Final author draft only. The copyedited article may differ from this manuscript version. The details of the article are as follows:
Beattie, G. & McGuire, L. (2016). Consumption and climate change. Why we say one thing but do another in the face of our greatest threat. *Semiotica*.

Consumption and climate change. Why we say one thing but do another in the face of our greatest threat.

Abstract

There is clear evidence that human beings have contributed to climate change through their patterns of consumption, and since we are part of the problem then we must be part of the solution. People say that they are prepared to adapt their behaviour to ameliorate the effects of climate change, but numerous studies have found that little behaviour change actually occurs. This experimental study investigates this issue, by focussing on explicit (self report) attitudes, and implicit (automatic) attitudes to various consumer brands with differing environmental consequences in a behavioural choice task. We found firstly, in line with previous research, that human beings have reflective attitudes and more unconscious and automatic attitudes that are 'dissociated'. In terms of consumer choice of brands, we found that consumers were particularly sensitive to both big brand information and value in their selection of products, particularly under time pressure. Organic/eco brands were, however, much less favoured, especially under any further time pressure, where processes that are more automatic are evident. Carbon footprint information

influenced choice even under time pressure but only in those consumers with a strong positive implicit attitude to carbon footprint. Human beings may well have a 'divided self' (reflective versus unconscious attitudes) when it comes to the environment/climate change, and this underlying dissociation might be critical to their behaviour as consumers. This concept may help us understand why relatively little has changed thus far with regard to more sustainable consumption, but might open up new thinking about how we might attempt to promote change in the future.

Introduction

Climate change represents the greatest threat we, as a species, have faced. The scientific evidence for the existence of climate change and its likely effects on life itself is overwhelming; indeed, despite what critics like the Global Warming Policy Foundation say, it is rare to see such a scientific consensus on anything (see IPCC, 2014). According to the Stern Review, which reported a decade or so ago: 'Climate change threatens the basic elements of life for people around the world.' Stern's review continued: 'A rise in global temperature will have: severe and widespread impacts, major risks to global food production, *and* more extreme fluctuations in weather, including droughts, flooding and storms.' However, Stern (2006) also made another critical point - 'Human activities are a major driver of this rapid change in our

climate…particularly patterns of consumption and energy use, driven by consumer demand for higher standards of living.' In other words, we as consumers are playing a major role in the creation of this problem. One argument is that if we are part of the problem, then we must be part of the solution. This point has not been lost on agencies like the United Nations, selected governments around the world and many leading multinationals, indeed the very same multinationals that have made it their mission to promote and then satisfy this increasing consumer demand.

Take Unilever, for example, one of the top ten global companies in terms of both turnover and reach. This company reports an annual turnover of around £40 billion with its products sold in 190 countries across the globe (Unilever Sustainable Living Plan, 2013). It proudly boasts that 2 billion times a day, a consumer somewhere on the globe uses one of their products. The Key Performance Indicators (KPI) of this enormous company are, not surprisingly, primarily financial – they are currently aiming for 5% growth with fewer, bigger innovations. They aim to win a higher proportion of market share, and want to build their brands and win consumer preference. They are choosing to focus on premium products with higher margins. However, they recognize the essential dilemma that they (and we) are all facing. In their 'Sustainable Living Plan', they say that 'We are living in a world where temperatures are rising; water is scarce, energy expensive, food supplies uncertain and the gap between

rich and poor increasing.' (Unilever Sustainable Living Plane, 2013, p. 1.) Their conclusion is that **'**Business must be part of the solution. Sustainable, equitable growth is the only acceptable business model' and that 'in order to live within the natural limits of the planet we will have to decouple growth from environmental impact'. Therefore, they have another KPI, which is not about finance, but about the environment. As a company, they aim to 'halve the greenhouse gas impact of our products across the lifecycle by 2020.' (2013, p.16) In pursuit of this goal, they have reduced greenhouse gas emissions from their manufacturing chain and reduced deforestation. They have opted for more environmentally friendly sourcing of raw materials. They have doubled their use of renewable energy and produced concentrated liquids and powders. They have reduced greenhouse gas emissions from transport and reduced greenhouse gas emissions from refrigeration. They have also reduced employee travel. So what effect did these various initiatives have on their environmental impact? Their report concludes: 'Our greenhouse gas footprint impact per consumer has ….***increased*** by around 5% since 2010.' (2013, p.16) They then attempt to explain what has gone wrong. 'We have made good progress in those areas under our control but…the big challenges are those areas not under our direct control like…..***consumer behaviour.'***

It would seem that the problem essentially is us, as consumers, and how we behave. It is what we do with these good environmental products (in terms of

our patterns of usage and our generation of waste, our fondness for refrigeration, the length of the showers we choose to take, our use of energy etc.) and why we choose the environmentally unfriendly alternatives in the first place. So why might this be?

There is, of course, a multiplicity of possible reasons. The effects of climate change are (unfortunately from some points of view) less personal than other looming disasters, and will primarily affect future generations (Hansen et al, 2013). Climate change cannot be reversed immediately and we know that *delayed* contingent reinforcement and punishment is highly problematic for behaviour change (see Skinner, 1938). Climate change also requires a 'global response', but because it is a global issue (Walker and King, 2008), involving many different countries, we can expect a diffusion of responsibility, and social loafing, leaving it to others. It also seems that quite simple experiences can occasion quite significant shifts of responsibility at the level of the individual (Beattie, McGuire and Sale, 2010). For example, when experimental participants in the U.K. watched sections of Al Gore's film 'An Inconvenient Truth' highlighting China's industrialization and its dirty power stations, then they were significantly more likely to agree to statements like 'It is the responsibility of other countries, not the U.K., to reduce climate change' and 'Climate change is a problem to be solved by future generations.' This all happened because they had been briefly reminded of China's huge coal reserves

and its use of old technology in coal-burning technology (see also Beattie, 2010, p.221; Beattie, 2011). Uncertainty about the time course of climate change undoubtedly also play an important role with powerful lobbies behind this uncertainty (according to the BBC, the US fossil fuel giants, the Koch Brothers, are spending $900 million on advertising to put their case), rather similar to the uncertainty about the relationship between smoking and lung cancer generated by the tobacco industry in the nineteen fifties, sixties and seventies (Conway and Oreskes, 2010).

Then again, climate change is complicated; it requires an understanding of basic physics (or perhaps more than basic physics) to understand the mechanisms underpinning it (without very high degrees of simplification), the public even find some of the proposed solutions far too complicated in terms of the basic physics involved. Take, carbon labeling, for example, which is the practice of communicating the greenhouse gas (GHQ) emissions associated with the life cycle of a product or service. This process of enhancing product information to promote more sustainable consumption has been stressed in a variety of top-level policy reports (see Upham, Dendler and Bleda, 2011). These include UN Agenda 21 United Nations (1992), the EU Sustainable Consumption and Production Action Plan (Commission of the European Communities, 2008) the UK Sustainable Development Report (Government, 2005), and the United States Environmental Protection Agency 1998).

However, Upham et al (2011) tested the public's reaction to carbon labeling in a series of focus groups and found that they had genuine difficulty in understanding how a gas (or gases) could even be expressed in terms of its mass (260g of carbon etc.), which, of course, is the essence of carbon labeling . They also had severe difficulty in linking an emissions figure to its environmental impact.

Then there is the emotional valence of 'global warming' (Beattie, 2010), which sounds almost benign and, at the opposite extreme, with climate change we probably have something, which is too catastrophic to contemplate. Therefore, in order to maintain some degree of psychological stability and to remain relatively optimistic about the future, we avoid contemplating climate change whenever possible (Ehrenreich, 2009). We may even subconsciously avoid seeing images connected with climate change as we do with other sorts of negative images (Isaacowitz 2006, 2007; Beattie and McGuire, 2012).

Thus, for a myriad of reasons, it is clearly going to be difficult to get the public to change their behaviour in the light of this particular threat. However, some have maintained a degree of optimism despite all of this, and they have argued that it may be difficult to promote major behavioral change, but not impossible. These proponents of behaviour change suggest that in order to do this successfully we have to 'read' people better and to design better initiatives, which build on underlying psychological insights. The first step, they say, is to

'read the mind' of the consumer (although they may not use these exact words) in order to ascertain which sections of society (or indeed all of it) are ready for change. In order to do this, they say we must access the underlying attitudes of the public to climate change and sustainable living. An attitude is classically defined as 'a mental and neural state of readiness organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related' (Allport, 1935, p.810). This mind reading might seem to be very difficult, but an extraordinary number of influential people and organizations think it is possible, and even relatively easy (you just have to ask the public to report their attitudes in carefully constructed surveys).

Take, for example, the arguments of Leahy (2007), the then CEO of Tesco (the multinational supermarket chain), when he announced a call to arms to tackle the problem of climate change. His message was simple. He said that 'The green movement must become a mass movement in green consumption.' In order to achieve this goal Leahy argued that '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. In other words, he was arguing, from a marketing and business point of view, that we must make green choices affordable and give the consumer the right information in the supermarket itself

to make informed decisions to produce a 'revolutionary' change in our patterns of consumption. He argued that 'Customers want to do more in the fight against climate change if only we can make it easier and more affordable', and pointed to numerous market research surveys, which seemed to support his conclusion. Various surveys reported that '70% of people agree that if there is no change in the world, we will soon experience a major environmental crisis' and '78% of people say that they are prepared to change their behaviour to help limit climate change (Downing and Ballantyne, 2007). These sorts of findings are very consistent. Thus, the British Social Attitudes survey (2012) revealed that 76% of people 'believe climate change is happening and that humans are, at least partly, responsible.' More recently, the Department of Energy and Climate Change (2015) in the U.K. found that 66% of people 'reported feeling very or fairly concerned about climate change' based on a survey using 1,981 face-to-face home interviews.

So Leahy was basing his planned initiative, which was the carbon labeling of Tesco products, on the reading of consumer minds ('they were prepared to change their behaviour' etc.). Similarly, the UK government, in the guise of Department of Environment, Food and Rural Affairs (DEFRA), started from the very good assumption that 'Policy action needs to be rooted in understanding and awareness of consumer behaviour' (2008, p. 22). They argued that we must focus on people's ability to act and people's willingness to act, and then they

too engaged in mind reading. 'Many people are willing to do more to limit their environmental impact, they have a much lower level of understanding about what they can do and what would make a difference' (2008, p.28). Having read the mind of the consumer, and assessed the 'mental and neural state of readiness' in Allport's words (identifying 'a positive underlying attitude to the environment' in this case), they then carried out various segmentation analyses. These analyses were used to segment the population into identifiable groups with different socio-economic profiles, consumer habits and patterns of media consumption, and various campaigns were then planned aimed at each of the segments. However, few of these social marketing campaigns had the intended outcomes (see Corner and Randall, 2011).

So why might this be? We would like to suggest a very simple hypothesis: we would argue that it is more difficult than it might appear to read the minds of consumers because consumers do not have a mind; they have two. There is mounting evidence that people have two distinct cognitive systems each with its own properties and mode of operation, with one of these systems not open to introspection (Kahneman, 2011). Kahneman calls these systems – System 1 (the fast, automatic and largely unconscious system) and System 2 (the slower, more deliberate and reflective, conscious system). This could be the reason why many initiatives aimed at behavioral adaptation to climate change

(and very expensive campaigns at that in terms of both time and money) have failed. They have made the wrong basic assumption about human beings.

