

COMMENTARY:

The psychological effectiveness of carbon labelling

Geoffrey Beattie

Despite the decision by supermarket-giant Tesco to modify its plan to add carbon-footprint information on all of its 70,000 products, carbon labelling, if carefully designed, could yet change consumer behaviour. However, it requires a new type of thinking about consumers and much additional work.

In an important speech in 2007, the then chief executive of Tesco, Sir Terry Leahy, announced a call to arms to tackle climate change. The message was simple but profound: “The green movement must become a mass movement in green consumption.” To achieve this goal, Leahy argued, “we must empower everyone — not just the enlightened or the affluent”. He believed that the market was ready for this green consumer revolution, and his proposed solution was to break down the barriers of price and information by making green choices affordable and giving the consumer the right information to make informed decisions.

There was, after all, clear evidence that the provision of certain types of product information could significantly affect consumer choice. The UK Food and Drink Federation’s guideline daily amounts (GDA) nutritional labelling scheme was a case in point, and one that was often cited, not least by Leahy himself. By monitoring its own clubcard data, Tesco had found that sales of low-fat meals increased significantly when GDA was introduced, whereas sales of high-fat meals decreased, all within a relatively short timeframe. For example, sales of their salmon *en crouete* (with a GDA fat content of 53%, saturated fat 91%) went down by 29% in the two-month period after GDA was introduced, whereas sales of their vegetable curry (with a GDA fat content of 25%, saturated fat 20%) went up by 33%.

The plan then was for Tesco to include carbon-footprint information on each of its 70,000 own-brand products in the near future. However, in January this year the plan was suddenly changed. Helen Fleming, climate change director of Tesco, quoted in *The Grocer* magazine, explained that the labels took months to calculate and Tesco were disappointed at the take-up by other

Table 1 | Information displayed on Tesco’s freshly squeezed orange juice carton.

Front view	Side view
(in descending order of surface area)	(in descending order of surface area)
Product image (picture)	Background image (picture)
Nutritional information (numbers, words and symbols)	Carbon footprint (icon with text, numbers and scientific abbreviations)
Product name and information (Tesco orange 100% pure squeezed juice)	Carbon footprint information (text, numbers and scientific abbreviations)
Price (text, numbers and icon)	“Picked and processed within 24 hours” (quote)
“NOT FROM CONCENTRATE” (quote)	Small product image (picture)
“With bits” (quote)	Price (text, numbers and icon)
Other	Other

retailers. But she also said that consumers found the labels difficult to understand. This point might be at the very heart of why carbon-footprint labels did not have their anticipated impact, but it may involve much more than mere understanding.

Take GDA information, for example. I personally do not need too much convincing that labels on food can work, especially at this time of year. For me, Easter was always about chocolate Easter eggs and sitting in the back of the family car with five or six large eggs on my lap deciding which to eat first. Recent research¹ using brain imaging suggests that high-calorie/high-fat foods such as chocolate stimulate more activation in certain regions of the brain than low-calorie/low-fat foods, and that for those individuals who consistently over-indulge “stimuli associated with foods high in fat and energy density, may possess greater than normal potency for activating the reward system and, as a result, triggering excessive motivation for non-homeostatic eating of such foods.” As a child, I was very familiar with such non-homeostatic eating of chocolate eggs and recognized all too well their inherent reward value. But of course,

now things are different, and every time I approach an Easter egg my eyes flit, without any apparent volition, to the nutritional information on the back of the box. I have learnt that one of my favourite chocolate eggs has 1817.9 calories and 102.9 grams of fat, another contains 1658.9 calories and 93.9 grams of fat (the GDA information is presented in such a way, of course, that I have to work these figures out with a calculator).

In many ways I would prefer not to know any of this, but I feel compelled to look (and even compelled to do the calculations) and this information does influence my choices. I now choose the second egg rather than the first (and even that feels very bad), and, of course, six eggs are clearly out of the question. So from a personal point of view, nutritional labels on food seem to have had some effect, and this is backed up by research on the visual processing of labels using eye tracking as “an unobtrusive, sensitive, real-time behavioural index of ongoing visual and cognitive processing,”² to provide accurate data on the allocation of attention³. We need eye tracking because there is evidence that self-reported viewing



Figure 1 | Sample fixation hotspots on 'non-bio' liquid detergent (front and rear views).

of nutritional information is higher than the objective figures⁴.

