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Significant life experiences, motivations and values of climate change educators

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Significant life experiences, motivations and values of climate change educators

Abstract: We present a survey of 85 people involved in climate change education and mitigation, mainly in the UK, exploring the significant life experiences and formative influences that have contributed to their concern about climate change and their interest in climate change education and mitigation. In contrast with the findings of a large number of previous studies of environmentalists/ environmental educators, outdoor experiences during childhood were not generally a major formative influence on the respondents. Although Western children nowadays commonly have fewer opportunities to enjoy such experiences, analysis showed that the differences were not due simply to changes over time. Uniquely in research on significant life experiences of environmentalists/ environmental educators, we also examined respondents' values and motivations, to further understand what inspires action. Social justice concerns were rated as more motivating than biospheric concerns by the sample as a whole, and altruistic and biospheric values were considered equally important as guiding principles. These findings have implications for the framing of climate change as an 'environmental' problem, and suggest that, contrary to conclusions that may have been drawn from past research, environmental education specifically directed towards stimulating engagement with climate change need not entail promoting outdoor experiences, nature connectedness, or biospheric values and motivations for action.

Keywords: climate change, significant life experiences, values, motivations, pro-environmental behaviour, environmental education

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Introduction

Previous studies of environmentalists (Chawla 1999; Hsu 2009; Peters-Grant 1986; Sward 1999; Tanner 1980) and environmental educators (Corcoran 1999; James 1993; Palmer 1993; Palmer and Suggate 1996; Palmer, Suggate, Bajd, Hart, et al. 1998; Palmer, Suggate, Bajd, and Tsaliki 1998; Palmer et al. 1999; Peterson 1982) found that outdoor experiences involving exposure to nature, often in childhood, were the primary influence in the development of ‘environmental sensitivity’ resulting in pro-environmental behaviour and in work in the field of environmental education (EE). This has led to suggestions that ‘children must first come to know and love the natural world before they can become concerned with its care’ (Palmer and Suggate 1996, 109).

Similarly, it has been argued (de Groot and Steg 2010; Thompson and Barton 1994) that in order to promote pro-environmental behaviour it is necessary to inculcate ‘biospheric’ values in individuals, encouraging an ecocentric worldview that values the environment for its own sake. Thompson and Barton echo the conclusions of significant life experience research in recommending that EE should ‘emphasize the intrinsic rewards of being in natural settings through experience in nature and the appreciation of wildlife’ (1994, 156).

However, a recent exploratory study by Howell (2013) found that people taking significant action to reduce their carbon footprint because of concern about climate change were motivated more by altruistic concerns about impacts on poorer people than by biospheric concerns about the environment per se. The issue was framed by several of her interviewees as one of social justice and fairness, more than of responsibilities towards, or affective connections with, non-human nature. Similarly, Wolf and colleagues found that people feel a responsibility to act to mitigate climate change because of the perceived unfairness of poorer people suffering more from the impacts,

and feelings of guilt at contributing to the problem (Wolf 2011; Wolf, Brown, and Conway 2009).

Although some of the literature on significant life experiences of environmentalists/environmental educators also mentions concern about social justice (e.g. Chawla 1999), the difference in emphasis on this factor in that literature compared to studies focussed on climate change mitigators suggests that the latter may be influenced by experiences and values somewhat different to those of participants in earlier studies who were generally focussed on nature/wildlife conservation. If so, this has implications for the framing of climate change as an ‘environmental’ problem, and suggests that calls for particular types of experiences (in or of nature) to be incorporated into EE programmes may not be necessary if the focus is on promoting lower-carbon behaviours or lifestyles.

This study explored the significant experiences of people involved in climate change mitigation and education, mainly in the UK, to compare these with previous studies of the significant life experiences of environmentalists/environmental educators. This is a development of the work of Howell (2013), both in terms of scale (her exploratory interview-based study involved only 16 participants), and methodology (she did not ask about significant experiences, nor analyse her data, in ways that can be directly compared to previous studies). We also aimed to ascertain whether or not any differences observed represent a cohort effect, i.e. outdoor experiences being reported as formative less frequently simply because there are fewer opportunities for such experiences nowadays than when the original studies were carried out.

We supplement the qualitative data with quantitative data on values and motivations for action, in order to triangulate the results obtained from coding open

responses, and to be able to consider what specifically motivates respondents' action now, as well as what influences have formed their concern more generally.