This hypothesis could help explain a number of things. Consider first one of the core problems in the attitude-behaviour literature. Why do people report positive attitudes about the environment, but then do very little to ameliorate the effects of their own lifestyle on the environment – the so-called 'value-action' gap? This 'value-action' gap occurs emerges repeatedly in the research literature in the area of consumption and elsewhere in a range of countries. For example, Aertsens et al. (2009) noted: 'While most consumers hold positive attitudes towards organic food (Magnusson et al, 2001, Saba and Messina, 2003, Kihlberg and Risvik, 2007), the proportion of consumers purchasing organic food on a regular basis remains low, with market shares of organic products in European countries, varying from below one percent in some Southern, Central and Eastern European countries to over 5% (Sahota, 2009; Padel et al, 2009)' (Aertsens et al, 2009, p. 1140). Similarly the Swedish researchers Roos and Tjarnemo (2011) wrote 'While a large proportion of the population has positive attitudes towards caring for the environment, these positive attitudes are not always translated into actual behaviour. Sales of organic food products are low' (2011, p.983). Vermeir and Verbeke (2006) say that 'initiatives like sustainable organic food, product free from child labor, legally logged wood, and far-trade products often have market shares of less

than 1% (MacGillivray, 2000). This is at least partly due to the attitude-behaviour gap: attitudes alone are often a poor predictor of behavioural intention or market place behaviour (Kraus, 1995; Ajzen, 2001).

There are clearly different ways of attempting to resolve this 'value-action' gap. You could assume that you have a good measure of underlying attitude but what you need to do is to add other psychological components into the model, like subjective norms (beliefs about how others will behave) and perceived behavioural control (whether you think that your behaviour will make a difference) in an attempt to boost its predictive power (Ajzen and Fishbein, 1980; Ajzen, 1985, 1991). Alternatively, you can consider other economic, marketing or commercial features of products (like price, quality, convenience, and brand familiarity, see Vermeir and Verbeke, 2006, p. 171) that may impact on consumer choice and factor those into the model in an interactive way.

However, there is, of course, another possibility, which is that perhaps we have been measuring attitudes incorrectly in the first place, or the wrong sort of attitudes. Indeed one might question whether our 'mental and neural state of readiness' is open to introspection, and whether we could ever hope to report it accurately in surveys. Allport himself seemed to show some awareness of this in his classic 1935 volume. He wrote 'The meagreness with which attitudes are represented in consciousness resulted in a tendency to regard them as manifestations of brain activity or of the unconscious mind. The persistence of

attitudes which are totally unconscious was demonstrated by Muller and Pilzecker (1900)' (Allport 1935, p.801). He clearly did not rule out the concept of the unconscious attitude but chose to focus exclusively on the measurement of attitudes with self-report questionnaires. One of the authors has argued elsewhere (Beattie, 2013) that his reasons for this particular focus were both academic and highly personal. Academically, he had been clearly impressed by Likert's early research on the measurement of racial attitudes using objective self-reports (the observable data that the new science of psychology craved). However, at a more personal level, it is clear from his autobiography that he was appalled by Freud's attempt to psychoanalyze him on his visit to Vienna in 1920. Allport told Freud a story about a boy on the tram he had just observed who was obsessed with dirt: Freud with his 'kindly therapeutic eyes' then asked Allport whether he was the little boy in the story. Allport later argued that 'psychoanalytic excess' (what Freud in his view was culpable of that afternoon in Vienna) must be avoided at all costs and that we should not delve too deeply into the human psyche without first considering more manifest motives. Allport's legacy, both academic and personal, then defined attitude measurement in psychology, and related disciplines, for many decades to come.

But interest in 'the meagreness with which attitudes are represented in consciousness', in other words 'implicit cognition' and 'implicit attitudes', has been growing in the past few years, and this could lead us to think very

differently about the 'value-action' gap. This research might one day tell us that the 'value-action' gap does not actually exist because we have been measuring and factoring in the wrong measure of 'value' in the first place. In an international bestseller, the Nobel laureate and behavioural economist Daniel Kahneman (2011) has made a very convincing case for the central role of these implicit and automatic processes in everyday life. Take a very simple example, imagine looking at an angry face – as quickly as you recognise the gender of the person or the colour of the person's hair, you have decoded the facial expression. This is System 1 thinking – it is automatic, unconscious and fast. A multiplication task, on the other hand, is much slower and more deliberate; it requires effort and is conscious. This is 'System 2' thinking in Kahneman's terminology. In everyday life, System 1 is always active, dealing with many of the routine aspects of everyday life. Kahneman characterises System 1 as a 'workaholic' and System 2 as sometimes a bit lazy ('harsh…but not unfair', according to Kahneman, 2011, p.46). System 1 often jumps rapidly to conclusions, but System 2 does not always check the validity of the conclusions, even when it would be relatively easy to do so. The two systems work on different principles, System 1 works on the principle of associative activation – 'ideas that have been evoked trigger many other ideas, in a spreading cascade of activity in your brain. The essential feature of this complex set of mental events is its coherence. Each element is connected, and each supports and strengthens

the others' (Kahneman, 2011, p.51). System 2 uses more propositional and logical reasoning.

Kahneman uses the example of 'bananas - vomit' to show how System 1 works in terms of spreading activation. Our minds automatically assume a causal connection between the two words, producing within us an emotional response, and changing the state of our memory so that we are now more likely to recognise and respond to objects and concepts associated with sickness and nausea. We are, for example, more likely to complete the frame 's-ck' as 'sick' rather than as 'sock' or 'suck', having been unconsciously primed with the paired concepts of 'bananas' and 'vomit', all because of this associative 'machine' underpinning System 1 thinking. Kahneman argues that as human beings we do not necessarily understand the causes and operations of our own cognitions and behaviour because of this fundamental division in our cognitive processes. 'When we think of ourselves, we identify with System 2, the conscious, reasoning self that has beliefs, makes choices, and decides what to think about and what to do. Although System 2 believes itself to be where the action is, the automatic System 1…is effortlessly originating impressions and feelings that are the main sources of the explicit beliefs and deliberate choices of System 2' (2011, p.21).

Greenwald (1990) has considered the accumulated effects of all of this associative activation for attitudes, our 'mental and neural state of readiness',

and argued that we may well have implicit attitudes formed on such basic processes that are not available to introspection and are indeed unconscious. We may believe that we have a positive attitude to bananas because we think that they are healthy and nutritious, but our associative experiences may provide us with a very different implicit attitude to them (and Seligman, 1970, famously demonstrated that you only need a small number of negative experiences to make this happen). The problem with this theorising about implicit attitudes was that we had no way to access implicit attitudes or measure them reliably, until Greenwald developed a reaction time based task to measure associative connections called the Implicit Association Test or IAT (Greenwald, McGhee and Schwartz, 1998). The basic premise is that when participants categorise items into two sets of paired concepts, then if the paired concepts are strongly associated, participants should be able to categorise the items faster, and with fewer errors, than if they are not strongly associated.

In some domains, consciously reported explicit attitudes and implicit attitudes measured through speed of association are correlated (although the size of the correlation does vary), but in many other domains, there seems to be little or no correlation between the two measures and this has led Greenwald and Nosek (2008) to suggest that explicit and implicit attitudes can be 'dissociated'. When it comes to climate change, there appears to be no significant correlation between implicit and explicit measures, this time in terms of attitude to carbon

footprint (Beattie and Sale, 2009). Some argue that this is not that surprising and that explicit and implicit attitudes reflect the two very different information-processing systems described by Kahneman and others with different processes of acquisition. Implicit attitudes are based on a slow-learning associative system whereas explicit attitudes are based on a fast learning system, which uses higher-level logic and symbolic representations (Sloman, 1996). Rydell et al. (2006) have also shown that you can change implicit and explicit attitudes with different sorts of information. Consciously accessible verbal information about a target changes the explicit attitude towards that target, whereas subliminally presented primes, 'reflecting the progressive accretion of attitude object-evaluation pairings', changes the implicit attitude towards them. You can even change implicit and explicit attitudes in opposite directions by using associative information below the level of conscious awareness to change implicit attitudes, and consciously processed verbal material (in opposition to this) to change explicit attitudes.

So what are the possible implications of this 'divided self', of not having one but two underlying types of attitude, for behaviour in general, and more specifically for consumer behaviour in the context of the threat of climate change? Both types of attitude can be relevant for behaviour, but under different sets of circumstances and this is what the empirical research seems to suggest. Self-report attitudes may predict behaviour under certain situations,

especially when people have the *motivation* and the *opportunity* to deliberate before making a behavioural choice, (Fazio, Jackson, Dunton and Williams 1995), but they are less good at predicting spontaneous behaviour under time pressure (Freise, Wanke and Plessner 2006; Beattie, 2010, Beattie and Sale 2011), or when consumers are under any sort of cognitive or emotional load, (Gibson 2008; Hoffman, Rauch and Gawronski 2007). Unfortunately, time pressure, cognitive load and the absence of any opportunity to deliberate, characterises much of everyday supermarket shopping (Beattie and Sale, 2011). Supermarket shopping is rarely found to be a slow, deliberate, reflective process, the shopper passes about 300 brands per minute (Rundh 2007) and each individual choice is often quick and automatic (Zeithaml 2008). In such contexts, unconsciously held *implicit* attitudes might be a better predictor of actual consumer behaviour than explicit attitudes, where an implicit attitude is defined as 'the introspectively unidentified…trace of past experience that mediates ***R'*** [where ***R*** is the response – the favourable or unfavourable feeling, thought, or action towards the social object] (Greenwald and Banaji 1995: 5). In other words, habitual consumer behaviour without much opportunity or motivation to deliberate might be driven by processes not open to introspection and therefore not picked up by self-report measures. They require a different sort of measure. In the words of Greenwald and Banaji (1995: 5)

'Investigations of implicit cognition require indirect measures, which neither

inform the subject of what is being assessed nor request self-report concerning it'.

The concept of implicit attitude gives us a different way of thinking about the motivational basis for human action and could be a critical element in the fight against climate change. Implicit, rather than explicit attitudes may well be underpinning everyday habitual consumer behaviours. Such behaviours may be 'sticky', in sociological jargon (Downing and Ballantyne, 2007) because attempts to change attitudes and behaviour just focus on certain types of message, ignoring the associative networks of the implicit system. Recently, we have been investigating how implicit attitudes relate to how we process information relevant to climate change, assuming that the processing of relevant information is the start point of the whole process of behavioural change (Blair et al, 2009). There are many persuasive messages available about climate change, but what happens if people do not seem these sorts of messages? (Beattie et al, 2011) In one study we attempted to determine how eye movements towards or away from iconic images of environmental damage and climate change are affected by explicit versus implicit attitudes. We did this by projecting slides onto a computer screen, each slide containing three images, one positive image of nature, one negative image of climate change and environmental damage, and one neutral image (things like pictures of cups, plates and other everyday objects). We found that people do not focus

inordinately on the negative images of environmental damage when there are other positive images and neutral images available. They usually look less than 40% of the time at the negative images. However, very importantly those with strong positive implicit attitudes to carbon footprint were significantly more likely to focus on the negative images of environmental damage and climate change than the positive images. We also found that this even occurs in the first 200 milliseconds of viewing the slide. Those with a positive implicit attitude to low carbon footprint products looked more at the negative images of climate change and environmental damage in the first 200msecs compared with those with less strong positive implicit attitudes to low carbon footprint products. Measures of explicit attitude did not, however, predict patterns of eye movement towards the negative images in this way. It would seem that those who have strong implicit pro-low carbon attitudes are primed to attend to these sorts of images, whereas those with strong explicit attitudes are not (they actually look less.

More recently, Beattie and McGuire (2015) considered the relationship between explicit and implicit attitudes and visual fixation of carbon labels on products. They found that there was no significant relationship between how positive the explicit attitude to carbon footprint was and the overall amount of attention devoted to the carbon label and no effect was found either with our measure of implicit attitude. However, there was a significant statistical

association between our measure of *implicit* attitude and the target of the first fixation. Those individuals with the most positive implicit attitude were more likely to fixate first on the carbon footprint information (rather than 'energy' or 'price') compared with those with a more negative implicit attitude. Those with the most positive implicit attitude had a mean of 7.0 first fixations on carbon footprint whereas those with the least positive implicit attitude had a mean of 4.5 first fixations on carbon footprint. This association did not, however, occur with explicit attitude. Those with the most positive explicit scores had a mean of 5.3 first fixations on carbon footprint whereas those with more negative explicit attitudes had a mean of 6.5 first fixations on carbon footprint. This difference was both in the wrong direction and non-significant. So again we find evidence that measures of implicit attitude, but not measures of explicit attitude, predict patterns of unconscious eye movements.

