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Explicit and Implicit Attitudes to Low and High Carbon Footprint Products

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Abstract: This paper will outline new research carried out at the Sustainable Consumption Institute at the University of Manchester, England, into how to measure both implicit and explicit attitudes to sustainability. The specific focus of the research are attitudes to the size of carbon footprint associated with a range of consumer products, as measured using explicit measures like the feeling thermometer and a Likert scale and implicit measures like the Implicit Association Test. The research identifies exactly how positively people feel about low carbon footprint products using a range of measures and highlights individuals who appear to be strongly pro-low carbon on the basis of explicit measures but are less positive on the basis of implicit measures, the so-called 'green fakers'.

Keywords: Implicit Attitudes, Explicit Attitudes, Sustainability, Carbon Footprint, Carbon Labelling

Introduction

'The scientific evidence is now overwhelming: climate change presents very serious global risks, and it demands an urgent global response.'

- Stern Review (2006)

'The climate change crisis is the product of many generations, but overcoming it must be the great project of this generation.'

- Gordon Brown, The British Prime Minister (2007)

'We have said that the historians of the future will call these the climate change years.'

- Forum for the Future (2008)

ACCORDING TO THE scientific community, climate change is upon us. There is no real disagreement on this issue; according to the *Human Development Report 2007/2008* (Watkins, 2007), the choices and decisions we make today will have massive impacts for generations to come. The consensus amongst scientists from a range of disciplines (see Walker & King, 2008) is that we have entered a new era in the earth's history; an epoch known, by some, as the 'Anthropocene era' resulting from anthropogenic climate change (Crutzen, 2002). The Industrial Revolution, characterised by a dramatic increase in population and by the mass exploitation of fossil fuels, was in many ways the original stimulus for this new period of change and thus effectively marked the emergence of this new era (Zalasiewicz et al. 2008). The climate started to change from that point onwards but the trend has now accelerated significantly. Thus;

‘For almost as long as people have been worrying about anthropogenic climate change, there have been warnings that, although the build-up of greenhouse gases may be slow and gradual, the effects they will have on the system need not be. The physical, chemical and biological responses that turn greenhouse gases into climate change are complex and subtle, and capable of responses that are surprisingly disproportionate. There are thresholds beyond which the past response of the system no longer predicts the future... All these possibilities are now being discussed under the rubric of tipping points.’ (Editorial, *Nature*, 2006, p. 785).

The term ‘tipping point’ was popularised by Malcolm Gladwell (2000) in his bestseller: *‘The Tipping Point: How Little Things Can Make a Big Difference’*. Gladwell (2000) applied epidemiological terms to explain how trends and behaviours in the social world can often spread like viruses that suddenly reach epidemic proportions. According to Gladwell (2000), from many small and seemingly insignificant changes, a phenomenon can suddenly tip; beyond which the changes are dramatic. The notion of a ‘tipping point’ was seized upon particularly by the media, but was also used in many scientific papers to suggest that although climate change has, until now, been a somewhat gradual process, there are projected tipping points, beyond which, we may see irreversible change (Walker, 2006). Although such tipping points with regard to climate change are still debated within the scientific community, with questions raised about their exact number, their exact nature and indeed whether we have already actually passed *the* tipping point with respect to climate change, the predominant view is that we all must do something immediately to stop any worsening of the climate situation, to prevent us reaching the final tipping point (if we have not reached it already).

With a surge of recent media reports, public awareness concerning the dangers of climate change (and the apparent need for us all to act, and act fast) is now greater than ever. In a recent publication from Ipsos MORI (Downing & Ballantyne, 2007), 88% of the public reported their belief that the climate is changing and 70% apparently believed that there will soon be a major environmental crisis if there is no change in our pattern of living. Despite this reported awareness of the significance of climate change and the need to alter our lifestyles accordingly we would seem to be far from the stage where pro-environmental behaviours themselves could reach a tipping point in this area, radically changing the nature of all our lives for the better.