Significant life experiences (SLE) literature

The study of significant experiences in the lives of environmentalists and environmental educators was initiated by Tanner (1980), who wrote to staff of leading conservation organisations in the USA, inviting them to provide a statement detailing the formative influences which led them to choose conservation work as a career. Among his 45 respondents, childhood experiences of the outdoors were a dominant influence. SLE research by Peters-Grant (1986, as reported by Chawla 1998b, 15), Sward (1999), Hsu (2009), and Li and Chen (2015), involving US environmental volunteers, El Salvadoran environmental professionals, Taiwanese environmental activists and Chinese citizens engaged in nature conservation/EE respectively, all found that childhood experiences of nature were most frequently mentioned as influencing participants' pro-environmental attitudes and behaviour. Chawla (1999), who interviewed environmentalists in Kentucky and Norway, reported two distinct paths into environmentalism: concern for the environment in and of itself, and concern for social justice, discussed by a quarter of her sample. Social justice was also mentioned in studies by James (1993; 12% of the sample), Corcoran (1999; unspecified proportion) and Hsu (2009; 10% of the sample).

SLE studies focussing on environmental educators in the USA include those by Peterson (1982, as reported by Tanner 1998b), James (1993, as reported by Chawla 1998b, 16), and Corcoran (1999), who all found that experiences outdoors were the primary influence on development of environmental concern. The largest study of formative influences on environmental educators was conducted by Palmer and colleagues, who administered a survey in nine countries: Australia, Canada, Greece,

Hong Kong, Slovenia, South Africa, Sri Lanka, Uganda, and the UK (Palmer, Suggate, Bajd, Hart, et al. 1998). This highlighted some interesting differences between countries. While outdoor experiences were especially influential in the development of environmental concern for educators in Australia, Canada, South Africa, Sri Lanka and the UK, and were important in Hong Kong and Uganda, these experiences were more likely to occur during adult years rather than childhood for respondents in Hong Kong, Sri Lanka and Uganda. In Greece, Hong Kong and Uganda, the most formative experiences were apparently negative ones such as pollution, tree clearing and disasters; influential people were the most frequently mentioned influence by Slovenian educators.

None of these SLE studies specifically mentions climate change; little information is given about participants in some of the studies, but where it is provided their focus appears to be more on conservation and general environmental education.

This body of research has been criticised by several authors. Dillon, Kelsey, and Duque-Aristizabal (1999), Noel Gough (1999a), and Stephen Gough (1999b) express concern about the reliability of the memories that SLE research depends on. However, Chawla (1998a) draws upon a body of research into the validity of memories in life-span research to argue that although memory is often confused about precise details, it tends to be reliable when it comes to the general course of events, and is more likely to be so under conditions of free recall such as we used in this study. While it is important to be aware of the possibility that respondents construct a narrative from where they are now, rather than an objectively 'true' reportage of 'the facts', we agree with Chawla (2001, 457) that 'people's own constructions of their past point us to forms of experience that we should take seriously' and that if we reject all data based on memory because of its constructivist nature, there are few options to pursue social research.

Payne (1999) criticises Tanner's (1998a) suggestion that SLE research should focus on people engaged in political activism. He argues that such research needs to broaden our understanding about how different individuals construct experience, and that everyday action also deserves enquiry. We meet this objection in our study by including people who are involved in different kinds of climate change education and domestic mitigation action. Payne also discusses the importance of considering the *continuity* of experience, and of what might be disregarded in a focus on 'significant experiences'. We aimed to do this by asking about both significant experiences *and* 'formative influences', which might be understood as including more repeated/ongoing and/or 'ordinary' experiences.

Values and motivations

In order to provide a richer understanding of factors that influence climate change educators, our study combined SLE research with exploration of the importance for participants of specific values and motivations, which have not been discussed before in the SLE literature.

We use Schwartz's definition of values as 'guiding principles in the life of a person or other social entity' (1994, 21). Schwartz's Value Theory (1992, 1994) identifies ten value types, organised in two bipolar dimensions. This study focusses on values that belong to the oppositional poles 'self-transcendence' (including both altruistic and biospheric values), and 'self-enhancement' (egoistic values), because several studies show that pro-environmental behaviour is positively correlated with self-transcendent values, and negatively correlated with self-enhancement values (Klößner 2013; Nordlund and Garvill 2002; Schultz et al. 2005). Both altruistic and biospheric values are related to pro-environmental attitudes and behaviour (e.g. Tapia-Fonllem et al. 2013; Thøgersen 2011; van der Werff, Steg, and Keizer 2013). However, debate

began in the 1970s over whether pro-environmental behaviour is more strongly associated with ‘the golden rule’ (altruistic values) or a ‘land ethic’ associated with biospheric values (Dunlap and Van Liere 1977a, b; Heberlein 1972, 1977); more recently there have been attempts to discover whether these values can be separately detected in empirical studies (e.g. de Groot et al. 2012). De Groot and Steg (2007, 2008) developed a survey instrument distinguishing egoistic, altruistic and biospheric values, which Howell (2013) used in her exploratory study of individuals choosing to live lower-carbon lifestyles. She found that her interviewees tended to rate altruistic values significantly higher than biospheric values, and egoistic values significantly lower than either.

Values do not always translate into action; the ‘value-action’ gap is well-documented (Blake 1999; Corraliza and Berenguer 2000) as there are many other factors that enable or inhibit pro-environmental behaviour (a comprehensive model is offered by Klöckner 2013). But we were interested to discover whether altruistic or biospheric values were rated more highly by a sample of people who *are* acting on their concern about climate change through their involvement in education and mitigation behaviours.