Of course, these studies are about visual attention rather than choice but it is the actual behavioural choices that people make rather than merely what people notice that is the critical issue when it comes to climate change. However, one domain where we have explored actual choice is that of racial bias in recruitment. In this research, we showed that, although the vast majority of people report having no preferences either way in terms of race or ethnicity (essentially 'neutral' attitudes), when implicit bias is measured through the IAT, focussing on the associative connections between the target categories

(Black/White) and the attribute categories (good/bad), the majority of our sample had an implicit pro-White bias. Our White participants, it seems, had a *strong* pro-White bias. Furthermore, implicit bias measured in the IAT predicted shortlisting decisions in an (experimental) job selection task in a way that explicitly reported attitude did not. The fact that the vacancies in this experimental task were all from that most liberal of institutions, a university (the positions being both academic and administrative), make the results even more striking (See Beattie, 2013; Beattie, Cohen and McGuire, 2013; Beattie and Johnson, 2012).

This research opens up the possibility that we may have implicit attitudes at odds with what we report (and indeed at odds with how we think about ourselves), which can nevertheless influence our everyday decisions. So the question remains, to what extent do these implicit attitudes predict consumer choice (given the importance of consumption to climate change)? In a very simple study, Beattie and Sale (2011) had found that when participants were asked to select either a high carbon or low carbon goody bag at the end of an experiment measuring attitudes, those with a strong pro-low carbon implicit attitude were more likely to select the low carbon goody bag, but only under time pressure. Very similar results had been reported by Friese, Wanke and Plessner (2006) who also found that implicit attitude predicted the choice of a gift (a 'generic' gift versus a 'branded' gift) for taking part in the experiment, but again only under time pressure. These results are interesting, but of course,

tell us very little about how people will behave in a real consumer choice situation for a number of reasons. Firstly, in terms of what might be called broad ecological considerations, consumer products are characterised by a number of different dimensions (brand, value, taste, health features, environmental implications etc.), all operating simultaneously, which could impact on consumer choice at both the associative and more rational levels. Advertising is used to build brands (be they well-known brands, luxury brands, organic or eco brands, or value brands) in an associative manner (Aaker and Biel, 2013), and when it comes to consumer choice under time pressure even when System 1 might be more active, these other associations might swamp any implicit associations to do with our attitudes to carbon footprint. Secondly, in terms of experimental considerations, in both Friese et al. (2006), and Beattie and Sale (2011), the choice of the reward was left until the very end of the experiment. At this point, it might have been apparent to participants that the experiment was measuring attitudes to certain attributes of products, and might have produced some demand characteristics about what was or was not appropriate behaviour.

Of course, notwithstanding these points, both studies did suggest that time pressure is a critical variable in this domain and that implicit attitudes might be more predictive of behaviour when time is not freely available and when there is certainly little opportunity to deliberate. This may have particular relevance for consumer choice especially in supermarkets where much everyday

shopping occurs in advanced Western nations. These kinds of considerations formed the basis for the present study, where we study consumer choice of real brands as a function of both time and as a function of both implicit and explicit attitude. Our aim is to investigate what sorts of factors determines choice, and whether the 'divided self' of human beings (at least in terms of System 1 and System 2 thinking) has any relevance for our culture of consumption and our ability to adapt to face the threat of climate change. Here, we also experimentally investigate whether carbon footprint information has any effect on consumer choice. There is recent evidence from Finland that it can influence consumer choice at least on meat products (Koistinen, Pouta, Heikkila, Forsman-Hugg, Kotro, Makela and Niva, 2013). In Australia there is evidence that carbon labelling, particularly using colour-coded carbon footprints (with a green footprint denoting 'below average carbon emissions' and black denoting 'above average') can influence actual shopping behaviour, but the effects are not particularly large (high carbon decreasing by 6%; low carbon increasing by 4%), unless paired with price. But how would carbon label interact with the other information labels on products (see Gadema and Oglethorpe, 2011) and would it relate in any way to our measures of explicit or implicit attitude? Further, can we find any evidence of 'dissociation' in these attitudes towards the environment, which may help explain the relative inaction of the consumer towards climate change, and which attitudinal variables might predict a behavioural response to the various labels?

Method

Stimuli

Ten products were selected for this study. These were everyday products, which would be central to any weekly shop. The products chosen were: breakfast cereal (bran flakes), bread, cheese, coffee, fabric conditioner, ice cream, orange juice, soup, toilet roll and washing up liquid. These products have a variety of information labels on the front of the products. The number of these informational labels do vary from product to product, and depend to a certain extent on the price and brand of the product, with the more expensive products having either more information labels or more of their surface area covered by image, logo or icon. For example, the Sharpham Park Morning Multi Flakes (as sold in the U.K.) is an expensive brand of cereal (a 'luxury' brand in our jargon). It retails at £2.99 (compared with £1.38 for a supermarket's own brand, in other words more than double the price). It contains the following information:

1. Name of product ('Morning Multi Flakes').
2. Image of product.
3. Name of brand ('Sharpham Park').
4. Source of product ('British Grown Grains').
5. Health relevant information ('naturally high in fibre….').
6. Product description ('Deliciously crispy, light multigrain rice flakes…').

7. More product description (‘No wheat grains’).
8. Nutritional information.
9. Size/weight of product (‘375 grams’).

Figure 1: Sharpham Park Morning Multi Flakes.

On the other hand, the cheapest (bran flakes) breakfast cereal – the Asda ‘chosen by you’ brand (retailing at £1.38) contained the following information:

1. Name of product (‘Bran Flakes’)
2. Image of product
3. Name of brand (‘Asda Chosen by you’)
4. Health relevant information (‘Bran enriched wheat flakes, fortified with vitamins….’).

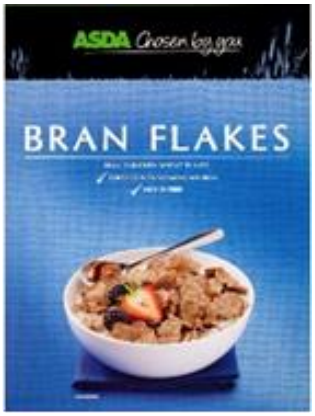

Figure 2: Asda 'chosen by you' bran flakes.

In the case of the washing up liquid, 'Town Talk Polish Co ltd' is a luxury brand that retails in the UK at £4.15, which compares with 80p for the supermarket's own brand. It contained the following information, which covered a significant surface area of the product:

1. Name of product ('Washing up liquid')
2. Name of brand ('Town Talk 1895 Polish Co ltd')
3. Image of a man with a top hat doing the dishes
4. Product description (' Superior')
5. Scent of product ('basil and lime')

Figure 3: Town Talk Polish Co ltd washing up liquid.

The cheapest washing up liquid used in this study, the 'Tesco' own brand contained the following information:

1. Product description ('Original')
2. Name of brand ('Tesco')
3. Name of product ('Washing up liquid)
4. Image of a white casserole dish surrounded by bubbles

Figure 4: Tesco' own brand washing up liquid.

For each product we selected four variations – luxury (the most expensive), well-known brand (brands like Heinz, Kelloggs, Hovis etc.), value (the cheapest alternative, invariably a supermarket's own brand) and organic/eco (identified as either 'organic' or 'eco' on the product itself). So, for example, in the case of the coffee, the luxury brand selected was 'Starbucks' the well-known brand

was ‘Lavazza’, the value brand selected was ‘Tesco’, and the organic/eco brand was ‘Café Direct’ (see Figure 5).

	Luxury	Well-known brand	Value	Organic/eco
Coffee				

Figure 5: An example of the images selected for coffee.

The price of each product was then superimposed onto the image of the product; price was always represented in white numbers on a black circular background. The positioning of the price sticker was always in the same position across the four individual products in that set. So for example, in the case of cheese, the price sticker was superimposed on the bottom left-hand corner of the product. When it came to bread, in each case the sticker was superimposed on the top right-hand corner. The prices superimposed on the images of the products were always the actual prices. The luxury brands were always the highest in price, then organic/eco, then the well-known brands followed by the value brands. All of the original details on the product remained

the same and were not altered in any way, rather information was merely added to them.

As well as the addition of price information, the carbon footprint value for each item was also superimposed onto the front of each product. Our intention for carbon footprint was to manipulate carbon footprint information in order to test experimentally its effects on consumer choice. The question is can carbon footprint information influence consumer decision making. This is a very important theoretical and practical issue for many businesses concerned about climate change. A core consideration was to vary carbon footprint in a systematic way by beginning with the actual carbon footprint of the product (derived from a variety of sources from both government and commercial databases) and then recalculating three additional values using this as the baseline in order to generate two high and two low carbon footprint values. For example, in the case of 'soup' we started with 186 grams CO_2 for a standard can of 'generic' soup. This was represented with a '186g' on a black footprint and assigned arbitrarily to the value version of the product. This figure was then halved to generate a lower carbon footprint value (93g CO_2). This was represented with a '93g' on a green carbon footprint and assigned arbitrarily to the well-known brand version of the soup. Then 10% was subtracted from this value to generate the lowest carbon footprint value. This was represented with a '83g' also on a green background. Finally, 10% was added to the starting value which generated the highest carbon footprint value (here represented by '204g'

on a black background). This was arbitrarily assigned to the organic/eco brand of the soup. In the case of the other products the high and low values were assigned arbitrarily to the different versions of the products (luxury, well-known brand, value and organic/eco) with the only constraint being that each of the ten products had to have an equal number of high and low carbon footprint labels attached (5 of each in the final tally). The images of the various products complete with the added carbon footprints and price stickers were then placed on a white background and laminated, creating a series of flash cards. There were 40 flash cards in total.

Figure 6: An example of the 'Heinz Classic Cream of Tomato Soup' with a price sticker at the bottom right corner and a low carbon footprint in the top left corner.

It is important to emphasise that these stimuli were very different to those used by Beattie and McGuire (2015). In this previous study the 'products' had only rudimentary information and did not really approximate the richness of real heavily branded and marketed consumer products. Here we have a very

different scenario in that we have used images of *real* products where the items have much more detailed information to compete with carbon footprint, which is much more typical of items found in the supermarket. The question is, in this study, would carbon footprint information (now superimposed on these products) impact significantly on the actual choice of products in competition with these other features like luxury, well-known brand, value and organic/eco?

The effects of time pressure and no time pressure on product choice was also an important aspect of the design of this experiment. Under no time pressure they were given as much time as they needed to make the selection and under time pressure they were told to choose an item as quickly as they could. The average time spent choosing a product under time pressure was 2.7 seconds (with a range from 1.2 to 5.5 seconds) as opposed to 7.3 seconds (range from 2.0 to 27.8 seconds) under no time pressure. The time spent choosing under time pressure was significantly shorter (Wilcoxon Matched-Pairs Signed-Ranks Test, $T=0$, $n=49$, $p<0.001$, 2-tailed test). It is interesting to note that under no time pressure, most choices were still made relatively quickly.

Method

Attitude measures

In order to determine participants' explicit attitudes towards high carbon footprint and low carbon footprint, participants completed a computerised Likert scale (see Figure 7) and a Feeling Thermometer (see Figure 8). Here

participants rated how ‘warm’ or ’cold’ they felt towards ‘high carbon’ and then how ‘warm’ or ‘cold’ they felt towards ‘low carbon’ where 1 = cold, 3 = neutral and 5 = warm (see Figure 8). In order to calculate a Thermometer Difference (TD) score, the high carbon footprint score is subtracted from the low carbon score. Thus, a TD scores can range from -4 to +4, with a negative TD score indicating that the participant report a preference for high carbon footprint to low carbon footprint and a positive TD score indicating that they report a preference for low carbon footprint to high carbon footprint. The more extreme the number then the stronger the preference on this measure. For example, 1 would represent a mild preference for low carbon footprint, whereas 4 represents a very strong preference for low carbon footprint.

