The Great Community Climate Change Experiment: Using children from the community to promote meaningful sustainable actions.

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Contents

Abstract

This project used a bottom-up approach to attempt to create a shared understanding of a sustainable future and to promote the adoption of more sustainable behaviour in the context of the climate emergency using children (12-13 years old) as role models for adults from the same, or similar, communities in the North West of England. The children appear in a film produced by the researchers talking about climate change, and what they were trying to do to mitigate its effects, in the context of an educational programme. The new shared understanding is that a sustainable future necessarily involves all of us - even in our most mundane behaviours. One goal of this research was to attempt to overcome several major psychological barriers to climate change mitigation (namely self-efficacy and learned helplessness) to help ensure that individuals believe that any sustainable actions they can carry out are meaningful and that they can make a difference to our collective future. Another major objective of this research was to change how people feel emotionally about climate action, in order to influence their underlying *implicit* attitudes to carbon (and not just their reported attitudes), as implicit attitudes are often associated with sustainable everyday choices. We also aimed to influence beliefs about climate change as well as feelings of morality associated with sustainable behaviour. The results of this study are considered in detail and the policy implications discussed.

The empirical objectives

1. To use a bottom-up approach to create a new shared understanding of a sustainable future in communities in the North-West of England.
2. To overcome learned helplessness in the communities and to promote feelings of empowerment and self-efficacy using children from the area as role models, where the children describe their efforts to mitigate the effects of climate change.
3. To attempt to develop a new theoretical and methodological framework for the promotion of sustainable behaviour by focusing on underlying implicit rather than self-reported attitudes, where implicit attitudes are ‘automatic, associative evaluations of social objects, operating without any conscious awareness’.
4. To test the predictive value of these implicit attitudinal measures for sustainable behaviour.
5. To test whether implicit attitudes to carbon can be modified with an experimental intervention.

Introduction

We are faced with compelling scientific evidence that we are experiencing a climate emergency that requires immediate and concerted action at all levels in society, including the political, economic, social and individual level (IPCC, 2023). Social and individual action necessitates significant change in our everyday behaviours and in our decision-making about energy use, transportation and everyday consumer choice. We need to change both our rational and considered decisions (like deciding on a new car or holiday, or deciding whether to insulate the family home), and our more habit-based decisions (like turning off lights when leaving a room or choosing imported rather than local produce in the supermarket). However, there would appear to be a major disconnect between what people say about climate change, which tends to be very pro-sustainability and where they seem to recognise that it is important and they should do something urgently about it, and their actual behaviour, which seems more resistant to change and wedded to high carbon products and lifestyle behaviour (Beattie & McGuire, 2018). Gifford (2011) has discussed this discrepancy in terms of the psychological 'dragons of inaction'. These include feelings of learned helplessness and lack of self-efficacy, emotions not sufficiently negative to drive behaviour, habits resistant to change, and behaviours not predictable from standard attitudinal measures. Dealing with these dragons of inaction is a major societal concern.

Various behaviour change campaigns have been introduced in the past to promote awareness of climate change and to encourage more sustainable behaviours. Some of these campaigns over the past decade have been media based, including television commercials (Act on $CO_{2,}$) magazine advertisements (WWF) and social media (Climate Coalition), but all have had somewhat limited success (Beattie & McGuire, 2018). Other campaigns have tried a different approach. With groceries accounting for, on average, one third of household CO_2 emissions (Moser, 2015), it is important to attempt to influence everyday consumer behaviour towards low carbon, more locally-sourced food products. Such a change would then, in theory, drive the market to produce fewer high carbon items (a politically more attractive option than say a carbon tax on groceries). One approach that has been tried is 'carbon labelling', which provides information about GHG emissions in CO_2 equivalents that can be ascribed to goods and services. Consumers are informed of the environmental impact of the products through a simple labelling scheme, thus enabling them to reduce the CO_2 emissions of their household by making simple and relatively small changes to their lifestyle (Beattie & McGuire, 2018). This was introduced in the U.K. by the supermarket chain Tesco in 2007. DEFRA and others seemed confident on the basis of *self-report* attitude surveys that the U.K. public were ready to adapt their patterns of consumption 'with appropriate information about how to act' (DEFRA, 2016). These surveys consistently reported that the public held strong views about climate change and very positive attitudes towards more sustainable consumption, for example, '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 behavior to help limit climate change' (Downing & Ballantyne, 2007). Forum for the

Future wrote that '85% of people *reported* that they wanted more information about the associated environmental impacts of their purchases' (Berry, Crossley, & Jewell, 2008). DEFRA concluded that '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).

But carbon labels, unfortunately, at that time, had little effect on consumer choice. Research found little understanding of the values attached to carbon labels (Upham, Dendler, & Bleda, 2011), and carbon footprint was ranked 13th on the list of important attributes of a product (out of 14; see Gadema and Oglethorpe, 2011). When experimental participants viewed product images in the laboratory using eye-tracking, the carbon footprint icon, or the accompanying carbon footprint information, was the focus of the first visual fixation in only 7% of cases (Beattie, McGuire, & Sale, 2010). But most importantly, unlike the introduction of nutritional information like fat content and calories on products, which produced an almost immediate change in consumer choices, carbon footprint had little effect on consumer behaviour (Beattie, 2012a). Tesco discontinued carbon labelling in the U.K. in 2012, although it continued in various forms in other countries and is now being reintroduced in the U.K. (although it remains to be seen as to whether these labels will now draw consumers' attention in the 5-7 second time window when choice is made).

Despite carbon labelling and other major initiatives, large scale behavioural change in the direction of more sustainable lifestyles has not occurred. For example, domestic energy consumption increased by 40% between 1990 and 2005 and by 1.5% between 2015-2016 (Department for Business, Energy and Industry Strategy, 2017). One of the world's leading multinationals Unilever outlined in their 'Sustainable Living Plan' in 2013 how they planned to halve the GHG emissions of their products across the lifecycle by 2020. They reduced GHG from their manufacturing chain, doubled their use of renewable energy, produced concentrated liquids and powders, reduced GHG from transport and refrigeration and restricted employee travel. The result was that GHG footprint per consumer '*increased* by around 5% since 2010' (Unilever, 2013). Unilever concluded that the biggest challenge facing this whole enterprise was 'consumer behavior', which was more resistant to change than had been previously anticipated, and was, in fact, moving in the wrong direction (despite the apparent increasing positive attitude of the public to more sustainable lifestyles). There have been some changes in consumer behaviour in the interim but not of the magnitude required.

Resistance to change: self-efficacy, empowerment, and learned helplessness

Some of this resistance to change may be attributable to the public thinking that their behaviours will not make any real difference to the overall issue, they feel disempowered, they have feelings of low self-efficacy (feeling that they *personally* can't make a difference to climate change mitigation) and low response efficacy (feeling that their *behaviours* will not make a difference) The resistance to change may also be associated with feelings of learned helplessness where people have 'learned' to stop trying, they have tried in the past to do something and it didn't seem to have any effect (Seligman, 1972). For this reason, assessing and attempting to change empowerment (feelings of self-efficacy and response-efficacy) and learned helplessness are central features of the current project. Behavioural inaction may also be attributable to the fact that although people *know* that climate change is bad they don't *feel* it sufficiently strongly (Beattie, 2010) or believe that it won't impact on

them personally because of low perceived vulnerability and optimism bias (Beattie et al. 2017). So again, measuring and attempting to change emotions associated with climate change and perceived personal vulnerability are central features of this research.