So what possible inroads can we make here to induce positive change? One major focus might be the targeting of consumer behaviour, potentially involving both retailers and manufacturers. According to *Forum for the Future* (2007), ‘Retail has a vital role to play in delivering sustainable development. It employs 2.9 million people and generates almost 6% of the GDP of the UK. It is responsible for approximately 2.5% of the UK’s carbon dioxide emissions and has a disproportionate influence over society and the economy through its marketing, regular customer transactions and complex, globalised supply chains’ (p.8). The message here is clear – ‘Some retailers and manufacturers have begun to realise that they can use their knowledge of, and relationship with, their customers to play a key role in facilitating change’ (*Forum for the Future*, 2007, p.12). The philosophical underpinnings here are that people will do their bit in the fight against climate change, and that they will make their lives more sustainable, provided that they are given the *opportunity* to make sustainable choices in the first place (*Sustainable Consumption Roundtable*, 2006). The carbon reduction label was launched by the *Carbon Trust* in 2007 for this very reason. The label was designed to inform consumers about the amount of greenhouse gases produced in a product’s lifecycle from its manufacture to its disposal, otherwise known as the carbon footprint (*Carbon Trust*,

2008). The provision of this information empowers consumers by allowing them to make informed decisions about the products they buy based on the products' associated environmental impacts (Tesco, 2008). However, this basic principle is reliant upon a number of underlying assumptions, namely that consumers are *motivated* to change their behaviour and that consumers consider that making changes in their patterns of consumption is a *legitimate* way to 'do their bit' in the fight against climate change. From relevant market research in this area we would seem to have *prima facie* evidence for these basic propositions; according to an Ipsos MORI poll 78% of people say that they would change their behaviour to help reduce climate change (Downing & Ballantyne, 2007). Furthermore, *Forum for the Future* reported that 85% of people wanted more information about the associated environmental impacts of their purchases (Berry, Crossley & Jewell, 2008). However, whilst these figures seem to suggest a high degree of environmental concern among consumers, this level of concern is not necessarily reflected in subsequent patterns of consumption. Whilst there is some evidence that there have been a number of major waves of pro-environmental behaviours, including the buying of organic food and, of course, recycling, many pro-environmental behaviours remain the responsibility of a green consumer minority who make up only a small fraction of the overall market share (Downing & Ballantyne, 2007). Clearly pro-environmental attitudes (measured using the traditional techniques) are not necessarily being translated into pro-environmental behaviour more generally; a phenomenon known in psychology as the 'attitude-behaviour gap' (Vantomme, Geuens, De Houwer & De Pelsmacker, 2005).

What can Explain the Attitude-behaviour Gap?

In 1976 Kardash made a very optimistic proposal. He wrote that if two products were identical in every way except that one was better for the environment than the other, then consumers would (naturally) purchase the environmentally-friendly product. Basically, if everything else is equal, consumers will tend to be 'green' in terms of their shopping habits. But, from the wealth of market research on the issue of green consumerism, it is apparent that certain barriers must exist that inhibit consumers from being green. As Sir Terry Leahy (Chief Executive of Tesco) commented in 2007, 'People talk about green choices, but for millions of people a lack of information and affordability limit this choice. We will not tackle the challenge of climate change by enlisting only the few.' Here he hints that it is not just the basic information that is important in guiding green choices but other factors like affordability. If barriers such as lack of information, convenience, affordability and knowledge are the underlying causes of the attitude-behaviour gap, then it would follow that by removing these barriers, pro-environmental behaviours should start to emerge. In this scenario, the challenge facing those trying to encourage behaviour change through the process of carbon labelling is not one of attitudinal change (which always presents a somewhat larger obstacle to overcome) but the removal of certain barriers (clearer basic information about carbon footprint, convenience of purchase, affordability of product etc.) currently preventing the pro-environmental attitudes finding their way to actual behaviour. Once barriers to pro-environmental behaviour are removed, consumers are then able to act in accordance with the pro-environmental attitudes they hold. This strategy, of course, rests upon one very important underlying assumption; that people do actually hold the pro-environmental attitudes that they claim to hold. This assumption is rarely challenged in this area, yet research from

elsewhere in psychology over the past decade has revealed that there is often much more to an attitude than what a person actually says.