Figure 7: A computerised version of the Likert scale measuring participants' attitudes to carbon footprint.

Figure 8: A computerised version of the Feeling Thermometer scale measuring participants' attitudes towards high and low carbon footprint products.

Implicit Association Test (IAT)

Participants were also asked to complete a 'carbon footprint' Implicit Association Test or IAT (Beattie, 2010, Beattie and Sale, 2010, Beattie and McGuire, 2012, Beattie and McGuire 2015). This particular version of the IAT is designed to test people's implicit attitudes to the target categories (high/low carbon) by measuring the associative connection between these and the attribute

categories (good/bad). Thus, participants who associate low carbon footprint products with ‘good’ and high carbon footprint products with ‘bad’ should respond slower on trials where the pairs are ‘good’/’high carbon footprint’ and ‘bad’/’low carbon footprint’ and faster on trials where the pairs are ‘good’/’low carbon footprint’ and ‘bad’/’high carbon footprint’. The converse should be true for participants who associate low carbon footprint products with bad and high carbon footprint products with good.

The operation of the test is very straightforward. Exemplars from the high/low carbon footprint or good/bad categories (e.g. images of energy efficient light bulb, pizza, local vegetables or words like ‘happy’, ‘sad’, ‘glorious’, ‘nasty’ etc.) appear in the middle of the screen. Participants have to sort these exemplars into their respective categories as quickly as possible (these categories appear at the top left- and right-hand corners of the computer screen). To sort exemplars into the left-hand category, participants press *z* (on the left-hand side of the keyboard) and to sort exemplars into the right-hand category participants press *m* (on the right-hand side of the keyboard). In blocks 1,2 and 5 participants sort into single categories (e.g. ‘high carbon’ versus ‘low carbon’ for the images of pizza etc.; ‘good’ versus bad’ for the words like ‘happy’, ‘sad’ etc.) to allow them to familiarise themselves with the task. In blocks 3 and 6 (the shorter practice blocks) and 4 and 7(longer blocks),

participants have to assign the exemplars into conjoined categories ('high carbon footprint or good' versus 'low carbon or bad' etc.).

The computerised versions of the seven trials are shown below in Figures 9 - 15. This is what the participants actually saw on the computer screen in our IAT:

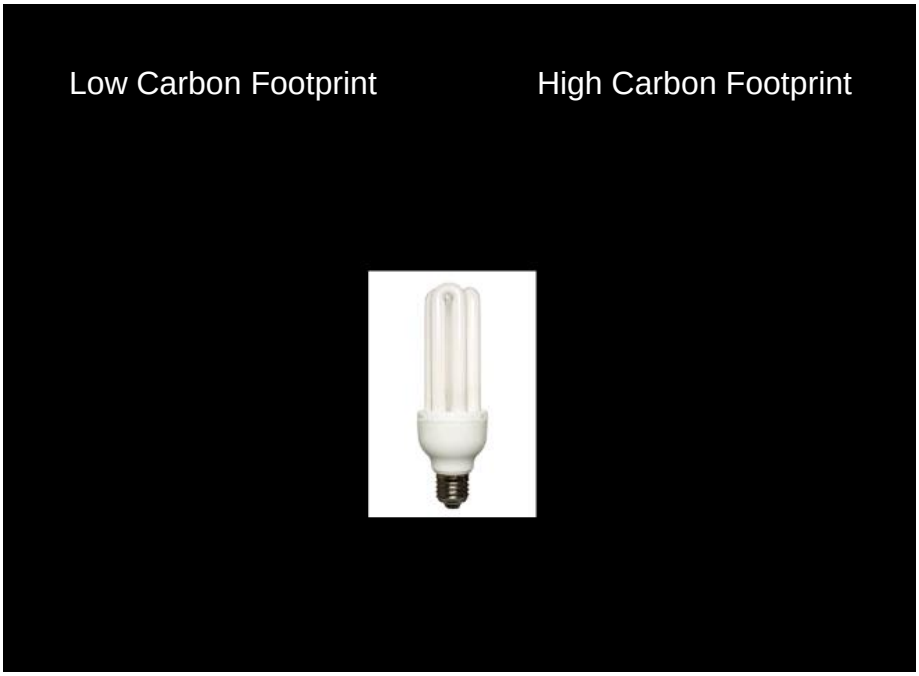

Figure 9: Block 1: low versus high carbon footprints.

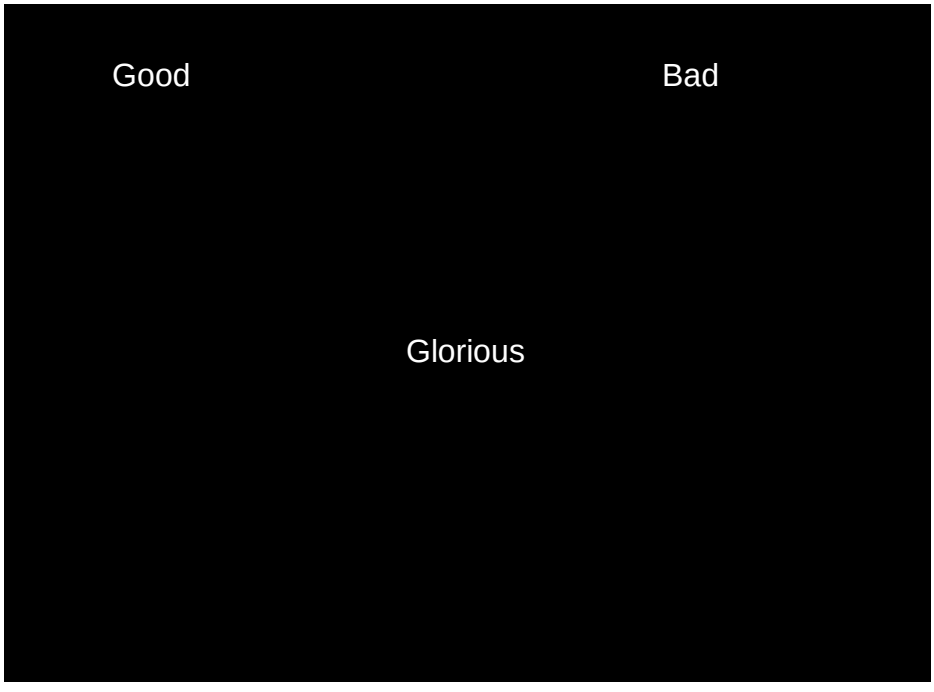

Figure 10: Block 2: good versus bad.

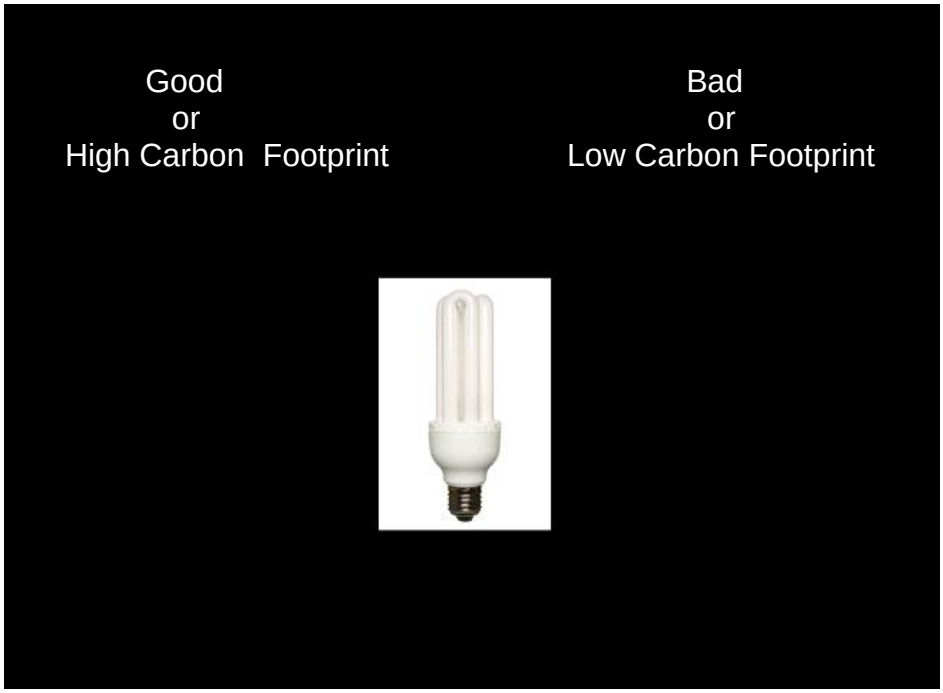

Figure 11: Block 3 - Good or high carbon footprints versus bad or low carbon footprints

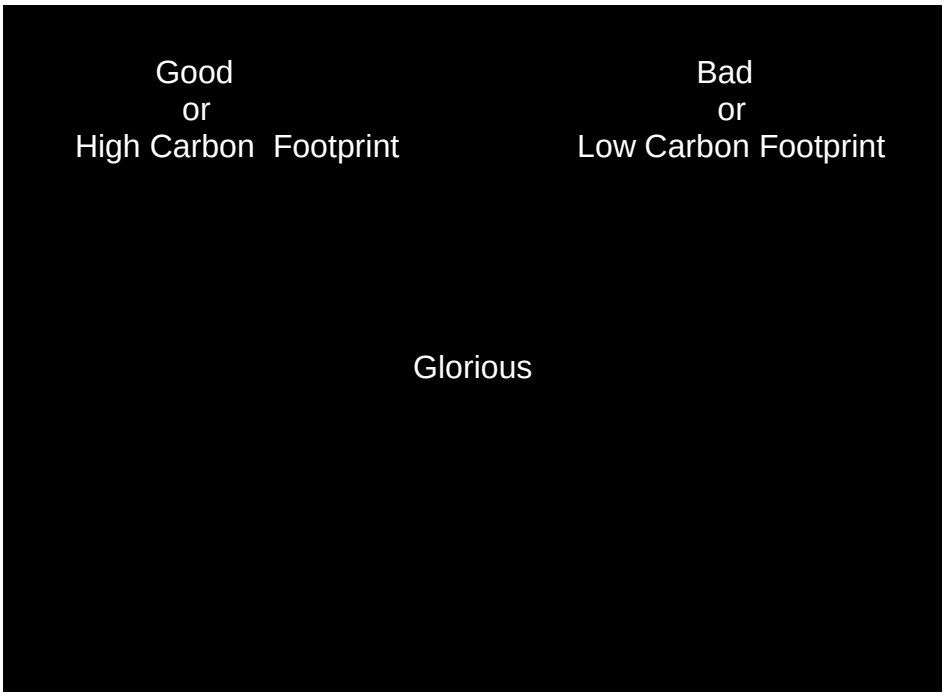

Figure 12: Block 4: Good or high carbon footprints versus bad or low carbon footprints.