Vivianne Visschers and her colleagues from the University of Zurich, using eye tracking, found that 66% of their participants looked at the nutrition label on the front of cereal packets, and those packets with a simple design were more successful in drawing participants' attention to the nutrition label⁵. They also found that those participants with a particular 'health motivation' spent more time viewing the nutritional information than those with a 'taste motivation'. Dan Graham and Robert Jeffrey from the University of Minnesota monitored participants viewing food items on a computer and found that calorie information was the most salient feature (71% of participants looked at this), with 61% looking at fat content and 40% at carbohydrate content⁶.

So the argument goes, carbon-footprint information could (and should) have a similar effect. Indeed, a piece in *The Economist* in June 2011 reported encouraging signs of progress: "In Britain, a pioneer in carbon labelling, nine out of ten households bought products with carbon labels last year ... and total sales of such products exceeded £2 billion." But what is interesting about the quote is that the

missing words are 'albeit mostly unwittingly'.

However, my research group discovered that carbon-footprint information was not like GDA nutritional information when we first eye-tracked people looking at images of various products with carbon labels back in 2010 (ref. 7). There is a lot of competing information on these products (Table 1). But is carbon-footprint information sufficiently salient to consumers that they actually selectively attend to this — compared with everything else — within an appropriate timeframe (estimated at between five and seven seconds for supermarket shopping)?

We showed simultaneous front and back views of each product on a computer screen and analysed point of gaze on a 40-millisecond frame-by-frame basis, for 10 seconds. We analysed level of fixation in the first and second five-second interval, and also the first fixation period of 200 milliseconds. What we found was that the pattern of visual attention varied considerably depending on the product type. In the case of the clearly 'green' low-energy light bulb, our participants looked at the carbon footprint (icon plus accompanying carbon-footprint information) for a significant proportion of the time (mean of 65.4 frames across both right-left rotated views, or 26.1% of total time). In the case

of orange juice, they looked at the carbon footprint for a mean of 24.9 frames (or 10.0% of total time), dipping to 5.7% for one stimulus view. In the case of 'non-bio' detergent (Fig. 1) [Au: figure citation OK here? where can Fig. 2 be cited?], the means were 8.2 frames and 3.3% of the time. In the case of the light bulb, attention was directed within the first five seconds at the carbon-footprint icon, but attention only moved to the accompanying carbon-footprint text in the second period. It took much longer for participants to attend to the carbon-footprint icon in the case of the orange juice (only really appearing in the second five-second interval, with the fixation level increasing by a factor of three, which may be too slow for normal supermarket shopping). In the case of the detergent, there was minimal visual attention to any aspect of the carbon footprint. Importantly, in less than 7% of all cases did the participants fixate first on either the carbon-footprint icon or the accompanying carbon-footprint information. And, these results may (if anything) have over-estimated attention *in situ* because we simultaneously presented front and back views of the products. In supermarkets customers would have had to turn the products round (GDA information is, of course, represented on the front of most products).

Could carbon-footprint information ever have had the impact that GDA nutritional information does have? The answer is probably not. First, this is because nutritional information, such as calories and fat content, has a certain emotional significance for us. Ask anyone who has been on a diet how they feel when they have just eaten something with a large number of calories and you will get an emotional response. Watch them approach a high-calorie 'treat'. The neuropsychologist, Antonio Damasio, from the University of Southern California, has shown that in choice experiments "non-conscious biases guide behaviour before conscious knowledge does. Without the help of such biases overt knowledge may be insufficient to ensure advantageous behaviour."⁸ Damasio found that activation of the emotional system precedes activation of any conceptual system with the neural connection between the two systems located in the ventromedial prefrontal cortex.

It is, at the present time, very unlikely that carbon-footprint information would produce the same kind of emotional response that information about calories and fat content does. Calories and fat content mean something emotionally because we know what they do to the human body — our body. We know how many hours of

walking or running we need to do to burn off a bag of crisps or a chocolate Easter egg. But carbon-footprint information is much more abstract, much less personal and, hence, much less emotional. The information might be 'interesting' but it does not engage us in quite the same way. Of course, with shopping, time is often of the essence so we need to be engaged immediately; emotional responses are good for immediate responding.

But there are also other issues that may have affected the psychological impact of carbon labels. Carbon-footprint information is represented on the back of products, which may act as an implicit signal that this information is less important anyway than GDA information. And then there is 'how' the information is represented with the black footprint of the Carbon Trust and a lot of apparently technical information that requires time to interpret. We may actually do the calculations for calories and fat content for the chocolate egg from the GDA information (from kcal figures per 100 g), but this information has to be important to us in the first place to go to this kind of trouble.