For the first sixty years, or so, of experimental social psychology (starting with Gordon Allport in 1935), the measurement of attitudes was a relatively straightforward matter; people simply rated their attitude along a scale, usually in the form of a likert scale. This is the method currently employed most often in market research; you simply ask people what they think. Measurement of attitudes in this way depends upon two major assumptions; 1) that attitudes are consciously held and 2) that attitudes can be measured directly, using self-report based upon this conscious reflection. The problem, of course, is that such *explicit* attitudes, which are highly conscious and reportable, can be subject to all sorts of biases, including biases to do with social desirability (Gregg, 2008). Many people feel the need to present themselves in life and in research encounters in the most positive way possible, and this is why the use of explicit attitude measures in certain topical areas can become highly problematic. The issue in the area of pro-environmental attitudes and low carbon footprint products is that we all know that green is good. We all know that we should have greener lifestyles and no doubt we would all prefer to say that we are concerned about the environment, to say otherwise would be very strange indeed. However, our real underlying attitudes to things like low carbon footprint products may be much less positive than those we explicitly espouse for a number of different reasons, including factors such as associating certain negative qualities (like higher prices and inconvenience) to products which are part of living a green lifestyle (Downing & Ballantyne, 2007). There is the distinct possibility that as a result of (highly self-aware) conscious reflection, people may explicitly state what they believe to be socially acceptable attitudes in this area but these might not necessarily reflect their underlying attitudes.

This hypothesis might explain the attitude-behaviour gap when it comes to green issues. Potentially, pro-environmental explicit attitudes are not being translated into purchasing behaviour because these are not the real attitudes that people hold! Rather, their underlying (and unconscious) attitudes, known as their implicit attitudes, are the real ones and they are the ones controlling and dictating the actual behaviour of consumers. If this were the case, the challenge here would be a much greater one than simply the removal of barriers preventing attitudes reaching behaviour; it would entail a complete attitude change programme, ensuring that consumers hold genuinely pro-environmental attitudes at an implicit level.

What is an Implicit Attitude?

An implicit attitude is an underlying evaluation of an object. This evaluation can be negative or positive, but, importantly, implicit evaluations are automatic processes in that, by definition, they elude both introspection and conscious control (Gregg, 2008). In other words, implicit attitudes are unconscious, fast and not subject to the same kinds of biases as explicit attitudes. Interestingly, early definitions of attitude did not rule out the possible unconscious nature of certain components of an attitude. For example, Allport (1935) defined an attitude 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’ (p.784); and whilst there is no direct mention of the implicit aspect of the attitude, this definition does not rule it out either. It was Anthony Greenwald who took Allport’s original concept of the attitude and began to research its overlooked implicit aspect. Green-

wald used an example from his own personal experience to illustrate what he understood to be an implicit attitude. He wrote, 'As a manuscript reviewer, I often cannot help noticing an initial warm, positive reaction when I review a manuscript that cites my work favourably (or maybe just cites it at all), and sometimes I notice the opposite - a colder reaction when some of my work that might have been cited is not mentioned. I know that these reactions interfere with the way my work as reviewer should be done, but it is difficult to avoid these reactions – and it is difficult not to do the review by searching for virtues that will justify the initial warm reaction, or for flaws that will justify the initial cold reaction' (Greenwald, 1990, p.257). For Greenwald, it was this unconscious and automatic attitudinal force that influenced his resulting behaviour; a force that is not governed with the same degree of control as the explicit attitude. Of course, the immediate issue then becomes how do we measure these fast and unconscious processes, operating under the radar of conscious introspection? This was something that clearly had eluded the early attitudinal theorists, but what happened in the nineteen nineties was that we now (for the first time) had the technology, readily available, to lay these unconscious processes bare (through basic computer technology) and the result was the Implicit Association Test (IAT), introduced by Greenwald, McGhee and Schwartz in 1998.