There is one other important dragon of inaction that needs consideration - the discrepancy between expressed attitudes and behaviour, which is sometimes referred to as the 'value-action gap' (Kollmuss & Agyeman, 2002). So why do people not behave in accordance with their attitudes to sustainability? The value-action gap raises a number of fundamental psychological questions, for example, as to whether people have the appropriate attitude ('a mental and neural state of readiness to act', Allport, 1935) to sustainability/climate change in the first place, and whether they do just need better information (like carbon labels) to change their behaviour? Some have argued that self-reported attitudes, which necessarily are both conscious and explicit, may not be sufficient for understanding and predicting behaviour, and have questioned whether 'our mental and neural state of readiness to act' in *each and every* domain is necessarily conscious in the first place (Beattie, 2010; Greenwald et al., 2009). Indeed, Gordon Allport, considered by many to be the 'father' of attitude measurement in social psychology, who first propagated self-report measures in the discipline, seemed to have held doubts about this himself. He wrote 'Often an attitude seemed to have no representation in consciousness other than a vague sense of need, or some indefinite or unanalysable feeling of doubt, assent, conviction, effort, or familiarity' (Allport, 1935). Furthermore, in domains like sustainability, self-reported, explicit attitudes may be overshadowed by social desirability and reporting biases. For example, in one study, although 50% of participants reported that they preferred to buy organic products, this was contradicted by actual consumption data (Tsakiridou, Boutsouki, Zotos, & Mattas, 2008). Ajzen and Cote (2008) concluded that the predictive validity of explicit attitude measures declines as social desirability increases. In the case of climate change and sustainability, the social desirability of certain responses is very high (Beattie, 2010).

The value-action gap: explicit and implicit attitudes

One alternative approach to this issue of the potentially weak relationship between self-report measures of attitudes and actual behavior, is to measure 'implicit' attitudes, where reporting biases may not be so prevalent. Implicit attitudes are conceptualized as underlying evaluations, which appear to be fast and automatic (Kahneman, 2011), often operating below the level of conscious awareness (Beattie, 2010; Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995; Wilson, Lindsey, & Schooler, 2000). Greenwald, McGhee and Schwartz (1998) defined implicit attitudes as 'actions or judgments that are under the control of automatically activated evaluation, without the performer's awareness of that causation' (1998, p.1464). Research has shown that in a number of domains implicit attitudes (measured using the Implicit Association Test, or IAT) and self-reported attitudes show little or no correlation. This seems to be the case in the environmental domain (Beattie, 2010; Beattie & Sale, 2009, 2011; Brunel, Tietje, & Greenwald, 2004; Friese, Wänke, & Plessner, 2006; Hofmann, Gawronski, Gschwender, Le, & Schmitt, 2005), and other 'sensitive' domains like race (Beattie, 2012b; Beattie, Cohen, & McGuire, 2013). The IAT has been acknowledged as a reliable and valid measure of implicit attitudes towards given target concepts with a test-retest reliability of .60 (Greenwald et al., 2002) and a consistency measure with a Cronbach's alpha > .80 (Friese et al., 2006; but see Blanton et al., 2009). The basic premise behind the IAT

is that when categorizing items into two sets of paired concepts, if the concepts are strongly associated (e.g., 'low carbon'/'good'), then participants should categorize the items faster (and with fewer errors) than if they are not strongly associated.

Models of attitudes and behaviour that consider both deliberate and automatic processes are known as dual-system models (e.g. Fazio 1990), and these have been applied to a number of domains, including consumer decision-making (Alós-Ferrer & Strack, 2014). Our decisions as consumers are sometimes slow, deliberate and 'thoughtful', but are, on many occasions, driven by much more automatic and non-deliberate processes (Panzone, Hilton, Sale, & Cohen, 2016), that are core to everyday shopping *habits* (Ulph & Southerton, 2014).

This theorizing about explicit and implicit attitudes aligns well with mounting evidence from psychology, cognitive science, and behavioral economics that human beings have two distinct (and very general) cognitive sub-systems with automaticity, and conscious awareness of the processes, as a principal distinguishing feature. Kahneman calls these systems – System 1 (fast, automatic and unconscious) and System 2 (slow, deliberate and conscious). Kahneman characterizes System 1 as a 'workaholic' and System 2 as often 'lazy' ('harsh…but not unfair', according to Kahneman, 2011, p.46). The two systems operate 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' (Kahneman, 2011, p.51); System 2 uses more propositional and logical reasoning. 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' (2011, p.21), but we are often, in reality, it seems, directed by System 1.

Panzone et al. (2016) argue that the automatic evaluations in consumer decision-making are based on the experientially-derived implicit attitudes towards various products (Eagly & Chaiken, 2007). Bettman, Luce and Payne (1998) and others have argued that 'consumers often do not have well-defined existing preferences, but construct them using a variety of strategies' (1998, p.187). One such 'strategy' is the implicit evaluation of the product (Bohner & Dickel, 2011), and the operation of implicit processes.

But what evidence is there that we can change implicit attitudes to carbon? This research is very much in its infancy, particularly in the domain of sustainability. Beattie & McGuire (2020) were the first to demonstrate that this is possible using highly emotionally-engaging climate change film content (from Gore's 'An Inconvenient Truth'), with an associated effect on low carbon choices in an experimental setting. From a neuroscience perspective, such a change could reflect modification of the underlying associative structures that underpin implicit attitudes (through evaluative conditioning), or it could be a temporary activation of pre-existing associative patterns without necessarily any change in the underlying associative structures (Gawronski & Bodenhausen, 2006). Of course, even this latter type of change could be important in disrupting some long-held behavioural habits.

However, a more systematic intervention might well be necessary to change underlying associative structures to low carbon, hence we developed a series of educational programmes for young people when these associative structures are being established to see if we could influence implicit attitudes to low carbon products and lifestyle behaviours (McGuire & Beattie, on-going). We investigated

how the explicit and implicit attitudes, and everyday sustainable behaviours, of children (9-11 years old) from the Kirkby /Liverpool region could be positively influenced using educational programmes, including a knowledge-based programme and a creative arts programme (with drama, drawing, posters, poetry writing, rap etc.), which was high in emotional engagement as well as knowledge. The creative arts project proved to be more effective in promoting change.

The current project

This project build on this. It uses children on a similar educational programme as role models for the adults from their own and similar communities. It involves screening a short documentary film the researchers produced ('The Great Climate Change Experiment', funded by an AHRC COP26 Development Grant, March 2022) based on this educational research using a new cohort of children. In the current project, we tested the effects of this film on adult audiences, assessing feelings of empowerment (self-efficacy and response efficacy) and learned helplessness, personal responsibility to act, perceived personal vulnerability, as well as emotional feelings towards climate change, beliefs and feelings of morality about climate change. The explicit and implicit attitudes of the adult participants, their reported behaviours, and the behavioural intentions of the audience were also assessed.

Method

Ethical Considerations

Ethical approval was obtained through Edge Hill University's Science Research Ethics Committee and was carried out in line with the British Psychological Society's Code of Human Research Ethics and Code of Ethics and Conduct. All participants read an information page embedded within the Qualtrics online survey, and a series of consent statements needed to be approved by the participants before they could proceed with the survey. Respondents were not asked to provide any personally identifiable information.

