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Australian attitudes to climate change: 2010-2014

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Executive summary

This report presents the findings of a longitudinal survey of Australians from 2010 to 2014. Conducted annually in July and August of each year, we surveyed a total of 17,493 Australians; 4,999 of whom completed two or more surveys, and 269 of whom completed all five. The surveys formed part of a research program investigating the ways in which Australians think about climate change, and the activities they are undertaking to mitigate or adapt to its impacts.

Attitudes to climate change

- *A large majority of people think climate change is happening, and are more likely to attribute climate change to humans than to natural fluctuations in Earth's temperature*. Just under 80% of respondents thought climate change was happening. On average, respondents estimated that human activity accounted for about 62% of changes to the climate. Those who think climate change is not happening still attribute a third (34.6%) of climate change to human activity.
- *People are inaccurate when predicting the views of other Australians*. The prevalence of the view that climate change is not happening was overestimated by people of all opinion-types. On average, respondents predicted that 23% of Australians were of the opinion that climate change was not happening, when fewer than 8% of our respondents were of this opinion.
- *Aggregate levels of opinion are stable over time.* Slightly more people thought climate change was not happening or solely due to natural processes in 2012 and 2013 when compared to 2010, however figures in 2014 were not statistically different to any other point in time. Aggregate misperceptions about opinions were also relatively stable over time, with a small decrease between 2010 and 2011 of perceived estimates of others thinking climate change was human-induced.
- *There is inconsistency in individuals' opinions over time.* Nearly half (48.5%) of repeat respondents changed their opinion on climate change on at least one occasion.
- *Opinions on climate change are weakly related to demographic differences.* Demographic criteria such as age, gender, and education, only account for small differences in opinion, if at all.
- *People think big-polluting countries, multinational corporations, and wealthy countries are the most responsible for causing climate change.* These three groups, with the addition of the Government, were also seen as most responsible for responding to it. Individuals were rated as the least responsible for both causing climate change and responding to it.
- *People attribute the bases of their opinions to different sources, depending on what their opinion is.* Those who think climate change is human-induced were more likely to say 'scientific research' was the main basis for their opinion. Those who thought climate change was not happening, or caused by natural processes, were more likely to select 'common sense', 'the weather', or 'historical events' as their basis. Very few selected 'politicians and government' or 'news and media'.
- *People's opinions about climate change are related to voting behaviour, but more strongly related to their environmental worldview.*

Climate-relevant behaviour

- *People undertake a broad range of climate-relevant behaviours for a variety of reasons.* Levels of behavioural engagement were related to opinions about the causes of climate change, but how important and personally relevant climate change was to respondents was more strongly related to behavioural engagement than how sure they were it was happening.
- *People's engagement in individual climate-relevant behaviour has reduced in 2014.* There were also significant changes for reasons for engaging in reducing household energy consumption and turning off lights around the home, with more people stating they performed these behaviours for reasons other than environmental reasons in 2014.
- *People tend to overestimate how much they do compared to others*. More than 90% of respondents estimated they engaged in the same or more behaviours than other Australians. Less than 7% thought they did less than other Australians.
- *Levels of behavioural engagement are influenced by social norms*. People who engage in more climate-relevant behaviours agree more with statements suggesting many other people engage in the same behaviours (descriptive norms) and more with statements suggesting that they themselves *should* behave in these behaviours (injunctive norms). Injunctive norms were more strongly associated with behaviour than descriptive norms.

Climate estimates and projections made by the public, and coping appraisals

- *Most people expect temperatures to rise in their region.* About two-thirds of respondents (66%) expected it would get warmer in their region over the next 20 years. Greater uncertainty existed in estimates for 80 years' time, but very few expected it to be cooler (7.4%). Projections for summer and winter rainfall were more evenly distributed, with about a quarter thinking it would not change much in 20 years. Again, there was greater uncertainty for rainfall patterns in 80 years' time. The most common combined projection from respondents is that their region would become hotter and drier.
- *People think extreme climate and weather events will increase in intensity and frequency in the future*. Respondents thought heatwaves, extreme weather events, and drought and water scarcity were most likely to increase in frequency and intensity in their region, although expected increases were low to moderate.
- *Many people have suffered injury, loss, or damage as a result of an extreme weather event.* More than half of respondents reported experiencing at least some injury, loss, or damage as a result of extreme high temperatures (61%), heatwaves (61%), heavy rain (59%), drought and water scarcity (57%), or hailstorms (51%).
- *People report being least able to cope with bushfires and storms if they occur in the future*.
- *People think they will be less harmed by climate change than others.* Respondents thought they themselves would be harmed less than others in their family and neighbourhood, who in turn would be harmed less than others in the country. Those in poor, developing countries, and people around the world generally were expected to be the most harmed by climate change.

Adaptation

- *There is little familiarity with climate change terminology, but this is improving.* Roughly one in five respondents had heard of 'climate mitigation' (21%), while nearly one in three had heard of 'climate adaptation' (31%). This was up from 18% in 2013 for 'climate mitigation' familiarity, and up from 19% in 2012 for 'climate adaptation' familiarity.

- *There is broad support for a wide range of adaptation initiatives.* Most support was given to investment in renewable energy resources, protection from invasive species, increased investment in public transport, and restrictions on development in vulnerable areas. Least support was given to investment in nuclear power stations and increased aid to overseas countries impacted by climate change.
- *Support for adaptation initiatives was related to perceptions of individual and collective efficacy.*

Trust and emotions

- *People trust university scientists the most to provide truthful information about climate change.* Respondents rated oil companies and car companies as the least trusted.
- *Trust in several sources increased over time.* There were slight increases in trust in environmental group scientists, government, local authorities, oil companies, and car companies over the five surveys. No source is significantly less trusted in 2014 than in previous years.
- *The strongest emotions associated with climate change are negative, but a sense of hope is related to climate-relevant behaviour.* Anger, fear, and powerlessness were rated as the most commonly felt emotion in response to climate change. Hope, joy, and excitement declined over time, but so did feelings of powerlessness. Boredom decreased over time. A higher sense of hope was related to behavioural engagement and support for adaptation initiatives, as were the negative emotions of anger, shame, guilt, and fear.

Predicting behavioural engagement and support for adaptation initiatives

- *We could explain 34% of the variance in people's engagement in individual climate-relevant behaviours.* The strongest predictors of individual behaviour were the salience of climate change (how important and personally relevant it was, and how worried they were), how much ethical and moral responsibility they felt to respond to it, and to what extent they had personally experienced climate change.
- *We could explain 26% of the variance in people's engagement in community climate-relevant behaviours.* The strongest predictors were the salience of climate change, how much ethical and moral responsibility they felt to respond to it, and how certain they were that climate change was happening.
- *We could explain 39% of the variance in people's support for adaptation initiatives.* The strongest predictors were having an environmental worldview that justifies environmental conservation (a 'ductile' worldview), how much ethical and moral responsibility people felt to respond to climate change, having greater trust in science organisations, and having lower trust in authorities and industries to provide truthful information about climate change.

Introduction

This report presents the findings of a longitudinal study of Australians from 2010 to 2014, comprised of five national surveys conducted annually in July and August of each year. The surveys formed part of a research program investigating the ways in which Australians think about climate change, and the activities they are undertaking to mitigate or adapt to its impacts. Our goal was to understand the prevalence of different responses Australians have to climate change, including perceptions and opinions about its causes, personal and social attitudes directly and indirectly related to climate change, the climate-relevant behaviours people are engaging in, the types of initiatives people want taken to address the impacts of climate change, and the patterns within and between each of these.

The surveys were administered online using a representative group of respondents from across metropolitan, regional, and rural Australia. Respondents were drawn from a research-only[1] panel of 300 000 individuals. The panel used for this survey was administered by the ORU, an online fieldwork company with QSOAP 'Gold Standard' and Global ISO 26362 accreditation.

Table 1 provides a summary of survey respondents across the five time points. In total we surveyed 17,493 Australians aged 18 years and over; 4,999 of whom completed two or more surveys, and 269 of whom completed all five. Further details on the results of previous surveys are also available (see Leviston, Price, Malkin, & McCrea, 2014; Leviston & Walker, 2011; Leviston & Walker, 2010; Leviston, Walker & Malkin, 2013).

Table 1 Basic description of survey respondents at each time point

	2010	2011	2012	2013	2014
Sample Size	5036	5030	5081	5219	5163
New respondents	5036	3675	3277	3017	2488
Repeat respondents	-	1355	1804	2202	2675
Average Age	50.4	51.8	50.4	50.0	49.6
Gender					
Male	51.2	46.4	48.3	48.6	50.3
Female	48.8	53.6	51.7	51.4	49.7
Location					
Capital city	55.2	55.1	55.2	57.6	60.9
Regional town	29.0	29.4	28.6	28.1	26.1
Rural area	13.2	13.8	14.2	12.4	11.6

[1] A 'research-only' panel means that panel members complete only surveys intended for legitimate research purposes. This strategy reduces the number of 'professional' survey respondents and increases the representativeness of respondents across behavioural, attitudinal, and lifestyle criteria.

Table 2 displays a demographic breakdown of the 5,163 respondents who took part in the most recent survey (undertaken in 2014), the 269 repeat respondents who completed all five of our surveys, and Census data describing the Australian population as a whole. The 2014 sample was broadly representative of the Australian public, while the 269 repeat respondents were generally older and overly represented by males when compared with the Australian public. We will use the 5,163 respondents for most of the data analyses contained in this report, and the 269 for our formal longitudinal analyses, with the understanding that care must be taken in extrapolating the results of the longitudinal analyses to the general Australian population.

Table 2 Demographics of survey respondents in 2014, repeat-respondents, and Australian population

DEMOGRAPHIC	CATEGORY	2014 (*N* = 5163) %	REPEAT RESPONDENTS (*N* = 269) %	AUSTRALIAN POPULATION IN 2011 %
Age	<24	6.9	0.0	10.7
	25–34	18.0	0.0	18.3
	35–44	16.3	5.9	18.9
	45–54	16.7	8.9	18.2
	55–64	18.1	24.9	15.4
	65–74	18.3	37.5	10.0
	75+	5.8	22.7	8.5
Gender	Male	50.3	61.3	49.4
	Female	49.7	38.7	50.6
Location	Capital city	60.9	59.5	65.2 (capital city)
	Regional town	26.1	23.0	17.4 (significant urban area)
	Rural area	11.6	15.2	17.4 (other)

1 Basic attitudes to climate change

In this section, we will look at some of the basic attitudes people have about climate change, including whether people think climate change is happening or not, and the role of human activity in causing or exacerbating climate change. We will explore what people think Australians in general think about these matters. We will also cover *who* people think is both responsible for causing climate change, and for responding to it, and whether any of these basic attitudes have noticeably shifted over time.

1.1 Climate change and its causes

Our respondents were initially asked a 'yes' or 'no' question about the existence of climate change (Figure 1). Just under four in five people (78%) indicated they think climate change is happening.

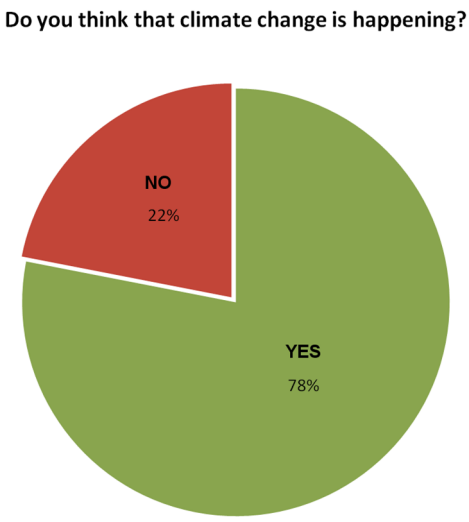


Figure 1 Percentage of agreement that climate change is happening (*N*=5163)

Further analyses were conducted to look for differences in responses across basic demographic criteria. Women were more slightly more likely than men to agree that climate change was happening, but the strength of the association was very small.[2] Those who lived in capital cities were more likely to think that climate change was happening than those in rural areas, but again the association was very small.[3] There were no significant differences between states/territories.[4] Those who thought climate change was happening were marginally younger[5] and had slightly higher levels of education[6] than those who disagreed,

[2] Women = 81.1% selected 'yes'; Men = 75.0% selected 'yes'. $\chi 2$ (1, n = 5163) = 27.90, $p < .001$, *phi* = .07.

[3] $\eta^2 = .003$, $p = .009$.

[4] $\eta^2 = .003$, $p = .05$.

[5] 'Yes' mean date of birth = 1966 (SD = 17.05). 'No' mean date of birth = 1960 (SD = 16.33). $t(5161) = 10.12$, $p < .001$, Cohen's $d = .34$.

[6] $t(5161) = 7.24$, $p < .001$, Cohen's $d = .24$.

but the association was small in both instances. There was no difference in levels of agreement across levels of household income.[7]

Survey respondents were asked to rate which of a series of statements best described their thoughts about the causes of climate change (Figure 2). Just under half of respondents (45.9%) selected the statement indicating climate change was largely caused by humans. A further 38.6% indicated they thought it was happening, but just a natural fluctuation. Smaller proportions selected the option that it was not happening at all (7.9%) and that they didn't know (7.7%). For ease of reporting, for the remainder of the report these statements (termed 'opinion-types'), will be abbreviated to the terms in parentheses in Figure 2: *Not happening*; *Don't know*; *Happening, but natural*; *Happening and human-induced*.

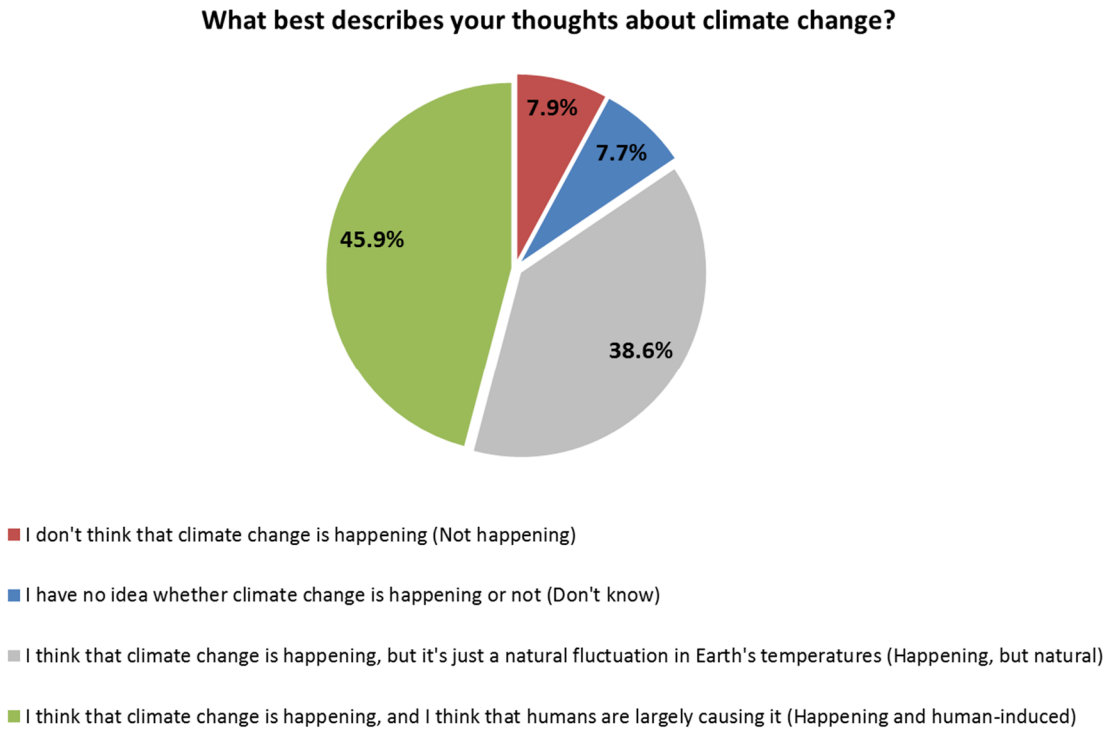


Figure 2 Typological breakdown of thoughts about the causes of climate change (*N*=5163)

Further analyses were conducted to look for demographic differences across these opinion-types (Table 3). There was a small but significant association with gender,[8] with men more likely to state that climate change was not happening than women. There was a small but significant association with age,[9] with those who thought climate change was not happening or due to natural causes being slightly older on average than those who thought climate change was human-induced. Those who didn't know about climate change were the youngest on average. There was a significant but very small association with education, with those who thought climate change was human-induced having slightly higher levels of education on average.[10] There was no association with household income.[11]

[7] $t(5161) = 1.49$, $p = .07$.

[8] Cramer's $V = .10$, $p < .001$.

[9] $F(3, 5159) = 62.01$, $p < .001$, $\eta^2 = .04$.

[10] $F(3, 5159) = 21.56$, $p < .001$, $\eta^2 = .01$.

[11] $F(3, 4385) = 1.76$, $p = .15$.

Table 3 Prevalence of opinion-type about the causes of climate change, by demographic (*N*=5163)

OPINION-TYPE	MALE	FEMALE	AVERAGE BIRTH YEAR (AGE IN YEARS)
Not happening (*n* = 407)	62.4%	37.6%	1961 (53)
Don't know (*n* = 396)	47.7%	52.3%	1972 (42)
Happening, but natural (*n* = 1991)	53.2%	46.8%	1962 (52)
Happening and human-induced (*n* = 2369)	46.1%	53.9%	1966 (48)

1.2 Climate change and its causes: What people think *others* think

Respondents were asked to estimate the percentage of Australians they thought would agree with each of the four statements shown in Figure 2. A comparison of these estimates with *actual* levels of agreement is displayed in Figure 3. On average, respondents *overestimated* the proportion of people who would state that climate change was not happening, and *underestimated* the proportion who would state climate change *was* happening (due to either natural or human processes).

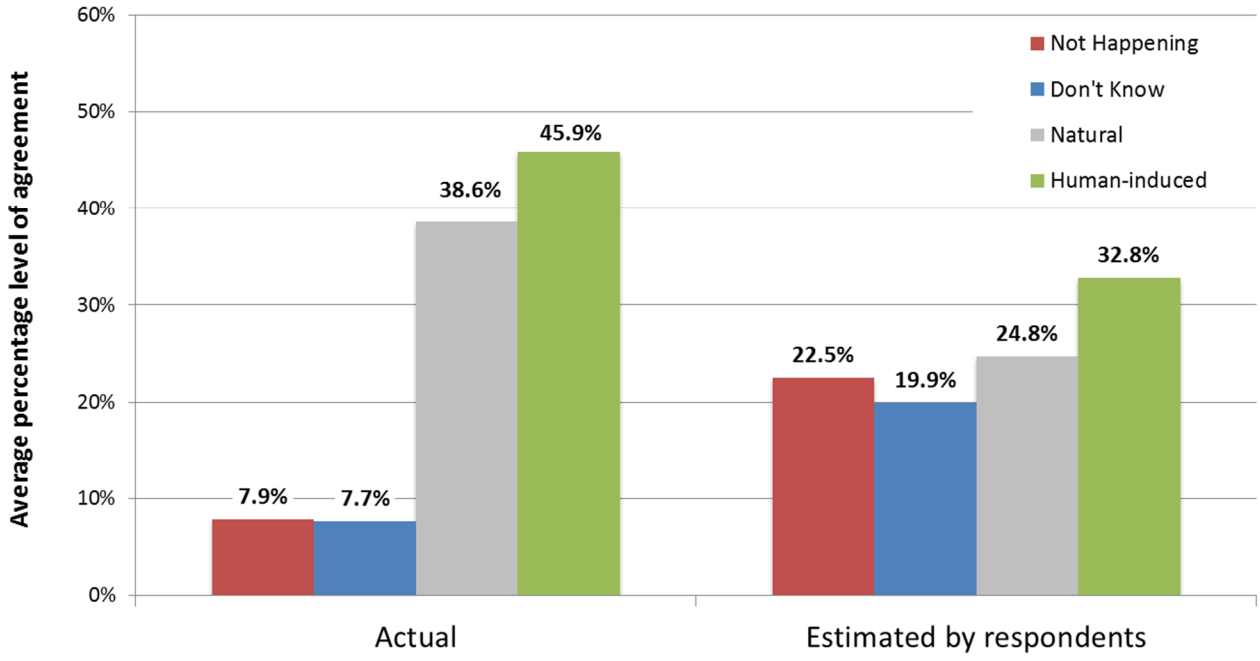


Figure 3 Comparison of respondents' *actual* level of agreement with each statement with their estimates of the Australian community's agreement (*N*=5163)

Figure 4 shows the estimated proportions of the Australian community grouped by the respondents' own opinion-type. Every group estimated their own opinion to be the most common among the broader community. Those who thought climate change was not happening (7.9% of respondents from Figure 2) strongly overestimated the prevalence of their own opinion (49.1%). Those who thought that climate change was natural or human-induced were more accurate in their perceptions, slightly underestimating the broader prevalence of their own opinions. *Every* group overestimated the percentage of people who denied climate change was happening.