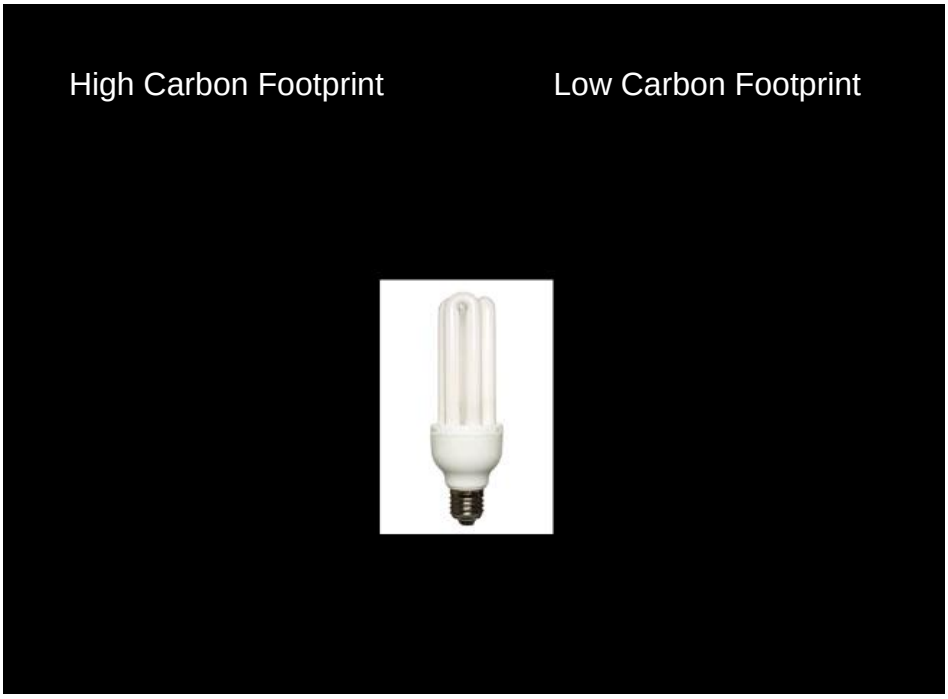

Figure 13: Block 5: high versus low carbon footprints.

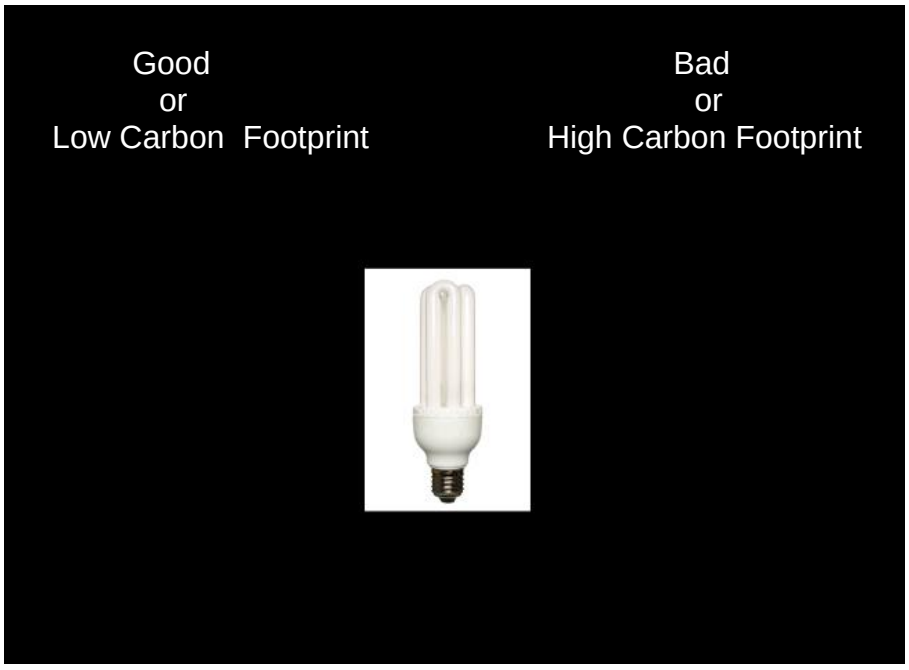

Figure 14: Block 6 - Good or low carbon footprints versus bad or high carbon footprints

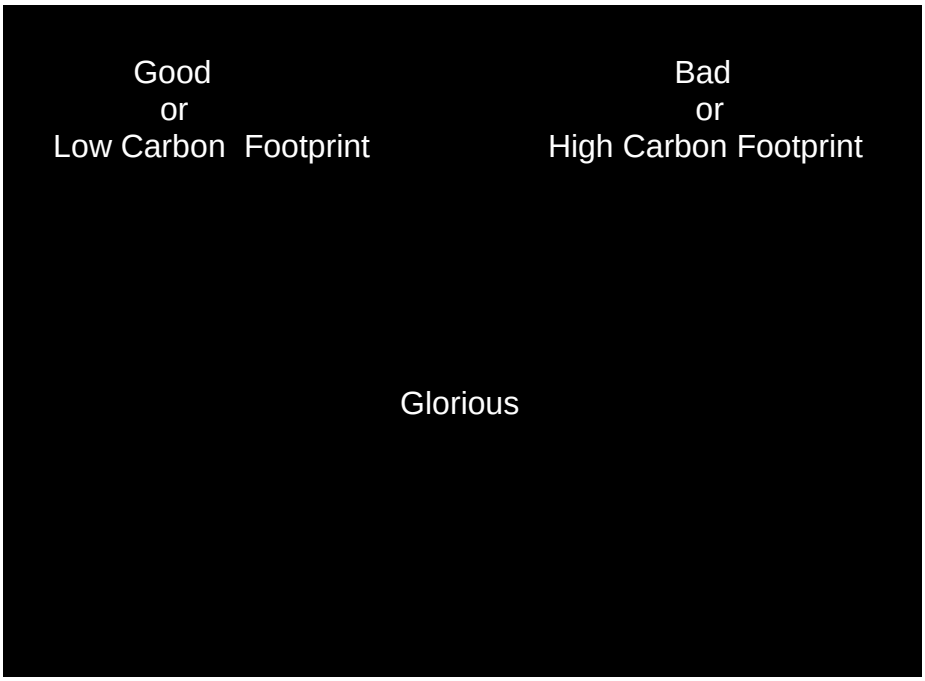

Figure 15: Block 7: Good or low carbon footprints versus bad or high carbon footprints

IAT effect scores (D scores) were computed using the revised scoring algorithm devised by Greenwald, Nosek and Banaji (2003). Using this algorithm, researchers:

1. Exclude trials where latencies are above 10,000 ms.
2. Exclude trials where over 10% of trials had latencies lower than 300 ms.
3. Calculate mean response latencies for Blocks 3 and 4, and Blocks 6 and 7.

4. Calculate the difference score for Blocks 3 and 4 and Blocks 6 and 7.

5. Divide the two difference means by their standard deviations.

6. Average the scores to compute the D score for each participant.

There was no specific time penalty for errors in this version of the IAT. If participants made a mistake then they had to press the correct key before moving on and this additional step represented the time penalty.

The D score reflects the difference in latencies during the critical trials. D score effect sizes are similar to Cohen's *d* (Cohen 1988) and usually take the form of small, medium and large values of 0.2 (slight preference), 0.5 (medium preference) and 0.8 (strong preference) respectively. Positive IAT effect scores reflect a preference for low carbon footprint products, negative effect scores reflect a preference for high carbon footprint products (D scores between - 0.2 and + 0.2 are considered neutral).

Shopping task

A total of 40 flash cards were laid out on a table. There were 10 different products (bran flakes, bread, cheese, coffee, fabric conditioner, ice cream, orange juice, soup, toilet roll and washing up liquid) with four different brand variations of each (luxury brand, well-known brand, value brand and organic/eco brand). The four different brands for each product were laid out in a row. The particular order within the row was changed for each new

participant. Each participant was asked to select a choice of items under a number of shopping conditions that included shopping alone under time pressure ('Imagine yourself shopping along in a supermarket; you are in a real hurry') and shopping alone but with no time pressure ('Imagine yourself shopping along in a supermarket you are shopping with plenty of time on your hands'). Each condition was randomised between participants to control for possible order effects. Participants had to select 10 products in total. Once they had chosen their first product, they were then asked to select the next and so on. All choices were timed on a stop-watch. The order in which they had to choose the products was randomised across both conditions. Each participant was asked to complete the shopping task for all products under one condition before moving on to the next condition.

Results

(1) Consumer choice and brand with no time pressure: descriptive statistics.

The first focus for the analysis was the relationship between brand and consumer choice under no time pressure. See Tables 1 and 2. It was immediately apparent that the brand chosen most frequently under no time pressure was the well-known brand (38.0% of all selections) followed by the value brand (32.4%) followed by the organic/eco brand with 17.0% and lastly the luxury brand at 12.6%.

Table 1: The relationship between consumer choice of brand under no time pressure.

Brand	Percentage of times chosen by all participants
Luxury	12.6%
Well-known brand	38.0%
Value	32.4%
Organic/eco	17%

There was, however, considerable variation from product to product. So for example, when it came to products like soup (Heinz), toilet roll (Andrex) and conditioner (Lenor) the well-known brands were chosen in over 50% of all occasions, and these well-known brands dominated consumer choice. However, in other cases the well-known brands were not chosen so frequently. So, for example, in the case of coffee, the well-known brand (Lavazza) was chosen only in 18% of cases; in the case or orange juice the well-known brand (Princes) was chosen in only 24% of cases. Value brands seemed to be selected more frequently when it came to washing-up liquid (62%) and bran flakes (52%). Organic/eco brands were selected most frequently when it came to coffee (32%)

and ice cream (24%), but note that the well-known and value brands are still selected more frequently in the case of these products. Luxury brands were selected most frequently when it came to orange juice (32%) and ice cream (28%). In both these cases these were the top selection (see Table 2).

Table 2: Brand choice across all participants under no time pressure (percentage choice).

	Luxury	Well-known brand	Value	Organic/eco
Bran Flakes	0%	26%	52%	22%
Bread	10%	44%	28%	18%
Cheese	2%	44%	36%	18%
Coffee	14%	18%	36%	32%
Fabric Conditioner	20%	56%	12%	12%
Ice cream	28%	26%	22%	24%
Orange Juice	32%	24%	30%	14%
Soup	16%	58%	14%	12%
Toilet roll	4%	58%	32%	6%
Washing up liquid	0%	26%	62%	12%
Mean	**12.6%**	**38.0%**	**32.4%**	**17.0%**

(2) Consumer choice under time pressure: descriptive statistics.

Interestingly, under time pressure, the well-known brands became even more popular. Well-known brands were now selected in 42.8% of all cases compared to 38.0% under no time pressure. Value brands were selected 31.4% of the time, followed by luxury brands with 15.4% and lastly organic/eco with 10.4%. See Table 3 and 4.

Table 3: The relationship between consumer choice of brand under time pressure.

Brand	Percentage of times brand was chosen by all participants
Luxury	15.4%
Well-known brand	42.8%
Value	31.4%
Organic/eco	10.4%

Table 3 reveals a number of things. Firstly, it hints at the power of advertising for those brands that have become well-known (Hovis, Kellogg's, Heinz etc.), in that these brands are immediately recognisable and accessible under time pressure and when consumers are under time pressure, then the more likely they are to choose something they instantly recognise (Jenson and Drozdenko, 2008). The well-known brand of soup was selected most frequently of all products (74%) and the same for toilet roll (58%). See Table 4.

Secondly, it demonstrates that the organic/eco brand drops to fourth place under time pressure (10.4%), which is lower than the luxury brand (15.4%). However, without time pressure, the organic/eco brand is selected more frequently (17.0%) than the luxury brand (12.6%). This would seem to suggest that when we change the temporal context of consumer choice, it does influence consumer behaviour and that the organic/eco brand becomes more popular when there is some time for consideration (see Table 4).

Table 4: Brand choice across all participants under time pressure (percentage choice).

	Luxury	Well-known brand	Value	Organic/eco
Bran Flakes	0%	48%	42%	10%
Bread	8%	44%	34%	14%
Cheese	2%	56%	30%	12%
Coffee	24%	20%	40%	16%
Fabric Conditioner	26%	42%	18%	14%
Ice cream	44%	16%	20%	20%
Orange Juice	34%	38%	24%	4%
Soup	12%	74%	14%	0%
Toilet roll	2%	58%	38%	2%
Washing up liquid	2%	32%	54%	12%

Mean	**15.4%**	**42.8%**	**31.4%**	**10.4%**

(3) Consumer choice: inferential statistics.

Statistical analyses focussed on the relationship between time pressure and brand choice. The first analysis considered the relationship between choice of organic/eco brand versus the well-known brand under both time pressure and no time pressure following our observations above (see Table 5). Under time pressure the well-known brands were chosen more frequently, whereas the organic/eco brands were chosen less frequently under time pressure and this difference in distribution was significant ($X^2 = 9.25$, d.f. = 1, $p < 0.01$, 2-tailed test).

