more grocery stores. But

if you are looking for what you hope will change obesity, healthy food access is probably just wishful thinking' (Kolata 2012).

Perhaps the problem is the opposite: that there are too many food outlets, so it is easy to buy 'junk' food rather than travel a little further in search of fresh food. That is certainly the thinking behind local authority planning decisions to refuse applications for new takeaway food shops near schools. For example, the London borough of Waltham Forest has decided that 'the council will not give planning permission to new hot food takeaways if they are 400 metres or less from a school, youth facility or park. The policy aims to limit the opportunities that young people have to eat "fast food", thus reducing childhood obesity' (Local Government Association 2014). But this is not a question of too little choice, but too much. While food and public health campaigners may be unhappy about the kinds of choices consumers are making, the market is providing those options for those who want to take them. Restricting choice in the purchasing of food to ensure consumers access the 'right' food is rather like banning MTV in the hope that it will force everyone to watch opera.

Consumer ignorance?

Another argument about choice is that consumers may be ignorant of what they are buying. An obvious example is that of sugary soda like Coca-Cola and Pepsi. People are often surprised at just how much sugar is contained in these drinks. A standard 330ml can of Coke or Pepsi contains the equivalent of about nine sugar cubes (35 grams in total). Yet while this may surprise some people, it is clearly stated on the label. In fact, these two products are by no means the most sugary on the market, with some soft drinks containing almost 50 per cent more sugar (Sedghi 2014). If people aren't aware of these facts, it suggests labelling is at best of limited value in guiding people's dietary choices.

One proposal to make labels more effective is to introduce 'traffic light' labels, with a red symbol for products with high levels of salt, sugar or saturated fat, an amber symbol for intermediate products, and a green symbol for those products with low levels. However, there are complications. Many products generally regarded as nutritious might also fall foul of these warnings. For example, most cheeses would get a 'red light' for fat and possibly for salt. There are also issues to do with how a product is used. Butter is very high in saturated fat but only a few grams are used for each serving. A can of Coca-Cola contains a relatively high proportion of sugar, and would therefore attract a 'red light', but a single can consumed per day in the absence of any other sugar in a person's diet would constitute a relatively low intake. In short, diets matter more than individual foods. 'Traffic lights' can't tell us very much about the dietary load of any of these elements of food and, as a result, what impact they might have on a person's health.

Moreover, as we have seen above, it is not clear that sugar or saturated fat are harmful substances *per se*, so the warning may well be misplaced. If a similar system had been in place years ago, eggs would have been given a warning label for being high in cholesterol. Indeed, health advice in the past was to restrict egg consumption but, more recently, eggs have been given the all-clear in this regard – cholesterol consumed in food has little impact on the levels of cholesterol in our blood. The 'traffic light' system implies that there is settled science about the healthiness or not of food products when in fact that seems very far from the case.

‘Big Food’

This idea that the industry (‘Big Food’, as some call it) is the problem precedes rather than flows from the evidence about food. In the view of many activist academics and campaigners, the food industry is out to kill us with dangerous products. Evidence is then created or selected to confirm this prejudice. Take, for example, this opening section of an abstract from the *Lancet* series on obesity in 2011:

> ‘The simultaneous increases in obesity in almost all countries seem to be driven mainly by changes in the global food system, which is producing more processed, affordable, and effectively marketed food than ever before. This passive overconsumption of energy leading to obesity is a predictable outcome of market economies predicated on consumption-based growth’ (Swinburn 2011).

Admittedly, the *Lancet* has form for this kind of activist research and commentary, but it is still nonetheless remarkable that a high-profile article in a peer-reviewed medical journal should start with such schoolboy anti-capitalism.

So how does industry get away with this apparently lethal activity? According to anti-sugar campaigners, the secret is successful and underhand lobbying of ministers rather than their own weak evidence. In response to the revelation in early 2014 that the food industry had met the coalition government 16 times since it took office in May 2010 (hardly remarkable for one of the country’s biggest manufacturing industries), obesity campaigner Tam Fry declared:

> ‘These meetings are an example of how the industry has a charmed route into the corridors of power that is denied to everyone else. The fear of people like us is that the government secretly sews

> things up on the industry's behalf. Perhaps if the government weren't so influenced by them, we would have a maximum sugar level in foods by now' (Martin 2014).