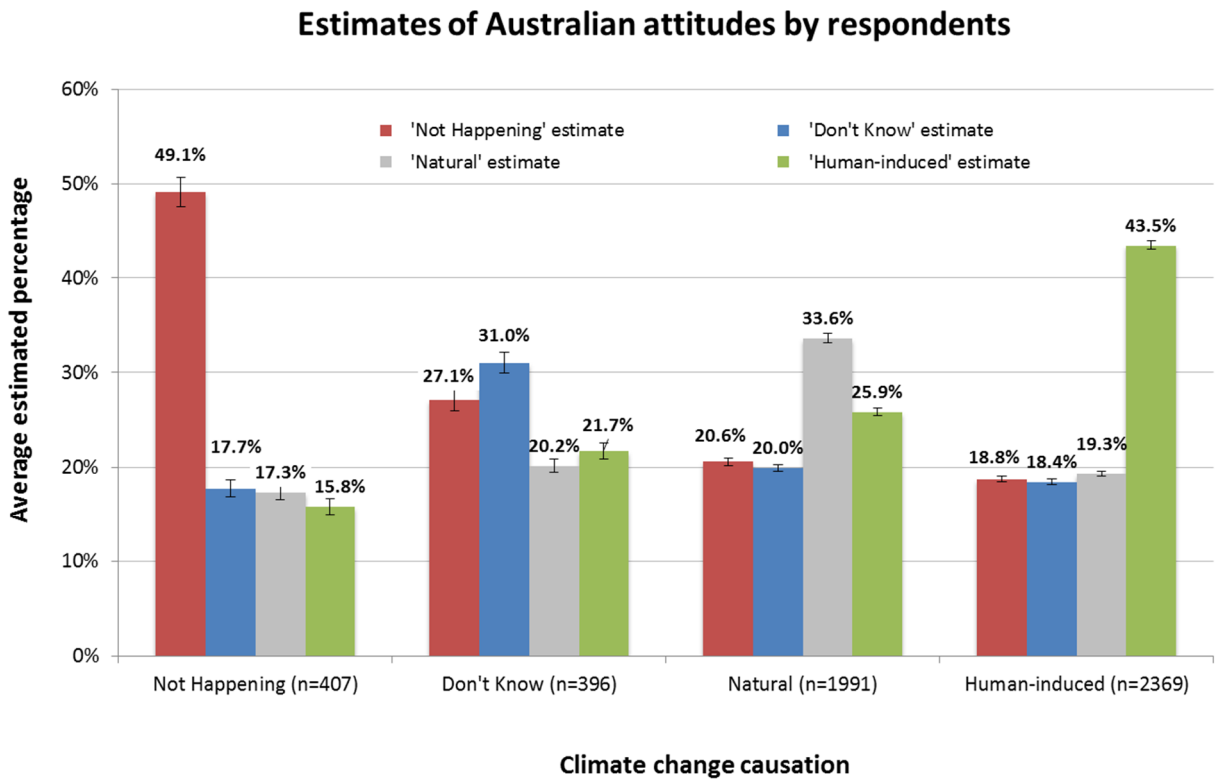


Figure 4 Respondents' estimates of the Australian community's level of agreement with each statement, by respondents' own opinion-type (*N*=5163)

Respondents were asked to estimate the percentage that human activity contributed to climate change (Figure 5). Overall, respondents estimated that 61.5% of climate change was attributable to human activity. Estimates were related to people's opinion-type, but even those who though climate change was not happening at all thought roughly a third of climate change was attributable to human activity.

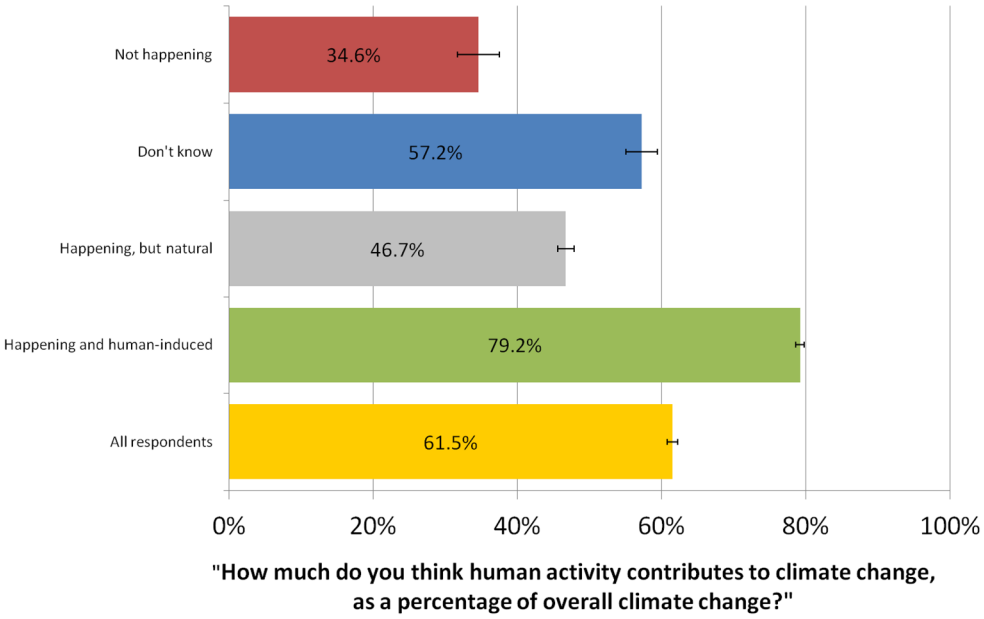


Figure 5 Average estimated human contribution to climate change, by opinion-type (*N*=5163)

Respondents were asked how confident they were of their general attitude toward climate change (Figure 6). There was, on average, moderate to strong confidence in one's own opinion. Even those who had previously stated they were uncertain of the causes were moderately certain of their general attitude.

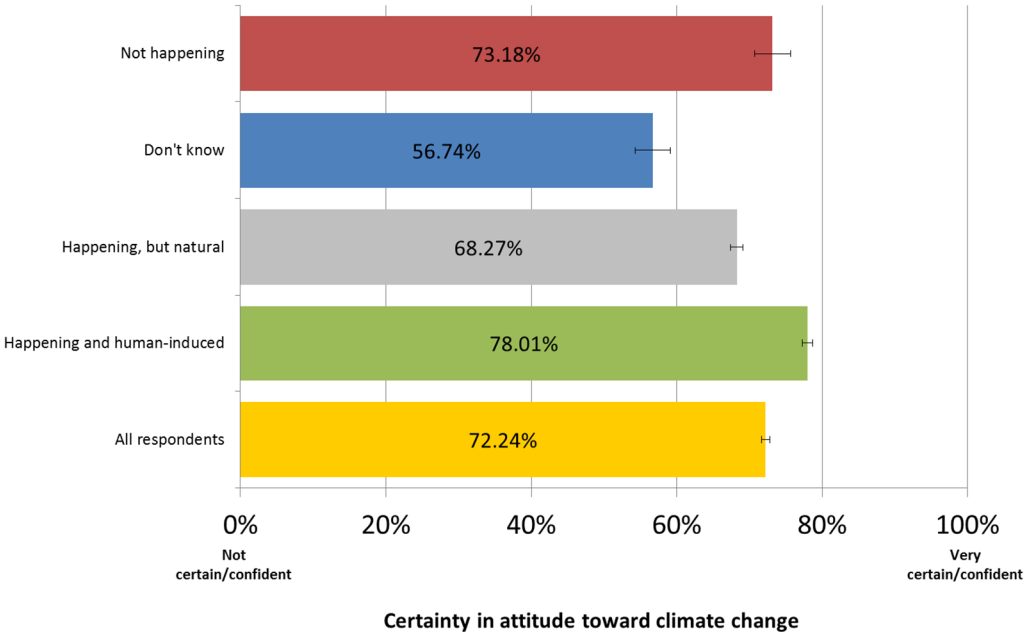


Figure 6 Average certainty/confidence in attitude toward climate change, by opinion-type (*N*=5163)

Respondents were asked to select a source from a list[12] that best described what their opinion about climate change was based on (Figure 7). 'Scientific research' was the most frequently selected phrase, followed by 'common sense', and 'the weather'. When these responses were broken down by opinion-type, the phrase 'common sense' was the most frequently selected among respondents of all opinions except for those who thought climate change was human-induced or who didn't know. 'Politicians/Government' and 'friends/family' were consistently unpopular selections.

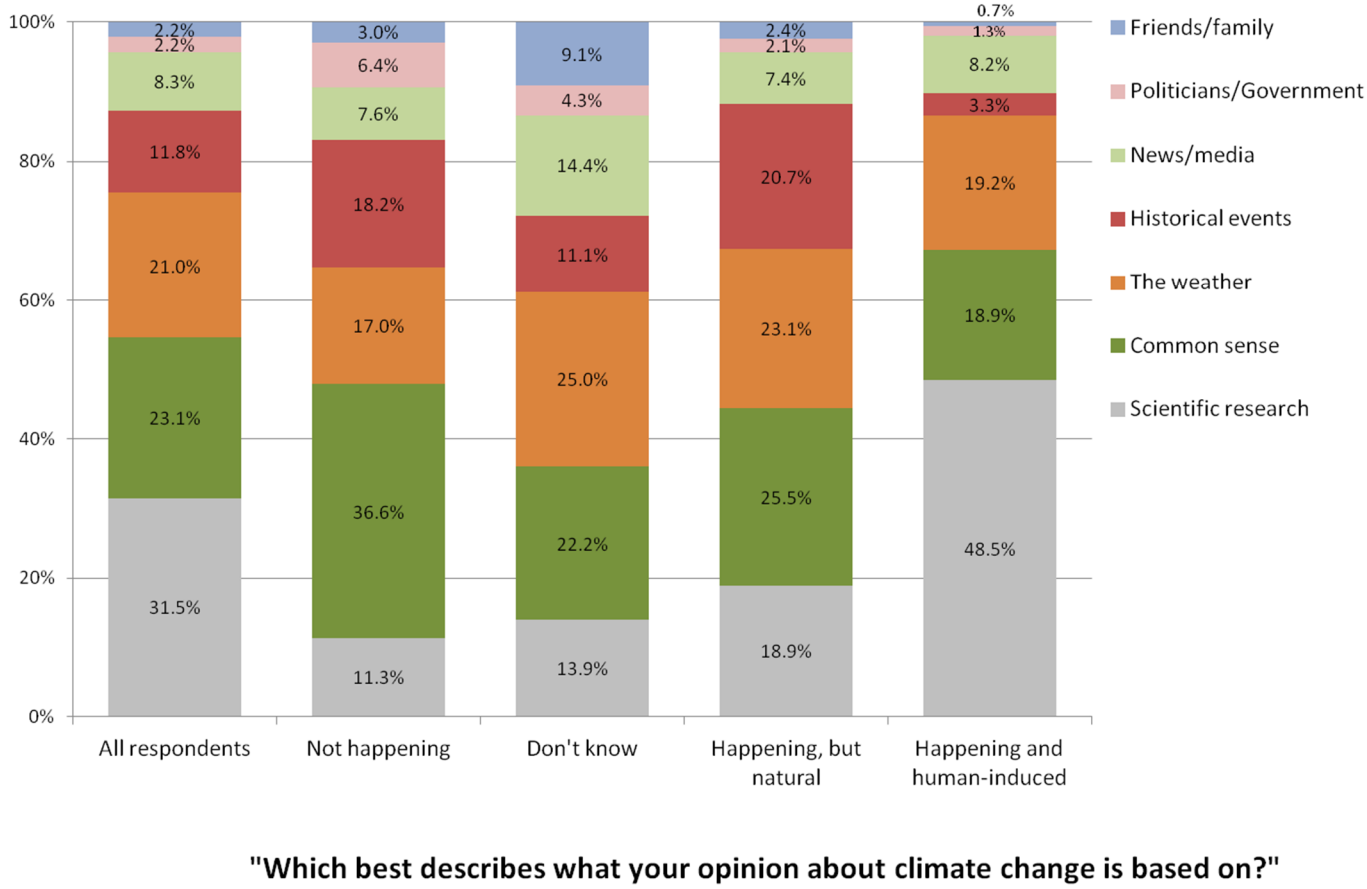


Figure 7 Most accurate descriptors of what respondents' opinions on climate change were based on, by opinion-type (*N*=5163)

[12] This list was formed by compiling the most common responses to a similar open-ended question in the 2013 survey.

1.3 Climate change and its causes: Changes over time

The top half of Figure 8 displays the proportions of climate change opinion using whole samples from each of our five surveys. The proportions remain reasonably static over time, with the exception of an increase in the small proportion of people indicating they did not know if climate change was happening or not, and a small initial decrease in the happening and human-induced opinion between 2010 and 2011. The bottom half of Figure 8 reveals that estimates of others' opinions about climate change is consistent, and inaccurate, throughout the years.

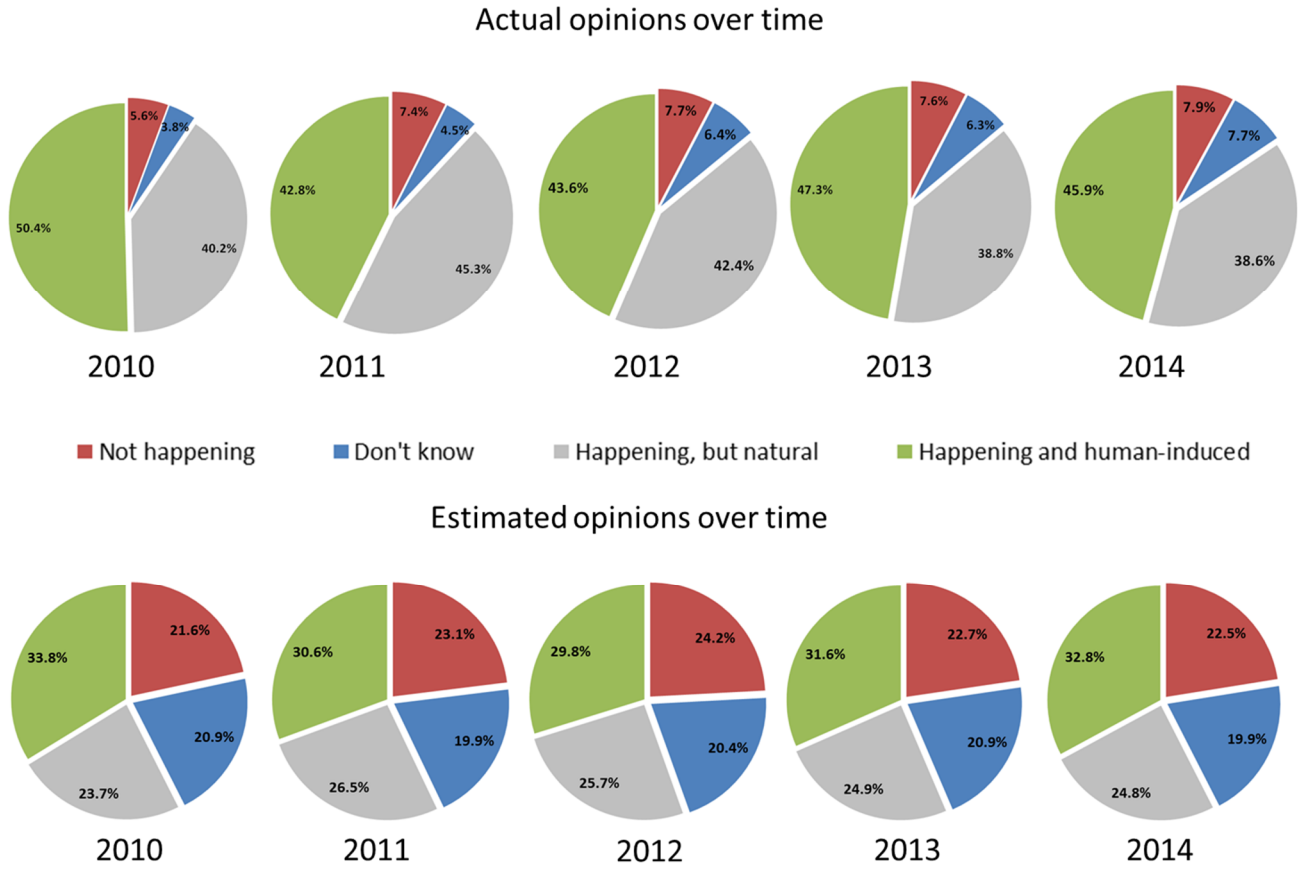


Figure 8 Actual levels of climate change opinion compared with estimated levels of opinion over time, using whole samples

To test whether changes in opinions about climate change were statistically significant over time, analyses were conducted with the 269 repeat respondents who completed all five surveys. While more likely to be male and older on average, these repeat respondents were similar to the larger samples in their proportions of those who thought climate change was either happening or not happening. Figure 9 shows a stable proportion of respondents who thought climate change was happening. The small fluctuations in percentages were not statistical significant.[13]

[13] Cochran's Q = 6.66, p = .16.

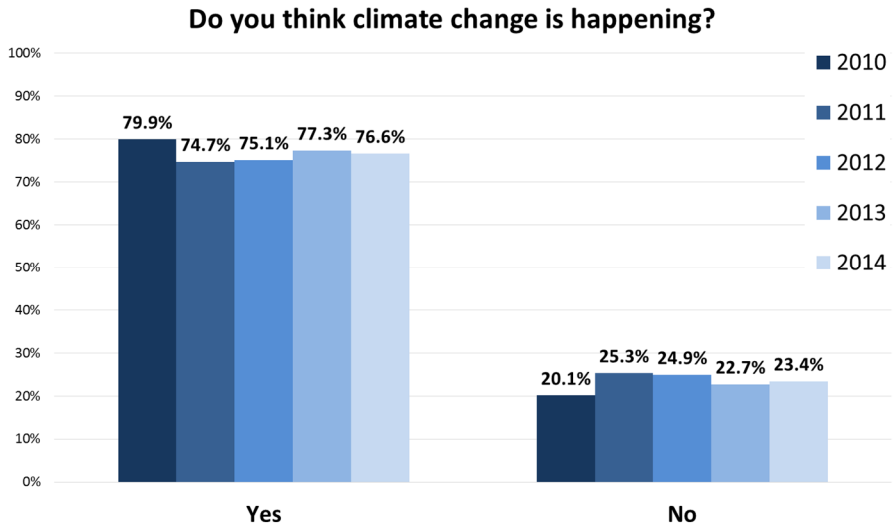
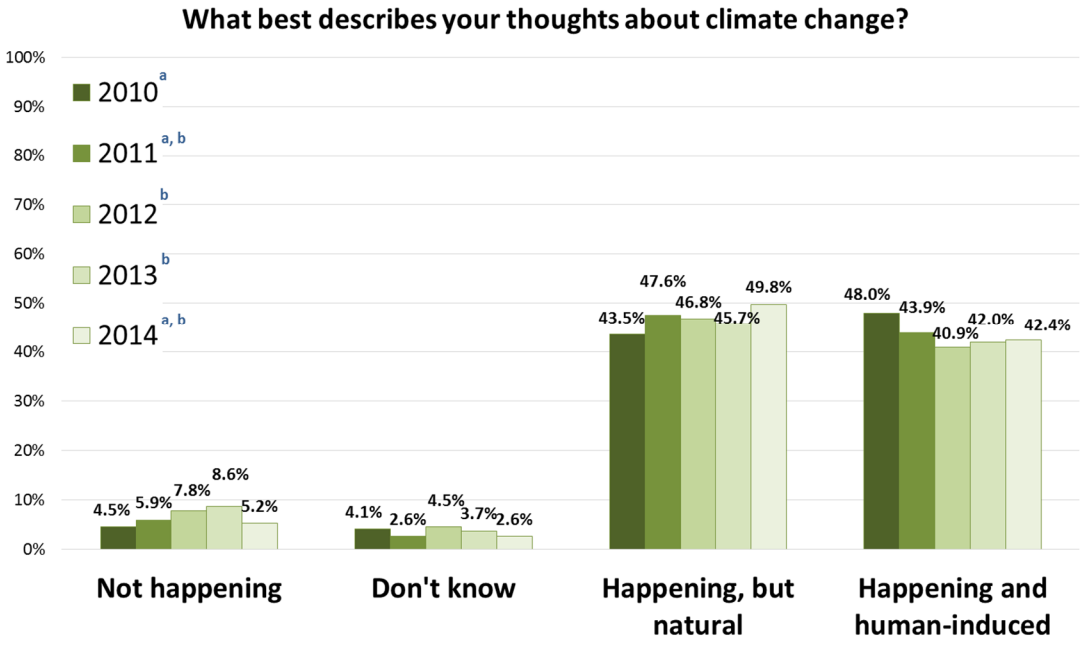


Figure 9 Percentage of agreement over time that climate change is happening (*n*=269)

Figure 10 shows the proportion of repeat respondents selecting each opinion category regarding the causes of climate change. There were small but statistically significant changes in these proportions over time.[14] Specifically, the proportions in the 2010 survey were significantly different from both the 2012 and 2013 surveys. Significantly more people indicated they thought climate change was not happening in 2012 and 2013 than in 2010, and fewer indicated they thought climate change was human-induced in 2012 and 2013 than in 2010. Proportions in 2014 were not significantly different than for other time periods.



a Years with different subscripts mean proportions are significantly different on the basis of Tukey's HSD test

Figure 10 Levels of agreement over time about the causes of climate change (*n*=269)

[14] $F(4, 264) = 3.20$, $p = .014$, $\eta_p^2 = .05$.