Table 5: The relationship between choice of organic versus well-known brand under time pressure/ no time pressure.

	No TP	TP	**Total**
Organic/eco	85	52	**137**
Well-known brand	190	214	**404**
Total	**275**	**266**	**541**

The next comparison considered choice of organic/eco brands versus luxury brands under time pressure and no time pressure, as shown in Table 8. The analysis suggests that the organic/eco brands were less likely to be chosen

under time pressure compared to the luxury brands, which were more likely to be chosen under time pressure ($X^2 = 8.03$, df = 1, $p < 0.01$, two tailed test). In other words, under time pressure, consumers are significantly more likely to choose luxury brands and significantly less likely to choose organic/eco brands.

Table 6: The relationship between choice of organic /eco brands versus luxury brands under time pressure/no time pressure.

	No TP	TP	**Total**
Organic/eco	85	52	**137**
Luxury	63	77	**140**
Total	**148**	**129**	**277**

A number of the statistical comparisons, however, revealed no significant differences in terms of the comparisons made. So, for example, both organic/eco brands and value brands are less likely to be chosen under time pressure in a similar pattern to each other with no significant difference in underlying distribution ($X^2 = 3.48$, df=1, n.s.). See Table 7.

Table 7: *The relationship between the choice of organic/eco brands versus value brands under time pressure/no time pressure.*

	No TP	TP	**Total**
Organic	85	52	**137**
Value	162	157	**319**
Total	**247**	**209**	**456**

Similarly, when well-known brands and luxury brands were compared, under time pressure and no time pressure, the participants were more likely to

choose both the well-known brands and the luxury brands under time pressure in a very similar pattern and again there was no significant difference (X^2 = 0.17, df = 1, n.s.). See Table 8.

Table 8: *The relationship between the choice of well-known brands versus luxury brands under time pressure/ no time pressure.*

	No TP	TP	**Total**
Well-known brand	190	214	**404**
Organic	63	77	**140**
Total	**253**	**219**	**544**

Next, we compared value brands and well-known brands under time pressure and no time pressure. Although the value brands were more likely to be chosen under no time pressure, the well-known brands were more likely to be chosen under time pressure. The differences in terms of absolute numbers under the two conditions were not that large and the difference failed to reach significance (X^2 = 1.05, df = 1, n.s.). See Table 9.

Table 9: The relationship between the choice of value brands versus well-known brands under time pressure/ no time pressure.

	No TP	TP	**Total**
Value	162	157	**319**
Well-Known brand	190	214	**404**
Total	**352**	**371**	**723**

Similarly, when the choice of value brands and luxury brands were compared under time pressure and no time pressure, it was found that the luxury brands were more likely to be chosen under time pressure, but again, the difference in quantitative terms were not that great and the overall difference failed to reach significance ($X^2 = 1.34$, df = 1, n.s.). See Table 10.

Table 10: The relationship between the choice of value brands versus luxury brands under time pressure/no time pressure.

	No TP	TP	**Total**
Value	162	157	**319**
Luxury	63	77	**140**
Total	**225**	**234**	**459**

(4): Does carbon footprint influence consumer choice?

The carbon footprint of each consumer choice is laid out in Table 11. 'HH' represents the product with the highest carbon footprint assigned (starting value plus 10%), 'H' represents the product with a high carbon footprint (the starting value), 'L' represents the low carbon footprint product (half the starting value), and 'LL' represents the lowest carbon footprint (0.5 of the starting value minus 10%).

Table 11: Number of high and low carbon items chosen by each participant in the sample under no time pressure/time pressure.

	No Time Pressure				Time pressure			
	(HH)	(H)	(L)	(LL)	(HH)	(H)	(L)	(LL)
Participant 1	2	1	3	4	0	4	2	4
Participant 2	2	3	3	2	2	3	3	2
Participant 3	3	1	2	4	2	1	4	3
Participant 4	1	3	4	2	1	4	3	2
Participant 5	1	4	4	1	2	2	4	2
Participant 6	3	2	3	2	2	2	3	3
Participant 7	4	1	3	2	2	1	4	3
Participant 8	1	1	5	3	2	1	5	2
Participant 9	2	3	2	3	1	3	4	2
Participant 10	1	3	5	1	2	1	4	3
Participant 11	4	2	3	1	1	1	4	4
Participant 12	1	2	4	3	2	2	3	3
Participant 13	3	3	2	2	3	3	3	1
Participant 14	3	4	2	1	5	1	2	2
Participant 15	2	2	1	5	1	3	5	1
Participant 16	3	1	4	2	4	3	3	0
Participant 17	0	4	4	2	3	5	2	0
Participant 18	3	2	2	3	4	1	2	3
Participant 19	2	1	4	3	2	2	2	4
Participant 20	3	1	5	1	3	3	2	2
Participant	3	2	4	1	3	1	3	3

21								
Participant 22	1	2	5	2	2	3	2	3
Participant 23	1	3	2	4	0	2	3	5
Participant 24	3	0	4	3	5	0	3	2
Participant 25	0	3	4	3	1	3	3	3
Participant 26	2	1	3	4	3	1	2	4
Participant 27	4	2	1	3	1	2	4	3
Participant 28	0	1	5	4	4	0	4	2
Participant 29	2	4	3	1	3	2	2	3
Participant 30	2	4	2	2	2	5	1	2
Participant 31	2	0	4	4	3	1	3	3
Participant 32	1	1	5	3	2	0	5	3
Participant 33	1	2	5	2	1	2	5	2
Participant 34	4	0	3	3	4	1	4	1
Participant 35	1	3	4	2	1	4	2	3
Participant 36	0	2	3	5	0	2	5	3
Participant 37	1	2	1	6	2	2	2	4
Participant 38	4	4	0	2	4	3	1	2
Participant 39	2	3	1	4	1	4	2	3
Participant 40	3	2	3	2	3	2	3	2
Participant 41	2	4	2	2	1	3	2	4
Participant 42	5	3	2	0	4	3	2	1
Participant 43	1	1	3	5	3	4	2	1
Participant 44	1	3	3	3	2	3	2	3
Participant 45	2	3	3	2	2	2	3	3

Participant 46	1	4	1	4	2	2	2	4
Participant 47	3	1	2	4	2	2	2	4
Participant 48	2	2	5	1	2	3	4	1
Participant 49	0	1	5	4	0	3	4	3
Participant 50	1	3	2	4	1	3	3	3

From Table 11 and 12 (below) it should be clear that the carbon footprint of the products did influence consumer choice. Table 12 shows that when there is no time pressure, our experimental participants chose low carbon items a mean of 3.1 times, very low carbon items a mean of 2.72 times, high carbon items a mean of 2.2 times and very high carbon items a mean of 1.98 times. In other words, they seem to prefer low as opposed to high carbon items (of course, signalled by the green footprint superimposed on the product). However, in addition, they also prefer the less extreme variations within each of these categories (the low carbon item was chosen more than the very low carbon item and the high carbon product was chosen more than the very high carbon product). Variations within the category were, of course, only signalled by the numerical value on either the green or the black background. Nonparametric analyses revealed that the preference for low carbon items over high carbon items was significant – with either the full set ('HH+H' versus 'LL+L') compared (Wilcoxon Matched-Pairs Signed-Ranks Test, $z = -3.322$, $n = 39$, $p<0.001$, 2-tailed), or focussing just on the less extreme categories items 'H'

versus ‘L’) (Wilcoxon Test, z = -2.833, n = 44, p<0.004, 2-tailed). It was also significant focussing just on the more extreme category items (‘HH’ versus ‘LL’) (Wilcoxon Test, z = -2.422, n = 42, p<0.05, 2-tailed). However, the apparent preference for the low carbon items (‘L’) versus the very low carbon items (‘LL’) was not significant (Wilcoxon Test, z = -1.212, n= 44, n.s.), neither was the choice of high carbon items (‘H’) versus the very high carbon items (‘HH’) (Wilcoxon Test, z = -0.812, n = 43, n.s.).

When the participants were under time pressure, they chose low carbon items a mean of 2.98 times and very low carbon items a mean of 2.58 times, high carbon items a mean of 2.28 times and very high carbon items a mean of 2.16 times. So again, the participants show a preference for low as opposed to high carbon items. As in the previous case, they seem to choose the low carbon items more than the very low carbon items and the high more than the very high carbon items but when under time pressure the difference was not as extreme as it was when there was no time pressure. Again, nonparametric analyses revealed that the preference for low carbon items over high carbon items was significant – comparing the full set (‘HH+H’ versus ‘LL+L’) (Wilcoxon Matched-Pairs Signed-Ranks Test, z = -2.630, n = 38, p<0.05, 2-tailed). The differences were also significant focussing either on the less extreme categories items (‘H’ versus ‘L’) (Wilcoxon Test, z = -2.362, n = 40, p<0.05, 2-tailed). However, when it came to the more extreme category items (‘HH’ versus ‘LL’) the preference for low carbon was not significant (Wilcoxon Test, z = -1.317, n = 52, n.s.). When

comparing the preference for the low carbon items ('L') versus the very low carbon items ('LL') this was not significant (Wilcoxon Test, z = -1.563, n= 4440, n.s.), neither was the choice of high carbon items 'H') versus the very high carbon items ('HH') (Wilcoxon Test, z = -0.657, n = 49, n.s.)..

Table 12: Mean number of high and low carbon items chosen by each of the 50 participants under no time pressure/ time pressure.

	No Time Pressure				**Time pressure**			
	HH	H	L	LL	HH	H	L	LL
Mean	**1.98**	**2.20**	**3.10**	**2.72**	**2.16**	**2.28**	**2.98**	**2.58**

(4): Do measures of explicit and implicit attitudes to carbon footprint relate to one another?

Table 13 shows the mean Likert scores, Thermometer Difference (TD) scores and D scores for the sample. The mean Likert score was 3.6, which is approximately midway between neutral and a moderate preference for low carbon, translating to a slight preference for low carbon. The mean TD score was 1.2, which also represents a slight preference for low carbon. The D score was 0.99, which represents a strong pro-low carbon preference for this particular set of high and low carbon items. The means are set out in Table 13.

Table 13: Mean Likert scores, Thermometer Difference (TD) scores and D scores for the sample.

	Likert (explicit)	**TD score (explicit)**	**D score (implicit)**
Mean	**3.60**	**1.20**	**0.99**

Figures 14-16 show simplified distributions of the Likert, TD and D scores in which the scores are assigned to just three categories – pro-low carbon (positive score above neutral), neutral ('3' for Likert; -1 to +1 for TD; -0.2 to +0.2 for D) and pro-high carbon (negative score below neutral). It is immediately apparent that on both explicit and implicit measures our participants emerge as pro-low carbon, and as before (see Beattie, 2010) the scores on the implicit measures suggest that they are even greener (with the clear proviso that this result will depend upon the particular stimuli used in the IAT to represent high and low carbon products).