Never mind that anti-sugar campaigners have also actively lobbied government and that Consensus Action on Salt and Health (CASH), out of which Action on Sugar was born, had previously and successfully lobbied for reductions in salt content in food, despite the reservations of industry.

A more sophisticated version of this argument was offered by Gary Taubes and Cristin Kearns Couzens in the American left-liberal magazine *Mother Jones.* Taubes and Couzens set out the public-relations campaign by the Sugar Association, a trade body, to reverse anti-sugar feeling among consumers and anti-sugar advice from government and medical associations, claiming: 'So effective were the Sugar Association's efforts that, to this day, no consensus exists about sugar's potential dangers.' Taubes and Couzens quote one industry insider, as long ago as 1976, declaring in a memo: 'In confronting our critics, we try never to lose sight of the fact that no confirmed scientific evidence links sugar to the death-dealing diseases. This crucial point is the lifeblood of the association.'

It is perfectly normal for a particular industry to defend its product against accusations of harm, especially if those accusations are built on shaky evidence. If the evidence was, in reality, so strong, why does official advice on sugar remain so ambiguous? Can it really simply be down to lobbying? Firstly, as Taubes and others have pointed out elsewhere, the medical research establishment had already decided by the 1970s that those, like John Yudkin, who criticised sugar rather than fat as the primary cause of chronic disease were wrong and had marginalised them. If there is a paucity of evidence condemning sugar, it is surely in part to do with a lack of interest from researchers. Moreover, taking the self-promotion of a lobby group like the Sugar Association as meaningful evidence of its importance to the outcome is a bit like assuming that Spike Milligan had a pivotal role in World War II because he wrote *Adolf Hitler: My Part in His Downfall.* Secondly, the official advice may be ambiguous because the evidence itself really is ambiguous on the specific role of sugar, as we have seen. Whatever the role of the sugar industry, it is surely more important to examine the evidence that we have to hand before condemning sugar rather than assuming there must be a problem because lobbyists were involved.

The economics of eating: policy proposals

While Action on Sugar claims that there is underhand lobbying going on, it also trumpets the fact that the health secretary, Jeremy Hunt, had asked them to produce some proposals for tackling obesity (Action on Sugar 2014). Since these proposals are quite typical of this kind of campaign, it is worth looking at them in some depth. With only one exception, they are all predicated on the belief that consumers are unable, rather than unwilling, to make the 'correct' choice about what to eat.

Government limits on the use of sugar

1. 'Reduce added sugars by 40 per cent by 2020 by reformulating foods (a similar programme to salt)'

At the heart of Action on Sugar's policy agenda is the assumption that consumers are faced with a lack of real choice in the food market because so much food is 'spiked' with sugar. Constrained by an 'obesogenic environment' which makes healthy choices difficult, if not impossible, consumers are unable to fulfil their true desire to eat less sugar and fat. Action on Sugar's solution is to force companies to systematically reduce the amount of sugar in the food supply. (Note the anti-sugar campaigners' schizophrenic attitude to big corporations when it comes to policy prescriptions, seeing them as a way of bypassing consumers to achieve their ends in this instance.) However, as we have seen, the amount of sugar consumed in Britain has fallen significantly in recent decades and there is no evidence that people are constrained by a lack of choice.

On the contrary, there are many low-fat, low-sugar and low-calorie options on supermarket shelves. The fizzy drink market is a good example of this.

No products raise the ire of obesity campaigners more than carbonated beverages and yet there is an abundance of low-calorie options available. Diet Rite was launched in the US in 1958 and was followed in 1963 by Coca-Cola's equivalent, Tab. Coca-Cola alone now produces Diet Coke, Coke Zero and Coke Life. Diet Coke and Coke Zero contain no sugar and Coke Life is a lower-calorie version of Coke, made with a combination of sugar and natural sweeteners. Nearly all soft drink companies produce similar low-calorie and sugar-free varieties. All are widely advertised and all are available on the same shelves, in the same shops and for the same price as their more sugary cousins. It is very difficult to argue that consumers are nudged, let alone coerced, into buying the high-calorie variants. Indeed, Diet Coke overtook Pepsi in 2010 as the second-most popular soft drink in the US (Riley 2011) and has retained that position since (Beverage Digest 2014).