Stimulus material

The film used in the present study derived from ongoing research by McGuire and Beattie (2020 - 2023) looking at the effects of educational programmes on primary schoolchildren in the Kirkby area of Liverpool. This research found that creative arts programmes had a significant effect on the adoption of sustainable behaviour in a sample (n=417) of primary school children. For the film, interviews were conducted with secondary school children where they spoke about their thoughts and feelings about climate change at various stages in the programme and what they were doing to mitigate its effects. It was hoped that we could increase feelings of self and response-efficacy and decrease learned helplessness in adult audiences with implications for how they respond to the threat from climate change. The sources of the climate change message for the audience of the film are not politicians, scientists, influencers, celebrity endorsers or (often middle class) eco-activists, all of whom may be perceived as having an agenda thus raising issues of trust and credibility, but children from the community talking for the first time about their fears

and anger over the world that they are inheriting.

Procedure

Participants were asked a series of question related to climate change. These included questions about empowerment (self-efficacy and response efficacy), personal responsibility to act, learned helplessness, perceived personal vulnerability, as well as emotional feelings towards climate change, beliefs and feelings of morality about climate change. The explicit and implicit attitudes of the adult participants and the behavioural intentions of the audience were also assessed at the outset of the experiment (Time 1). They were then asked to watch the 20-minute climate change film (or in the case of the control group - a film unrelated to climate change - about crocheting). Once they had watched the film, they were then asked to complete all of the measures again (Time 2). After eight weeks, they were asked to complete all the measures again (Time 3, this research is on-going as the Time 3 data is still coming in).

Measures

Beliefs about climate change

Participants were presented with five statements about climate change, for example, 'Scientific evidence points conclusively to a warming in global temperature', Human activity has been the driving force behind the warming of the earth', and 'Global warming presents a serious threat to human life' (see Appendix 1 for all the measures used in this study). Participants were asked to rate the extent to which they agreed with each of the statements on a five-point scale from 1- strongly disagree, 3 – neither agree nor disagree, to 5 strongly agree.

Empowerment

Participants were presented with four statements in this section including 'I feel empowered in the fight against climate change' and 'How much can ordinary people influence future changes in our climate?' Again, participants were asked to report the extent to which they agreed with each of the statements on a five-point scale from 1 – strongly disagree to 5 strongly agree.

Learned helplessness

Participants were presented with three statements relating to learned helplessness. They were asked to rate to what extent they agreed with each statement on a five-point scale (1-strongly disagree, 3 neither agree nor disagree, 5 – strongly agree). Statements included 'There is no point in me trying to do anything to reduce climate change', 'Climate change is too difficult to overcome', and 'I feel powerless in the fight against climate change'.

Emotions

Participants were also asked about how they felt emotionally about climate change There were four questions in this category including 'How sad are you about climate change?', 'How frightened are you about climate change?', and 'How angry are you about climate change?' etc. Participants were asked to report what extent they felt these emotions on a five-point scale from 1 – not at all, to 5 - extremely.

Perceived personal vulnerability

Participants had to indicate to what extent they agreed with statements like 'I will

personally be affected by climate change', and 'climate change will only affect future generations' (reverse scoring) using a five-point scale from 1 – strongly disagree to 5 -strongly agree.

Personal responsibility

Participants were presented with five statements including 'I am prepared to change my everyday behaviour to reduce climate change', 'Climate change is a problem to be solved by future generations', 'I would do more to try to reduce climate change if other people did more as well'. Participants were asked to report the extent to which they agreed with each of the statements on a five-point scale from 1 – strongly disagree to 5 strongly agree.

Moral feelings about climate change

The next set of questions focused on moral feelings about climate change and included three where participants reported the extent to which they agreed on a five-point scale from 1 – strongly disagree to 5 strongly agree. Statements included 'Preventing global warming decreases suffering in others', 'Recycling is morally right', and 'reducing energy consumption is morally right'.

Measure of explicit attitudes – Likert scale

Participants were asked to rate on a five-point scale their preference for high and low carbon footprint from 1 – 'I strongly prefer products with a low carbon footprint to a high carbon footprint', 3- 'I like products with a high carbon footprint and a low carbon footprint equally', 5 - I strongly prefer products with a high carbon footprint to a low carbon footprint

Measure of explicit attitudes - Feeling Thermometer

Participants were also asked to report how warm or cold they felt towards high carbon footprint and low carbon footprint on a Feeling Thermometer. The scale is as follows: 1 (extremely cold) to 5 (extremely warm). The score for high carbon footprint is then subtracted from the score for the low carbon footprint which yields a Thermometer Difference score (TD score). The TD score can range from -4 to +4 where a negative number reveals a warmer feeling for high carbon and a positive number reveals a warmer feeling for low carbon footprint. Participants with a very positive feeling towards low carbon might select '5' when asked how warm they feel towards low carbon (meaning 'very warm') and they might select '1' when asked how warm or cold they feel toward high carbon (meaning very cold). This would yield a Thermometer Difference (TD) score of +4. On the other hand, a participant who had a very positive feeling towards high carbon might select '5' meaning 'very warm' towards high carbon and '1' for low carbon, thus producing a TD score of −4.

Measures of implicit attitudes - Implicit Association Test

Participants were then asked to complete the Carbon Implicit Association Test (IAT). The Carbon IAT measures speed of association to different sets of paired concepts (high carbon/good and low carbon/bad, or high carbon/bad and low carbon/good) when categorizing words and images – in the case of this IAT images of high and low carbon items, good and bad words.

In the first block, coloured images of high and low carbon items appeared in the centre of the screen and participants were required to sort the images into the correct category either 'high carbon' or 'low carbon'. There were 16 images in total

and all images had a matched pair e.g. a plastic bottle of water (high carbon) versus a glass of tap water (low carbon (see Appendix ii). The IAT was designed with 7 Blocks in total (Greenwald et al. 2003) and each Block had either 20 or 40 trials. In Block 1 (20 trials) participants were asked to sort images of high and low carbon items into the categories 'High Carbon' or 'Low Carbon', Block 2 (20 trials) participants were asked to sort positive and negative words into the categories 'Good' or 'Bad'. In Blocks 3 and 4 (40 trials) the categories were combined e.g., 'High Carbon/Bad', 'Good/Low Carbon' or 'High Carbon/Good', 'Low Carbon/Bad' (this is randomized between participants). Block 5 (20 trials) participants were asked to sort positive and negative words into the categories 'Good' or 'Bad' (however the words 'Good' and 'Bad' were displayed on opposite sides of the screen to what they were displayed in Block 2). Blocks 6 and 7 (40 trials) categories were combined again and are displayed in the opposite combination to Block 3 and 4 e.g., if the pairing was High Carbon/Bad, Low Carbon/Good in Block 3 and 4, the pairing would be High Carbon/Good, Low Carbon/Bad in Blocks 6 and 7 and vice versa.

Data was calculated from Blocks 3, 4, 6 and 7 to form a D score. The D score is the difference in time that it takes to assign a word or image to one combination of paired concepts (e.g. High Carbon/Good) compared to the alternative combination of paired concepts (e.g. Low Carbon/Bad). For example, if a participant had a positive implicit attitude to high carbon, participants would find it easier to assign images of high carbon items into the conjoined category High Carbon/Good than into High Carbon/Bad. If a participant had a positive implicit attitude to low carbon, they would find it easier to assign images of low carbon into the conjoined category Low Carbon/Good than into Low Carbon/Bad, in other words when white faces were paired with good, than when white faces were paired with bad.

The basic premise behind the IAT is that participants should find it easier to sort exemplars if the paired target categories are associated (therefore responding faster and making fewer errors) and harder to sort exemplars if the paired target categories are not associated (therefore responding slower and making more errors). A positive D score, indicating a quicker response time when the paired concepts are 'Good/Low Carbon' and 'Bad/ High Carbon', reveals an implicit preference for low carbon. The higher the D score the stronger the implicit preference. A negative D score, on the other hand, indicates a preference for high carbon, the lower the score the stronger the high carbon preference.