To test whether changes in misperceptions of others' attitudes changed significantly over time, ratings of repeat-respondents' perceptions of others' opinions were compared across time (Table 4). There was no significant difference in estimates of how many Australians would state climate change was happening, or who didn't know. Estimates of how many Australians would endorse the view that climate change was happening, but due just to natural processes, rose slightly between 2010 and 2011 (but was still underestimated compared to actual levels). Estimates of Australians who would endorse the view that climate change was happening and human-induced fell slightly between 2010 and 2012, but rose again in 2014 (but was still underestimated compared to actual levels).

Table 4 Percentage estimates of the Australian community's level of agreement with each statement, over time (*n*=269)

OPINION-TYPE	2010	2011	2012	2013	2014	SIG	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
Not happening	20.6%	21.6%	22.8%	23.9%	21.5%	$p = .12$	.03	-	-
Don't know	22.0%	19.3%	21.1%	21.0%	20.2%	$p = .16$	.03	-	-
Happening, but natural	24.3%	28.7%	27.4%	27.1%	26.9%	$p = .01$	.05	Fluctuating	Small
Happening and human-induced	33.1%	30.4%	28.8%	28.0%	31.4%	$p = .002$	.06	Fluctuating	Medium

1.4 Climate change and its causes: Consistency over time

Table 5 shows the percentage of repeat respondents who selected the *same* statement regarding the causes of climate change in all five surveys. No participants repeatedly selected the 'not happening' statement, while the 'happening and human-induced' statement was the most consistently selected option. Nearly half (48.5%) changed their selection at least once. Between 2013 and 2014, the percentage of repeat respondents changing their selection was 29%.

Table 5 Percentage of repeat respondents selecting the same statement about the causes of climate change in all five surveys (*n*=269)

STATEMENT	CONSISTENT ACROSS SURVEYS
Not happening	0%
Don't know	0.3%
Happening, but natural	21.6%
Happening and human-induced	29.4%
All	51.5%

Table 6 displays a comparison of statement selections in 2010 and in 2014. Cells shaded in grey represent the number of respondents who selected the same statement in both surveys (71% of respondents). Cells shaded in pink represent respondents who agreed in 2010 that climate change was human-induced, but who had moved away from that view in 2014 (12.3% of respondents). Cells shaded in green represent respondents who did not agree in 2010 that climate change was human-induced, but moved towards this view by 2014 (6.7% of respondents). The most common shift was to move from the opinion that climate change was human-induced to the opinion that it was happening, but natural (11.2% of respondents).

Table 6 Repeat respondents' opinion-type in 2010 and 2014 (*n*=269)

		2010 SURVEY				
	Opinion-type	Not happening	Don't know	Happening, but natural	Happening and human-induced	2014 Total
2014 SURVEY	Not happening	1 (0.4%)	3 (1.1%)	9 (3.3%)	1 (0.4%)	14 5.2%
	Don't know	0 (0%)	3 (1.1%)	2 (0.7%)	2 (0.7%)	7 2.6%
	Natural	8 (3.0%)	5 (1.9%)	91 (33.8%)	30 (11.2%)	134 49.8%
	Human-induced	3 (1.1%)	0 (0%)	15 (5.6%)	96 (35.7%)	114 42.4%
	2010 Total	4.5%	4.1%	43.5%	48.0%	100%

Legend: Pink-shaded cells represent those who moved away from the human-induced opinion at 2014. Green-shaded cells moved toward the human-induced opinion at 2014. Grey-shaded cells represent consistent opinions at 2010 and 2014.

1.5 Other climate change attitudes

A series of attitudinal statements was asked to establish several further basic attitudes to climate change. These are detailed in Table 7. In general, people were moderately sure climate change was happening, were moderately worried, thought it was important, had some experience of its effects, and felt it was personally relevant.

Table 7 Responses to attitudinal questions about climate change (*N*=5163)

STATEMENT	SCALE	MEAN	SD
"How sure are you that climate change is happening?"	1 = not at all sure – 4 = extremely sure	2.58	1.04
"How worried are you about climate change?" †	1 = not at all worried – 4 = very worried	2.66	0.88
"How important is the issue of climate change to you personally?" †	1 = not at all important – 5 = extremely important	3.11	1.14
"How much have you personally experienced the effects of climate change?" †	1 = not at all – 4 = a great deal	2.08	0.88
"How personally relevant is climate change to you?"	1 = not at all relevant – 5 = extremely relevant	2.95	1.14

† Items based on Yale Project on Climate Change (Leiserowitz, Maibach, & Roser-Renouf, 2010).

1.6 Other climate change attitudes: Changes over time

Table 8 displays how these first four attitudes changed over time, using the 269 repeat respondents who completed all five surveys. Certainty that climate change was happening did not alter significantly. Ratings of worry, experience, and importance all displayed a similar pattern: after an initial decrease in worry, experience, and importance (from 2010 to 2011), ratings increased again and remained stable for the next three years.

Table 8 Mean ratings of attitudes toward climate change over time (*n*=269)

STATEMENT	MEASUREMENT SCALE	2010	2011	2012	2013	2014	SIG	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
How sure are you that climate change is happening?	'1 = Not at all sure' to '5 = Extremely sure'	2.56 a	2.57 a	2.53 a	2.61 a	2.54 a	*p* = .95	.01	-	-
How worried are you about climate change?	'1 = Not at all worried' to '4 = Very worried'	2.58 b	2.40 a	2.53 b	2.52 b	2.49 a, b	*P* = .002	.06	Fluctuating	Medium
How much have you personally experienced the effects of climate change?	'1 = Not at all' to '4 = A great deal'	1.93 b	1.73 a	1.82 a, b	1.84 a, b	1.83 a, b	*p* = .001	.07	Fluctuating	Medium
How important is the issue of climate change to you personally?	'1 = Not at all important' to '5 = Extremely important'	3.03 b	2.82 a	2.89 a, b	2.92 a, b	2.90 a, b	*p* = .02	.04	Fluctuating	Small

a Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test

1.7 Who people think is responsible for climate change

Respondents were presented with a range of groups and asked how much they considered each group to be responsible for *causing* climate change. Figure 11 reveals that big-polluting countries were considered most responsible, followed by multi-national corporations and wealthy countries. Individuals were considered the least responsible, regardless of whether people thought climate change was happening or not, or whether it was human-induced or not. People who thought climate change was not happening, or was happening but natural, still gave moderate to high ratings to several human groups for causing climate change.

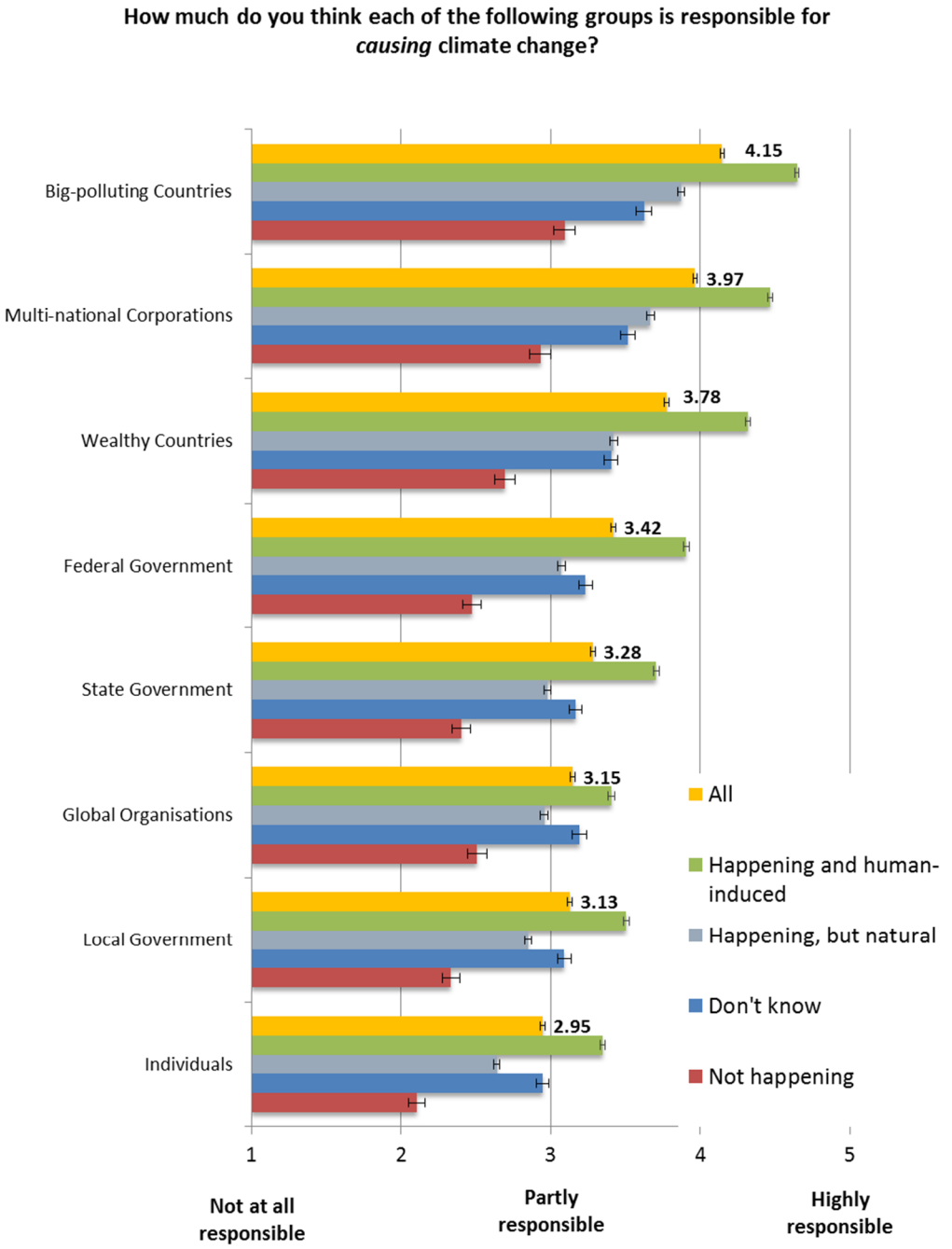


Figure 11 Mean rating of responsibility for *causing* climate change, by opinion-type (*N*=5163)

Respondents were asked how responsible they thought each of these groups were for *responding* to climate change. Patterns of ratings were similar to causal ratings. Again, big polluters were considered most responsible, and individuals the least responsible. Again, those who thought climate change was not happening gave at least moderate ratings of responsibility upon all groups to respond to climate change.

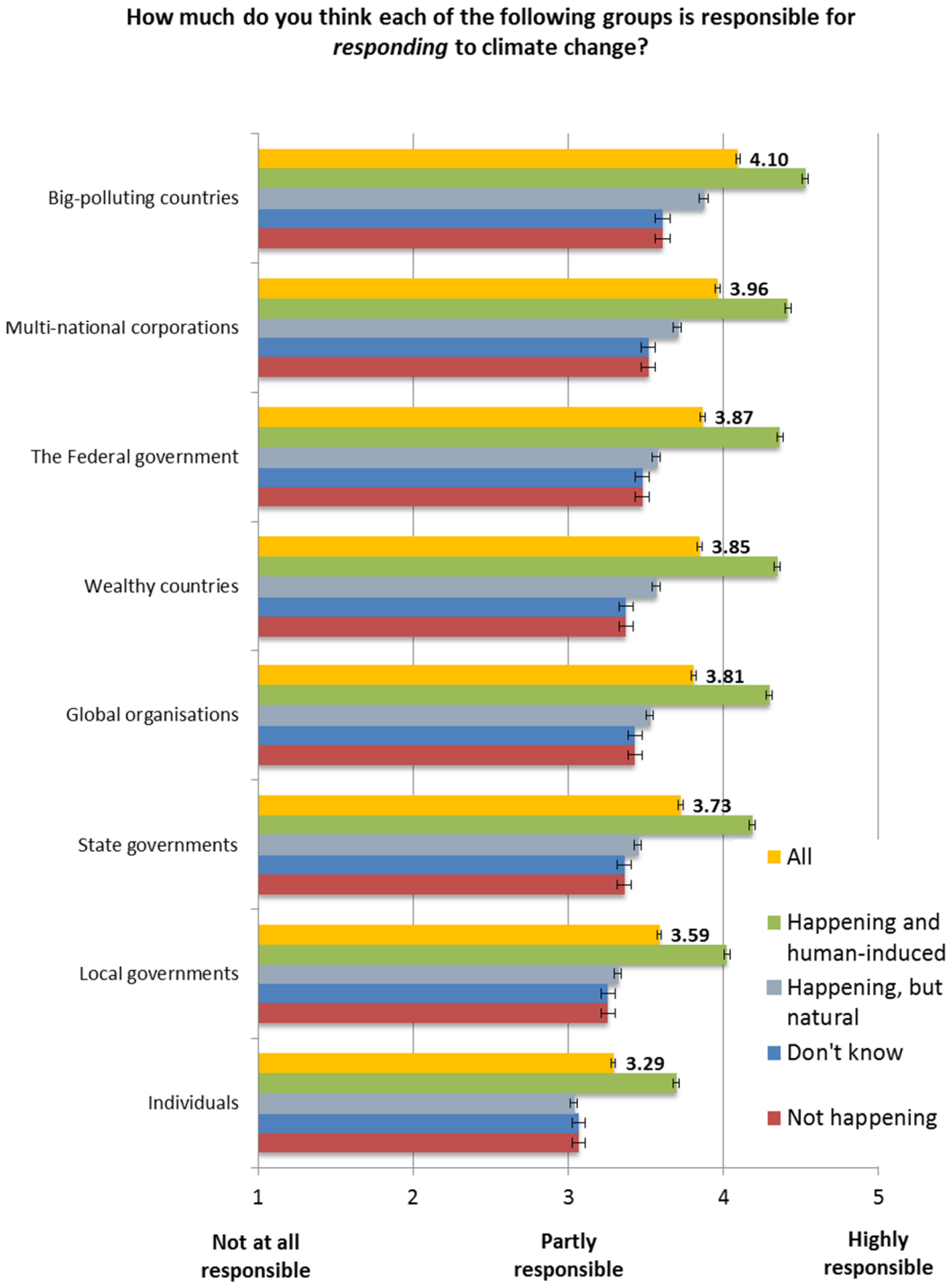


Figure 12 Mean rating of responsibility for *responding* to climate change, by opinion-type (*N*=5163)

Table 9 displays how ratings of responsibility changed over time, using the 269 repeat respondents who completed all five surveys. There were small fluctuations over time for ratings for local governments, state governments, and multi-national corporations, with the general trend being a reduction in responsibility ratings between 2010 and 2011, before these changes were almost (but not quite) reversed in 2012. After 2012 ratings remained stable, although multi-national corporations received a small increase in responsibility ratings in 2014. The federal government received a stronger drop in responsibility rating between 2010 and 2011 before ratings stabilised, as did wealthy countries and big-polluting countries.

Table 9 Mean ratings of responsibility for causing and responding to climate change over time (*n*=269)

AGENCY		2010	2011	2012	2013	2014	SIG	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
Normal individuals	Cause	2.77 a	2.64 a	2.68 a	2.73 a	2.67 a	*p* = .26	.02	-	-
	Respond	3.14 a	3.08 a	3.17 a	3.20 a	3.15 a	*p* = .30	.02	-	-
Local governments	Cause	2.92 b	2.73 a	2.81 a, b	2.81 a, b	2.78 a, b	*p* = .047	.04	Fluctuating	Small
	Respond	3.41 b	3.21 a	3.38 a, b	3.34 a, b	3.33 a, b	*p* = .04	.04	Fluctuating	Small
State governments	Cause	3.08 c	2.85 a	2.90 a, b	2.91 a, b, c	2.92 a, b, c	*p* = .01	.05	Fluctuating	Small
	Respond	3.58 b	3.37 a	3.44 a, b	3.46 a, b	3.48 a, b	*p* = .04	.04	Fluctuating	Small
The federal government	Cause	3.16 b	2.94 a	2.98 a, b	3.00 a, b	3.09 a, b	*p* = .003	.06	Fluctuating	Med.
	Respond	3.76 a	3.58 a	3.61 a	3.62 a	3.66 a	*p* = .12	.03	-	-
Global organisations	Cause	2.77 a	2.74 a	2.68 a	2.77 a	2.73 a	*p* = .70	.01	-	-
	Respond	3.68 a	3.52 a	3.50 a	3.53 a	3.58 a	*p* = .12	.03	-	-
Wealthy countries	Cause	3.67 b	3.44 a	3.61 b	3.60 a, b	3.58 a, b	*p* = .003	.06	Fluctuating	Med.
	Respond	3.71 a, b	3.62 a, b	3.58 a, b	3.52 a	3.73b	*p* = .01	.05	Fluctuating	Small
Big-polluting countries	Cause	4.09 b	3.85 a	3.95 a, b	4.02 a, b	4.02 a, b	*p* = .003	.06	Fluctuating	Med.
	Respond	4.02 a	3.90 a	3.81 a	3.78 a	3.98 a	*p* = .02	.04	-	-
Multi-national corporations	Cause	3.83 b	3.64 a	3.77 a, b	3.78 a, b	3.84 b	*p* = .02	.05	Fluctuating	Small
	Respond	3.81 a, b	3.77 a, b	3.69 a, b	3.64 a	3.87 b	*p* = .01	.05	Fluctuating	Small

a **Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test**

2 Climate-relevant behaviours: What are people doing and why?

It is interesting to know the prevalence of people's basic opinions about climate change and its causes, but arguably much more important than this is what people actually do in their day-to-day lives in response. In this section, we will examine a range of activities that have relevance to climate change in some way: be it to reduce their impact on greenhouse gas emissions, or to adapt to the impacts of climate change now and into the future. We will see how engagement in these activities is associated with attitudes, whether engagement has changed over time, and whether they are associated with beliefs about what other Australians are doing.

2.1 Climate-relevant behaviours

Respondents were asked to indicate whether they had, in the last five years, engaged in any of the community-based environmental behaviours listed in Figure 13. In general, engagement levels were low, although nearly a third (29.3%) of respondents stated taking part in environmental event in the last five years.