In many other categories, there is already a wide range of products with markedly different sugar contents. For example, in breakfast cereals, Frosties contains 37 grams of sugar per 100 grams, but the otherwise identical Corn Flakes contains just three grams per 100 grams. Shredded Wheat contains no added sugar at all. Since there is a large market for heathier foods, companies heavily promote low-sugar and low-fat products and consumers can easily choose what level of sugar they want in the food and drink they buy. To reformulate brands by diktat with the simple aim of reducing sugar is unnecessary and would limit choice.

Nevertheless, campaigners have called for mandatory reductions in sugar content, a policy that is explicitly modelled on the salt reduction scheme that was agreed between industry and the government of Tony Blair (MacGregor and Hashem 2014). It is unsurprising that Action on Sugar should propose such a move as it shares its key personnel, website and charity registration number with Consensus Action on Salt and Health, but, as one food industry insider told us, reducing salt content is relatively easy compared to reducing sugar. Salt has a role as a preservative and a flavour enhancer, but it can be cut back to a degree over time without driving too many customers away. Reducing sugar content by such a large amount would be a challenge and the resulting products would be very different. Biscuits, cakes and confectionery with markedly less sugar would lose much in texture and flavour. Sugar-sweetened beverages could swap sugar for an artificial sweetener, but many people dislike the taste of saccharin or aspartame (aka Nutrasweet).

2. 'Reduce fat in ultra-processed foods, particularly saturated fat – 15 per cent reduction by 2020'

For a group called Action on Sugar, this is an odd demand, and seems directly contrary to the views of some of its leading lights, who have professed that dietary fat is not a problem. It does indicate, however, that it is mass-manufactured food - and the companies who make it - that is the real target.

The fact remains that choice is not a problem for buyers of food in twenty-first century Britain. Indeed, there is so much choice that some critics complain of being overwhelmed by the 40,000 products that sit on supermarket shelves (Hastings 2013: 37). The food industry has responded to people's concerns with a vast range of low fat and low sugar products in accordance with the scientific consensus of the day. The idea that the government should force manufacturers to reduce sugar and fat content in individual products by an arbitrary percentage is not a response to a lack of choice in the market, rather it is a response to the fact that many consumers exercise their choice by rejecting the low calorie options.

Advertising bans

3. 'Cease all forms of marketing of ultra-processed, unhealthy foods and drinks to children'

There is an enormous amount of economic evidence showing that advertisements for established products increase demand for specific brands but do not increase demand for the entire product category (Bagwell 2007; Schmalensee 2008). An advertisement for the butter-like spread Clover, for example, might increase sales of Clover, but is unlikely to increase sales of fatty spreads overall. Despite the evidence that advertising reflects, rather than controls, primary demand, public health campaigners continue to regard advertising as a powerful corporate weapon of coercion which, if curtailed, would lead to consumers abandoning tobacco, alcohol and high-calorie foods. The mere fact that all these products were consumed on a massive scale long before the advent of advertising does not shake their conviction, nor does the conspicuous failure of advertising bans to reduce the consumption of these products in recent decades (Duffy 1995, Qi 2008). Health campaigners are also largely indifferent to the benefits that advertising provides, such as funding the media, incentivising high quality standards

and allowing new entrants to break into the market (Harris and Seldon 2014).

In Britain, a broadcasting ban on advertising of foods high in salt, fat and sugar in programmes with a large audience of children has been in force since 2007. The ban appears to have been a significant factor in the closure of ITV's children's television production department. According to one report at the time, 'it is estimated that round 70 per cent of the cost of children's programmes is funded from advertising and a significant proportion of that comes from food advertising' (Thomas 2006). Yet the ban has been so ineffective that there have been calls to extend it to any programming before the 9pm 'watershed' (Wallop 2010). Such a move would be unlikely to fare much better. Children have plenty of direct access to 'junk' food without the need to advertise it, through shops on the way to and from school, for example. In any event, most of the products that campaigners rail against - such as breakfast cereals and ready meals - are bought by parents, not children. (It is because parents frequently watch television with their children that advertisers pick these slots. Campaigners claim that food companies are attempting to harness 'pester power', but this cannot explain why payday loans, cleaning fluids, laundry detergent and other products of little interest to children are also advertised during children's programmes.)