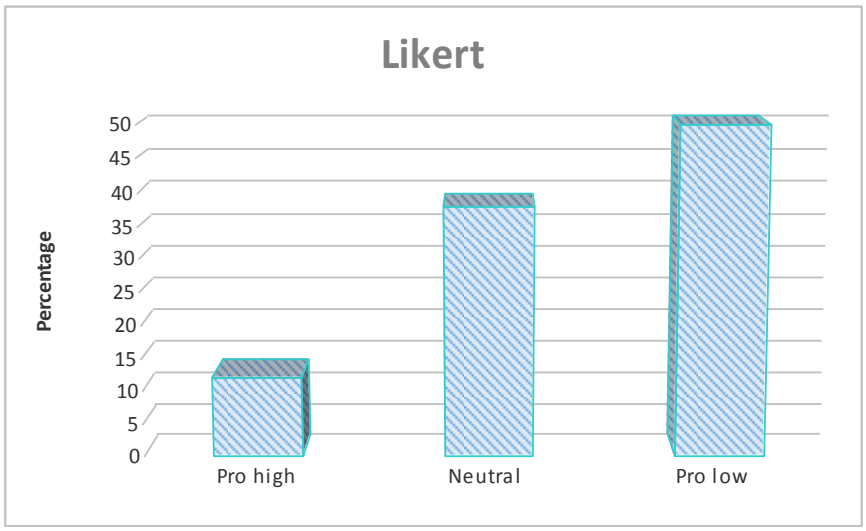

Figure 16: The underlying distribution for the Likert scores

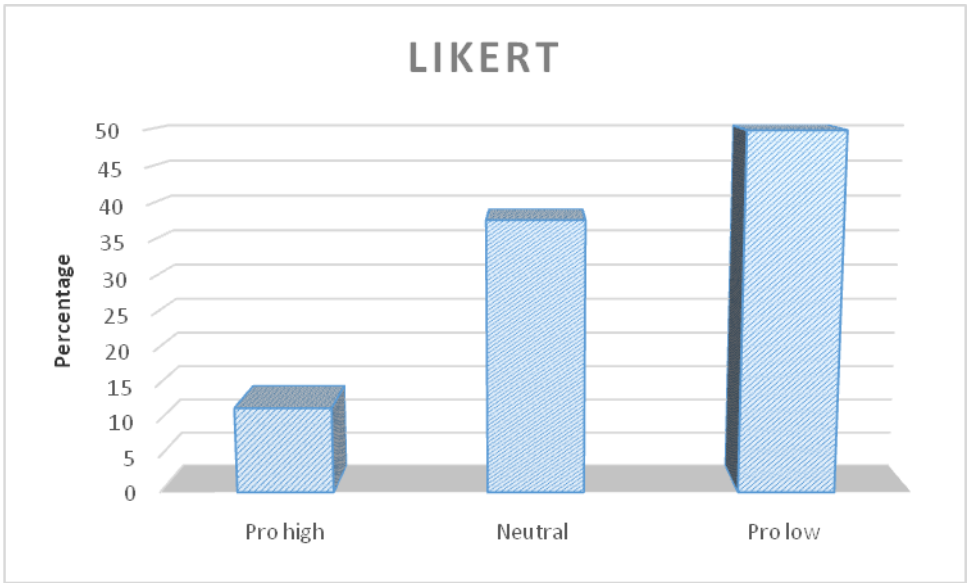

Figure 17: The underlying distribution for the Thermometer Difference scores

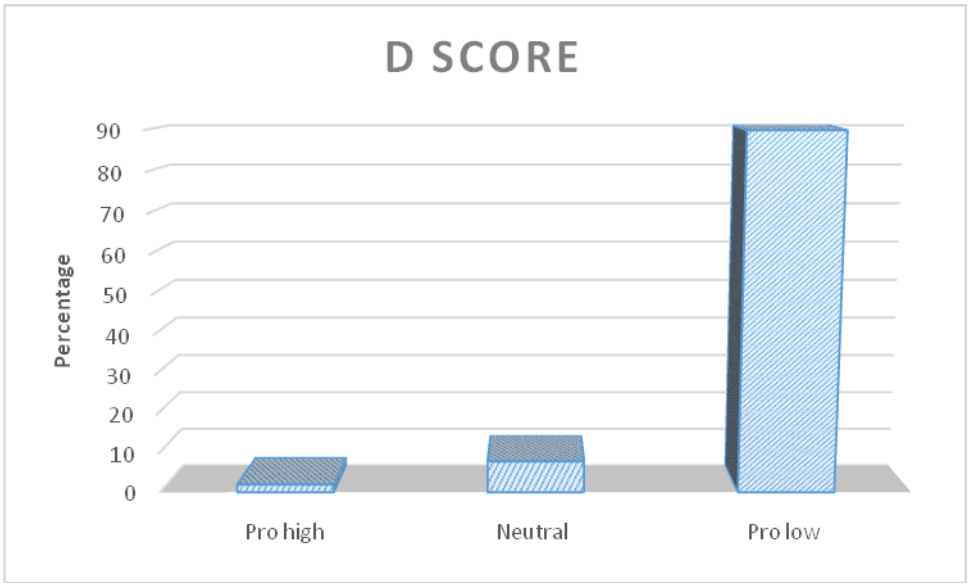

Figure 18: The underlying distribution for the D scores

But do the explicit and implicit measures relate to each other? A Pearson product-moment correlation was computed to assess the relationship between the Likert and TD scores (explicit measures) and the D score (implicit measure). In line with previous research there was no significant correlation between the Likert and D scores ($r = 0.016$, $n=50$, n.s.). Neither was there a correlation between the TD and D scores ($r = 0.198$, $n=50$, n.s.). This again suggests that explicit and implicit measures are 'dissociated' in this domain. Interestingly, the Likert and TD scores also did not correlate ($r = 0.056$, $n=50$, n.s.), which suggests that self-reported attitudes ('I strongly prefer products with a low carbon footprint to a high carbon footprint' etc.), do not necessarily correlate

with participants' reports of how 'warm' or 'cold' they felt towards low/high carbon products (see Table 14).

Table 14: Pearson product-moment correlation coefficient between D scores and Likert and Thermometer Difference scores.

	Thermometer Difference (TD)	Likert
IAT	r = 0.198	r =0.016
Thermometer Difference	-	r =0.056

(6): Does carbon footprint influence consumer choice?

The next question is whether these various measures of explicit and implicit predict choice of low or high carbon products when information about carbon label is included on products, which vary in terms of brand and with all of the competing marketing information included. The statistical comparisons here consider the number of choices of low carbon products (either 'L' or 'LL') of that set of participants who score strongly pro-low carbon footprint on the various measures. In the case of the Likert scale, this set consists of those scoring '5' ('I strongly prefer products with a low carbon footprint to a high carbon footprint'). Using this criterion, 20% of the sample is identified as having a strong explicit attitude to low carbon. In the case of the Thermometer Difference measure, we employed a criterion of +4. This criterion identifies 26% of the sample and represents the maximum difference between feeling

warm about low carbon and feeling cold about high carbon. In the case of the IAT, the criterion we use is what has become the norm in the literature for identifying a strong implicit bias and that is 'greater than or equal to 0.8'. It should be stressed that this is an *arbitrary* criterion (Blanton and Jaccard, 2008 Blanton et al, 2007, 2015) and here identifies 52% of the sample, in other words, a much higher proportion than either of the other two criteria used for the explicit measures. The logic of our analysis is as follows: the focus will be on a possible bias in selecting low carbon items for those who fall within the set of a strong pro-low carbon attitude. We compare this with any bias in the residual sample that does not have a strong pro-low carbon attitude. If both groups come out with a significant bias this would simply reflect that it was a general bias towards selecting low carbon items by the overall sample. However, if those with a strong positive attitude to low carbon had a significant bias towards selecting low carbon items and this trend was not significant for those with a less strong attitude, then we would suggest that this reflects some meaningful properties of that attitudinal measure for predicting behaviour. We carried out separate analyses when the choice was made not under time pressure and under time pressure. Table 15 shows the behavioural choices of those with a strong pro-low carbon attitude (measured by the Likert scale) under no time pressure. Table 16 shows the behavioural choices of those with weaker pro-low carbon attitudes (again measured by the Likert scale). In both cases, the results are significant and represent a bias in both groups towards low carbon choices.

Therefore, this particular attitudinal measure (the Likert scale) does not discriminate in terms of actual behaviour those with a strong pro-low carbon attitude and those with a weaker attitude.

Table 15: The relationship between strong pro-low carbon attitude (Likert scale) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	67	33	$X^2 = 11.56$, df=1, $p<0.01$, 2-tailed.
Expected frequency (under the null hypothesis that choice is not affected by carbon footprint information)	50	50	

Table 16: The relationship between weaker pro-low carbon attitude (Likert scale) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	224	176	$X^2 = 5.76$, df =1, $p<0.02$, 2-tailed.
Expected frequency (under the null hypothesis)	200	200	

In Tables 17 and 18, the same comparisons are made when the participants are under time pressure. What is striking from Table 17 is that those with a strong pro-low carbon attitude, as identified by the Likert scale, do not display a significant bias towards selecting low carbon items, but those with a weaker attitude (according to this scale) do. In other words, both under no time pressure and under time pressure, this attitudinal measure would seem to have little discriminatory power for predicting actual behaviour.

Table 17: The relationship between strong pro-low carbon attitude (Likert scale) and behavioural choice under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	51	49	$X^2 = 0.04$, df =1, n.s.
Expected frequency (under the null hypothesis)	50	50	

Table 18 :The relationship between weaker pro-low carbon attitude (Likert scale) and behavioural choice under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	227	173	$X^2 = 7.29$, df =1, $p<0.01$, 2-tailed.
Expected frequency (under the null hypothesis)	200	200	

In the case of the Thermometer Difference, we see a very similar pattern. With no time pressure comparisons, there is an inherent bias towards choosing low carbon items and this is true for those with a strong pro-low carbon attitude as measured by the TD and those with a weaker pro-low carbon attitude. Hence, the TD does not discriminate the behavioural choice of the two groups. In the case of the time pressure, the results were significant, but in the opposite direction to that predicted – only those with the weaker pro-low carbon attitudes were significantly more likely to choose low carbon products. See Tables 19-22.

Table 19: The relationship between strong pro-low carbon attitude (TD) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	79	51	$X^2 = 6.02$, df =1, $p<0.02$, 2-tailed.
Expected frequency (under the null hypothesis)	65	65	

Table 20: The relationship between weaker pro-low carbon attitude (TD) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	291	79	$X^2 = 121.5$, df =1, $p<0.001$, 2-tailed.

Expected frequency (under the null hypothesis)	185	185	

Table 21: The relationship between strong pro-low carbon attitude and behavioural choice (TD) under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	74	56	$X^2 = 2.49$, df =1, n.s.
Expected frequency (under the null hypothesis)	65	65	

Table 22: The relationship between non strong pro-low carbon attitude and behavioural choice (TD) under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	207	163	$X^2 = 5.23$, df =1, $p<0.05$, 2-tailed.
Expected frequency (under the null hypothesis)	185	185	

In the case of the analyses using the IAT, the results are different. Under no time pressure, both groups (strong and weaker pro-low carbon implicit attitude) show a significant bias towards choosing low carbon items. However,

under time pressure the strong pro-low carbon group does show a significant tendency to selecting low carbon items; the weaker pro-low carbon group does not show a significant tendency in this regard. In other words, when participants/consumers are under time pressure (as they are in many everyday consumer situation) those with a strong implicit attitude to low carbon are more likely to shop in a sustainable way. From a statistical point of view this is interesting because the group identified on the basis of the normative measure of strong implicit attitude (0.8 and above) was larger and therefore less selective, and less extreme, than the strong group identified by either of the other two measures. This makes the present result all the more interesting and significant.

Table 23: The relationship between strong pro-low carbon attitude (IAT) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	154	106	$X^2 = 8.86$, df = 1, $p<0.01$, 2-tailed.
Expected frequency (under the null hypothesis)	130	130	

Table 24: The relationship between weaker pro-low carbon attitude (IAT) and behavioural choice under no time pressure.

No time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	137	103	$X^2 = 4.82$, df = 1, $p<0.05$, 2-tailed.
Expected frequency (under the null hypothesis)	120	120	

Table 25: The relationship between strong pro-low carbon attitude (IAT) and behavioural choice under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	150	110	$X^2 = 6.16$, df = 1, $p<0.02$, 2-tailed.
Expected frequency (under the null hypothesis)	130	130	

Table 26: The relationship between weaker pro-low carbon attitude (IAT) and behavioural choice under time pressure.

Time pressure	Number of low carbon choices (L or LL)	Number of high carbon choices (H or HH)	Outcome of statistical test
Observed frequency	128	112	$X^2 = 1.06$, df = 1, n.s.
Expected frequency	120	120	

(under the null hypothesis)			

(7): Do either explicit or implicit attitudes to low carbon products predict the choice of organic or eco brands?