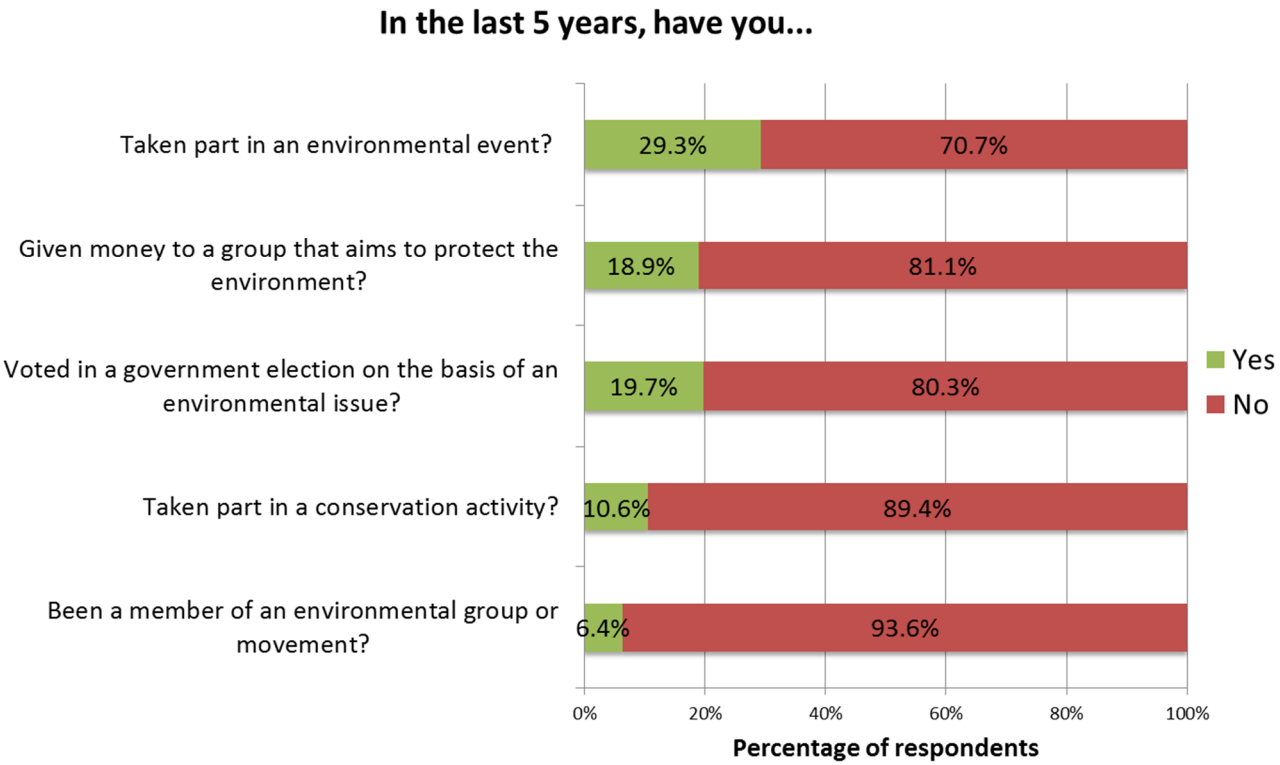


Figure 13 Percentage of respondents engaging in community-based climate-relevant behaviours (*N*=5163)

Respondents were asked whether they engaged in any of 21 different individual behaviours listed in Figure 14. These behaviours were designed to assess activities relevant to reducing or avoiding greenhouse gas emissions, as well as adaptation. Respondents were also asked their primary motivation for performing these behaviours. Responses revealed large variations in both rates and reasons for engagement.

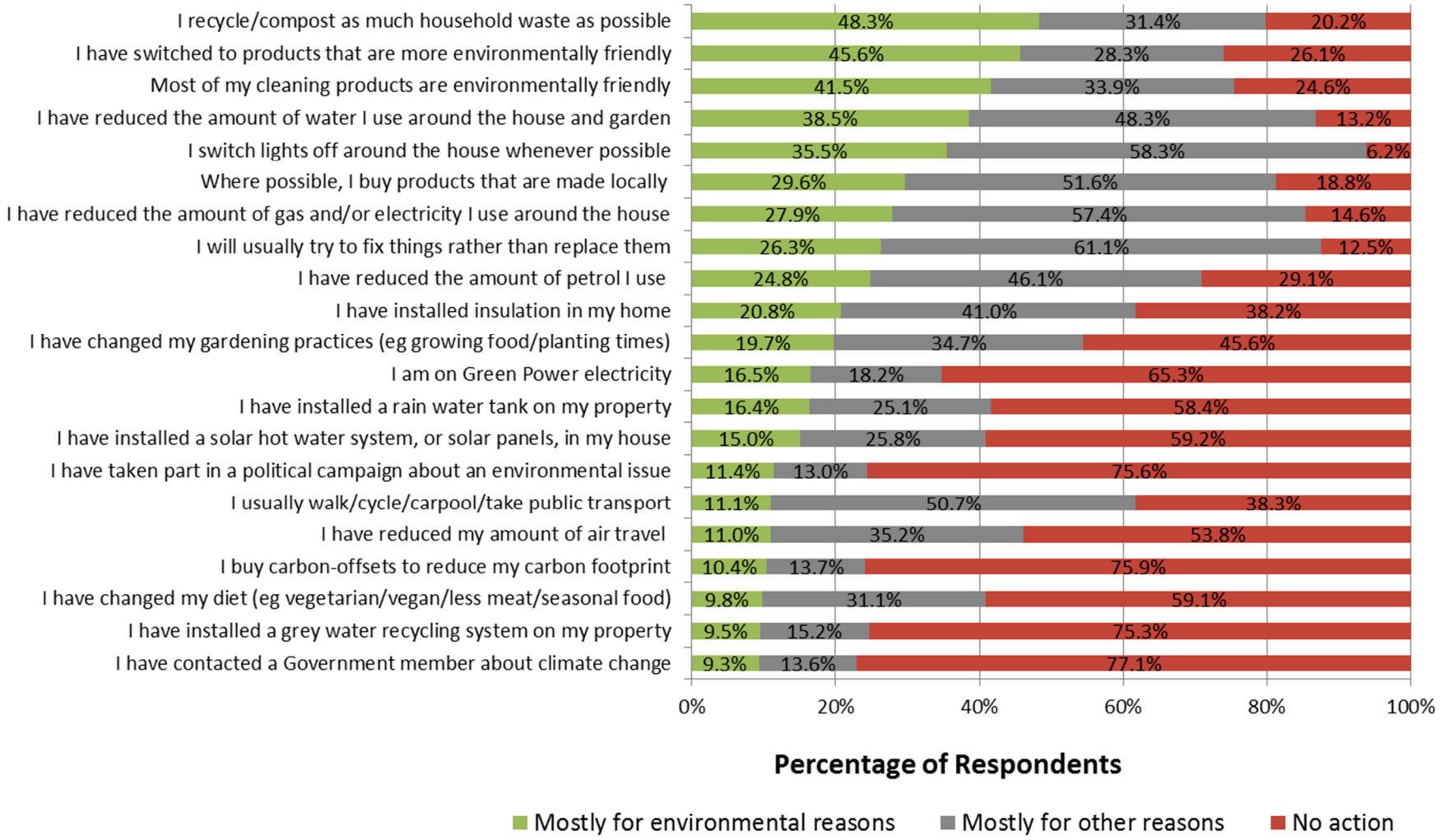


Figure 14 Percentage of respondents engaging in individual climate-relevant behaviours (*N*=5163)

Two scores were calculated for each respondent: a community behaviour score, by aggregating the number of community-based behaviours each respondent reported engaging in (yielding a maximum possible score of 5); and an individual behaviour score, by aggregating the number of individual climate-relevant behaviours they engaged in (yielding a maximum possible score of 42).[15] Opinion-type was moderately associated with both community behaviour[16] and individual behaviour,[17] as shown in Figure 15 and Figure 16 respectively. Those who thought climate change was human-induced were more likely to engage in individual and community climate-relevant behaviours.

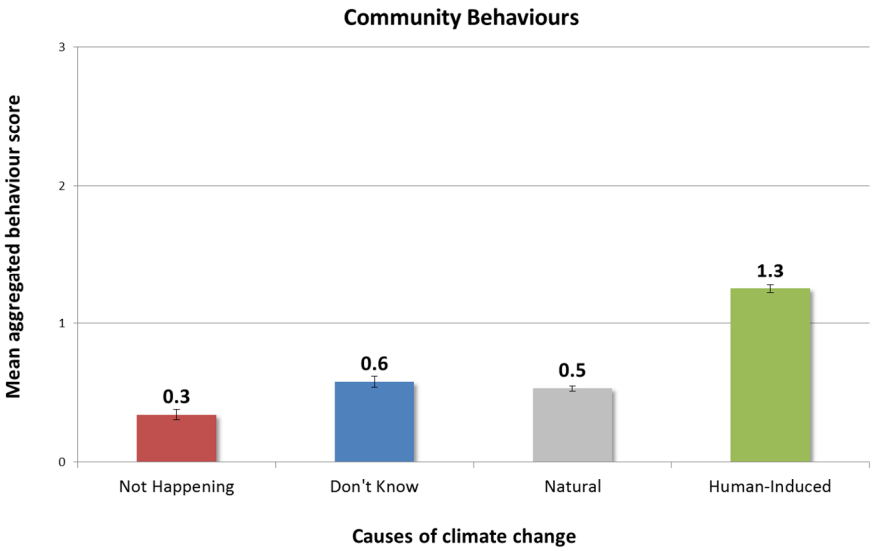


Figure 15 Mean aggregated community behaviour scores, by opinion-type (*N*=5163)

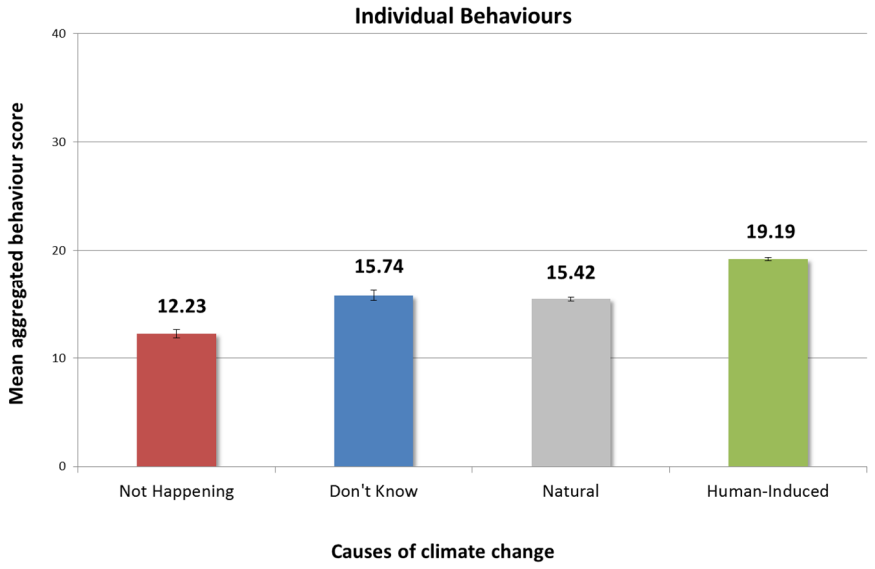


Figure 16 Mean aggregated individual behaviour scores, by opinion-type (*N*=5163)

[15] For each of the behaviours, a score of 1 was given for each behaviour engaged in for non-environmental reasons, and a score of 2 was given for each behaviour engaged in for mainly environmental reasons.

[16] $F(3, 5159) = 208.02$, $p < .001$, $\eta^2 = .12$.

[17] $F(3, 5159) = 130.45$, $p < .001$, $\eta^2 = .08$.

To investigate which attitudes most strongly related to the number of pro-environmental behaviours people engaged in, people's responses to a set of attitudinal questions about climate change were correlated with their overall individual and community behaviour score. Table 10 shows that all climate change attitudes are moderately related to individual behaviour, with *how important* and *how personally relevant* climate change is having the strongest relationships. Importance and personal relevance were also the most strongly related to engagement in community behaviours. How sure people were about climate change, and how much they estimated that human activity contributed to climate change, were among the weaker associations with behavioural engagement.

Table 10 Associations between climate change attitudes and individual and community behaviour (*N*=5163)

ITEM	INDIVIDUAL BEHAVIOUR (PEARSON CORRELATION)	COMMUNITY BEHAVIOUR (PEARSON CORRELATION)
How important is climate change to you?	.52**	.46**
I feel it is my ethical responsibility to change my individual behaviour to combat climate change	.41**	.37**
I feel a moral duty to do something about climate change	.43**	.39**
How personally relevant is climate change to you?	.50**	.44**
How sure are you that climate change is happening?	.34**	.38**
How worried are you about climate change?	.44**	.40**
How much have you personally experienced the effect of climate change?	.45**	.31**
How much do you think humans contribute to climate change?	.38**	.33**

2.2 Climate-relevant behaviours: Changes over time

Ten individual behaviours were asked about in all five surveys. To analyse changes in engagement levels with these behaviours, and changes in reasons for engaging in them, we looked at engagement levels of the 269 repeat respondents who completed all five surveys. In general engagement was relatively stable, but with significant changes to energy use and switching home lighting off (Figure 17 to Figure 26).

There were no significant changes in engagement in political campaigns for environmental issues (Figure 17).[18]

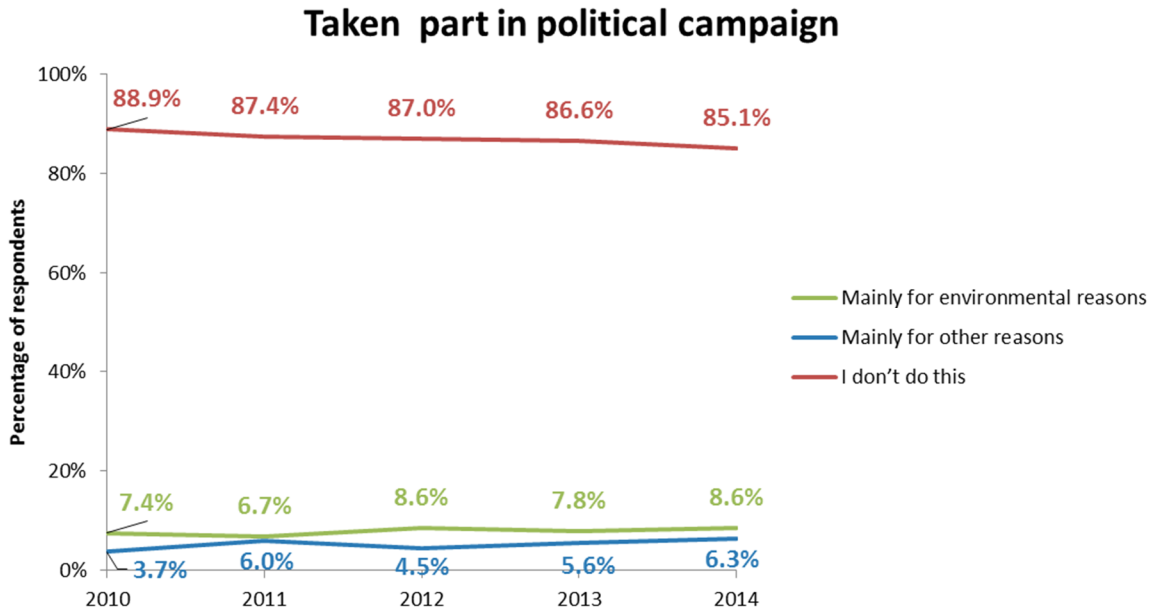


Figure 17 Percentage of respondents who stated they had taken part in a political campaign about environmental issues, over time (*n*=269)

There were no significant changes in proportions of people who had contacted a member of government about climate change (Figure 18).[19]

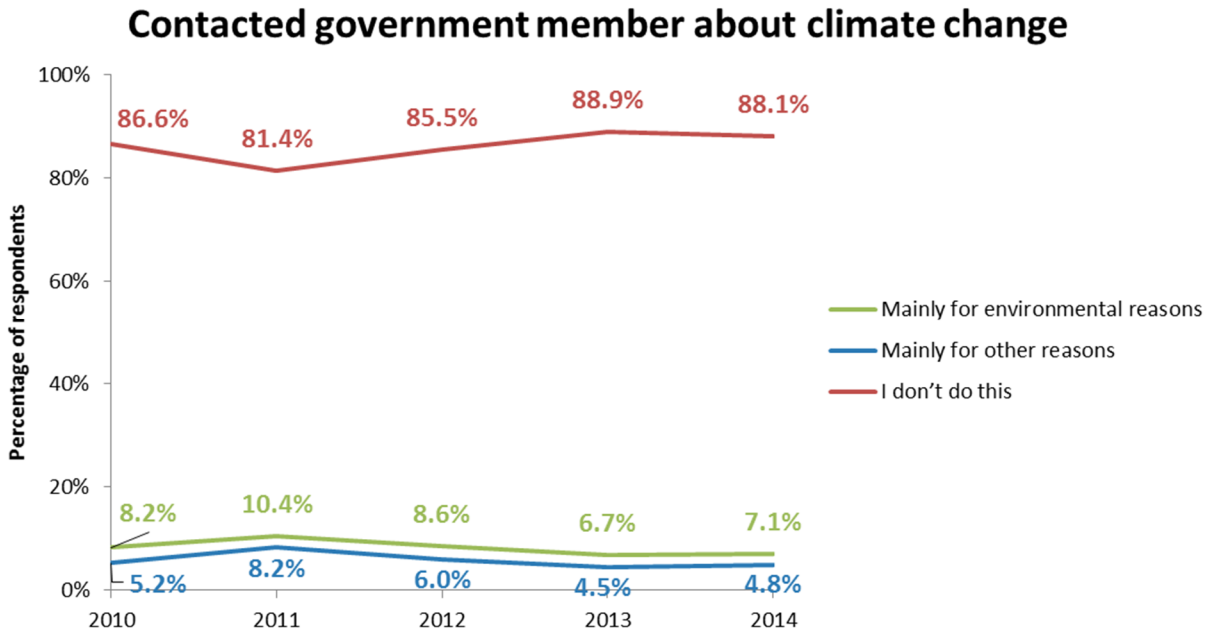


Figure 18 Percentage of respondents who stated they had contacted a government member about climate change, over time (*n*=269)

[18] F (4, 264) = .57, p = .69

[19] F (4, 264) = 2.52, p = .04.