We also investigate the importance of particular motivations for undertaking climate change mitigation action and education. The distinction we are making between motivations and values is that while values are *general* principles guiding a person’s life, the motivations we consider are more specific concerns about the impacts of climate change.

There are of course various motives for adopting lower-carbon behaviours and technologies that are not necessarily related to altruistic or biospheric values, including (among others) saving money (Whitmarsh 2009); an orientation towards frugality (Fujii

2006); (subconsciously) signalling positive characteristics to oneself and others (Noppers et al. 2014); seeking a less hectic lifestyle (Shaw and Newholm 2002); improved living standards and comfort (Fawcett and Killip 2014); and health benefits of actions such as cycling (Passafaro et al. 2014). We focus here on motivations related to the values we examine, in order to discover whether or not the values respondents hold are reflected in specific concerns that motivate action.

Method

Participant recruitment

We conducted an online survey from 28 June to 16 October 2013 of individuals who teach and/or write about climate change, and are engaged in climate change mitigation action. We recruited participants via email, electronic newsletters and mailing lists, and social media (Twitter, Facebook and LinkedIn). Emails were sent to academics, writers, and academic email lists identified as having a connection with climate change, and we asked a wide range of organisations including environmental, nature conservation and climate change action groups to publicise the survey to their members. We focussed on recruiting through UK networks but decided to include people from other countries who responded. Details of how respondents received the survey are given in Appendix A. Attempting to avoid biasing responses in favour of particularly altruistic individuals, we offered a financial incentive for participation (the chance to win one of five £50 vouchers). We also tried not to appeal to altruistic motives when publicising the survey.

Questionnaire

The questionnaire was administered online using Qualtrics survey software. There were two filter questions: ‘Have you reduced your carbon footprint AND/OR been involved

in campaigning, because of concern about climate change?’ and ‘Is teaching AND/OR writing for the general public about climate change a significant part of your work?’ (Yes/No). Respondents who answered ‘yes’ to the latter were asked where they teach about climate change. The main part of the questionnaire included closed questions about attitudes towards climate change and mitigation actions respondents were engaged in; these were followed by the core, open, question about significant experiences; then came closed questions about motivations for action and values (see results section for question wording). Questions which asked for a response on a 0–10 scale used the Qualtrics ‘slider’ function so that the scale was a continuous one, ensuring that parametric statistics (such as mean score) could be employed. The survey ended by collecting socio-demographic data.

Analysis of open question on significant experiences and formative influences

To analyse the open question on significant life experiences we developed a coding scheme, with categories derived partly from previous studies (Chawla 1999; Corcoran 1999; Palmer and Suggate 1996; Palmer, Suggate, Bajd, Hart, et al. 1998; Sward 1999; Tanner 1980), and partly through examining the data inductively (for further details of the process see Howell and Allen in press). The coding scheme we eventually agreed on comprised 23 single factors arranged into 12 groups, plus two codes identifying social justice- and biospheric-oriented comments (see Table 1). Note that although we started with separate codes for different types of outdoor/nature experiences at different ages, reflecting results from previous SLE research, these were amalgamated into one code due to the infrequency of mentions and sometimes our inability to identify at what age

experiences occurred¹.

We each coded all responses independently, aiming to apply codes only when a factor was mentioned as an influence on attitudes or action, not when it was solely an outcome of these. This was difficult at times due to the complexity of the responses, several of which related a series of interconnecting influential experiences and reactions to these. Hence we resolved all cases of coding disagreement through discussion, to ensure greater confidence regarding our analysis than could be achieved through compromises such as using each researcher's codes for half the divergent cases.

Results

Altogether, 85 people submitted complete responses to our survey having answered 'yes' to both filter questions. Socio-demographic characteristics of respondents are shown in Table 2, along with their responses to the question 'Where do you teach?'.

On a continuous scale from 0 (labelled 'Strongly disagree') to 10 ('Strongly agree'), mean score for 'I feel concerned about climate change' was 9.4 (SD 1.2), and there was a similarly high level of agreement that 'I feel motivated to do something about climate change' (mean 8.9, SD 1.4). Respondents also exhibited a sense of self-efficacy, albeit slightly lower: mean score for agreement with the statement 'I can make a difference by teaching/writing about climate change' was 7.9 (SD 1.5); for 'I can make a difference by reducing my carbon footprint' was 7.5 (SD 2.2) and for 'I can

¹ The phrase 'outdoor/nature experiences' as used in this paper reflects the wording of our coding scheme (see Table 1 for notes and examples). We recognise that one does not necessarily have to be outdoors to connect with nature, but as in previous studies, the formative experiences described did generally take place outside.

make a difference by campaigning about climate change' was 8.0 (SD 1.7).