Behavioural intentions

There were six statements under this section including 'I intend to replace all light bulbs in my home with more energy efficient lightbulbs', 'I intend to set my central heating 1 or 2 degrees lower', and 'I intend to recycle all of my rubbish'. Participants could either select 'I already do this' or they could choose their response from a five-point scale from 1 – definitely not to 5 definitely.

Extension and modifications to the project

We ran this study initially (January-June 2022) in a number of locations in the North West of England (and Northern Ireland).

1. Kirkby Art Gallery
2. Southport Eco-Centre

3. Liverpool World Centre, Toxteth
4. Edge Hill University
5. Ulster Museum.

We did, however, encounter a problem in that despite very significant efforts at promotion (including local media, Radio Merseyside etc., and social media, flyer distribution in the community, promotional material in the venues), we did not get the number of participants statistically required for our design. The project was intended to run from January 2022 until the end of June 2022. As well as recruitment, the production of the final film was also delayed. A one-month extension was originally requested until the end of July 2022, and an additional extension was granted until the end of May 2023.

In consultation with the B.A., we decided to run the study on Qualtrics using Prolific as the platform to reach a large locally-based audience. In order to qualify for participation in this study participants were required to have been born in an area in the North-West of England, or to be living in the North-West of England. Three-hundred and thirty-nine participants took part in the study, male (n= 161), female (n=176), non-binary/third gender (n=1) with one participant preferring not to disclose their gender. Participants were aged between 18 and 72 (see Figure 2). 52.2% of the sample were aged between 21 and 40 years old. Over half of the sample voted for Labour in the last general election (see Figure 1), in keeping with the broad political voting pattern of the area. Two-hundred and thirty-three participants were assigned to the experimental condition where they watched a 20-minute film about climate change, 106 participants were assigned to a control condition where participants watched a film unrelated to climate change, namely, a film about crocheting.

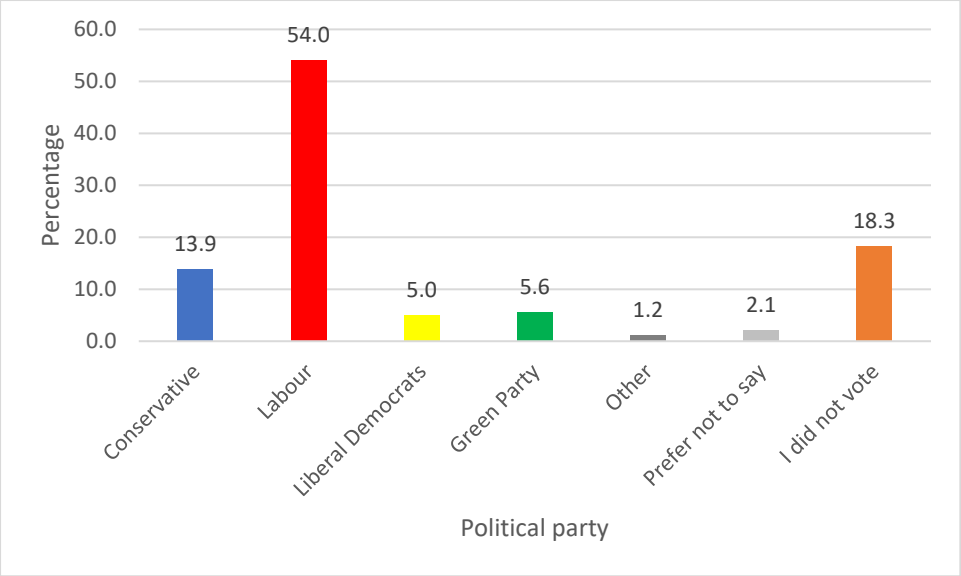

Figure 1: Percentage of participants grouped into political voting preferences

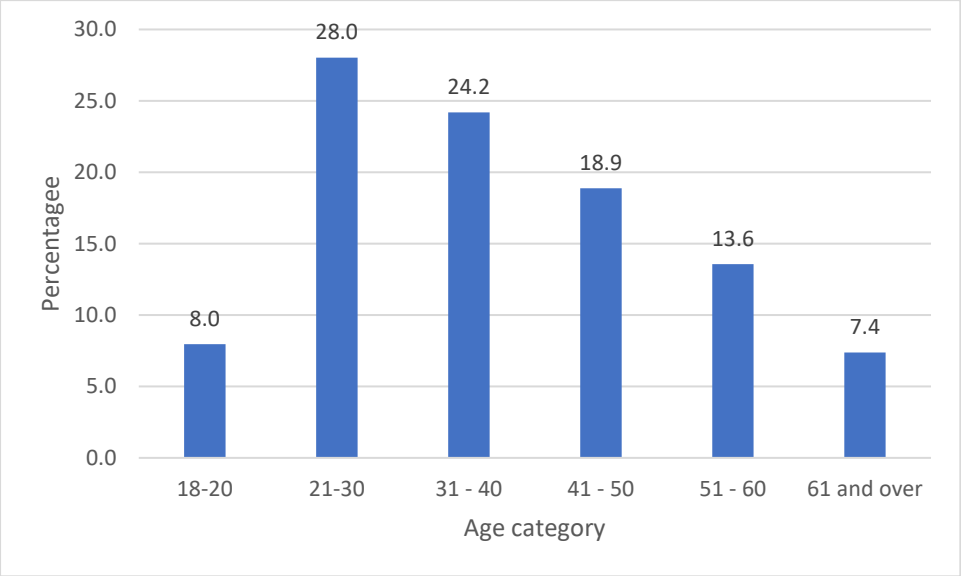

Figure 2: Percentage of participants grouped into age categories

Results

Beliefs about climate change

The first set of questions measured participants' beliefs about climate change on a five-point scale. Here they had to indicate to what extent they agreed with five individual statements on a five-point scale ranging from strongly disagree (1) to Strongly agree (5). Scores were added across all five statements to give a cumulative score for this section. See Appendix i for the full list of statements in this category *(directional hypotheses and directional statistics were used throughout).*

For this analysis, we focused exclusively on the percentage of participants in the experimental and control groups who selected 'strongly agree' on items like 'Scientific evidence points conclusively to the warming of global temperature' etc. from Time 1 (before watching the film) to Time 2 (immediately after watching the film). The percentage increased by 14.3% in the experimental group from 630 strongly agree responses to 720, but using a Chi-Square **this was not significantly different from the control group.** There was also a very slight increase in the control group (X^2=1.040, d.f. = 1, p=0.15).

Table 1: Number of participants who strongly agreed that there was compelling scientific evidence for climate change.