There were no significant changes in the proportion of people regularly purchasing environmentally friendly products (Figure 19).[20]

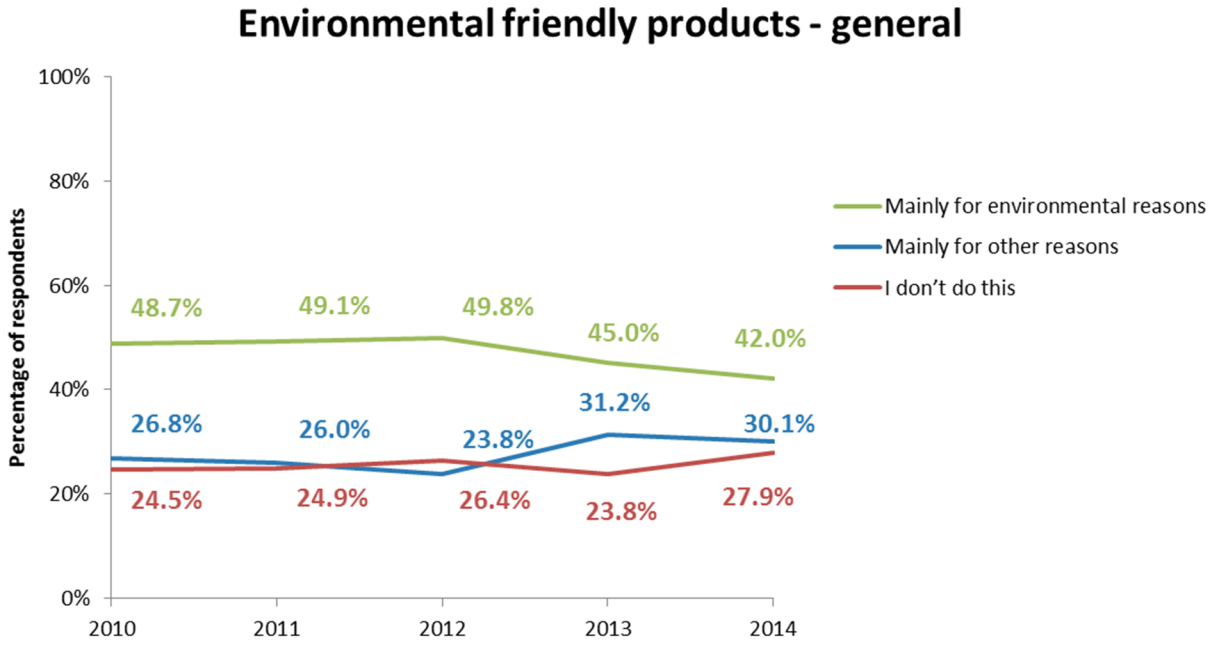


Figure 19 Percentage of respondents who stated purchasing environmentally friendly products, over time (*n*=269)

There were medium strength significant changes in reducing energy use over time, with a spike in engagement for environmental reasons (rather than other reasons) in 2012, and a decline in overall engagement in 2013 and 2014 (Figure 20).[21]

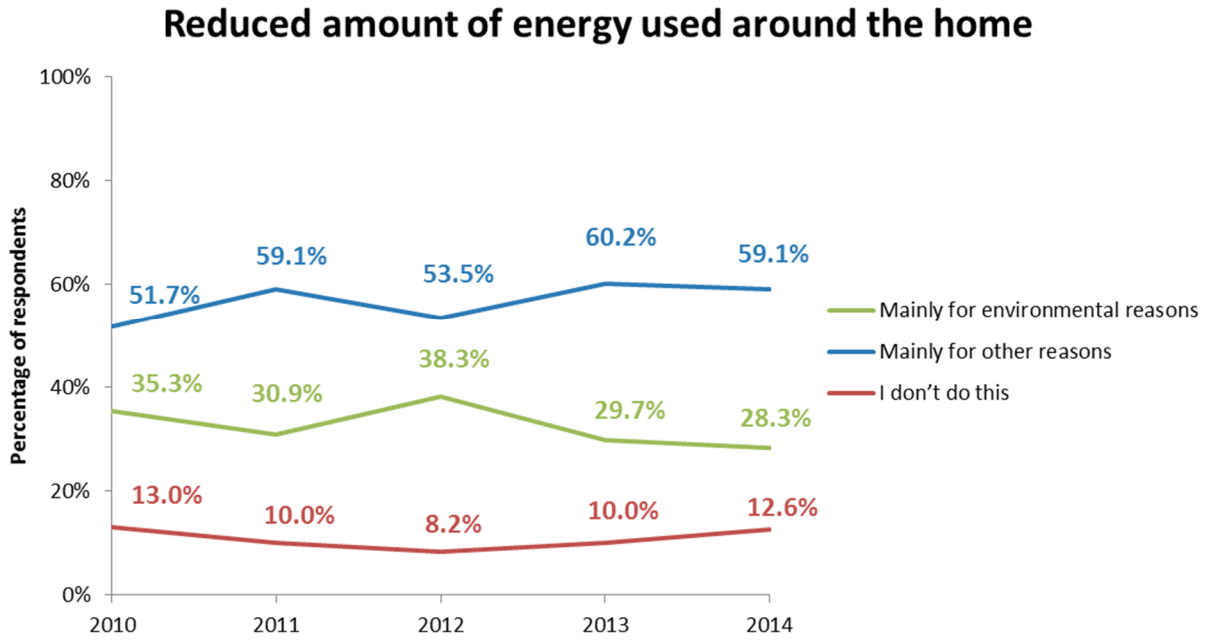


Figure 20 Percentage of respondents who stated reducing energy use around the home, over time (*n*=269)

[20] F (4, 264) = .1.71, p = .15.

[21] F (4, 264) = 4.68, *p* = .001, ηp^2 = .07.

There were no significant changes in proportions of people saying they tried to fix things rather than replace them (Figure 21).[22]

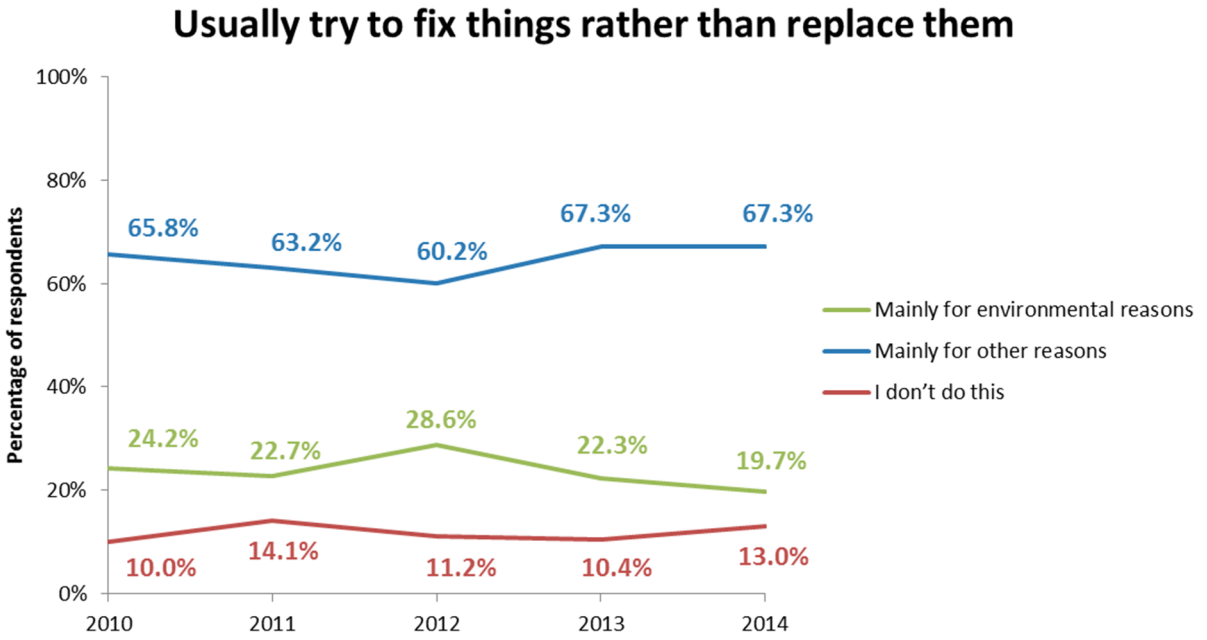


Figure 21 Percentage of respondents who stated they usually tried to fix things rather than replace them, over time (*n*=269)

There were no significant changes in the proportion of respondents stating they were on GreenPower electricity (Figure 22).[23]

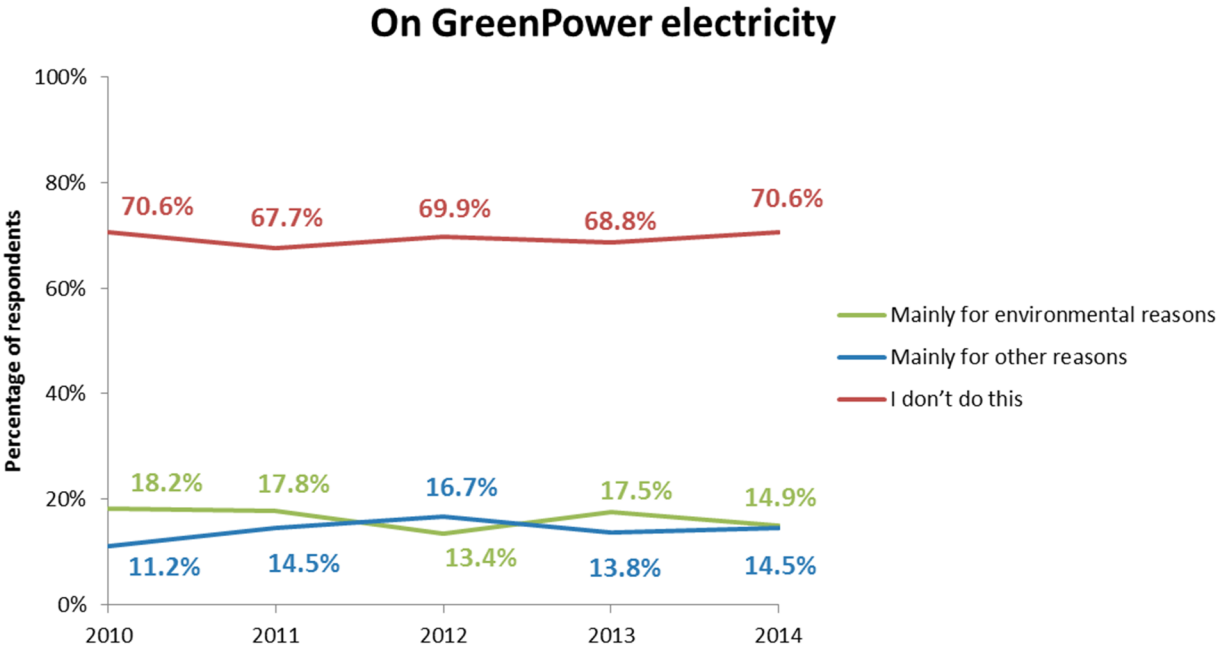


Figure 22 Percentage of respondents who stated they were on GreenPower electricity, over time (*n*=269)

[22] F (4, 264) = 2.65, p = .03.

[23] F (4, 264) = .90, p = .46.

There were no significant differences in the proportion of respondents who stated they purchased environmentally friendly cleaning products (Figure 23).[24]

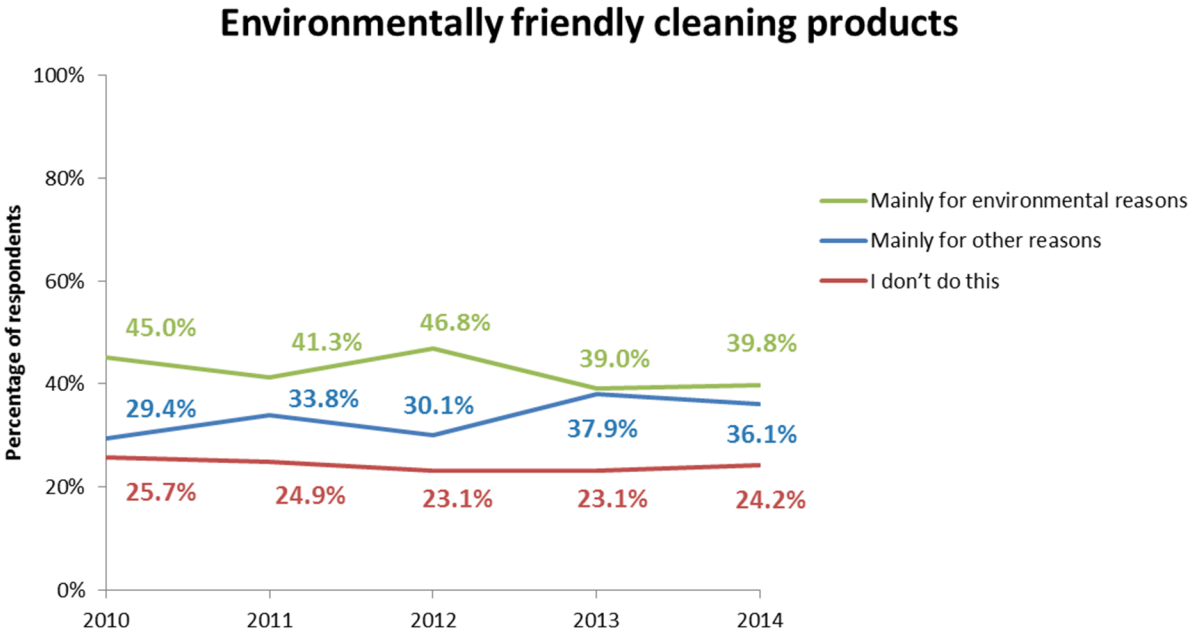


Figure 23 Percentage of respondents who stated they purchased environmentally friendly cleaning products, over time (*n*=269)

There were no significant changes in the proportion of respondents reporting they buy products that are made locally (Figure 24).[25]

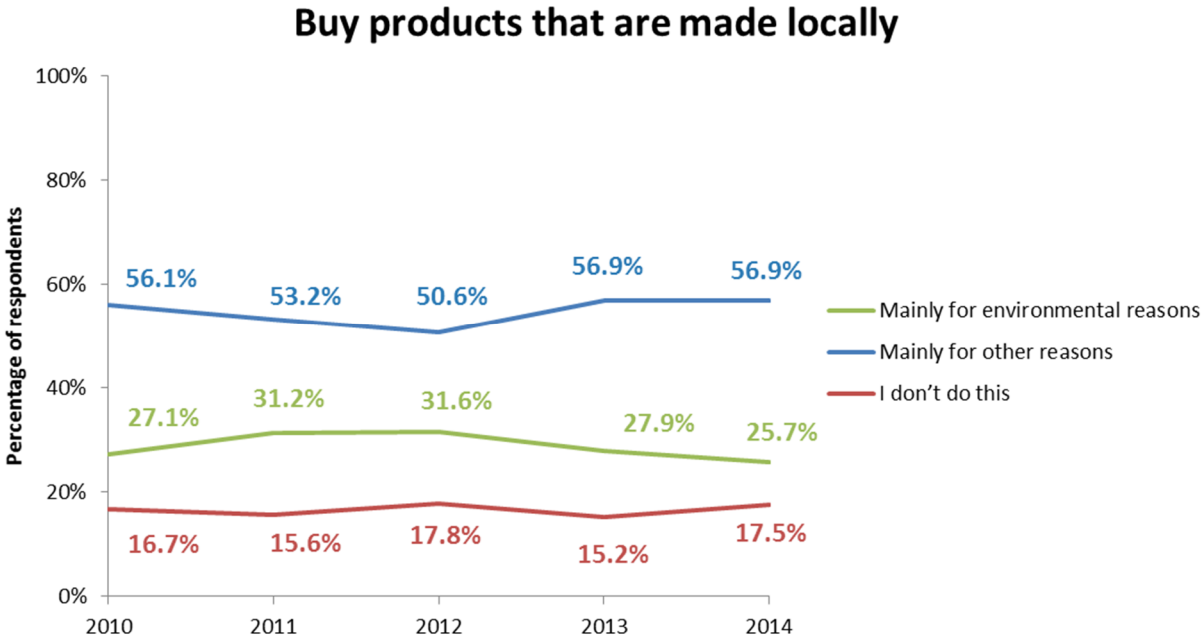


Figure 24 Percentage of respondents who stated they bought products made locally, over time (*n*=269)

[24] F (4, 264) = 1.15, p = .33.

[25] F (4, 264) = .94, p = .44.

Although the differences in the proportions of respondents stating they had reduced their water were not statistically significant,[26] there was a noticeable fluctuations between 2010 and 2011, where environmental engagement became less common and engagement for other reasons more common (Figure 25).

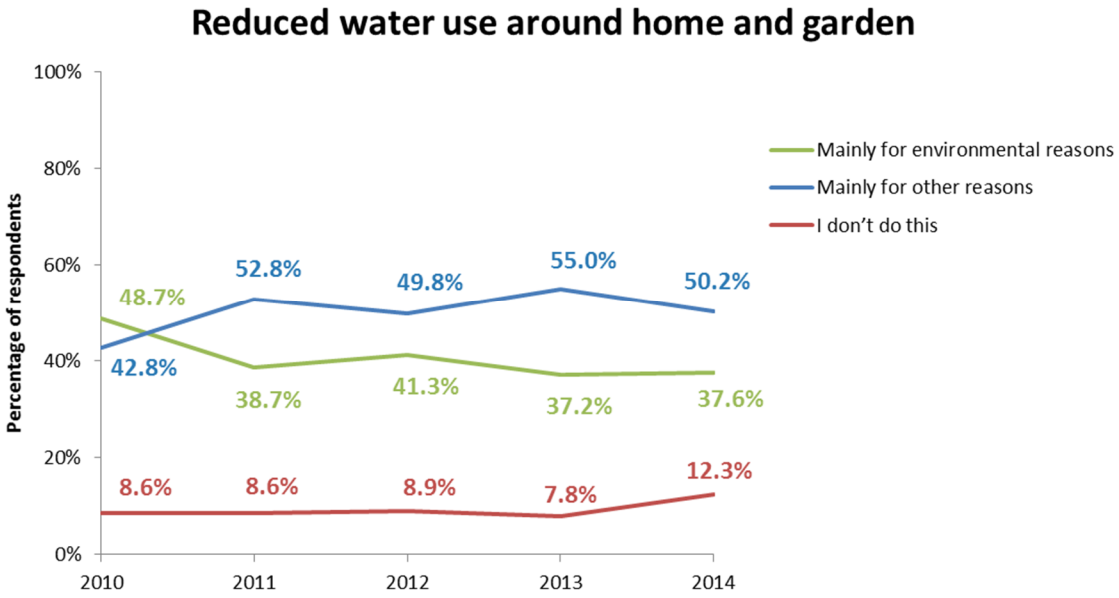


Figure 25 Percentage of respondents who stated they had reduced water use around their home and garden, over time (*n*=269)

There were medium strength significant changes in proportions of respondents stating they switched lights off whenever possible.[27] The number of respondents stating they did it for environmental reasons declined, and this was paralleled by an increase in the proportion of people saying they did it mainly for other reasons (Figure 26).

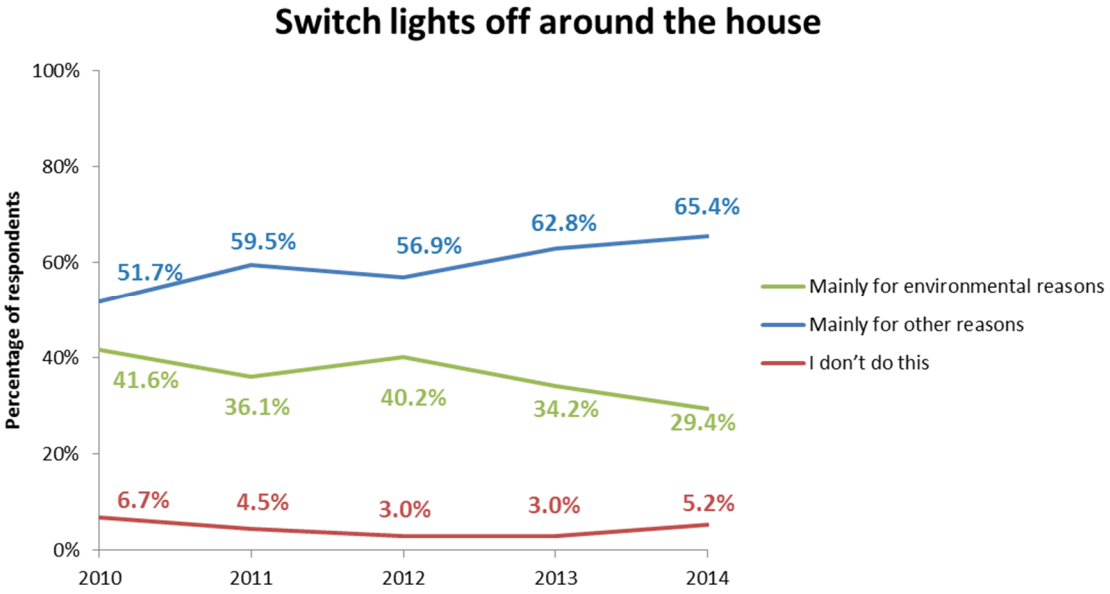


Figure 26 Percentage of respondents who stated they switched lights off around the home whenever possible, over time (*n*=269)

[26] F (4, 264) = 2.93, p = .02.

[27] F (4, 264) = 4.69, p = .001, ηp^2 = .07.

An index was calculated for each of the 269 repeat respondent to capture the total number of behaviours in which they participated, and why they participated in each.[28] Changes in these scores over time are shown in Table 11. Mean pro-environmental scores peaked in 2012, and dropped to their lowest levels in 2014.

Table 11 Mean pro-environmental behaviour score over time (*n*=269)

SURVEY YEAR	BEHAVIOUR INDEX SCORE (RANGE 0 – 20)	SD	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
2010	9.53 a, b	4.33			
2011	9.46 a, b	4.26			
2012	9.66 b	4.36	.06	Fluctuating	Medium
2013	9.30 a, b	4.03			
2014	8.96 a	4.28			

a **Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test**

Between 2010 and 2014, 48% of repeat respondents' pro-environmental behaviour scores decreased, 19.3% remained steady, and 32.7% increased. This was unrelated to their opinion-type in 2014.[29]

2.3 Climate-relevant behaviours: Social norms

Respondents in 2014 were asked to indicate how many of the 21 individual behaviours they thought they did compared to the general Australian population (Figure 27). The majority of respondents (54.6%) thought they did 'about the same' as others. An additional 38.4% though they did more, and only 7% thought they did less.

[28] For each of the behaviours, a score of 1 was given for each behaviour engaged in for non-environmental reasons, and a score of 2 was given for each behaviour engaged in for mainly environmental reasons, meaning total index scores ranged from 0 to 20.

[29] Cramer's $V = .10$, $p = .56$.