We next asked which, if any, of 18 different actions in the fields of home energy use, food, transport, purchases, and campaigning/group action respondents had undertaken '**PRIMARILY BECAUSE OF YOUR CONCERN ABOUT CLIMATE CHANGE**' (emphasis in original). The question stated that 'We understand that not all these actions will necessarily be possible for you, or that you may not want to do them', so as to avoid normative suggestions about behaviour and reduce the pressure to provide socially desirable responses. The mean number of actions was 12.5 (SD 3.5), with a range of 4–18 (see Table 3).

Significant experiences and formative influences

The key question on our survey asked respondents to 'describe the significant life experiences and formative influences which have contributed to your concern about climate change, your efforts to do something about it, and your interest in teaching/writing about it'. The number of single factors coded in responses to this question ranged from 0 to 9, with a median of 3 (interquartile range 2–5). The percentage of responses coded with each individual factor is noted in Table 1, while the frequency with which each *category* of factors was coded is shown in Figure 1. The main categories, and the only ones mentioned by over 20% of the sample were education (coded in 48.2% of responses); work (48.2%); media (41.2%); people (32.9%) and groups/organisations (29.4%). Outdoor/nature experiences were coded in 15.3% of the responses, making this the seventh most commonly mentioned influence in terms of both grouped and single factors. Social justice-oriented comments were noted in 27.1% of the responses, and biospheric-oriented comments in 20.0%.

In order to interpret our data, it was important to check whether differences between our results and earlier findings represent real differences in the formative experiences influencing different types of environmental educators, or a cohort effect due to the passing of time (which might indicate, for example, that fewer of our sample mentioned outdoor/nature experiences as formative simply because these have become less common in the West over the past 20 years). Therefore we compared our results to those of Palmer and Suggate (1996) using age categories of respondents. Their study was chosen as it is one of only two previous studies that report results by age (necessary for this analysis). The other, Palmer, Suggate, Bajd, Hart, et al. (1998), involved a very different sample to ours so we did not use it for comparison.

Palmer and Suggate asked members of the UK National Association for Environmental Education to write an autobiographical statement identifying the experiences that led to their concern for the environment. Assuming that their study was carried out in 1992 (a year before preliminary results were published (Palmer 1993); the year of data collection is not given), and that the minimum age of their respondents was 18, their ‘under 30’ respondent group would be 39–50 at the time of our data collection in 2013. Hence, our participants aged 39–50 belong to the same age cohort as Palmer and Suggate’s (1996) ‘under 30’ group, so differences in the ranking of formative influences mentioned by these two groups would suggest real differences between the samples. The same is true comparing our 51–71 year-old participants with Palmer and Suggate’s 30-50 age group, and participants aged over 71 in our study with their over 50 group (although we did not compare these latter two groups as there were only two respondents over 71 in our sample). Ten of the categories of factors were the same in each study so we compared the ranking of these grouped factors by number of mentions by respondents in each matched age group.

We found that, while outdoor experiences were ranked equal fourth in terms of number of mentions by the under 30 group in Palmer and Suggate's (1996) study, they were equal ninth (i.e. much less likely to be cited as formative) in the corresponding group in ours; similarly, outdoor experiences were the most frequently mentioned influence for Palmer and Suggate's 30–50 year-olds but only ranked equal seventh amongst our corresponding group. Therefore we conclude that there is a real difference between the climate change educators in our study and the environmental educators previously surveyed, in terms of how formative outdoor experiences were in their development.

Apart from this, four of the top five factors were the same comparing Palmer and Suggate's under 30s and our 39–50 age group (education, people, media and organisations), and five of the top six factors were the same comparing Palmer and Suggate's 30–50 year-olds with our 51–71 year-olds (education, people, work, media and organisations), although the order was not exactly the same in either case.

Motivations and values

Respondents were asked to rate on a continuous scale from 0 ('Doesn't motivate me') to 10 ('Motivates me most'), how much they are motivated by concern about the impacts of climate change on 'Landscapes'; 'Wildlife (for its own sake)'; 'Future human generations'; 'Poorer/vulnerable people'; 'Friends/family (incl. own children/grandchildren)'; and 'Me personally'. To avoid response-order bias, the order in which these statements was presented to participants was randomised. Descriptive statistics for the responses regarding each of these motivations are given in Table 4.

It had been intended to combine scores for 'Landscapes' and 'Wildlife' to create a 'biospheric concerns' scale, results for 'Future human generations' and 'Poorer/vulnerable people' into a 'social justice concerns' scale, and 'Friends/family'

with ‘Me personally’ in a ‘personal concerns’ scale, but as the scores for concern about future human generations did not correlate well with other motivations, they were all compared separately. A repeated-measures ANOVA indicated that there were significant differences between the mean scores, $F(3.944, 331.277) = 50.217$, $p < .0005$, partial $\eta^2 = .374$ (Huynh-Feldt correction applied as the assumption of sphericity was violated). Post-hoc paired samples t-tests showed that there was a significant difference between each pair of motivations (at the 95% confidence level), except the pairs ‘Future human generations’ and ‘Poorer/vulnerable people’ and ‘Family/friends’ and ‘Landscapes’.