Economist's assumptions about consumer sovereignty and rationality do not necessarily apply to children (Cawley 2011: 132), but it is not difficult to see how policies ostensibly aimed at 'protecting' children from 'exposure' to advertising could restrict communication between businesses and adult consumers. Whereas the UK's existing ban targets programmes that are predominantly viewed by children, a watershed ban targets programmes that are predominantly, though not solely, viewed by adults. It would effectively confine the promotion of a vast swathe of food and drink products, including cheese, bacon, butter, cakes and biscuits, to a few hours late at night. Any kind of broadcast ban would likely reduce the quality and quantity of television programmes and would limit the right of producers to tell the world about their products.

Anti-sugar campaigners have almost as dim a view of consumers as they have of corporations. It is assumed that we are clueless and unwitting fools who accept marketing at face value - a case of 'monkey see, monkey do', a frequent and false claim made against advertising generally. Therefore, the 'experts' - like Lustig and Malhotra - must step in to save

us from ourselves. No doubt, campaigners would point to the ban on tobacco advertising and say that the end - the possibility of better health - justifies the means. In our view, free speech - including truthful and honest advertising - should be an absolute in a free society. Most people would agree that alcohol, which is acutely poisonous and can create a potentially dangerous loss of physical control, should not be sold to minors. Cigarettes are a risky product with long-term health implications, so preventing their sale to children is also widely agreed to be sensible. But preventing the advertising of legal food products generally considered to be safe is, in effect, the government choosing what can and cannot be said. There is a commonly used name for that: censorship.

4. 'Disassociate physical activity with obesity via banning junk food sports sponsorships'

Food campaigners get particularly agitated about the sponsorship of major events such as the Olympics by fast food and soft drink companies. Yet while such advertising may be useful as a means of promoting one brand versus another, there is little evidence to suggest that total sales of fast food are increased by sponsorship of sporting events. In the case of the Olympics, the Olympic Park at London 2012 itself was free of such advertising. Sporting sponsorship may qualify under the remit of 'corporate social responsibility' - companies trying to look good by 'giving something back' to the community. But to suggest that sponsorship automatically leads to sales is to reiterate the view that consumers are dim-wits and flies in the face of a large body of economic evidence.

Moreover, if we are simply vessels for whatever combination of images are displayed to us, surely all this sporting sponsorship would be encouraging the consumers of Coca-Cola, McDonalds and the rest to put on their training shoes or hit the gym? Clearly, that is not happening.

Restricting availability

5. 'Limit the availability of ultra-processed foods and sweetened soft drinks as well as reducing portion size'

As with mandatory reductions of sugar content in food, restrictions on the sale of food and drink products are an attack on choice. Never mind the problem with defining an 'ultra-processed' food, it suggests a return to the 1970s, when the availability of takeaway food was limited and most shops

closed by 7pm. It fits with a policy among some councils of banning takeaway food shops in the vicinity of schools, too. Returning to an earlier example, Waltham Forest council in east London has reportedly turned down 83 per cent of applications to open fast food shops in the past five years (O'Brien 2014). Such an approach stifles competition, favours incumbents, and distorts the market by preventing supply from meeting demand. This is likely to result in higher prices and poorer quality.

The most high-profile attempt to limit soda portion sizes was in New York. In September 2012, the city's health board approved a plan by the then mayor, Michael Bloomberg, to limit servings in restaurants, cinemas and sports venues to 16 ounces (473ml), though there would be no limit on how many portions a customer could buy, nor would there be any limit on refills. However, the ban would not have applied to convenience and grocery stores. As a result of the uneven application of the ban, the courts ruled the health board had gone beyond its powers (Grynbaum 2014).

'Nudge' theorists would argue - probably correctly - that even if a customer wanted to order a 32-ounce or even 64-ounce portion - as in 7-Eleven's much maligned 'Double Gulp' - they would be much less likely to do so if they needed to order more than one portion. Yet such a ban would have a limited impact. In the UK, for example, the largest serving of soft drinks at McDonalds is 500ml - barely more than Bloomberg's suggested maximum.