	Time 1	Time 2
Experimental	630	720
Control	266	274

Empowerment

The next analysis focused on empowerment where participants had to indicate to what extent they strongly agreed etc. with statements like 'I feel empowered in the fight against climate change'. The experimental group showed a 146.9% increase in the most extreme responses following exposure to the film with a rise from 147 to 363. The Chi-Square revealed that **there was a very significant difference comparing the experimental and the control group (X^2=14.657, d.f.=1, p= 0.00006).**

Table 2: Number of participants who felt empowered in the fight against climate change

	Time 1	Time 2
Experimental	147	363
Control	105	140

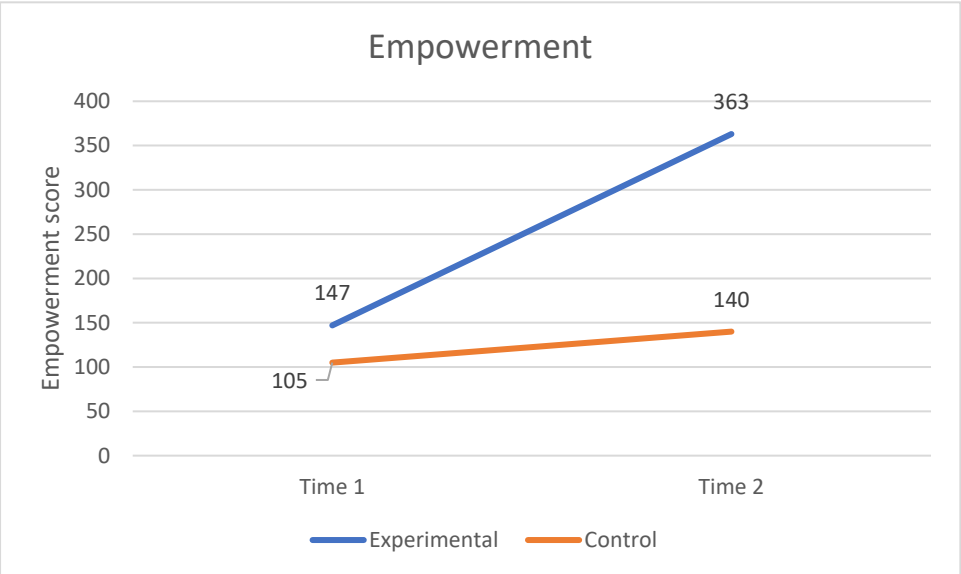

Figure 3: *Number of participants who felt empowered in the fight against climate*

change.

Learned helplessness

The next analysis considered the number of participants in the experimental and control groups who selected 'strongly agree' at Times 1 and Time 2 to questions like 'There is no point in me trying to do anything to reduce climate change' (with reverse scoring). Here, there was a 66.9% increase in 'strongly agree' from a base of 142 at Time 1 to 237 at Time 2 for the experimental group; this difference was significant when compared with the control group **(X^2=2.721, d.f. = 1, p< 0.05).**

Table 3: Number of participants who strongly agreed that they could do something to prevent climate change

	Time 1	**Time 2**
Experimental	142	237
Control	70	85

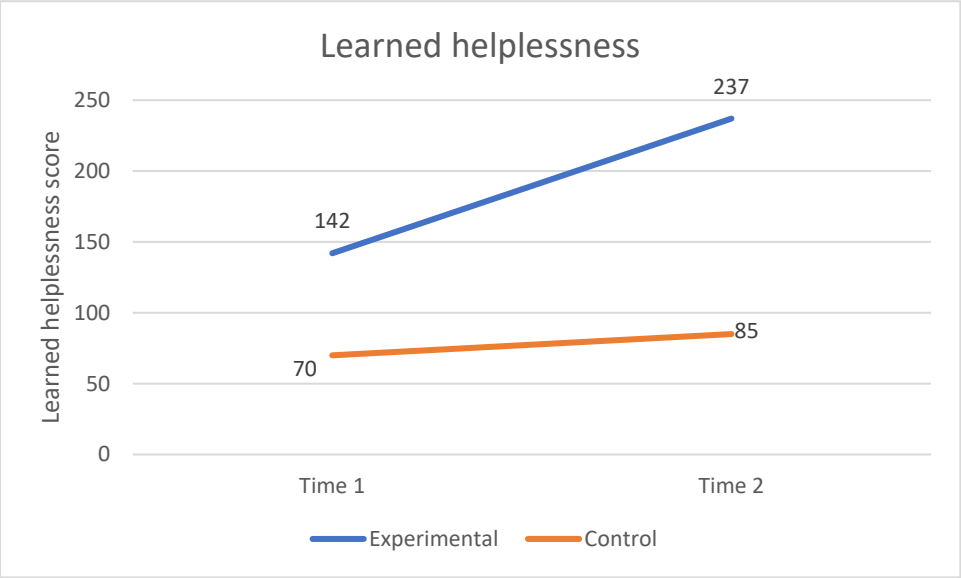

Figure 4: *Number of participants who strongly agreed that they could do something to prevent climate change*

Emotions

The specific emotions analysed were sadness, fear, anger and disgust; the analysis again focused on the most extreme responses ('extremely angry' etc.). There was a 68.9% increase in extreme negative emotions in the experimental group after watching the film and **the difference was significant in comparison with the control group (X^2=6.097, d.f.=1, p< 0.01).**

Table 4: Number of participants who felt extreme negative emotions about climate change.

	Time 1	**Time 2**
Experimental	183	309
Control	78	84

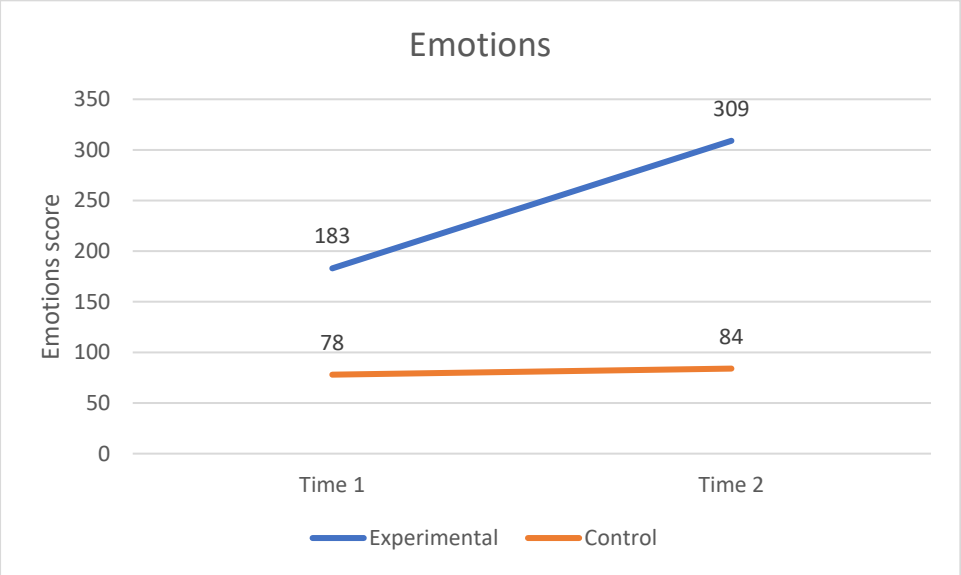

Figure 5: *Number of participants who felt extreme negative emotions about climate change.*

Perceived personal vulnerability

Participants had to indicate whether they agreed with statements like 'I will personally be affected by climate change', and (reverse scoring) statements like 'climate change will only affect future generations'. In the experimental group there was a 105.2% increase but a 64.9% increase in the control group. One usually imagines that in the control group there would be no or little difference between Time 1 and Time 2, but sometimes, upon reflection, participants can change their response. The experimental/control difference was **not significant** (X^2=0.815, d.f. = 1, p= 0.18).