The IAT is now acknowledged as a reliable and valid measure of underlying implicit attitudes. It has the ability to access the underlying associations that people hold, whether these are associations that people are unwilling to express or whether these are associations that people are completely unaware of holding (Brunel, Tietje & Greenwald, 2004). The initial paper by Greenwald et al. (1998) outlining the IAT uncovered something startling; indeed something unexpected and uncomfortable in today's society where racial prejudice is considered a thing of the past. Using the IAT, Greenwald and his colleagues found that whilst the majority of White college students in their study explicitly said they had no racial preference or even stated a preference for Black names, only one of the participants (out of a possible twenty six who expressed an explicit indifference or a preference for Black names) held an *implicit* preference for Black names in the IAT. Instead, the majority of White students demonstrated a strong implicit preference for names considered to be typically White compared to typically Black. What the IAT was uncovering were those attitudes that cannot be masked by social desirability, or attitudes that a person may be totally unaware of holding (Greenwald et al., 1998). It is all quite reminiscent of what Dostoevsky wrote more than a century earlier, 'Every man has some reminiscences which he would not tell to everyone, but only to his friends. He has others which he would not reveal even to his friends, but only to himself, and that in secret. But finally there are still others which a man is even afraid to tell himself, and every decent man has a considerable number of such things stored away. That is, one can even say that the more decent he is, the greater the number of such things in his mind.' (Fyodor Dostoevsky, 1864).

How does the IAT work?

In the original article, Greenwald et al. (1998) outlined the IAT as measuring the strength of attitudinal preference between two target categories and two attributes, so in one of the original IAT experiments the opposing target categories used were Black and White names, and the associated attributes used were pleasant and unpleasant. Over seven trials, participants assign word items into these target categories and attributes. The response latencies for these

trials are then measured. Faster response latencies occur when associated target categories and attributes share the same response key, whereas the reverse is true when categories and attributes that are not associated share the same response key, leading to slower response latencies. In the original IAT, participants were faster at categorising Black and White names with pleasant and unpleasant words when the target categories were grouped 'White'/'pleasant' and 'Black'/'unpleasant' than when they were grouped 'White'/'unpleasant' and 'Black'/'pleasant'.

Since the original seminal article by Greenwald et al. (1998), a wealth of research has used the IAT, including Nosek, Banaji and Greenwald (2002) at Project Implicit. Project Implicit measured evaluations towards a range of social groups, collating a staggering 600,000 tests from the Project Implicit website between October 1998 and April 2000. This allowed for the replication of the race IAT and a range of other IAT tests on an unprecedented scale. Nosek et al. (2002) found that in general White participants overall demonstrated an explicit preference for White over Black faces and names but implicitly they demonstrated an even stronger preference for White. Black participants on the other hand, demonstrated a strong *explicit preference for Black* faces and names, yet remarkably in the IAT even Black participants demonstrated a weak *implicit preference for White* over Black faces and names. The persistence of a general implicit White preference demonstrated by both White and Black participants has been attributed to aspects of American culture which often depict Black Americans in a negative light (despite much greater cultural awareness of this over the past few decades). It is argued that these negative associations have penetrated into underlying attitudes and have consequently led to the creation of automatic evaluations that favour White over Black (Nosek et al., 2002).

It is this remarkable ability of the IAT to 'cut through the fog of consciousness to what people really think and feel' (Gregg, 2008, p.764), particularly in the case of socially sensitive issues such as race, which is of particular interest in the current study. Clearly green consumerism can be a socially sensitive area where people may be motivated to hide their real underlying attitudes. However, the IAT has thus far had limited application to this important field (but see Vantomme et al. 2005). The IAT has been applied to consumer behaviour more generally and has proven to be a useful tool in the measurement of implicit consumer social cognition (for an overview see Greenwald, Poehlman, Uhlmann, & Banaji, in press). The application of the IAT to green consumerism could potentially uncover underlying *negative* implicit attitudes to low carbon footprint products that would go some way in accounting for what otherwise looks like an attitude-behaviour gap, with the positive explicit attitudes to 'green' products that are so frequently expressed not always resulting in the appropriate consumer behaviour. The IAT allows us to go beyond conscious and reflective explicit attitudes and uncover the unconscious, automatic implicit attitudes that people actually hold concerning green behaviours.