Sin taxes

6. 'Incentivise healthier food and discourage drinking of soft drinks by planning to introduce a sugar tax'

More than anything else, taxes are the most widely suggested idea for how to reduce sugar consumption. Basic economics suggests that if you make something more expensive, demand for it will decline. In November 2014, the Californian city of Berkeley became the first to vote for a large soda tax - in this case, of one cent per fluid ounce. However, whether imposing taxes is effective, fair or efficient is another matter.

As an aside, it could be argued that a 'junk food' tax, including on fizzy drinks, is already in place, in effect, in the UK. VAT is not charged on raw meat and fish, vegetables, fruit, cereals, nuts and pulses, bread, and a variety of other foods. But VAT at the standard rate of 20 per cent *is* charged

on alcoholic drinks, confectionery, crisps and savoury snacks, hot food, sports drinks, hot takeaways, ice cream, soft drinks and mineral water. While the fit between 'healthy' and 'unhealthy' foods and VAT-rating is not perfect (cakes are zero-rated, mineral water is standard-rated), by and large the foods that are supposed to be bad for us are 20 per cent more expensive than they would otherwise be thanks to the tax system. While HMRC does not keep separate figures for these categories, a rough calculation would suggest the income from 20 per cent VAT on snacks (sales in 2013: £3.2 billion (SNACMA 2014)), confectionery (£5 billion (IBIS 2015)) and added-sugar soft drinks (£5 billion (BDSA 2014)) is in the order of £2.6 billion per year.

On the question of effectiveness, soft drink buyers appear to be relatively 'price inelastic', that is an increase in price translates to a reduction in sales, but the percentage decline in sales is less than the percentage rise in price. The economics literature suggests that soft drinks have a price elasticity of 0.79, meaning that a price rise of 10 per cent should reduce consumption by 7.9 per cent (Andreyeva et al. 2010). The confidence interval of this 0.79 figures is very wide, however, and price-sensitive shoppers could avoid a price rise in a variety of ways. Anti-sugar campaigners hope that shoppers will switch to drinking water or, at the very least, switch to sugar-free versions of popular drinks from the much-maligned Coca-Cola and Pepsi. But as mentioned earlier, many dislike the taste of artificial sweeteners (and some fear that they are carcinogenic). Alternatively, price-sensitive shoppers could avoid a price hike by buying larger sizes with lower unit costs or switching to cheaper brands. For example, a two-litre bottle of Tesco own-brand cola is about one-third of the price of Coke. Indeed, 'private label' brands (own-brands) took almost as much in sales in supermarkets and stores (£1.51 billion) in 2013 as Coke-branded (£1.19 billion) and Pepsi-branded (£362 million) drinks combined, suggesting that the *volumes* of own-brand being sold in stores far outstrip the two biggest brands (Britvic 2014). On the other hand, those with a strong attachment to a particular brand and flavour will simply pay the higher price. Moreover, given the high price of their products in comparison to the cost of production, there is plenty of room for the big beverage brands to cut prices in order to maintain sales. That might hurt their bottom line, but it would reduce the impact of a soda tax on sugar consumption.

There are also practical questions about how such a tax would apply to lower-sugar brands such as Coke Life. If the aim is to encourage reductions in sugar content, applying a flat-rate tax to all sugary drinks would discourage

drinks manufacturers from producing lower-sugar alternatives. And how would fruit juices be dealt with when they are still part of the 'five-a-day' message, according to the NHS Change4Life website, but frequently contain as much sugar as fizzy soda?

Which brings us to the question of effectiveness: how much effect does a tax on one supposedly causative element in the problem of obesity actually have? There are numerous confounding factors. For example, Ketan Patel, a doctoral student at Northwestern University in Chicago, argues that the effect of a soda tax on obesity would be limited by the fact that obese people already strongly prefer sugar-free drinks. If calorie consumption from soft drinks falls due to a soda tax, there is also the problem of calorie-substitution - people eating or drinking other products with the effect of offsetting any gain in calorie reduction due to the tax.