Values were examined using a question designed by de Groot and Steg (2007, 2008), based on Schwartz’s value theory (1992, 1994). Respondents were asked to rate how important each of 13 values are to them ‘as a guiding principle in your life’, using a nine-point ordinal scale from -1 (‘opposed to my values’), through 0 (‘not important’), 3 (‘important’), to 7 (‘of supreme importance’). The instrument includes four biospheric values, four altruistic values and five egoistic values. Following de Groot and Steg (2007, 2008), participants were asked to distinguish as much as possible between values by varying scores, and encouraged to avoid scoring more than two values as ‘of supreme importance’. The definitions, mean scores and ranking of each value for the sample as a whole are shown in Table 5.

For purposes of comparison (and as usual with this instrument), the biospheric values were combined into one scale; Cronbach’s α (a measure of reliability) was good at .830. The altruistic values were also combined ($\alpha = .627$), as were the egoistic values ($\alpha = .779$). A repeated-measures ANOVA indicated that there were significant differences between the mean scores for the three value scales, $F(1.762, 147.966) = 257.494$, $p < .0005$, partial $\eta^2 = .754$ (Huynh-Feldt correction

applied as the assumption of sphericity was violated). Post-hoc paired samples t-tests showed that there was no significant difference between the mean scores for altruistic values (mean 5.6, SD 0.9) and biospheric values (mean 5.5, SD 1.2), but that there was a significant difference between the mean scores for each of those value scales and the egoistic value scale (mean 2.0, SD 1.5), $p < .0005$ in each case.

Discussion and conclusions

These results suggest some important considerations for environmental educators who wish to engage people with the issue of climate change.

The most notable feature of our results is that, in contrast with the findings of a large number of previous studies (Chawla 1998b), outdoor experiences such as childhood play in ‘natural’ areas, camping, and observation of/interaction with wildlife – while important influences for some of our respondents – were not a major formative influence for the sample as a whole. Our analysis shows that this is not simply due to the fact that children have fewer opportunities to enjoy such experiences now than previously (cf Louv 2010). Comparison of matched age groups between our sample and one of the largest previous studies (Palmer and Suggate 1996) reveals clear differences in the frequency of mentions of outdoor experiences ‘in nature’ as formative, even when the passage of time is taken into account. Apart from this, the categories of factors mentioned most frequently by our respondents were very similar to the other major categories in the Palmer and Suggate study: work, education, the media, people, and groups/organisations.

In addition, ‘social justice’ themes (e.g. comments about fairness, climate justice, environmental concern developing from involvement in justice and peace campaigns) were coded more frequently, in over a quarter of our responses, compared to a fifth of responses coded as containing ‘biospheric’ themes (e.g. comments about

biodiversity, animal welfare, feeling a connection to nature). Social justice concerns (about impacts of climate change on future human generations and poorer/vulnerable people) were rated as more motivating for action than biospheric concerns (about impacts on wildlife and landscapes) by the sample as a whole. This reflects findings from other studies of individuals concerned about climate change, who express distress, guilt, and feelings of responsibility about poorer and vulnerable people in developing countries who already/will suffer most from the impacts of climate change, while having contributed least to the problem (Howell 2013; Wolf 2011). It also corresponds with Chawla's (1999) conclusion that in addition to a 'life path' into environmental action via concern about the environment per se, there is an alternative path via a concern for social justice. Chawla's results may be more similar to ours because her sample of 'environmentalists' included people involved in a broader range of issues than other studies, including promoting sustainable lifestyles and 'Third World equity', which, like climate change, are arguably more anthropocentric concerns than nature conservation.

These results show that people who engage with climate change do not all act from an affective connection to non-human nature, suggesting that if EE is aimed at promoting such engagement, it is not necessary to encourage 'nature connectedness', or create opportunities for outdoor or wilderness experiences. This is *not* to deny that such experiences are valuable or necessary for other reasons, such as promoting pro-social/other-focussed aspirations (Weinstein, Przybylski, and Ryan 2009) and well-being (MacKerron and Mourato 2013). But encounters with 'nature' do not necessarily lead to pro-environmental attitudes and behaviour (Beery and Wolf-Watz 2014; Duerden and Witt 2010), and the results of this study confirm those of Howell's earlier exploratory research (2013), that climate change mitigation action is not necessarily

linked to biospheric motivations or a sense of nature connectedness developed through outdoor experiences. Instead, it could be helpful for educators to emphasise the links between climate change and altruistic as well as biospheric concerns (as they no doubt often do), and also to make links with organisations with an anthropocentric/altruistic focus (such as charities promoting gender equality, the rights of refugees, or peace), as well as environmental groups, in order to create new channels for the delivery of climate change education.