Only one published paper has, thus far, applied the IAT to green consumerism (Vantomme et al., 2005). Here, it was predicted that implicit attitudes towards green cleaning products would be less positive than would be expected from explicit attitude measures as a result of social desirability factors operating in the case of the explicit attitudes. In study 1, fictitious cleaning products were introduced to participants in a 'learning phase' where participants were informed that one product was environmentally friendly whilst the other was harmful to the environment. What the researchers found however, was that contrary to expectations, implicit attitudes towards the fictitious green cleaning products were in fact significantly

more positive than corresponding explicit attitudes. In study 2, real brands were used. This time, there was no difference reported between implicit and explicit attitudes towards the green cleaning products. The results from this study overall are, therefore, not that clear cut but, in general, implicit attitudes were not as negative as had been originally expected. But what differences might we anticipate between explicit and implicit attitudes in the case of high and low carbon footprint products? One might argue, following Greenwald that because of the importance of social desirability in the expression of green attitudes that implicit attitudes could well be significantly less positive than the more traditional explicit attitudes. Indeed, one could go further here and argue that because the whole concept of a carbon footprint is still in its infancy with many consumers not really understanding it, consumers may have even more negative implicit associations to a poorly understood concept that they feel is being foisted upon them (a recent article from Ipsos MORI suggested that 38% of people do not, in fact, understand what the term ‘carbon labelling’ means, Lamb, 2008). Alternatively, one could predict, following Vantomme, that the green message generally is getting through and that implicit attitudes to low carbon footprint products, like the implicit attitudes to the green cleaning products in the Vantomme study, will be essentially very positive, this time to real products. Either way the results are extremely important in that they will provide a snapshot of the attitudinal beliefs of a sample of the population in late 2008 in the UK, at a critical time in terms of climate change (Walker & King, 2008). The particular research focus will be on comparing measures of both explicit attitudes toward the carbon footprint of a product, using two explicit measurements; the likert scale and the feeling thermometer, and implicit attitudes toward carbon footprints using the IAT.

Method

Participants

100 participants (65 females and 35 males) were collected through opportunity sampling. The sample consisted of college and university students (originating from a range of social classes), college lecturers, secretarial staff and support staff, from Sheffield and Manchester, England. The age range of the sample was from 16-58 years old.

Procedure

Participants were seated at a table with a laptop placed in front of them. In the first part of the experiment, participants were asked to complete the computerised explicit attitude measures in the form of a likert scale and a feeling thermometer. Following on from this, participants were asked to read on-screen instructions outlining the basic IAT procedure, including examples to get participants acquainted with the IAT. When they had read through the instructions, participants then completed the IAT.

Explicit Attitude Measures

A likert scale was used to assess explicit preference towards the two target concepts of high and low carbon footprint products. Participants were asked, ‘Which statement best describes you?’ Responses were along a 5-point likert scale:

1. I strongly prefer products with a high carbon footprint to a low carbon footprint
2. I moderately prefer products with a high carbon footprint to a low carbon footprint
3. I like products with a high carbon footprint or a low carbon footprint equally
4. I moderately prefer products with a low carbon footprint to a high carbon footprint
5. I strongly prefer products with a low carbon footprint to a high carbon footprint

A feeling thermometer was used to assess explicit feelings of warmth and coldness towards products with high or low carbon footprints. Participants were asked: 'Please rate how warm or cold you feel toward the following products'. Ratings were measured on a scale ranging from 1 to 5 for both high and low carbon footprint products, where:

1. very cold
2. moderately cold
3. neutral
4. moderately warm
5. very warm

Implicit Attitude Measure (IAT)

Using the IAT procedure outlined by Greenwald, Nosek and Banaji (2003) there were two target categories (low carbon footprint/high carbon footprint) and two attribute categories (good/bad).