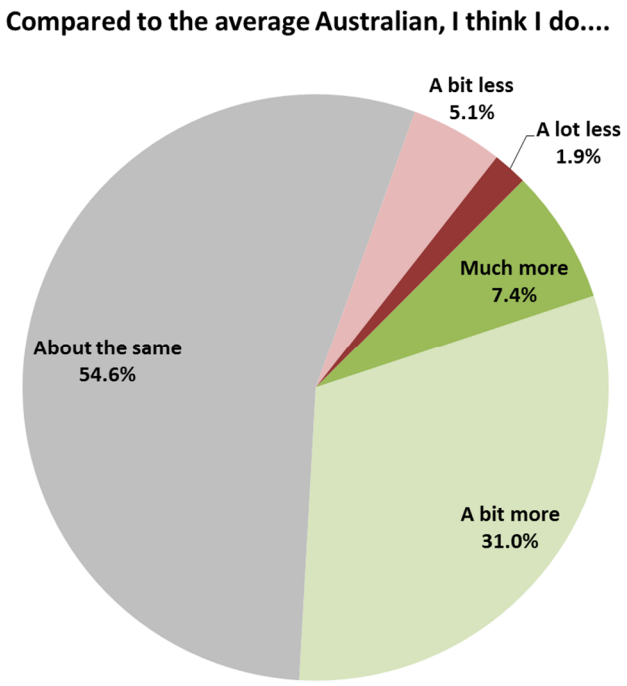


Figure 27 Respondents' estimates of their own pro-environmental engagement (perceived behaviour) compared to others (*N*=5163)

Respondents were asked a series of questions, with reference to the 21 individual behaviours (Table 12), regarding what they think other people do (i.e. descriptive norms), and what they feel they themselves should do (i.e. injunctive norms). Higher agreement with these statements was positively related with behavioural engagement, with norms about what one thinks one should do more highly correlated than norms assessing what they think other people do.

Table 12 Respondents' levels of agreement with injunctive and descriptive social norm statements, and their relationship with individual pro-environmental behaviour scores (*N*=5163)

STATEMENT	MEAN	SD	INDIVIDUAL BEHAVIOUR CORRELATION
I feel a strong personal obligation to do as many of these behaviour as possible †	3.50	.89	.41**
I am willing to put in extra effort to do as many of these behaviours on as possible on a regular basis	3.53	.86	.41**
I would feel guilty if I didn't do these behaviours	3.27	1.02	.39**
Most people who are important to me do many of these behaviours	3.39	.79	.20**
Most people in my social network do many of these behaviours	3.29	.77	.20**
Most of my family do many of these behaviours	3.42	.81	.20**
Most people in my community do many of these behaviours	3.16	.76	.13**

† All questions were asked using a response scale ranging from 1 = strongly disagree to 5 = strongly agree.
*** $p < .01$, ** $p < .001$**

3 Climate projections and scenarios: What does the Australian community think will happen?

Much of the research in climate science is dedicated to building projections and scenarios of what the climate might look like in the future under different baseline conditions. In this section, we will look at the communities own scenarios and projections – what do the Australian people expect will happen to the climate? We will investigate expectations about changes in temperature and rainfall patterns, and changes in the frequency and intensity of a range of severe weather events and ecological processes. We will then explore the impact people expect these changes to have on themselves and others, and their appraisals of their ability to cope with any changes.

3.1 Community projections and scenarios

Respondents were asked a series of questions relating to their expectations of future climatic changes in their region in both 20 and 80 years' time. The most commonly selected projection of future temperature for 20 years in the future, selected by 21.7% of respondents, was for a 0.5 to 1.5 degrees Celsius increase in temperature in their region (Figure 28). The next most common, selected by a further 20% of respondents, was for a 1.5 to 3.0 degrees increase in temperature. In all, about two-thirds of respondents (66%) expected some degree of warming in 20 years. The most commonly selected projection of future temperatures for 80 years' time was a 'don't know' response (19.8%), followed by 3 degrees or more (19.2%), and 1.5 to 3 degrees increase (17.7%). Very few respondents thought it would get colder in either 20 or 80 years (7.7% and 7.4% respectively).

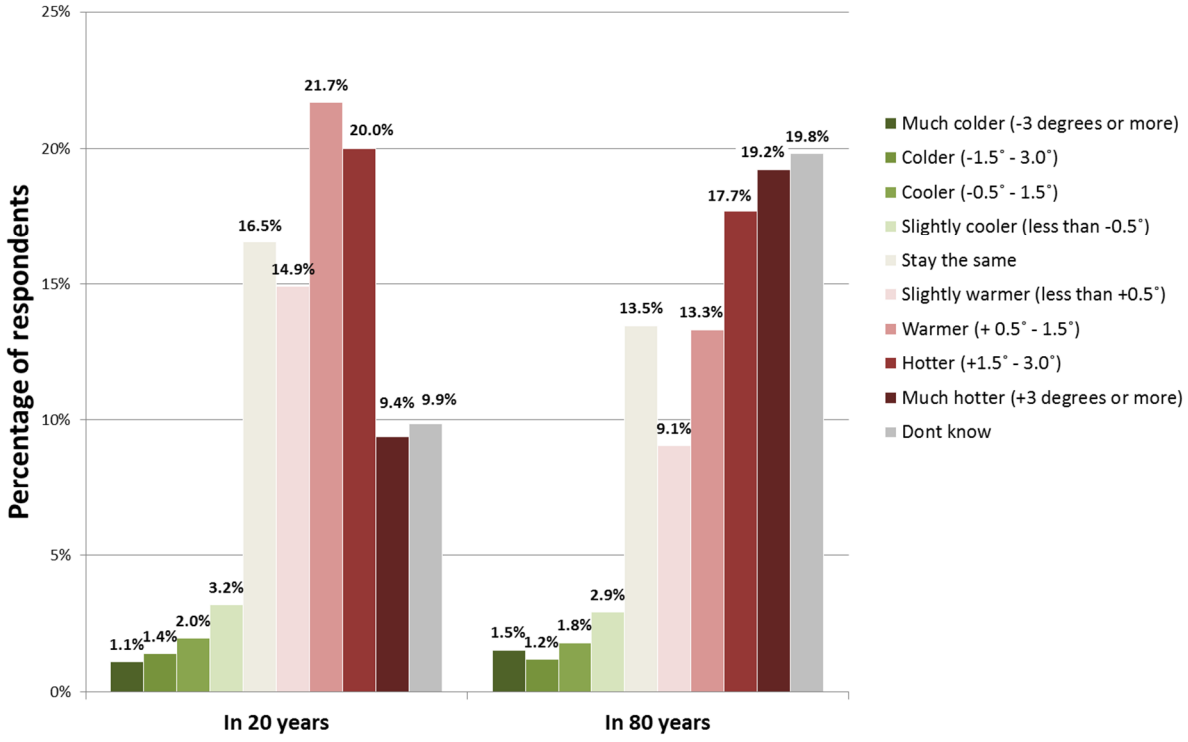


Figure 28 Perceived regional changes in temperature levels (*N*=5163)

With regard to expected future *winter* rainfall changes, the most commonly selected projection for 20 years' time, selected by 26.3% of respondents, is that it would stay the same (Figure 29). A further 35% thought it would become drier, and another 26.3% thought it would become wetter. The most commonly selected projection for rainfall in 80 years' time, selected by 23.4% of respondents, was 'don't know'. A further 35.6% of respondents thought it would become drier, 22.8% thought it would become wetter, and the remaining 18.1% of respondents thought it would stay the same.

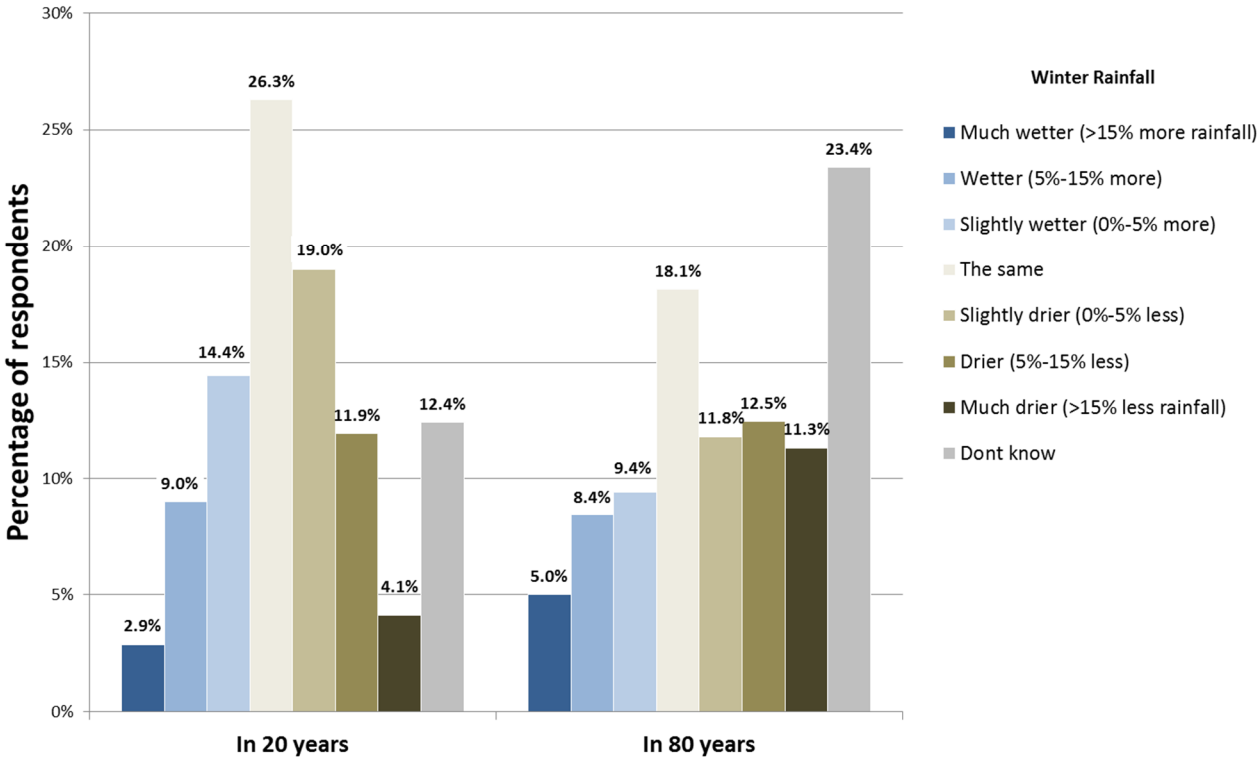


Figure 29 Perceived regional changes in winter rainfall (*N*=5163)

Expected future changes to *summer* rainfall were very similar to expectations for *winter* rainfall. The most commonly selected projection for 20 years' time, selected by 24.9% of respondents, was that summer rainfall would stay the same (Figure 30). A further 39.1% thought it would become drier, 24% thought it would become wetter, and the remaining 12.1% said they didn't know. The most commonly selected projection for 80 years' time, selected by 23.1% of respondents, was that they didn't know. A further 38.2% of respondents thought it would become drier, 21.3% thought it would become wetter, and the remaining 17.5% of respondents thought it would stay the same.

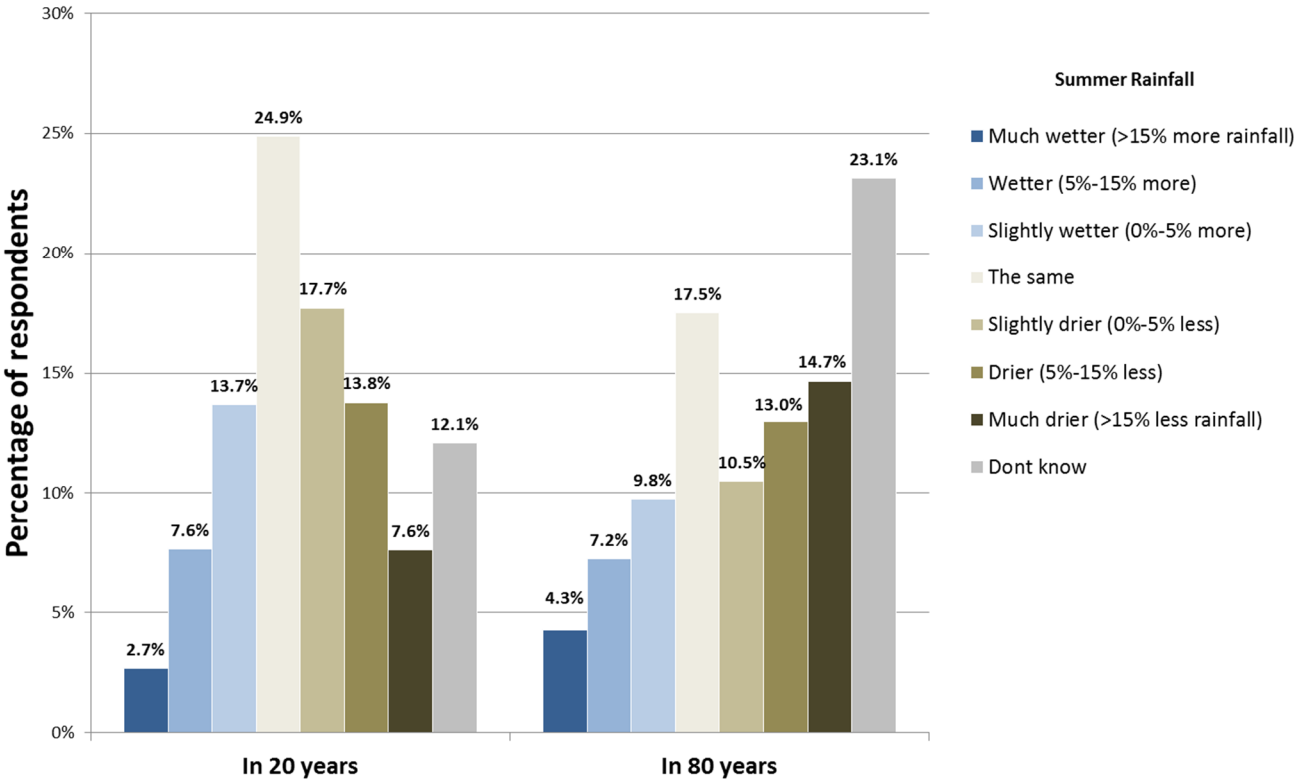


Figure 30 Perceived regional changes in summer rainfall (*N*=5163)

In Table 13 and Table 14, expected future changes in both temperature and rainfall are combined (excluding respondents who selected a 'don't know' option). The most common scenario for 20 years' time is that the respondents' region would be hotter and drier. This was also the case for expected changes in 80 years' time.

Table 13 Distribution of community scenarios for regional climate in 20 years' time (*N*=4428; *N*=4614)[30]

EXPECTED CLIMATE CHANGES (20 YEARS)	COOLER	THE SAME TEMPERATURE	HOTTER	TOTAL
WETTER	5.6% * (4.6%)**	1.9% (1.5%)	22.2% (20.0%)	**29.7% (26.1%)**
THE SAME RAINFALL	2.0% (1.7%)	15.6% (15.1%)	12.4% (10.4%)	**30.0% (27.2%)**
DRIER	1.2% (2.1%)	1.1% (1.4%)	37.9% (43.2%)	**40.2% (46.7%)**
TOTAL	**8.8% (8.4%)**	**18.6% (18.0%)**	**72.5% (73.6%)**	**100%**

*** Refers to winter rainfall**
**** Figures in parentheses refer to summer rainfall**

Table 14 Distribution of community scenarios for regional climate in 80 years' time. (*N*=3893; *N*=3950)

EXPECTED CLIMATE CHANGES (80 YEARS)	COOLER	THE SAME TEMPERATURE	HOTTER	TOTAL
WETTER	6.7% * (5.7%) **	1.0% (1.8%)	21.9% (20.5%)	**29.6% (28.0%)**
THE SAME RAINFALL	1.5% (1.2%)	15.5% (14.9%)	6.8% (6.4%)	**23.8% (22.5%)**
DRIER	1.4% (2.4%)	0.9% (1.5%)	44.4% (45.5%)	**46.7% (49.4%)**
TOTAL	**9.6% (9.3%)**	**17.4% (18.2%)**	**73.1% (72.4%)**	**100%**

* Refers to winter rainfall
** Figures in parentheses refer to summer rainfall

[30] Participants who had selected a 'don't know' option were excluded from these analyses.

3.2 Community projections and scenarios: Regional differences

There were significant differences in 20 and 80 year temperature and rainfall projections based on respondents' state/territory (Table 15). On average, respondents across all states expected the temperature in their regions to rise.[31] New South Wales respondents expected the temperature rise to be lower than those in Queensland, South Australia, and Western Australia for both the 20 and 80 year climate change projections. Respondents in Western Australia predicted much drier winter and summer rainfall patterns than other states. Specifically, Western Australians' winter and summer rainfall projections were significantly higher (i.e. much drier) than those living in New South Wales and Tasmania. Respondents in the Northern Territory tended to predict much wetter summer and winter rainfall changes. Specifically, their summer rainfall projections were significantly lower (i.e. much wetter) than respondents in South Australia and Western Australia for both the 20 and 80 years projections.

Table 15 Perceived regional changes in temperature and rainfall, by respondents' state/territory (*N*= 5163)

CLIMATE PROJECTIONS	ACT	NSW	NT	QLD	SA	VIC	WA	TAS	SIG	η_p^2
20 years projection										
Temperature**	6.52*a,b,c	6.37a	7.07a,b,c	6.66b,c	6.89c	6.46a,b	6.82c	6.57a,b,c	$p < .001$	0.11
Winter Rainfall***	4.21a,b,c	3.91a	3.43a,b,c	4.36b,c	4.16a,b	4.10a,b	4.70c	4.05a,b	$p < .001$	0.29
Summer rainfall***	4.53b,c,d,e	4.16b	3.33a,b,c	3.88a	4.81d,e	4.54c,d	5.03e	4.36a,b,c,d	$p < .001$	0.06
80 years projection										
Temperature	7.02a,b,c	6.64a	6.79a,b,c	7.01b,c	7.21c	6.79a,b	7.04b,c	7.04a,b,c	$p < .001$	0.01
Winter rainfall***	4.29a,b,c	4.08a	3.25a,b,c	4.59b,c	4.44a,b,c	4.33a,b,c	5.00c	4.21a,b	$p < .001$	0.03
Summer rainfall***	4.79c,d,e	4.35a,b,c	2.67a	4.07a,b	5.03d,e	4.79d	5.24e	4.55b,c,d	$p < .001$	0.05

*** Mean scores**
****9-point scale with higher scores indicating hotter climatic change projection**
*****7-point scale with higher scores indicating much drier climatic change projection**
a Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test

[31] It is important to note that states and territories do not overlap precisely with the different eight natural resource management regions identified by the CSIRO and the Bureau of Meteorology (CSIRO & Bureau of Meteorology, 2015). In our fourth annual survey, 44% of respondents thought of 'their region' as their city/town, and a further 25% thought of 'their region' as their state/territory.

3.3 Expectations for extreme weather events and ecological processes

Respondents were asked about expected changes in the frequency and intensity of a series of weather events and ecological processes. Endorsement of the view that these events and processes would increase to at least some extent ranged from about 50% or respondents to about 75% of respondents, depending upon the event or process in question (Figure 31 and Figure 32). Heatwaves, extreme high temperatures, and drought were most commonly expected to increase in both frequency and intensity. Sea level rise, floods, and cyclones were less commonly expected to increase.