Additionally, it may not be helpful to frame climate change education as ‘environmental’ education. Although EE is multidisciplinary, the use of the word ‘environmental’ might give the impression that environmental aspects of problems are privileged over social, economic, cultural and political facets, and therefore that climate change is necessarily viewed as an environmental problem with other dimensions, rather than, say, as a social and political problem with environmental impacts. This may limit engagement of those who don’t regard themselves as ‘environmentalists’.

There was little difference in the mean score across all respondents for the top six rated values, three of which were altruistic values, and three of which were biospheric values, and there was no significant difference in respondents’ mean scores for the altruistic values scale as a whole compared to the biospheric values scale. These results differ from those of Howell (2013), who found that altruistic values were rated more highly than biospheric values by her sample, but they do support her conclusion that it is not necessary to promote specifically biospheric values in order to stimulate lower-carbon lifestyles, since altruistic values appear to be just as important. In other words, since we found no difference in how biospheric and altruistic values are rated by people who have adopted lower-carbon practices, we conclude that it is not important to promote one set of these values over the other. Instead, perhaps the key to pro-

environmental behaviour lies in the relative lack of importance that respondents accorded to egoistic values, which is reflected in other studies (Brown and Kasser 2005; Grob 1995; Ku and Zaroff 2014).

It is interesting to consider why biospheric motivations for action were not rated as highly as social justice motivations, given that biospheric values were rated essentially equally with altruistic values, including 'social justice' and 'equality'. Perhaps biospheric values were rated highly for anthropocentric reasons; for example, 'protecting the environment (preserving nature)' might be given a high score because of the detrimental effects to humanity from not doing so. Or maybe engaging with climate change for altruistic reasons leads to a more ecocentric worldview and intrinsic valuation of nature, without changing the fundamental motivation for action. Alternatively, although people might rate somewhat abstract values equally, a question about more concrete impacts possibly brings to the fore the fact that these have different motivational force. However, it was clear from the qualitative responses, as well as the quantitative results, that biospheric and altruistic values, motives, and worldviews tend to be intertwined rather than distinct. Understanding of these issues, and of exactly why our sample differs from other groups of environmental educators, would be enhanced by further research involving in-depth interviews.

Finally, we should say a word in recognition of the potential problems associated with the use of the term 'significant experiences', as raised by Payne (1999). We used this phrase in our survey for purposes of comparison with other research. There is a risk that respondents would thereby infer that what we were asking about were specific, discrete events rather than the 'continuity of experience' that Payne highlights as equally important. We hoped to avoid this by including also the phrase 'formative influences', which we felt might be interpreted in a less time-bound way

than ‘experiences’. That we did not entirely succeed is evidenced by some responses which began with comments such as ‘I don’t think that there were any significant events as such, just a slow step by step development of environmental awareness and desire to take actions.’ However, such comments were invariably then followed by the kind of information about everyday experiences and influences that we were seeking, so it appears that respondents were not inhibited from giving information they felt was relevant, even if they were not sure that we would find it so. Nevertheless, it is important to recognise that research of this kind may privilege certain types of experience over others, and is also based on memories that may not be reliable, as discussed earlier. Furthermore, it is unable to capture influences that are invisible to respondents, such as the operation of social norms (Nolan et al. 2008).

However, we believe this study is valuable in highlighting that, contrary to conclusions that may have been inferred from past research, EE specifically directed towards promoting engagement with climate change need not entail promoting outdoor experiences, nature connectedness, or biospheric values and motivations for action, and that there is a case to be made for avoiding framing climate change education as ‘environmental’ education, as this may be of interest to a smaller number and range of people than would otherwise be the case.

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Table 1. Coding scheme and results for the open question on significant life experiences and formative influences