Exemplars from these categories appeared in the middle of the screen and participants were asked to sort the exemplars into their respective categories which appeared at the top left- and right-hand corners of the screen. To sort exemplars into the left-hand category, participants were asked to press z (on the left-hand side of the keyboard) and to sort exemplars into the right-hand category, participants were asked to press m (on the right-hand side of the keyboard). In total, there were seven trials where trial blocks 1, 2 and 5 were practice trials and trial blocks 3, 4, 6 and 7 were the critical trials where participants are required to sort exemplars into one of two categories that appear simultaneously. The trials are outlined in Table 1.

Table 1: Sequence of Blocks of Trials in the Implicit Association Test

Block	No. of trials	Left-key Response Categories	Right-key Response Categories
B1	20	Low carbon footprint	High carbon footprint
B2	20	Good words	Bad words
B3	20	Good words + High carbon footprint	Bad words + Low carbon footprint
B4	40	Good words + High carbon footprint	Bad words + Low carbon footprint
B5	20	High carbon footprint	Low carbon footprint
B6	20	Good words + Low carbon footprint	Bad words + High carbon footprint
B7	40	Good words + Low carbon footprint	Bad words + High carbon footprint

The theory is that participants should find it easier to sort exemplars if the paired target categories are associated (therefore responding faster) and harder to sort exemplars if the paired target categories are not associated (therefore responding slower). As such, participants who associate low carbon footprint products with ‘good’ and high carbon footprint products with ‘bad’ should respond slower on trials B3 (see Figure 1) and B4 (see Figure 2) where the pairs are as follows; good/high carbon footprint and bad/low carbon footprint and faster on trials B6 (see Figure 3) and B7 (see Figure 4) where the pairs are as follows; good/low carbon footprint and bad/high carbon footprint. The reverse should be true for participants who associate low carbon footprint products with bad and high carbon footprint products with good, as indicated by faster response latencies for trials B3 and B4 and slower response latencies for trials B6 and B7.

Figure 1: Trial B3

Figure 2: Trial B4

Figure 3: Trial B6

Figure 4: Trial B7

Results

Explicit Attitude Measure

Likert Scale

The results of the likert scale indicated that 30% of participants demonstrated a strong preference for products with low carbon footprints. 40% of participants demonstrated a moderate preference for products with low carbon footprints. 26% of participants demonstrated no preference and only 4% demonstrated a preference for products with high carbon footprints as shown in Figure 5.

Figure 5: Explicit Attitudes to High and Low Carbon Footprint Products using the Likert Scale

Feeling Thermometer

From the results of the feeling thermometer scales for both high carbon footprint and low carbon footprint products, thermometer difference scores (ranging from -4 to +4) were calculated by subtracting the score given to the high carbon footprint product from the score given to the low carbon footprint so that positive scores indicated a preference for low carbon. The analysis revealed that 23% of participants showed a very strong preference for products with a low carbon footprint. An additional 44% showed some preference for low carbon footprints, and 26% held neutral attitudes. Only 7% of participants showed a preference for products with a high carbon footprint (see Figure 6).

Figure 6: Thermometer Difference Scores for High and Low Carbon Footprint Products

Implicit Attitude Measure

IAT effect scores were computed by following the improved scoring algorithm created by Greenwald et al. (2003):

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.

N.B. 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 is the critical measure used which, in its simplest terms, calculates the difference in latencies during the critical trials and the error rate. The D score allows the experimenters to identify those participants who had implicit preferences for products with low carbon footprints and those who had implicit preferences for products with high carbon footprints. D score effect sizes which are similar to Cohen’s *d* (Cohen, 1988) take the form of small, medium and large values of 0.2, 0.5 and 0.8 respectively. Positive IAT effect scores reflect a preference for low carbon footprint products, whereas negative effect scores reflect a preference for high carbon footprint products.

The IAT results revealed that 59% of participants showed a strong implicit bias to products with a low carbon footprint. An additional 24% showed an implicit bias to products with a low carbon footprint (with a small or medium positive effect size). 10% of participants were neutral, showing little or no preference and 7% showed an implicit bias for products with a high carbon footprint (see Figure 7).