A review of the effect of soda taxes by Greek researchers concluded: 'The effectiveness of a taxation policy to curb obesity is doubtful and available evidence in most studies is not very straightforward due to the multiple complexities in consumer behavior and the underlying substitution effects. There is a need to investigate in-depth the potential underlying mechanisms and the relationship between price-increase policies, obesity, and public health outcomes' (Maniadakis 2013). An American review concluded: 'The limited existing evidence suggests that small taxes or subsidies are not likely to produce significant changes in BMI or obesity prevalence but that non-trivial pricing interventions may have some measurable effects on Americans' weight outcomes, particularly for children and adolescents, low-socioeconomic status populations, and those most at risk for overweight' (Powell 2009).

Other studies find some positive health benefits from such taxes, but only at fairly high rates and usually only in theory (computer models produce most of the evidence for soda taxes). Taxes that have been implemented in the real world seem to have been too low to have any impact. A 20 per cent tax rate might have some effect, but it would be a difficult sell, politically. Moreover, as with so many sin taxes, the idea really only becomes attractive to politicians in desperate need of revenue. So in 2010, the unfortunately named mayor of Philadelphia, Michael Nutter, proposed a soda tax to help fill the city's $120million budget deficit, promising that 'some' of the money might go to health programmes (NBC Philadelphia 2010).

Even if such a tax were to have positive health benefits, they would come at a high price. Small reductions in the incidence of obesity and, perhaps, cardiovascular disease would be paid for by large aggregate costs across society. Moreover, the tax would be thoroughly regressive. Firstly, because it would apply no matter what a person's income was, with the poor paying the same tax as the rich. Secondly, because sugary drinks are more popular among the poor, they would actually pay *more* tax than the well-off, not just proportionally, but in absolute terms.

From an economic perspective, the key question is whether such taxes will be efficient. The best economic justification for a 'sin tax' comes when the use of a product creates negative externalities which have to be paid for by others. In the field of public health, this typically means publicly funded healthcare costs. But the tax itself is an externality for consumers of the product. It reduces their consumer surplus. Both the costs and the benefits must be weighed before proceeding.

In Britain, obesity is said to cost the NHS £5 billion a year in healthcare costs. This is widely portrayed as an unnecessary burden on taxpayers, particularly on those who eat healthily and exercise. A tax of 20 per cent on sugary drinks has been proposed as a way of reducing this burden. One of the proponents of the tax, the Children's Food Campaign, estimates that it would reduce healthcare costs by £15 million a year, but their own figures show that the tax itself would relieve taxpayers of £1,000 million a year (Boseley 2015; Children's Food Campaign 2013). The cost of the tax would therefore vastly exceed the savings.

As a means of cutting healthcare costs, sugar and soda taxes would be highly inefficient, and as a way of relieving the burden on taxpayers would be counter-productive. It could be argued that a sugary drink tax would at least result in sugar fiends shouldering more of the healthcare costs, but that would not occur in the example above. The Children's Food Campaign does not anticipate any of the revenue being put towards healthcare costs, nor does it expect tax cuts in other areas; instead, it proposes the creation of a £1 billion per annum 'Children's Future Fund' to provide 'education and skills' (ibid.). The costs of healthcare would therefore be distributed between fat and thin as before.

But there is an even more fundamental problem with obesity-related taxes. As van Baal and others have shown, the lifetime healthcare costs of obese people are actually lower than average due to their shorter lifespans (van

Baal et al. 2008; Grootjans-van Kampen 2014). Add to this the financial savings to the state that come from a reduced pensions bill as a result of premature mortality and it becomes clear that obesity is not a drain on government resources. On the contrary, it is probably cost-saving. This, of course, is an economic argument, not a moral one, but it illustrates the hazards of presenting moral arguments in economic terms.

Transferring regulatory power to quangos

7. 'Remove responsibility for nutrition from the Department of Health and return it back to an independent agency'

This policy illustrates another element of the modern campaigner's mindset - a desire to distance decision-making over things like lifestyle choices from democratic control. This technocratic, anti-democratic tendency has been rife in political circles for some time. When the Conservative-Liberal Democrat coalition government came to office in 2010, it promised a 'bonfire of the quangos' (the flame soon went out). While campaigners have often found willing listeners in Whitehall's civil service and even among ministers, elected politicians still have to answer to voters. Taking power away from departments and giving it to quangos means that accountability is no longer there.