Category	Individual factors	Code	Notes and examples	% responses
People (with whom have direct personal contact)	Family	P/fam	Parents, siblings, children if they have taught/influenced (grand)parents directly; partners/spouses are not included in this category, intended to represent birth family.	15.3
	Educators	P/ed	Teachers, lecturers, academic supervisors.	8.2
	Other people	P/oth	Partners/spouses, friends, colleagues, people in church/Quaker/other groups. Also e.g. 'discussions with vegans'. Authors/speakers not included (unless personal contact).	17.6
Media	Books/scientific reports/magazines	M/read	All non-online reading material except newspapers even if not about climate change.	23.5
	News media	M/news	Newspapers or TV/radio news, also online news media if specified.	3.5
	TV/radio programmes (except news)	M/TV	Documentaries, discussions etc on TV or radio.	4.7
	Films	M/film	Any kind of film mentioned (fiction as well as films like An Inconvenient Truth).	9.4
	Internet	M/web	All online material except online news media e.g. blogs, social media.	2.4
	Media general	M/gen	Other/unclear media e.g. 'reading/reading the science' when medium is not stated.	16.5
Formal & informal education	School	E/sch	Lessons, fieldtrips etc. If a teacher is specified, code as P/ed, not E/sch.	10.6
	Tertiary education	E/3	University all levels including PhD research; professional education.	34.1
	Events/talks	E/oth	e.g. green fair/peak oil talk/visit to CAT. Planned (educational) events, not life events.	14.1
Outdoor/nature experiences		O	One-off or long-term; e.g. being brought up on a farm/smallholding; camping, playing outdoors, walking, bird spotting.	15.3
Work (paid or voluntary)		W	All work including academic research or for book/profession etc but not PhD research. Include voluntary work /internships; not colleagues (code as P/oth).	48.2
Negative experiences/events	Related to the environment	N/env	Habitat/rainforest loss, loss of green space; disasters such as floods/typhoons (not necessarily experienced personally).	8.2
	Other negative happenings	N/oth	e.g. economic crash in Ireland; illness due to pesticides.	15.3
Impacts of CC		I	Concern about, or observations of, specific impacts of climate change on weather patterns, seasons, people, animals etc.	14.1
Organisations/campaigns/groups	Climate change/transition group	G/CC	Involvement in direct action/campaigns/climate change related groups e.g. climate camp, local action group; influence of their campaigns even if not involved.	11.8
	Other groups/campaigns	G/oth	e.g. Greenpeace, road protests, anti-nuclear campaigns. Use for unspecific 'rallies' and non-CC campaign influences (unless it's a one-off educational event – code E/oth).	22.4
Grand/children		C	Having children/grandchildren, or concern for their future. Concern about particular people, not general concern about future generations.	4.7
Travel/living abroad		T	e.g. working abroad led to concern about impacts of climate change on other societies.	11.8
Religion/spirituality		R/Sp	Concern/action inspired by faith or participation in religious group.	8.2
Waste/frugality		F	Frugal/waste-conscious/DIY upbringing; concern about rubbish/recycling; dislike of sight of waste.	10.6
Social justice theme present		SJ	e.g. comments re fairness, climate justice, concerns re poor facing worst impacts of climate change, environmental concern developing out of peace/justice concerns etc.	27.1
Biospheric-oriented theme present		BIO	e.g. comments re connection to nature, biodiversity, animal welfare, environment valuable for its own sake, looking after animals as a child etc.	20.0

Table 2. Characteristics of respondents

	No.	%		No.	%
<i>Sex</i>			<i>Highest level qualification</i>		
Female	48	56.5	None	1	1.2
Male	36	42.4	A Level or equivalent	2	2.4
Not given	1	1.2	Undergraduate degree	16	18.8
			Postgraduate degree	63	74.1
<i>Age</i>			Other	3	3.5
20-29	16	18.8			
30-39	23	27.1	<i>Net household income</i>		
40-49	20	23.5	Less than £10,000	8	9.4
50-59	9	10.6	£10,000-£19,999	12	14.1
60-69	11	12.9	£20,000-£29,999	15	17.6
70+	5	5.9	£30,000-£39,999	14	16.5
Not given	1	1.2	£40,000-£49,999	12	14.1
			Over £50,000	20	23.5
<i>Place of residence</i>			Prefer not to say	4	4.7
England	38	44.7			
Scotland	20	23.5	<i>Where do you teach about climate change?^a</i>		
Wales	12	14.1	College/University	47	55.3
Other European countries	5	5.9	Writing	44	51.8
North America	6	7.1	Public events	33	38.8
Australia & New Zealand	2	2.4	School	6	7.1
Global South	2	2.4	Other	18	21.2

^a Percentages under this heading do not sum to 100 as participants could choose more than one response.

‘Writing’ represents the response ‘I write about it for the general public as part of my work’.

Table 3. Climate change mitigation actions that participants have engaged in

	No.	%
<i>Home energy use</i>		
Changed to a 'green electricity' supplier	51	60
Turned down thermostat or radiators, or cut time heating is on	78	91.8
Installed more insulation/draught-proofing at home	54	63.5
Reduced the temperature/frequency of clothes washing	69	81.2
Dry clothes on a rack or line (usually/always) instead of using a tumble dryer	75	88.2
Installed renewable energy generating equipment at home	19	22.4
<i>Food</i>		
Reduced meat/dairy consumption	64	75.3
Compost food waste	65	76.5
Changed shopping habits (e.g. buying more local/organic/seasonal food, reducing/avoiding air-freighted food/ready meals)	75	88.2
<i>Transport</i>		
Reduced/stopped flying for leisure purposes (e.g. holidays, visiting family and friends)	58	68.2
Significantly cut down on driving/avoid driving at all	61	71.8
Reduced the number of cars I own/avoid owning a car	36	42.4
<i>Purchases</i>		
Buy energy-efficient appliances <i>other than</i> light bulbs	64	75.3
Limit consumption of new goods	70	82.4
<i>Campaigning/group action</i>		
Written/spoken to politician(s) about climate change/energy policy, <i>other than</i> signing a petition	60	70.6
Taken part in more than one meeting of a support group with the aim of reducing my carbon footprint and/or helping others to do so	55	64.7
Taken part in an action <i>other than</i> a public-awareness raising event related to climate change	51	60
Been involved in <i>organising</i> an awareness-raising or political event related to climate change	58	68.2