Table 5: Number of participants who felt that they would personally be affected by climate change

	Time 1	**Time 2**
Experimental	97	199
Control	37	61

Personal responsibility

Participants were asked to respond on a five-point scale from 'strongly disagree' (1) to 'strongly agree' (5) to statements like 'I am prepared to change my everyday behaviour to reduce climate change', and 'I can personally help reduce climate change'. In the experimental group the number of the most positive responses increased by 60.4%; the control group was more stable and **the difference was marginally significant (X^2= 2.671, d.f. = 1, p= 0.05).**

Table 6: Number of participants who were prepared to do something to prevent climate change

	Time 1	**Time 2**
Experimental	278	446
Control	145	181

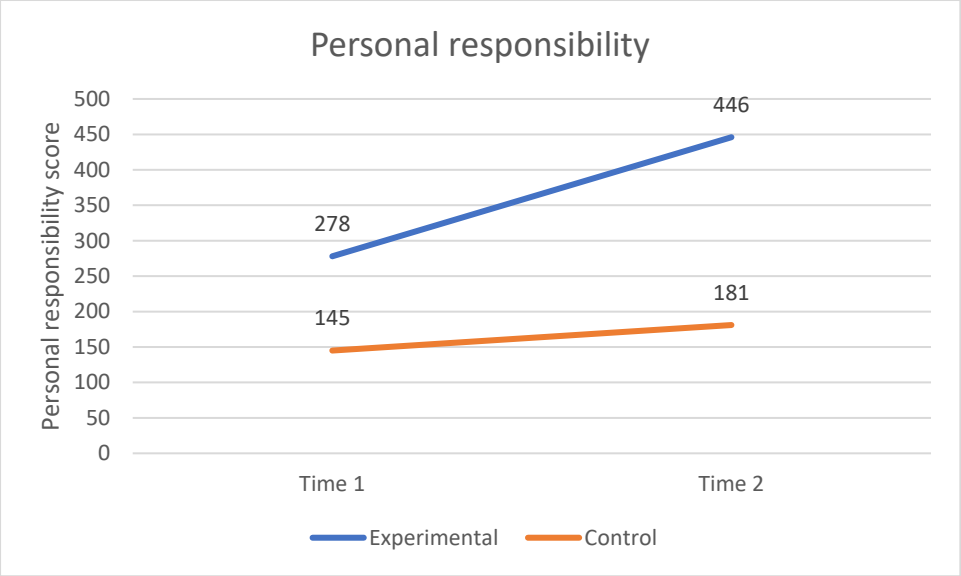

Figure 6: *Number of participants who were prepared to do something to prevent climate change*

Moral feelings about climate change

When it came to judgements of moral feelings about climate change, for example, whether they thought that 'recycling is morally right', 'reducing energy consumption is morally right' etc., we found that there was a 28.4% increase from 327 to 420 but there also seemed to be an increase in the control group of 13.9% which meant that the Chi-Square was **not significant** (X^2=0.783, d.f.=1, p=0.19).

Table 7: Number of participants who felt that non-sustainable behaviour was morally wrong

	Time 1	**Time 2**
Experimental	327	420

Control	144	164

Additional analyses

In terms of additional analyses, the questions in each category (emotions, empowerment etc.) were also analysed separately and some important results did emerge. In terms of emotional response to climate change, there was a statistically significant effect *overall* of the film on negative emotions, but this effect was not consistent across all types of emotions. All specific negative emotions did increase after watching the film but not all were statistically significant. Thus, in the case of sadness, after watching the film 43.3% more participants reported being extremely sad but when this was compared to the control group this increase was not significant (X^2= 1.307, d.f. = 1, p=0.13). After watching the film, 52.6% more participants reported that they were extremely frightened but again, in comparison to the control group this difference was not significant (X^2=0.161, d.f.=1, p=0.34). **The biggest effects were for anger and for disgust. After watching the film 82.5% more participants reported feeling extremely angry about climate change and this was statistically significant compared to the control (X^2=2.642, d.f.=1, p ≈ 0.05). 115.8% more participants said that they felt extremely disgusted by high carbon emissions after watching the film, and this again was statistically significant compared to the control group (X^2=3.043, d.f. = 1, p< 0.05).**

Some other interesting specific significant results emerged which do need further comment, in particular some of the questions about empowerment. In response to the question **'How much can individuals do to prevent climate change?', after watching the film there was an increase of 117.0% in the number of participants who selected 'a great deal' as their response. There was also an increase of 112.8% in response to the question 'How much can ordinary people do to influence future change in our climate. Both of these were statistically significant. In the first example, X^2=5.706, d.f.=1, p=0.008; in the second example, X^2= 5.345, d.f.=1, p=0.01.**

In other words, what this research demonstrated was that a film showing children from the community expressing their feelings about climate change and describing what *they* were doing to mitigate its effects can significantly increase feelings of empowerment in adults from the community, decreasing their feelings of learned helplessness and increasing their personal responsibility to act. It also affected them emotionally, making them angrier and more disgusted.

Attitudes to carbon footprint

Explicit attitudes; Likert

The results at Time 1 indicated very strong explicit attitudes to low carbon - 36.9% expressed a strong preference for low carbon, and 0% expressed a strong preference for high carbon; 77.9% of participants had either a moderate or strong preference for low carbon compared to 2.1% who had a moderate or strong preference for high carbon. The mean Likert score was 4.12 for the experimental group (T1), increasing to 4.42 (T2), and 4.19 (T1) increasing to 4.26 (T2) for the control group.

In other words, this set of participants was always going to be very difficult to change significantly because they had strong low carbon preferences at

the outset. Nevertheless, after the film there was a substantial increase (55.8%) in strong preference for low carbon footprint products with a small increase in the control group, but this difference was **not significant** (X^2=1.659, d.f.=1, p= 0.198).

Table 8: Number of participants who strongly preferred products with a low carbon footprint to a high carbon footprint (a score of 5 on the Liker scalet)

	Time 1	**Time 2**
Experimental	86	134
Control	41	46

Thermometer Difference

The mean TD score was 2.18 for the experimental group (T1), increasing to 2.91 (T2), and 2.40 (T1) increasing to 2.40 (T2) for the control group. In the case of the Thermometer Difference score, the focus of the statistical analysis was on those who scored +4 (indicating a very strong feeling towards low carbon footprint). We found that there was a 64.1% increase in the experimental group with an increase in the control group, meaning that this comparison was **not significant** (X^2= 0.391, d.f.=1, p=0.376).

Table 9: Number of participants who had a strong preference towards low carbon (on the TD)

	Time 1	**Time 2**
Experimental	327	420
Control	144	164

Implicit attitudes to carbon footprint, and behaviour

The mean D score was 0.86 for the experimental group at the outset and 0.90 for the control group. Again, there is clearly going to be an issue with respect to possible changes in implicit attitudes. Anything over 0.80 is considered a strong implicit pro-low carbon attitude. **The statistical analyses did not reveal any significant effect of the film** (experimental versus control) on the number of participants with a strong pro-low carbon implicit attitude between Time 1 and Time 2 (X^2= 0.235, d.f. = 1, p< 0.30).

Table 10: *Number of participants with a very strong implicit attitude to low carbon*

Number of those with D scores of 0.80 and above at Time1 and Time 2			
	T1	T2	Statistical analysis
Experimental	148	103	X^2 = 0.2349, p=0.25
Control	67	52	

In terms of a relationship between strong positive implicit attitudes and behaviour, one noteworthy result was that there was a significant effect for the buying of

locally sourced food (X^2 = 5.7851, d.f. =1, p=0.01). **Those with a strong positive attitude to low carbon at the outset were 2.5 times more likely to buy locally sourced food (as opposed to rarely or never).**

Table 11: *The relationship between implicit attitudes and buying locally sourced products (Time 1)*

Do you buy locally sourced products wherever possible?			
	Always/often/sometimes	Rarely/Never	Statistical analysis
≥ 0.80	154	61	X^2 = 5.7851, p=0.01
≤ 0.79	73	51	

Behavioural intentions

The next set of analyses focused on behavioural intentions and we analysed the number of participants who indicated that they would *definitely* make a change towards more sustainable behaviour, for example, intending to use the washing machine only when it was fully loaded. In the case of the experimental group there was a 56.4% increase, but when compared to the control group this **was not significant** (intentions to change behaviour also increased with this group but by a much smaller amount) (X^2= 0.901, d.f.=1, p=0.17).