In the last section, we could see that carbon footprint not only influenced consumer choice, but also that attitude to low carbon (either self-reported or implicit) seemed to impact on that choice. One important theoretical question is how general the behavioural impact of such underlying attitudes might be. We only measured attitude to low and high carbon products but would this measure also predict the choice of organic or eco products? It is important to remember that we randomly assigned carbon footprint to our range of products. Although there may be a relationship between carbon footprint and organic/eco products in general, this would not have been the case in this particular experimental context, where these two variables were randomly manipulated by the experimenters.

Tables 27-30 show how both implicit and explicit attitudes relate to the choice of organic/eco products under conditions of no time pressure or time pressure. These results are extremely interesting. The first analysis (Table 27) shows that of the 26 participants with a strong pro-low carbon implicit attitude, 22 of them chose one or more organic/eco products, only four of these participants did not choose organic/eco products, when there was no time

pressure. This contrasts with a much more even split (13/11) for those with a weaker pro-low carbon implicit attitude. In other words, when our participants as 'consumers' had time to make their selection this act of choice of organic/eco products was significantly affected by their underlying implicit attitude. This did not occur when our participants were under time pressure (see Table 28).

Table 27: The relationship between implicit attitude to low carbon and choice of organic/eco products under no time pressure.

	No. of participants with strong pro-low carbon implicit attitude (D=0.8 or higher)	No. of participants with weaker pro-low carbon implicit attitude (D less than 0.8)	Outcome of statistical test
One or more organic/eco choices	22	13	$X^2 = 5.51$, df = 1 $p<0.02$, 2-tailed.
No organic/eco choices	4	11	

Table 28: The relationship between implicit attitude to low carbon and choice of organic/eco products under time pressure.

	No. of participants with strong pro-low carbon implicit attitude (D=0.8 or higher)	No. of participants with weaker pro-low carbon implicit attitude (D less than 0.8)	Outcome of statistical test
One or more organic/eco choices	12	9	$X^2 = 0.40$, df = 1, n.s.
No organic/eco choices	14	15	

Our measure of explicit attitude to low carbon also significantly predicted the choice of organic/eco products, but again only when the choice was not made under time pressure. It must be remembered that our operational definition of a strong pro-low carbon explicit attitude was more extreme in terms of where it lands on the underlying distribution of scores than the implicit criterion, and uniquely identifies just 10 individuals but every single one of them chose an organic/eco product when not under time pressure. This was not the case for those with a weaker pro-low carbon explicit attitude (see Table 29). However, when the choices were made under time pressure those with a strong pro-low carbon explicit attitude still preferred organic/eco products, whereas the majority of those with a weaker attitude here chose no organic/eco products. However, this difference failed to reach significance (see Table 30). In other words, those who report the strongest attitude to low carbon products (either implicit or explicit) have some tendency to choose organic/eco products, but only when they are not under time pressure, suggesting that they may need more time to process the label and/or reflect on the nature of their choice.

Table 29: The relationship between explicit attitude to low carbon and choice of organic/eco products under no time pressure.

	No. of participants with strong pro-low carbon explicit attitude	No. of participants with weaker pro-low carbon explicit attitude	Outcome of statistical test

	(5 on Likert scale)	(4 or less, Likert)	
One or more organic/eco choices	10	25	Fisher's Exact Probability Test, $p<0.05$, 2-tailed test.
No organic/eco choices	0	15	

Table 30: The relationship between explicit attitude to low carbon and choice of organic/eco products under time pressure.

	No. of participants with strong pro-low carbon explicit attitude (5 on Likert scale)	No. of participants with weaker pro-low carbon explicit attitude (4 or less, Likert)	Outcome of statistical test
One or more organic/eco choices	7	14	Fisher's Exact Probability Test. n.s.
No organic/eco choices	3	26	

Discussion

This study attempted to uncover some of the core psychological factors underpinning consumer choice on the understanding that the behaviour of consumers is particularly relevant to issues to do with climate change and the reduction of greenhouse gas emissions. Indeed, consumer behaviour would appear to be one of the major obstacles on the road to reducing greenhouse gas emissions. The multinational Unilever, for example, has introduced a number of (very expensive) major initiatives in the last few years to reduce the

environmental impact of their goods, but found (rather vexingly) that 'Our greenhouse gas footprint impact per consumer has ….***increased*** by around 5% since 2010' (Unilever Sustainable Living Plan, 2013, p.16). Consumer behaviour seems to have been responsible for this unanticipated increase, rather than decrease, in carbon footprint associated with Unilever products.

This experimental study reported here attempted to answer a number of very basic psychological questions. Firstly, what brand aspects of products (well-known brand, value brand, luxury brand, organic/eco brand etc.) predict consumer choice? In addition, what are the implications of time pressure on such choices, given that under increasing time pressure there is less opportunity for deliberation and reflection? Secondly, do measures of explicit or implicit attitude towards carbon footprint impact on patterns of choice when environmental information is available? What, for example, happens if carbon footprint, experimentally manipulated in various ways, is added to products? Will this influence consumer choice when this particular type of environmental information has to compete with all of the other information that is available on products? How does time pressure impact on any of these realtionships?

In this behavioural choice study, it was immediately apparent that we, as consumer, are very sensitive to both brand information and value in our selection of products. The brands chosen most frequently under no time pressure were the well-known brands – Heinz, Kellogg's, Hovis etc. (chosen in 38.0% of all selections, with four alternatives to choose from) followed by the

value brand (32.4%). Significantly, further down the list were the organic/eco brands with 17.0% and lastly the luxury brands at 12.6%. However, when behavioural choice is made under time pressure, this trend became even more pronounced and the well-known brands were selected even more frequently (pointing to the power of advertising for promoting brand recognition). Well-known brands were now chosen in 42.8% of all cases and value brands 31.4% of the time (down slightly). Organic/eco brands were now in fourth and last place with only 10.4% of selections.

This time dimension (so characteristic of much supermarket shopping) had a statistically significant effect on consumer choice in terms of the selection of well-known brands compared to organic/eco brands. Under time pressure, consumers were also significantly more likely to choose luxury brands and significantly less likely to choose organic/eco brands. Given the social and temporal aspects of much supermarket shopping, often characterised by significant time pressure, this is not an optimistic conclusion regarding environmentally sensitive choices.

It must be remembered that carbon footprint information was represented in a very obvious visual way on our products with colour coded footprints (green for below average, black for above average) and they were represented on the front of products rather than the backs (see Beattie, McGuire and Sale, 2010). This result shows that representing carbon footprint in this way can influence consumer choice. Our participants (with a positive implicit attitude to

carbon footprint within this sample) were guided by these colour coded carbon footprints but not by the numerical values of carbon footprint, representing the gradations of high and low carbon, within them. There was no statistical difference between the two levels of high carbon footprint that were added to our products, or the two levels of low carbon fooprint. Given that most countries have not introduced colour-coded carbon footprint but have instead opted for numerical values on a plain background, this might well explain why these campaigns have up to now not been relatively unsuccessful in promoting behavioural change and the selection of the low carbon alternatives (See Beattie, 2010, 2012).

The next question was whether these various measures of explicit and implicit predicted choice of low or high carbon products when information about carbon label is included on real products, which vary in terms of brand and with all of the competing marketing information included. In the case of the explicit measure (the Likert scale), both under no time pressure and under time pressure, this attitudinal measure had little discriminatory power for predicting actual behaviour. When not under time pressure, both groups (strong and weak pro-low carbon attitude) showed a low carbon bias in terms of behavioural choice. When under time pressure, the weak explicit attitude group did display a low carbon preference; the strong group did not, which, of course, was exactly the opposite of what was predicted. In the case of the implicit measure, however, the results were different in one important regard. Under no

time pressure, both groups (strong and weak pro-low carbon implicit attitude) displayed a significant bias towards choosing low carbon items (as was the case with the explicit group). However, under time pressure, the strong pro-low carbon implicit group did show a significant tendency in selecting low carbon items; the weak pro-low carbon implicit group did not show a significant tendency in this regard. In other words, when participants/consumers are under time pressure (as they are in many everyday consumer situation) those with a strong implicit attitude to low carbon are more likely to shop in a sustainable way. Our measure of explicit attitude to low carbon also significantly predicted the choice of organic/eco products, but here only when the choice was not made under time pressure, suggesting that they may need more time to process the label and/or reflect on the nature of their choice.

In summary, these results give us some insight into some of the variables that affect consumer choice and point towards the attitudinal measures that may help us predict consumer behaviour that is more sustainable. Organic/eco brands are clearly not the first choice option, particularly under time pressure. Some individuals, however, with a strong positive implicit attitude towards low carbon are more sensitive to these brands and to carbon footprint information. In the case of implicit attitudes measured using the IAT, one might say that it is extraordinary that a simple reaction time measure, which simply computes the response time in a categorisation task, can predict anything at all in a separate domain. However, the simple measure predicts choice of low carbon items and

even predicts the choice of organic/eco products (at least when there is more time for the consumer to reflect). The advantage of this simple measure is that participants do not seem quite so able to distort it for reasons of social desirability, in order to appear greener than they really are compared to self-report measures (see Steffens, 2004). It may, therefore, provide us with a simple diagnostic tool to test the public's actual readiness to go green, in the fight against climate change, and this could turn out to be very important indeed. One could imagine redoing the segmentation analyses of DEFRA and other leading organisations where one attempted to profile the population in terms of both explicit and implicit attitudes rather than relying merely on what people say.

Of course, the research also raises some very general issues about whether or not consumers are dissociated in a number of respects, and whether two separate (but potentially interacting) systems of unconscious/implicit and conscious/explicit attitudes really do exist (see Gawronski, Hofmann and Wilbur, 2006; Rydell et al, 2006)). This is by no means universally accepted in the psychological literature; indeed it is currently the subject of much quite heated debate (see Blanton et al, 2006, 2007, 2009 for a critique of this position and Greenwald, Nosek and Sriram, 2006, McConnell and Leibold, 2009, and Ziegert and Hanges, 2009 for some rebuttals). However, it would seem that in some domains, this notion of implicit attitudes, deriving from various associative connections and operating unconsciously alongside our more

reflective attitudes (and indeed conflicting with them on occasion), might have some credibility (Beattie, 2013: Kahneman, 2011). Such a view, after all, might not surprise those psychologists who worked in the 1930's alongside some of the major tobacco companies to promote smoking (subliminally) through the association of smoking with societal success, social acceptance, masculinity or feminity and confidence. It might not even have surprised Gordon Allport in his early work on racism and 'the inner conflict' (Allport, 1954). It is certainly an idea worth exploring further in the domain of consumption and climate change. If we really do have a 'divided self' when it comes to our underlying attitudes towards the environment, then this could be critical in the battle against climate change. After all, most of us say that we know that we need to adapt our behaviour as consumers in the light of the threat of climate change, but then actually do nothing. Until we start to promote low carbon products and low carbon lifestyles in a way that impinges on our automatic, unconscious system, little may actually change in this regard. We cannot leave choice of low carbon products solely to reason and reflection, it could be far too late. As Kahneman (2011) himself has noted, System 2 (the system of reason and reflection) can be very lazy indeed; it leaves a great deal to System 1, and System 1 is currently prioritising well-known brands and value brands over those with the right environmental properties. System 1, in the domain of consumption, is directing us to choose those things that we have been taught to value – big brands (and status) and economical brands (and money) rather than

environmental brands. This may well need to change. By all means, let us continue to write (and read) the editorials in the quality newspapers about climate change and what we must all do. But at the same time let us think about how to promote low carbon lifestyles as something to do with a new sort of societal status, fun, sexy, necessary, caring, cooperative, clever, perceptive, confident, a must have, the next big thing, a new revolution, in a way that System 1 might notice. Moreover, if we have to borrow from the years of (chilling) success of the tobacco industry in promoting smoking, and learn from the way they used associative networks, then so be it. At least, we will then know that it was good for something.

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