Table 4. Descriptive statistics for responses to the question on motivations for action

Motivated by concern about climate change impacts on...	Mean	SD
Future human generations	8.4	2.0
Poorer/vulnerable people	8.3	1.8
Wildlife (for its own sake)	7.3	2.7
Family/friends (incl. own children/grandchildren)	6.5	3.3
Landscapes	6.2	3.1
Me personally	3.9	3.2

Table 5. Results of the question on values

Value and definition used in the survey	Rank (for 85 respondents)	Mean score
<i>Altruistic values</i>		
Equality (equal opportunity for all)	1	5.9
Social justice (correcting injustice, care for the weak)	=3	5.7
A world at peace (free of war and conflict)	5	5.6
Helpful (working for the welfare of others)	=7	5.0
<i>Biospheric values</i>		
Protecting the environment (preserving nature)	2	5.8
Respecting the earth (harmony with other species)	=3	5.7
Preventing pollution (protecting natural resources)	6	5.5
Unity with nature (fitting into nature)	=7	5.0
<i>Egoistic values</i>		
Ambitious (hard working, aspiring)	9	3.3
Influential (having an impact on people and events)	10	3.2
Wealth (material possessions, money)	11	1.4
Authority (the right to lead or command)	=12	1.1
Social power (control over others, dominance)	=12	1.1

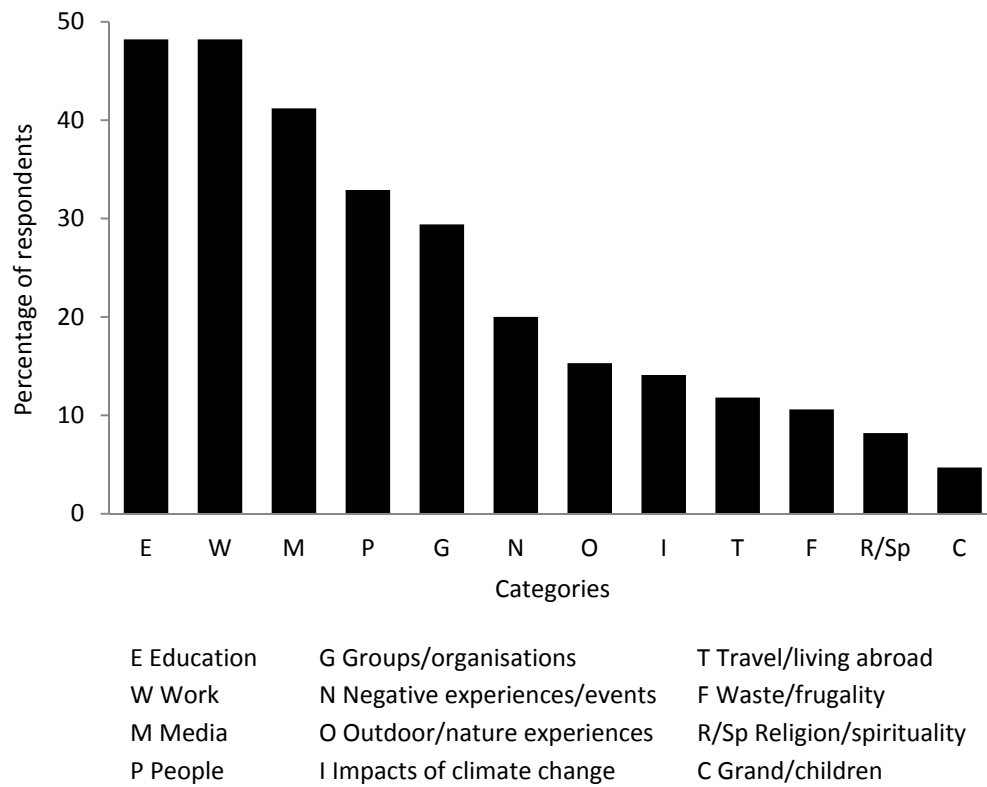


Figure 1. Factors influencing respondents' climate change concern and action

Appendix A: Organisations from which respondents received the survey via social media, email lists or website advertisement

Aberystwyth University weekly bulletin	Public Interest Research Company/Common Cause
Aberystwyth University Environmental Politics research group	Socioenergie email list
Carbon Conversations	Stop Climate Chaos
Climate Psychology Alliance	Talking Climate
Green Party	Twitter @Climate_diplo
Facebook	Twitter – not specified
LinkedIn	Winchester Action on Climate Change
Living Witness Project/Quakers	Unspecified email list/social media
Machynlleth SwapShop	

31 respondents received the survey via these channels; 30 from a friend/colleague; and 24 directly from the researchers.