Table 12: Number of participants who said that they would change their behaviour to mitigate the effects of climate change

	Time 1	**Time 2**
Experimental	78	122
Control	40	49

The main feature of this comparison that was not anticipated was the number of participants who indicated that they were already carrying out the specified behaviour. So, for example, with respect to the full load of washing machine, at Time 1, 76.4% said that they were already doing this, when it came to recycling all of their rubbish 72.1% said that they already did this and when it came to drinking tap water over bottled water 68.7% said that they were already doing this. 82.4% reported that they were already using a reusable shopping bag. This meant that there were far fewer participants who could possibly change in a positive direction because of the intervention.

Conclusions and discussion

This project has generated some interesting and potentially important conclusions in certain domains.

In line with Gifford (2011), we recognise that there are psychological 'dragons of inaction' with respect to the general public and climate change, which need somehow to be confronted if we are to encourage people to act more sustainably in their daily lives. These dragons of inaction include feelings of general disempowerment, which include feelings of low self-efficacy (feeling that they *personally* can't make a difference to climate change mitigation) and low response efficacy (feeling that any of their possible *behaviours* will not make a difference). This disempowerment may also be associated with feelings of what the psychologist Martin Seligman has termed 'learned helplessness' where people have 'learned' to stop trying to engage in particular actions, in that they have tried to live more sustainable lives in the past but felt that it did not have any positive effects, as far as they could tell. In the psychological jargon, they were 'punished' for trying to act sustainably – they have made an effort with no discernible positive consequences, just negative consequences, namely disappointment and negative emotion. They feel disempowered as a consequence, and ultimately give up trying to live more sustainably. These feelings might be particularly acute in working-class communities where disempowerment generally can be more accentuated because of various societal challenges.

For these reasons, assessing and attempting to change feelings of empowerment and learned helplessness in areas in the North West of England were at the core of the current project. We attempted to influence these feelings of disempowerment and learned helplessness by using children as role models for the adults from their own and similar communities. It involved screening a short documentary film the researchers had produced showing change in the attitudes and sustainable behaviours of children as a result of an effective educational programme. The film had been described as 'moving' and 'uplifting' by those who reviewed it. We presented the film and the survey online on Qualtrics (with a before and after design) to 339 participants (233 in the experimental condition and 106 in the control condition (where they watched a neutral film).

Summary of research findings:

1. Feelings of empowerment in respondents were very significantly influenced ($p= 0.00006$) by the climate change film involving the children (in comparison with the control group watching the neutral film). Participants had to indicate to what extent they agreed/disagreed etc. with statements like 'I feel empowered in the fight against climate change'. The experimental group showed a 92.8% increase in the most extreme positive responses following exposure to the film.
2. There was a statistically significant effect of the film on specific question like 'How much can individuals do to prevent climate change?', after watching the film. There was an increase of 117.0% in the number of participants who selected 'a great deal' after watching the climate change film.
3. There was also a significant increase of 112.8% in response to the question 'How much can ordinary people do to influence future change in our climate', after watching the climate change film.
4. There was a significant decrease in feelings of learned helplessness

after watching the climate change film.

5. There was also a significant increase in their personal responsibility to act after watching the climate change film.
6. In other words, what this research showed was that a film about children from the community expressing their feelings about climate change and describing what they were doing to mitigate its effects can have a significant positive effect on the empowerment of adults from the community and their personal responsibility to act, and significantly decrease their feelings of learned helplessness.
7. The climate change film also significantly influenced emotional feelings about climate change. There was a 68.9% increase in extreme negative emotions about climate change (sadness, fear, anger and disgust) after watching the film.
8. All specific negative emotions did increase after watching the climate change film but not all the individual comparisons were statistically significant.
9. The biggest (and statistically significant) effects were for anger and for disgust. After watching the climate change film 82.5% more participants reported feeling extremely angry about climate change and 115.8% more participants said that they felt extremely disgusted by high carbon emissions after watching the film.
10. In terms of behavioural intentions, we focused on the number of participants who indicated that they would *definitely* make a change towards more sustainable behaviour, finding a 56.4% increase in the experimental group who watched the climate change film (but this was not significant as the control group showed a slight increase).
11. The self-report attitudinal measures did not show any significant effects of the climate change film, although both the Likert scores and Thermometer Differences scores increased substantially.
12. The measure of implicit attitude (the D score) was not significantly influenced by watching the climate change film. The D scores of our participants were already very high at the outset of the study which made any modification very difficult.
13. Implicit attitudes are related to some important sustainable behaviours. For example, those with a strong positive attitude to low carbon at the outset of the study were 2.5 times more likely to buy locally sourced food (as opposed to rarely or never buying these products).
14. There was a strong increase in behavioural intentions after watching the climate change film, with a 56.4% increase in the number of participants who said that they would definitely engage in various sustainable behaviours (although this difference was not statistically significant because there was a slight rise in the control group, presumably after reflection, at Time 2).

Some of the policy implications are as follows:

1. **Empowering individuals**: These are potentially important findings with possible practical implications. It is too easy to think that learned helplessness and feelings of empowerment/disempowerment are relatively fixed in individuals and groups, but what this research shows are that with the right sort of emotional and engaging material (in this case a film showing children from their own community talking directly about climate change and what they were doing to mitigate its effects), that the feelings and thoughts of the audience can be significantly influenced in positive ways.
2. **Design of climate change campaigns**: This research could have implications for the design of future climate change campaigns with more of a *local* emphasis where the credibility of the message is enhanced by showing how change can happen within that community with children taking the lead.
3. **Children and the future:** There has been a good deal of effort in the past in trying to use children in campaigns, specifically designed around parents talking to their children about climate change in bedtime stories etc., as a way of getting people to think explicitly about the future, and to evoke certain new attitudes and emotions about climate change. But sometimes this explicit focus backfires, resulting in adults thinking that climate change is a problem *only* for the future, and, therefore, these campaigns can evoke an even stronger (temporal) optimism bias (Beattie & McGuire, 2018). Here the children were the spokespersons. They were telling the adults how it is. There was no comfortable retreat for the adult audience, anger at climate change and disgust at high carbon products/lifestyles both significantly increased, personal responsibility also increased.
4. **Urgent research needed on empowerment and actual behavioural choice:** There was a very large positive change in the behavioural intentions of the experimental group after watching the film. We analysed the number of participants who indicated that they would *definitely* make a change towards more sustainable behaviour, for example, intending to use the washing machine only when it was fully loaded. In the case of the experimental group there was a 56.4% increase, but we just measured behavioural intentions. The policy implication here is that we need more research into the actual behavioural implications of our findings. The changes we did observe set up the basis for change. We need accurate and large scale behavioural measures (and not just measures of behavioural intentions or reported behaviours), like Tesco's Clubcard data, to determine the immediate societal implications.
5. **Urgent research needed on how to influence implicit attitudes.** In the present analyses we found that those with a strong positive implicit attitude to low carbon were 2.5 times more likely to buy locally sourced food, suggesting that implicit attitudes can be of some significance as a behavioural predictor. But our intervention did not significant modify these implicit scores. There are a number of possible explanations – our sample

did have very strong implicit attitudes at the outset and any further increase would always have been difficult (thus we need other more diverse samples of participants for our research), and although our film was emotionally effective, it was most effective at influencing ‘anger’ and ‘disgust’ which may not be the most appropriate emotions for providing an immediate effect on implicit attitudes. There is clearly further work that needs to be done on this.