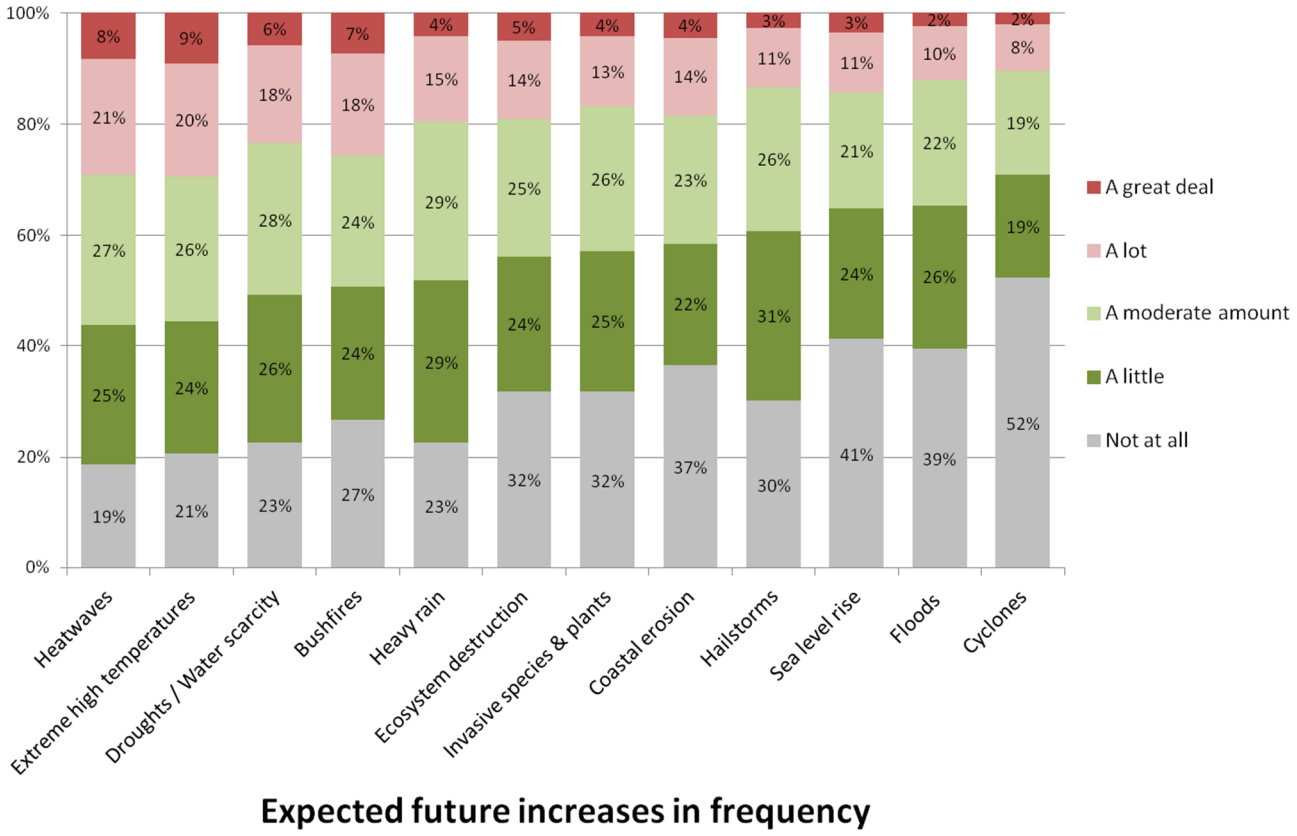


Figure 31 Expected future increases in frequency of events in respondents' region (*N*=5163)

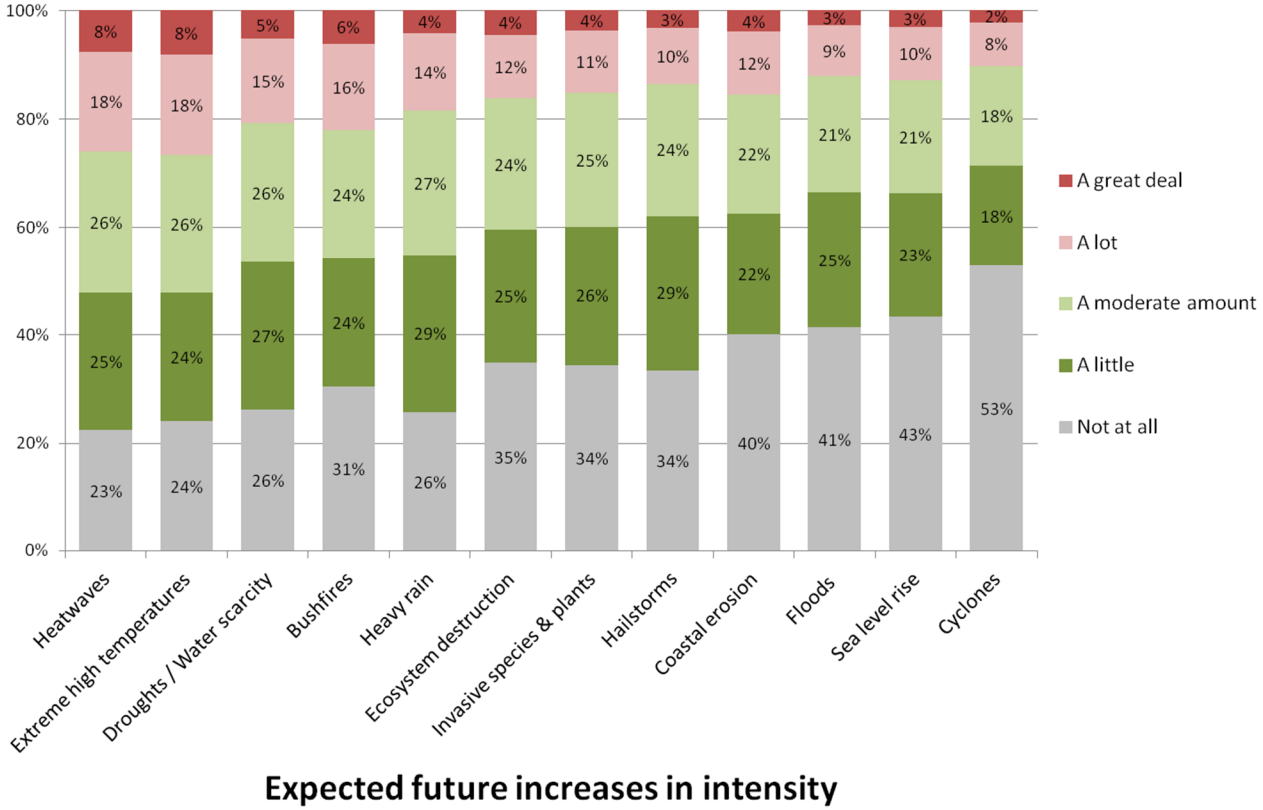


Figure 32 Expected future increases in intensity of events in respondents' region (*N*=5163)

3.4 Harm and coping

Respondents were asked how much they thought climate change would harm different groups of people (Figure 33). In general, respondents thought they themselves would be harmed less than others in their family and neighbourhood, who in turn would be harmed less than others in the country. Those in poor, developing countries, and people around the world generally were expected to be the most harmed by climate change.

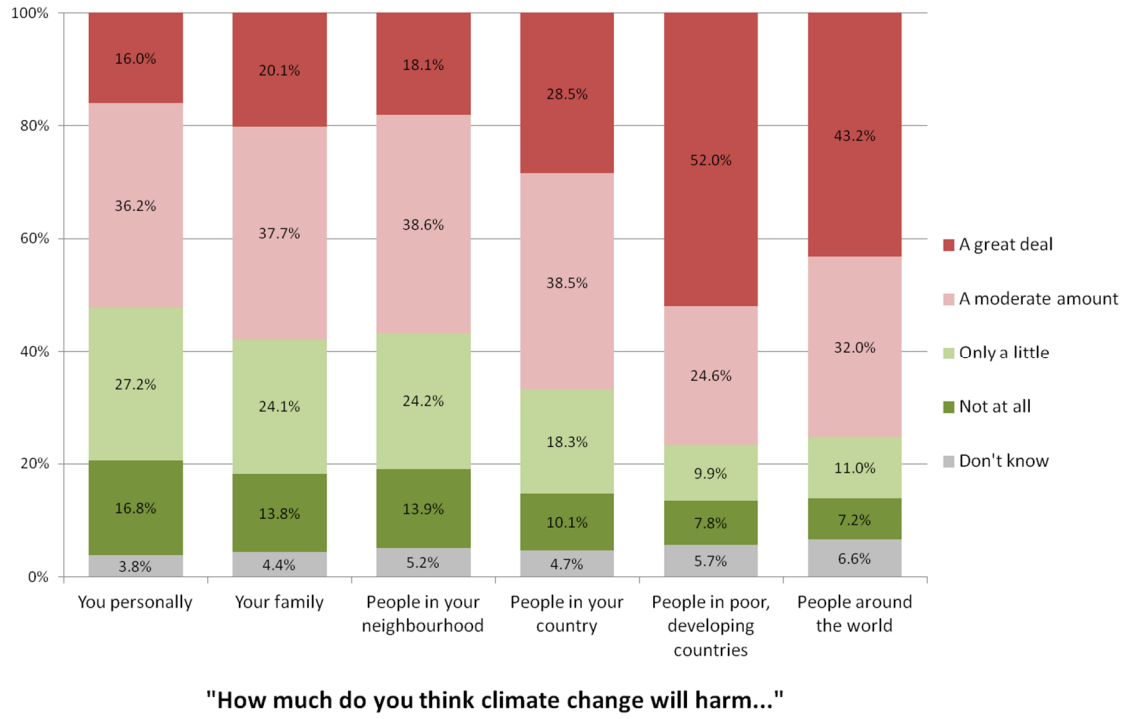


Figure 33 Ratings of harm resulting from climate change for different groups of people (*N*=5163)

When these harm ratings are broken down by opinion on the causes of climate change, large differences emerge (Figure 34). Those who think climate change is not happening give much lower harm ratings, although still think some harm will occur; those who think climate change is human-induced give the highest harm ratings. The basic trend to think more distant others will be harmed to a greater extent than oneself or close others is evident across *all* groups.

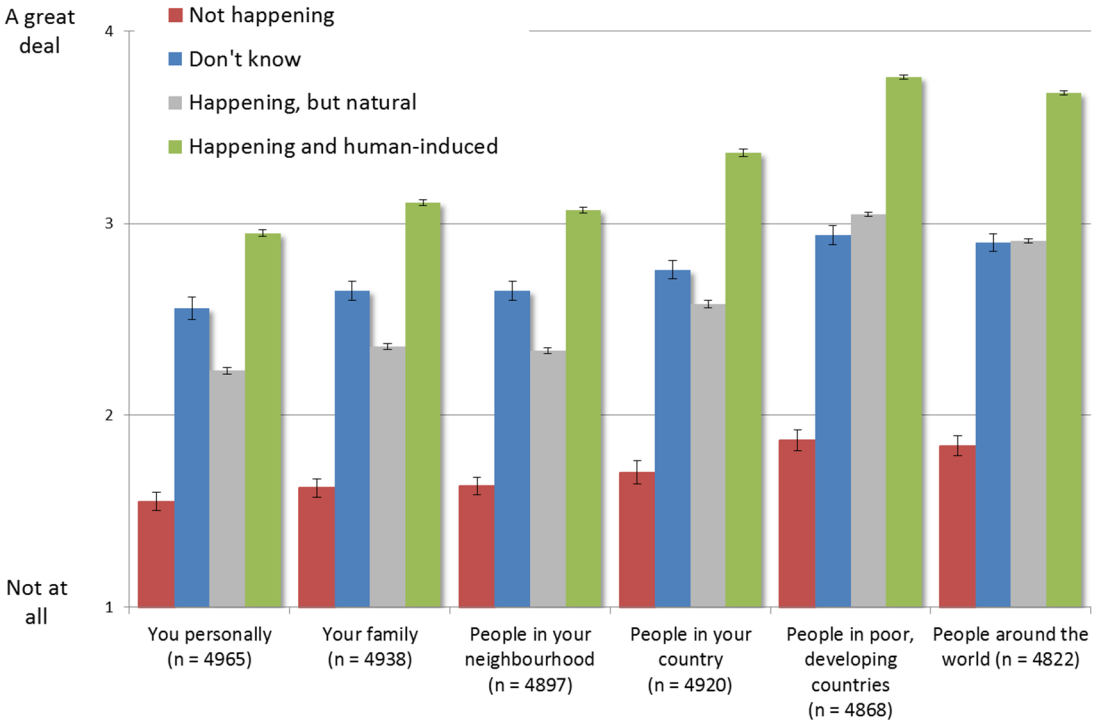


Figure 34 Ratings of harm resulting from climate change for different groups of people, by opinion-type (*N*=5163)

Respondents were asked about the impact various weather events and ecological processes would have on them personally. Firstly, they were asked the extent to which they had suffered injury, loss, or damage as a result of each of these events and processes (Figure 35). More than half of respondents reported experiencing at least some injury, loss, or damage as a result of extreme high temperatures (61%), heatwaves (61%), heavy rain (59%), drought and water scarcity (57%), or hailstorms (51%). By contrast, there were few reports of injury, damage, or loss resulting from sea level rise or cyclones.

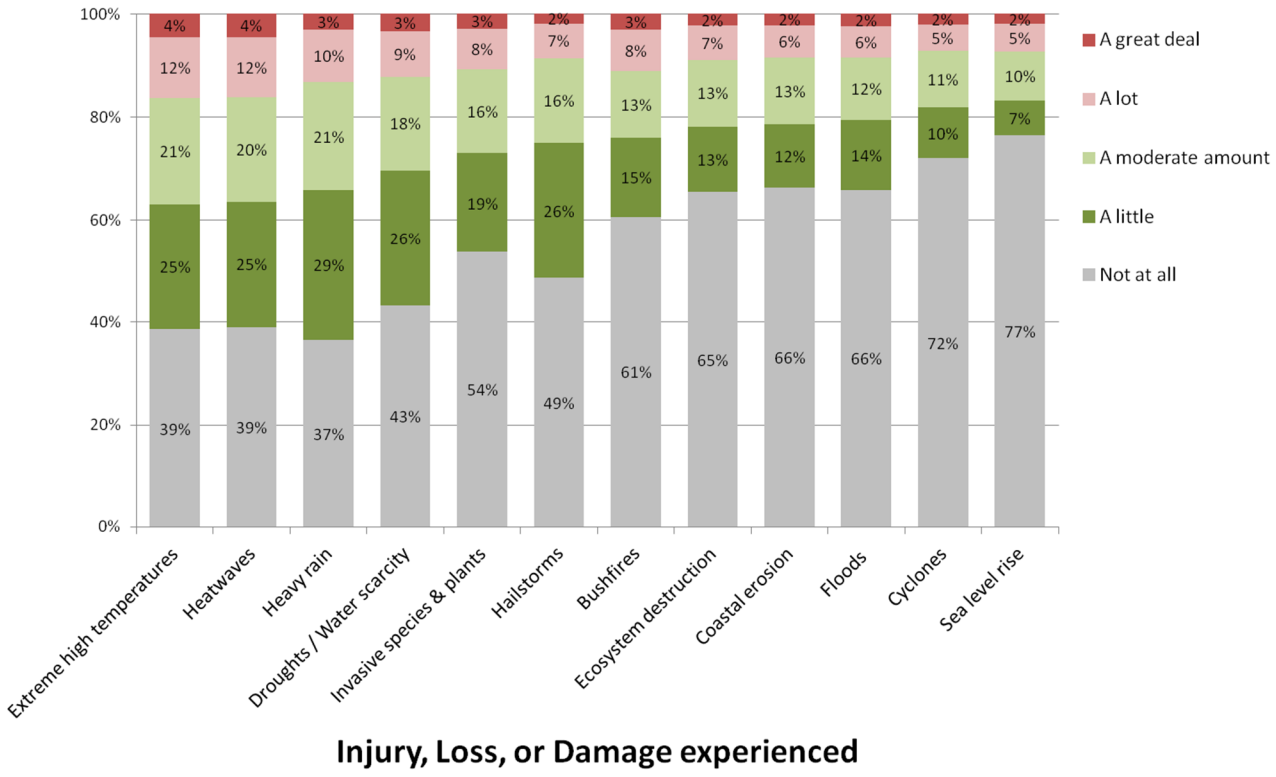


Figure 35 Levels of injury, loss, or damage occurring to the respondent as a result of events (*N*=5163)

Respondents were also asked how well they thought they would be able to cope with these weather events and processes should they occur in the future (Figure 36). There was only small variation across events and processes, with most respondents stating they would have at least some ability to cope. Bushfires and cyclones had the highest number of respondents stating that they would not be able to cope at all if they occurred in the future.

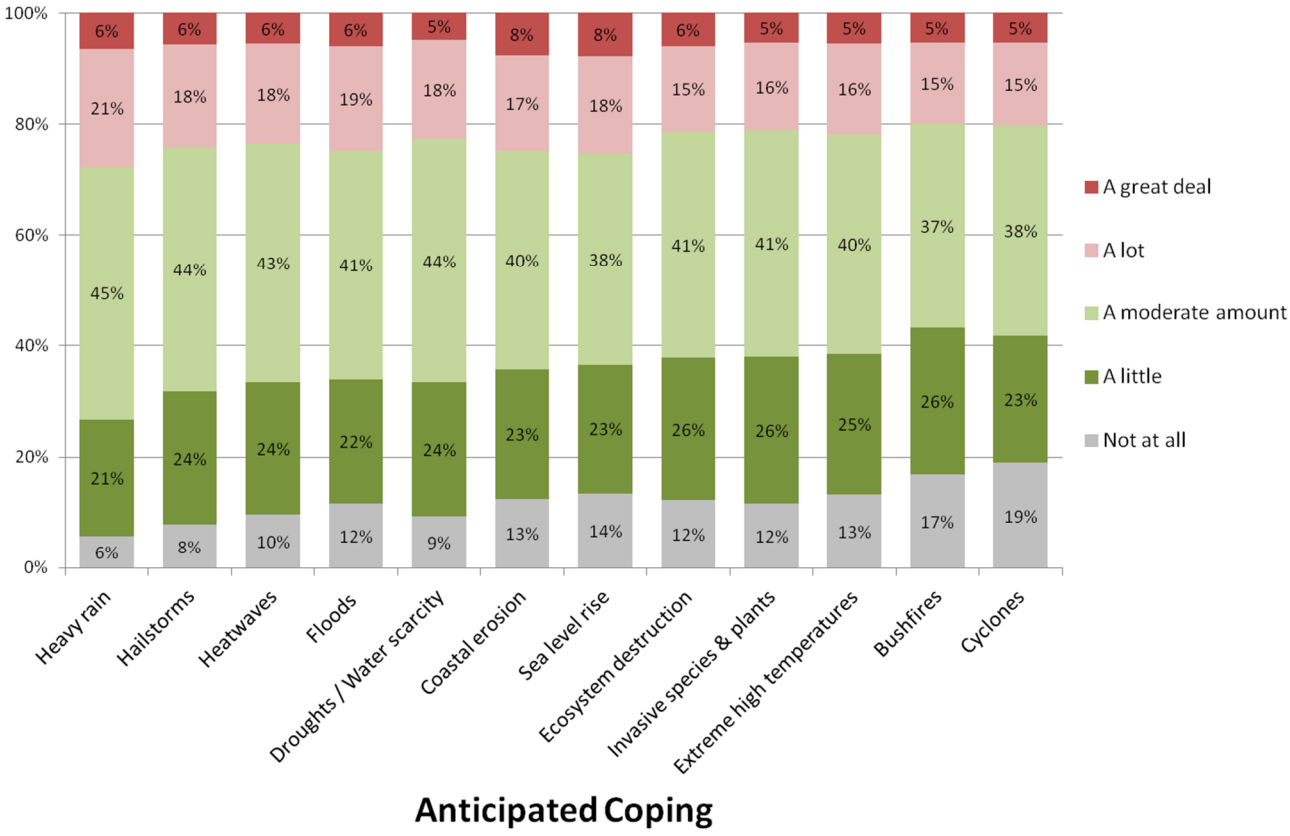


Figure 36 Anticipated ability to cope with future events (*N*=5163)

4 Responding to climate change: Support for adaptation initiatives

Individuals can (and do) engage in many activities that reduce their own greenhouse gas emissions and help them adapt to the impacts of climate change. But successful mitigation and adaptation also requires collective initiatives from organisations, industries, and governments. In this section we explore community support for a range of potential adaptation initiatives at the collective level. We begin by examining people's familiarity with some basic climate change terminology, and look for changes in familiarity over time. We then explore which initiatives have the most support and which the least, and how support is related to opinions and attitudes about climate change, and individual and collective efficacy.

4.1 Climate change terminology

Respondents were asked whether they had heard of the terms 'climate mitigation' and 'climate adaptation'.[32] Only one in five respondents said they were familiar with the term 'climate mitigation', while nearly one in three were familiar with 'climate adaptation'.