More ambitious public health campaigners have called for powers to be pushed even further away from the hands of democratic governments. In November 2014, several hundred health groups and individuals wrote a letter to the World Health Organisation - which is itself an unaccountable NGO - requesting a binding international treaty to tackle obesity (Long et al. 2014). This proposed 'Global Convention to Protect and Promote Healthy Diets' included many of the anti-market policies discussed above, including 'restrictions on marketing to children', 'compositional limits on the saturated fat, added sugar and sodium content of food', 'removal of artificial trans fats', 'restaurant calorie labelling', 'fiscal measures and financial incentives' and 'public health impact assessments in trade and investment policies'. Since national governments are capable of introducing any of these measures of their own volition, a global treaty would serve no other purpose than to impose the views of the Western public health elite on politicians now and in the future.

The sugar campaign in perspective

There are few people who would now claim that sugar is a health food (though a sugary drink can literally be a lifesaver for a diabetic experiencing the onset of a hypoglycaemic episode). Whether sugar is particularly bad for us or not is debatable, but the medical consensus - right or wrong - is that we consume too much sugar and, one way or another, it seems to be associated with obesity and diabetes. As a matter of personal choice, therefore, it might seem sensible to reduce the consumption of something which is not essential to our diets.

However, sugar is essential for many of the foods we enjoy today. This doesn't just apply to sugary drinks, confectionery or baked goods - those apparently nasty mass-produced foods. Some textures and qualities of food are simply not possible without sugar: the crisp topping of crème brûlée or the crunch of meringue. These are very particular pleasures for many people. Why would we consider demonising the ingredient that is crucial for creating these culinary treats? Even if we allow that the consumption of sugar in large quantities may be deleterious to our health, does launching a crusade against sugar make sense?

In economic terms, the answer is no. There is vanishingly little evidence that there is a market failure in the food industry. Consumers have an extraordinarily wide range of choice of what to eat, much of which contains little or no sugar. If products which are high in salt, sugar and fat are widely available it is because they are big sellers, not vice versa. Public health campaigners continually put the cart before the horse by assuming that people buy products because they are freely available and well advertised, but the economic evidence - and, we would suggest, a basic understanding

of how markets operate - reveals that advertising and availability are a response to established or latent demand, not the cause.

In contrast to this strong economic evidence, the evidence that sugar is addictive in any meaningful sense is extremely weak. Moreover, consumers seem to be reasonably well informed about the potential impact of high-calorie food on their health and have absorbed many of the public health messages about food. For example, the UK Food Standards Agency 'Food for You' survey found that 73 per cent of respondents in Scotland knew the recommended daily calorie intake for men or thought it was lower than it actually is. Less-specific messages – for example, the need to eat fruit and vegetables and drink plenty of water – were also broadly understood. Between 60 per cent and 70 per cent of respondents said that it was very important to limit foods high in sugar, fat and saturated fat (Pickering et al. 2014).

Finally, it is extremely doubtful whether obesity, however it is caused, places an additional burden on public finances. Pigouvian taxes on sugar, soda or fat cannot therefore be justified on economic grounds.

In sum, consumers are no more irrational or ignorant when buying food than when buying any other product, and they are able to exercise a very significant degree of free choice when making purchasing decisions. When eating sugary products, they are maximising their welfare as judged by the only person who can best know their preferences: themselves. Health campaigners may believe that people should be maximising their longevity rather than optimising their taste buds, but in a free society that is not their decision to make.

This brings us to an eternal philosophical question: to what extent should we engage in behaviours that we enjoy even when we know they are risky? A grand prix racing driver such as Lewis Hamilton knows he could die with one mistake behind the wheel, but he clearly takes great pleasure in his sport and enjoys the economic benefits. How we weigh up these decisions has been the subject of an enormous philosophical literature. But taking this kind of choice away from us is to deprive us of the right to exercise moral judgement, to *be* moral. If we have no choice, there is no room for morality, only obedience. While taxing (rather than banning) a relatively inessential substance such as sugar may seem a trivial matter, we should be astonished that such trivialities have become the target of government intervention. Such intervention should be resisted.

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