Some outcomes associated with the project:

1. Given the evidence that certain creative-arts based programmes can significantly influence the sustainable behaviour of children, a number of similar creative-arts programmes (developed and taught by Dr. McGuire) are currently being run in various primary schools in the local area (including Lister Junior School, Liverpool, St John’s C of E Primary School, Southport, St Michael All Angel, Kirkby etc.). More effective sustainability-education programmes, and the encouragement of more sustainable behaviour in children, is the impact goal here.
2. The Arbor School, Dubai, the first eco-school in the UAE, are basing some of their educational programmes on our approach, and using our specially-designed measures (including the carbon Implicit Association Test developed at EHU) to measure the effectiveness of these programmes. They are also interested in the effects of any change in the children on the parents.
3. Beattie and McGuire were invited in 2022 to present their work on measuring the effects of sustainability education programmes and recommendations to the Sustainability Leads Eco-Network, a network of primary and secondary school teachers from twenty-five schools in the London area to make other educationalists more aware of the implications and impact of this research to help change approaches to the teaching of sustainability. Again, they were interested in how this might filter through to the parents.
4. McGuire delivered a climate change creative arts workshop at the Liverpool City Region Borough of Culture 2022 Gaia Launch at St Chad’s Church in Kirkby with the same goal.
5. The ‘Great Climate Change Experiment’ film was shown in various locations including the Kirkby Art Gallery, Southport Eco-Centre, Liverpool World Centre (Toxteth), Edge Hill University, and the Ulster Museum (Belfast) in 2022. We are building connections with some of these centres to develop new initiatives on climate change.
6. McGuire won the Emerging Scholar Award in recognition of the climate change education work. This was awarded by the International Sustainability Research Network.
7. McGuire was shortlisted for the Climate Change Champion Award in 2022 at the Knowsley Education Award scheme and received the Highly Commended Award for the climate change education work she carried out in schools in Kirkby.
8. Beattie was invited to be a member of an ‘Climate Change Expert Panel’ in 2022, which included members of the IPCC, hosted by the International

Interdisciplinary Environmental Association and the Laboratorio Nacional de Ciencias de la Sostenibilidad-IE at UNAM in Mexico, the largest university in Latin America. The Chair was Dr. Paola M. Garcia-Meneses, a member of the Climate Change and Sustainable Cities Working Committees of the UN Sustainable Development Solutions Network (SDSN).

9. Routledge published Beattie's book '*Doubt: A Psychological Exploration*' in November 2022. It has a chapter on doubt regarding climate change, how doubt was generated and the effects of this on individuals (the work on empowerment and learned helplessness is clearly highly relevant). The book attracted some excellent reviews and received national and international media coverage.
10. Beattie has been commissioned (June 2023) to write a book on 'Climate Anxiety' by Routledge in conjunction with the British Psychological Society for their 'Ask the Expert' series.
11. Beattie and McGuire are giving two talks based on the research at an international interdisciplinary conference in Oxford in October 2023. The presentations are entitled 'Evaluating educational initiatives for promoting sustainability in school children using innovative measures of attitude to change behaviour' (McGuire & Beattie) and 'A community-based approach to making behaviour more sustainable in light of the climate emergency' (Beattie & McGuire).
12. McGuire was invited to be part of the UKRI Net Zero Digital Infrastructure Programme (£1.8m).
13. McGuire was invited to be a panel member for the U.S. National Science Foundation (the only non-U.S. reviewer.) reviewing £5m grants for their Global Centers: Use-Inspired Research Addressing Global Challenges in Climate Change and Clean Energy Programme.
14. Beattie was appointed in 2023 as Visiting Scholar at the University of Oxford (OCLW and Wolfson College) for two years. Wolfson College is particularly interested in climate change and climate change mitigation. Climate change anxiety and psychological barriers to climate change mitigation are of particular interest.

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Apendices

Appendix i:

Questionnaires

Beliefs about climate change

(Participants responded to the following statements using a 5-point scale: 1 – strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree).

1. Scientific evidence points conclusively to a warming in global temperature.
2. Human activity has been the driving force behind the warming of the earth over the past 50 years.
3. The release of carbon dioxide from human activity has played a central role in raising the average surface temperature of the earth.
4. The likelihood that greenhouse gas emissions are the main cause of the observed warming trend of the last 50 years is very high.
5. Global warming presents a serious threat to human life.

Empowerment

(Participants responded to questions 1 – 3 using a 5-point scale: 1 –nothing at all, to 5 – a great deal. And they responded to statement 4 using a 5-point scale: 1 – Strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree)

1. How much can individuals do to prevent climate change?
2. How much do individual choices affect the average global temperature?
3. How much can ordinary people influence future changes in our climate?
4. I feel empowered in the fight against climate change

Learned helplessness

(Participants responded to the following statements using a 5-point scale: 1 – Strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree).

1. There is no point in me trying to do anything to reduce climate change (reversed scoring).
2. Climate change is too difficult for me to overcome (reversed scoring).
3. I feel powerless in the fight against climate change (reversed scoring).

Emotions

(Participants responded to the following statements using a 5-point scale: 1 – not at all, to 5 – extremely).

1. How sad are you about climate change?
2. How frightened are you about climate change?
3. How angry are you about climate change?
4. How disgusted are you at high carbon emissions?

Perceived personal vulnerability

(Participants responded to the following statements using a 5-point scale: 1 – Strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree).

1. I will personally be affected by climate change.
2. Climate change will only affect future generations.

Personal responsibility

(Participants responded to the following statements using a 5-point scale: 1 – Strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree).

1. I am prepared to change my everyday behavior to reduce climate change.
2. I can personally help reduce climate change.
3. It is the responsibility of other countries, not the U.K., to reduce climate change.
4. Climate change is a problem to be solved by future generations.
5. It is not my responsibility to reduce climate change
6. I would do more to try to reduce climate change if other people did more as well.

Moral feelings about climate change

(Participants responded to the following statements using a 5-point scale: 1 – Strongly disagree, 2 – disagree, 3 – Neither agree nor disagree, 4 – agree, 5 – strongly agree).

1. Recycling is morally right.
2. Reducing energy consumption is morally right.

Behavioural intentions

(Participants responded to the following statements using a 5-point scale: 1 – definitely not, 2 – unlikely, 3 – possibly, 4 – probably, 5 – definitely. Participants could also respond with 'I already do this').

1. I intend to replace all light bulbs in my home with more energy efficient bulbs.
2. I intend to set my central heating 1 or 2 degrees lower.
3. I intend to use the washing machine only when I have a full load.
4. I intend to recycle all of my rubbish at home.
5. I intend to drink tap water over bottled water whenever possible.
6. I intend to use a reusable or recycled shopping bag.

Appendix ii

Explicit Attitudes

Likert scale

Participants were presented with a 5-point Likert scale and were asked to select which statement best described them:

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 high carbon and low carbon footprints equally', 5 'I strongly prefer products with a low carbon footprint to a high carbon footprint
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

Feeling Thermometer

Please rate how warm or cold you feel towards the following:
(1 = extremely cold, 3 = neutral, 5 = extremely warm)

High carbon footprint	1	2	3	4	5
Low carbon Footprint	1	2	3	4	5

Implicit Association Test

The following images were used in the IAT:

Low Carbon	High Carbon
	
	
	
	
	
	
	

The following words were used in the IAT:

GOOD	BAD
Happy	Sad
Lovely	Unpleasant
Nice	Nasty
Wonderful	Horrible
Superb	Awful
Marvellous	Terrible
Excellent	Evil
Great	Appalling