So is carbon labelling doomed for all time as a way of guiding consumer choice? Not necessarily. But, in my view, it requires more of an understanding of how the human brain works. The Nobel Laureate Daniel Kahneman of Princeton University recently wrote eloquently about the two great systems that make up the operation of the human mind⁹. System 1 is the system that, for example, analyses automatically and spontaneously the emotion in a face and anticipates what the person might do next as a result of their emotional state. Kahneman describes our reaction to the picture of an angry woman: "You did not intend to assess her mood or to anticipate what she might do, and your reaction to the picture did not have the feel of something you did. It just happened to you. It was an instance of fast thinking." System 1 operates automatically and quickly with no sense of conscious control or influence, and is often guided by our emotional response. System 2 is our conscious system, which allocates attention to mental activities that require some thought and is "often associated with the subjective experience of agency, choice and concentration". We may think of ourselves as rational, logical creatures, with a firm foundation in the operations and processes of System 2, ready to process carbon-footprint information when available, but in many aspects of life, including our decisions in front of the sweet counter, System 1 takes

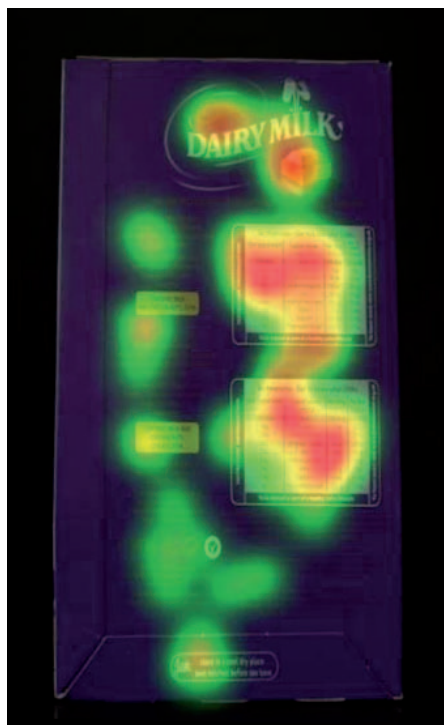


Figure 2 | Sample fixation hotspots on the back of a Dairy Milk Easter egg.

over and guides us to particular outcomes.

So how could we make carbon labelling actually work? We need to make carbon labels more psychologically salient and make sure that they impact on both the automatic and more rational systems. Given that the System 1 is non-reflective, unconscious, fast and automatic, we may well have to consider other symbolic representations for carbon-footprint information that can more effectively impact on this implicit system, such as colour-coded traffic signals with red symbolizing 'high carbon footprint' or 'danger', automatically producing more right frontal cortical activation in the brain and, therefore, a more immediate response¹⁰. We may want to put carbon-footprint information on the front of products, again sending a powerful implicit message that this really matters. We may want to persuade people that everyday shopping needs more care, thought and attention, so that people have the opportunity to make different kinds of decisions, and so that System 2 can take over¹¹. We could help motivated individuals use implementation intentions, which are simple 'if ... then' [Au: can you clarify what you mean by this?] plans to break their habits and guide their consumer choice¹². Individuals could be shown how to mentally plan their behaviour as consumers in

response to specific contextual cues ('if I see a high-carbon-footprint product, then I will look for an alternative'; 'if I am looking for fruit then I will look for local, seasonal fruit') to break habitual System 1 responses. We can also, in time, induce changes to System 1. This has been demonstrated in a number of domains including automatic responses to people from different racial or ethnic groups¹³. Here, Michael Olson and Russell Fazio from Ohio State University used 'implicit evaluative conditioning' (a form of classical conditioning involving the pairing of images of people from different races with evaluative words) to reduce automatically activated responses to people from different races, but, of course, it would take time (and effort) to induce different implicit and emotional responses to high-/low-carbon items through, presumably, a mixture of marketing, advertising and education. We need adverts promoting low-carbon products as 'good' for the environment, but they need to be emotionally positive and sexy as well (and you, dear consumer, can be part of this great new club), to combat years of promotion of high-status, prestige cars ('show that you've arrived'), sexy air travel and exotic food from all round the world.

One day we may well respond to high-carbon products in the same personal and emotional way that we respond to high-calorie or high-fat foods. Let's just hope that we have the time for that day to finally come. □

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