Figure 7: Percentage of Participants Displaying Scores within the Boundaries of each D Score Effect Size

Explicit and Implicit Comparisons

The analysis revealed that implicit attitudes are even more biased toward low carbon footprint products than explicit measures would suggest. Overall, 83% of participants showed a bias toward low carbon footprint products on the IAT compared to 70% on the likert scale and 67% on the feeling thermometer. Whilst both explicit measures suggested that 26% of participants held neutral attitudes toward low and high carbon footprint products, the IAT measure suggested that only 10% held a neutral attitude.

Discussion

Using a computerised measure of unconscious implicit attitudes, the IAT, it was found that implicit attitudes to low carbon footprint products were very positive in the sample tested,

indeed even more positive than the explicit attitudes of the same sample, as measured using the more familiar likert scale and the feeling thermometer. This is both a surprising and optimistic result. It was surprising, because we assumed that social desirability probably imposes constraints on respondents, such that they might well be forced to exaggerate their underlying beliefs about the positive aspects of low carbon footprint products, in the expression of their explicit attitudes. On the other hand, there is always the distinct possibility that their implicit attitudes might be somewhat less positive. However, we found the reverse pattern with the implicit attitude to low carbon footprint products even more positive than the explicit. The result was considered optimistic, because it suggests that in order for society to reduce its carbon footprint, through carbon labelling or similar schemes, what we need to do is remove the constraints that are preventing consumers acting on their underlying attitudes rather than having to change the underlying attitude. This would seem to be very good news from many points of view.

Interestingly, it was found that when compared to explicit measures, fewer participants held neutral attitudes when these were measured implicitly. Why is this the case? It could well be that participants were showing positive implicit bias towards *specific* products and images (those appearing on the computer screen, e.g. low energy light bulbs, Smart cars, chicken rather than beef, home grown apples rather than pineapples etc.) whereas, because on the explicit measures, participants are forced to imagine an undefined set of products with either high or low carbon footprints (which perhaps elicits a degree of uncertainty and unease about particular instantiations of these two categories), they therefore sit on the fence more with these abstract concepts. In other words, when it comes to specific products that respondents know and recognise (like low energy light bulbs) they are already very positive in terms of their unconscious implicit attitude. When it comes to more abstract things like 'low carbon footprint products' they are still positive but not quite so positive.

Most respondents showed a high degree of convergence between their explicit and implicit attitudes. However, there was a subset of around 12% of the sample who expressed divergent implicit and explicit attitudes in which explicitly stated attitudes were significantly more positive than their implicit counterparts; these people could well be termed the 'green fakers'. The IAT has successfully identified these people who, under traditional consumer research strategies would have gone under the radar. These are the people who are either deliberately stating attitudes towards the environment that they know they do not hold (due presumably to social desirability factors) or are reporting attitudes which contrast with their attitudes held at an unconscious, implicit level (of which they are unaware). In the case of these particular individuals, a degree of attitude change will be required before they will reduce their carbon footprint. We are currently investigating how to identify such individuals through their patterns of communication, particularly through possible mismatches in their speech and their spontaneous imagistic gesture (see Beattie, 2003; Beattie & Sale, in press).

Gordon Brown, the British Prime Minister (and quoted at the beginning of this article) has said 'The climate change crisis is the product of many generations, but overcoming it must be the great project of this generation.' The research that we have described here on implicit and explicit attitudes to carbon footprints suggests that many people are already positively primed to do something about lowering their carbon footprint, and thus to act in accordance with their underlying attitude (of course, we still need to investigate whether this is the case in a much larger and much more representative sample of the population). It would therefore seem to be a task of some considerable urgency to provide such consumers

with the relevant information, either on the products themselves or in consumer-related literature, in a form that they can understand, in order to guide their actual purchasing behaviour as an expression of their underlying attitude. This way we just might ensure that the tipping point for climate change is never reached.

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