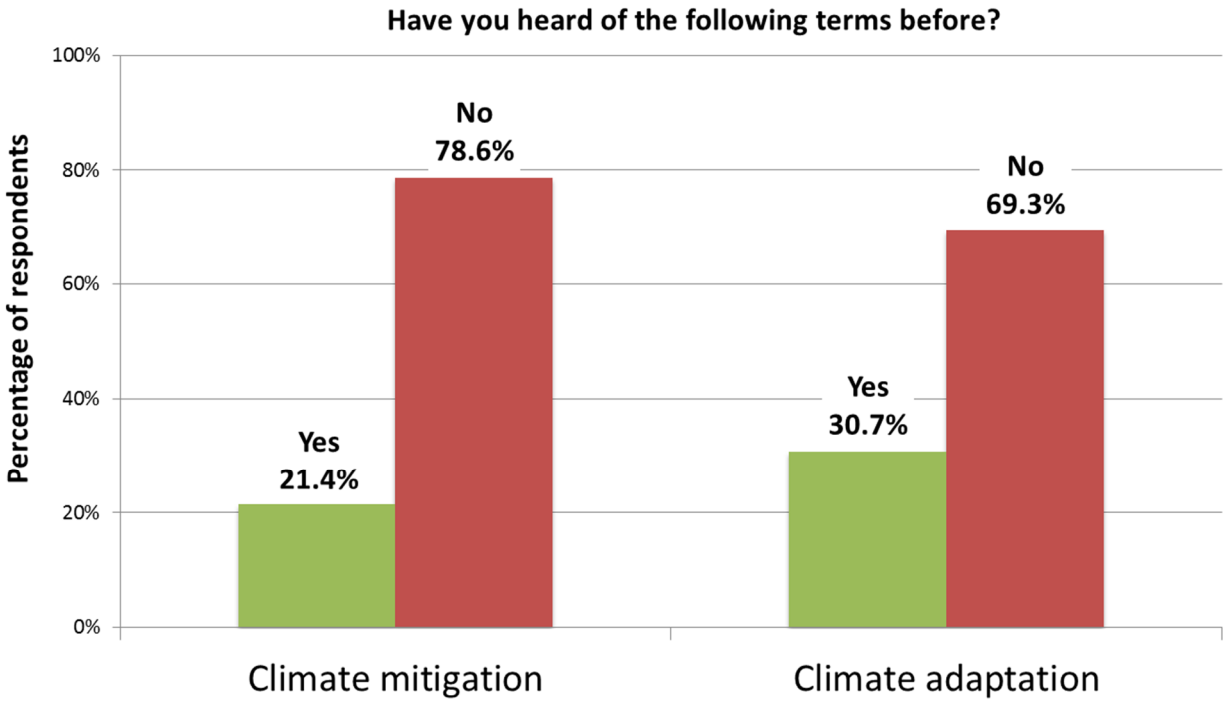


Figure 37 Levels of familiarity with the terms 'climate mitigation' and 'climate adaptation' (*N*=2567)

[32] Those respondents who had taken part in previous surveys where this question was asked were excluded from this analysis, as previously being asked this question familiarises the respondent with these terms.

4.2 Climate change terminology: Changes over time

Figure 38 displays changes in levels of familiarity with the term 'climate adaptation' from 2012 to 2014 (the question was not asked in the first two surveys). Only respondents who had not been asked the question before are included, so a formal test for statistical significance cannot be conducted, however the aggregate figures suggest a small but steady increase in familiarity over time. A similar increase in familiarity was observed for the term 'climate mitigation' from 2013 to 2014 (Figure 39).

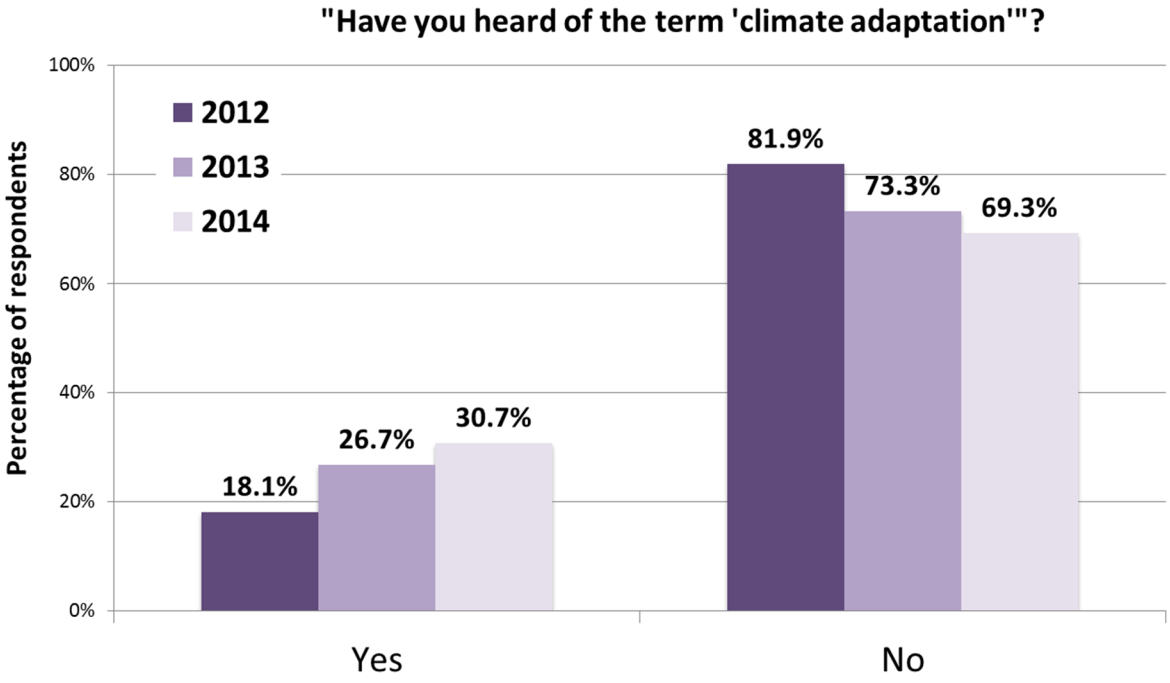


Figure 38 Levels of familiarity with the term 'climate adaptation' over time (2012: *N*=5081; 2013: *N*=3169; 2014: *N*=2567)

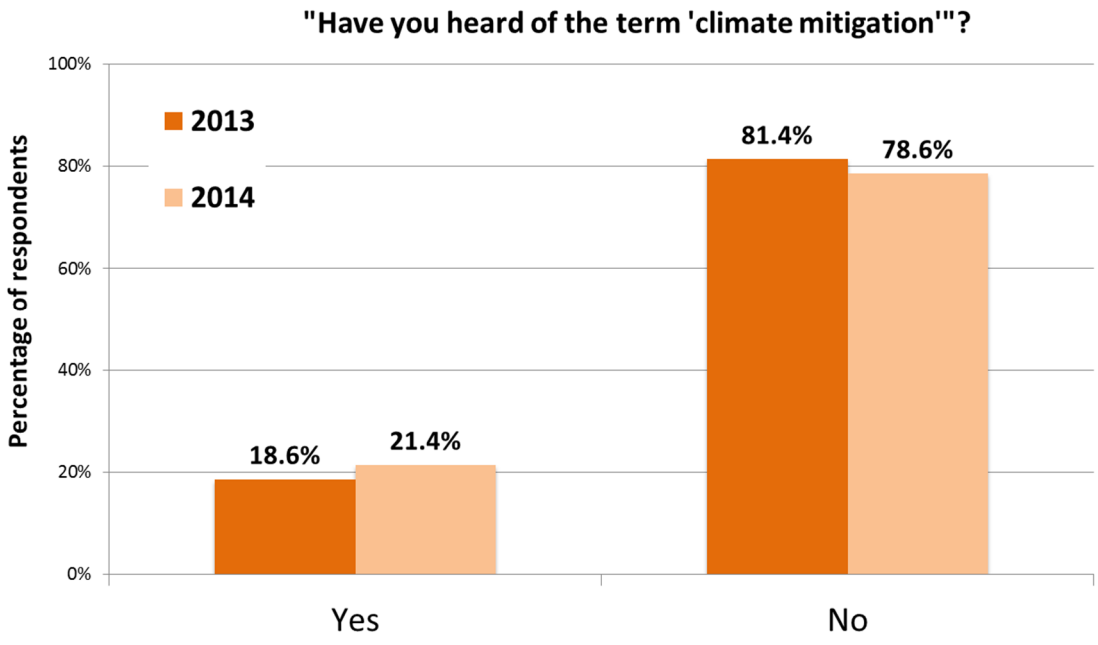


Figure 39 Levels of familiarity with the term 'climate mitigation' over time (2013: *N*=5291; 2014: *N*=2567)

4.3 Adaptation initiatives

Respondents were asked to state their level of support for a range of hypothetical initiatives designed to adapt to or reduce the impacts of climate change (Figure 41). On average, there was moderate to strong support for all adaptation initiatives, with the exception of increased aid for overseas countries and government investment in nuclear power stations. Increased investment in the areas of renewable energy, invasive pest species protection, and public transport were among the most strongly supported initiatives.

An aggregated index was calculated for each respondent by combining levels of support for all 18 initiatives (yielding a minimum score of 18 and a maximum possible score of 126). There was a large significant association between levels of aggregate support for adaptation initiatives and opinion-type,[33] although all groups were above the midway point of 71 (Figure 40), suggesting there was general support for these adaptation initiatives regardless of opinions about the causes of climate change.

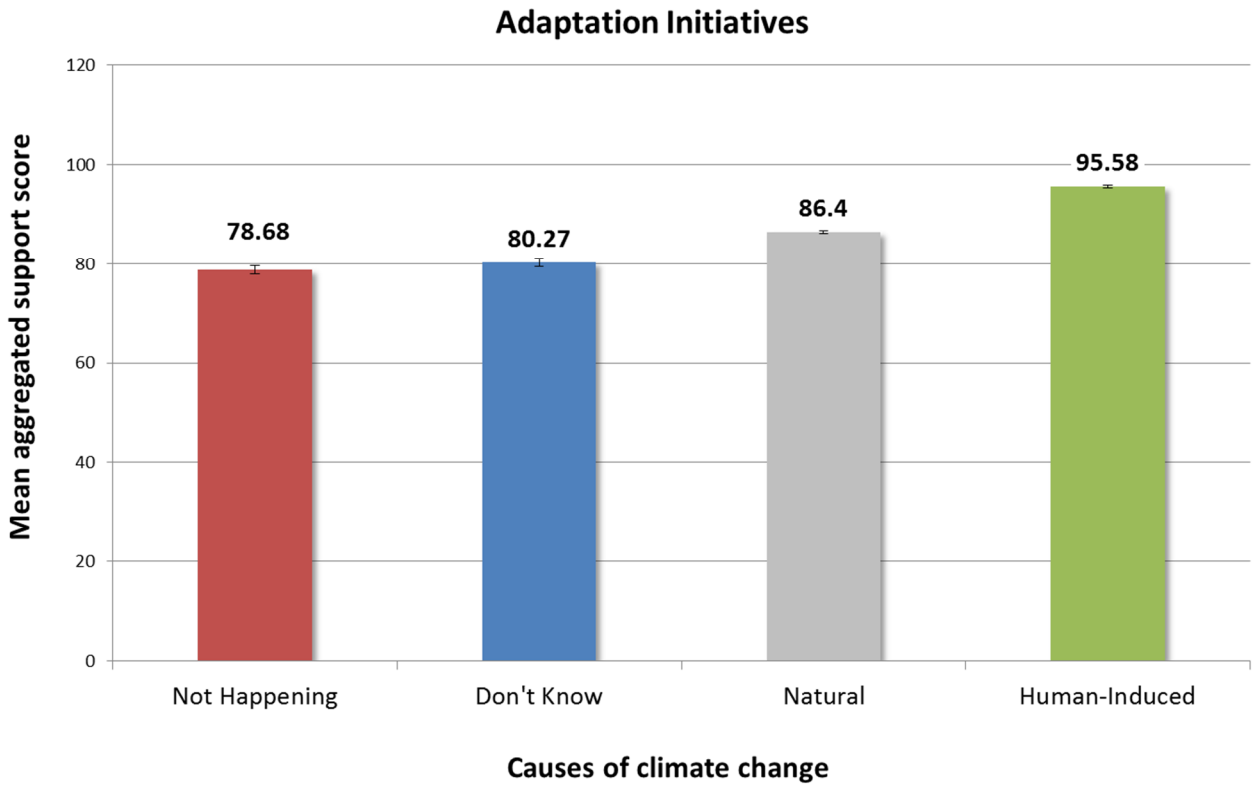


Figure 40 Levels of support for adaptation initiatives, by opinion-type (*N*=5163)

[33] $F(3, 5159) = 278.68$, $p < .001$, $\eta^2 = .16$.

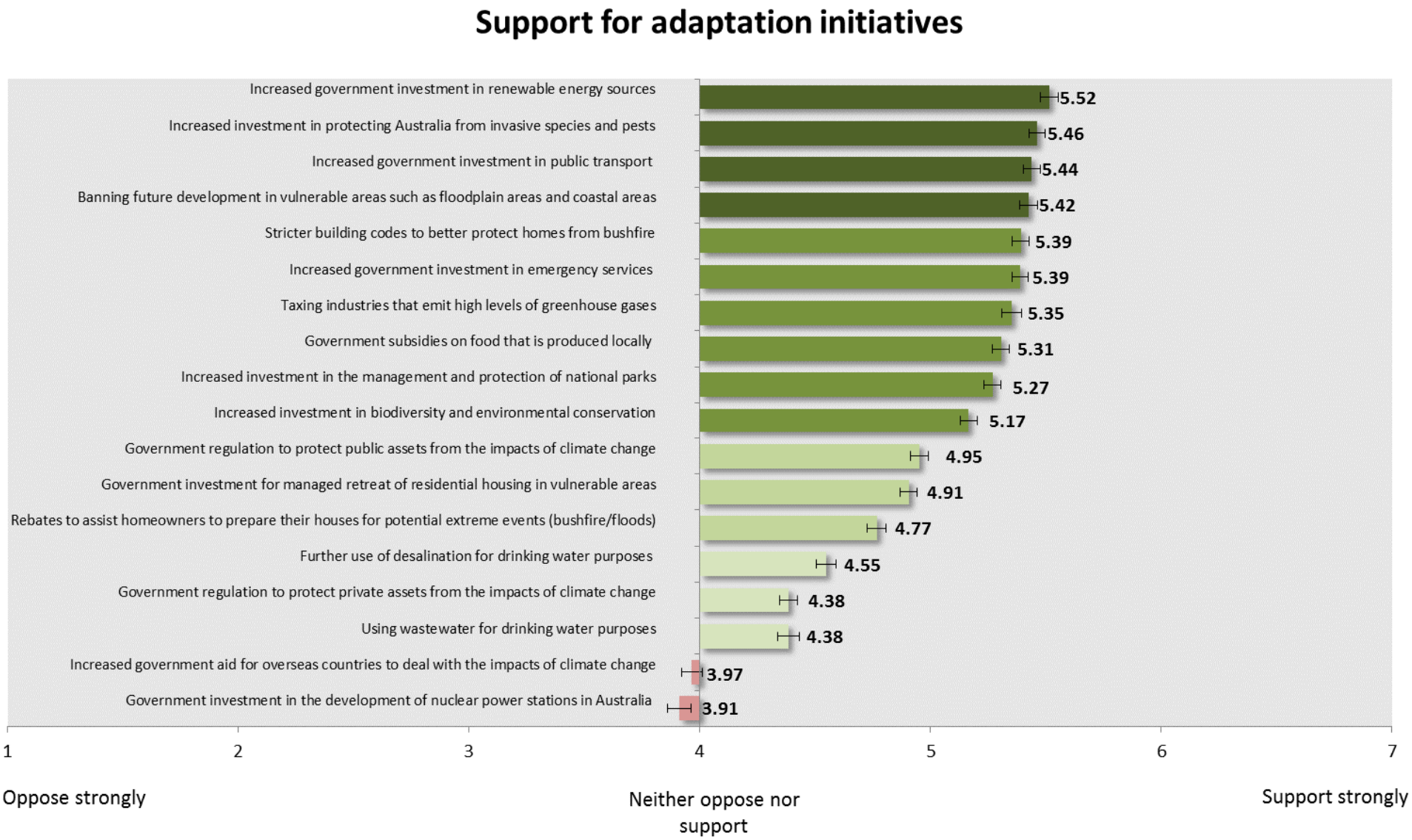


Figure 41 Mean levels of support for adaptation and mitigation initiatives (*N*=5163)

To investigate the relationships between levels of support for adaptation initiatives and climate change attitudes, people's responses to a set of attitudinal questions about climate change were compared with their overall support score. Table 16 shows that feeling a moral duty and ethical responsibility to respond to climate change were most strongly associated with higher support. The weakest relationship with support was how much people reported experiencing the effects of climate change.

Table 16 Simultaneous regression analysis of climate change attitudes and support for adaptation initiatives (*N*=5163)

ITEM	SUPPORT FOR ADAPTATION INITIATIVES (PEARSON CORRELATION)
I feel it is my ethical responsibility to change my individual behaviour to combat climate change	.49**
I feel a moral duty to do something about climate change	.49**
How important is climate change to you?	.41**
How worried are you about climate change?	.39**
How personally relevant is climate change to you?	.38**
How much do you think humans contribute to climate change?	.37**
How sure are you that climate change is happening?	.30**
How much have you personally experienced the effect of climate change?	.20**

4.4 Support for adaptation initiatives and efficacy

A series of questions relating to individual and collective efficacy[34] was asked, and correlated with levels of support for adaptation initiatives. The strongest relationships with support were efficacy statements regarding acting collectively and working together. The weakest relationship with support was a statement suggesting climate change is beyond one's control.

Table 17 Respondents' levels of agreement with individual and collective efficacy statements, and correlations[35] with levels of support for adaptation initiatives (*N*=5163)

STATEMENT	MEAN	SD	SUPPORT FOR ADAPTATION INITIATIVES (PEARSON CORRELATION)
If we act collectively, we will be able to minimise the consequences of climate change	3.69†	.92	.51**
Individuals working together can make a difference to climate change	3.67	.93	.51**
There are meaningful things I can do to reduce the impact of climate change	3.49	.95	.46**
Individuals can make a difference to climate change	3.51	.96	.44**
There's nothing Australia can do about climate change that will make a meaningful difference	2.58	1.20	-.30**
Ultimately, I am confident that the world community can find a solution to climate change	3.22	.95	.25**
The impacts of climate change are inevitable now so there's not much point worrying about it	2.55	1.06	-.23**
Realistically, nothing will be done about climate change until it's too late	3.27	.95	.19**
The impacts of climate change are really beyond my control	3.27	.97	-.03*

† All questions were asked using a response scale ranging from 1 = strongly disagree to 5 = strongly agree.
*** *p* < .01, ** *p* < .001**

[34] Efficacy may be defined as one's belief in one's ability to succeed at a given task, or to accomplish a specific goal. Collective efficacy is the belief in a group's ability to succeed at a task, or achieve a goal.

[35] A regression analysis was not performed because of multicollinearity between variables.

5 Ideologies and worldviews: Their influence on climate change responses

In the last section, we found broad support for a wide range of adaptation initiatives. In this section, we explore whether people's ideologies and worldviews are associated with responses to climate change. We look at patterns between political orientations, voting preferences, and support for adaptation initiatives and climate change attitudes. We then examine whether people's beliefs about humans' relationship with the environment underlie these patterns, and how people's basic values and principles influence behavioural engagement and support for adaptation initiatives.

5.1 Political orientations

Participants were asked to state their political orientation using a sliding scale on a 100-point scale, from 0=left-wing to 100=right-wing. On average, participants were close to the scale's centre, but there was a high amount of variation (*M* = 52.58, *SD* = 23.29). Table 18 shows significant relationships between stated political orientation and behavioural engagement (individual and collective), support for adaptation initiatives, and basic attitudes about climate change. On average, participants with more left-wing orientations were more likely to be sure climate change was happening, were more worried about it, and thought it more important. However, the strength of the relationship between political orientation and individual climate-relevant behaviours was very small.

Table 18 Correlations between political orientation and climate change behaviours, support for adaptation initiatives, and basic attitudes (*N*=5163)

POLITICAL ORIENTATION'S RELATIONSHIP WITH...	PEARSON CORRELATION
Individual behaviour	-.04*
Community behaviour	-.21**
Support for adaptation initiatives	-.15**
"How sure are you that climate change is happening?"	-.22**
"How worried are you about climate change?"	-.24**
"How much do you think climate change will harm you personally?"	-.14**
"How important is the issue of climate change to you personally?"	-.21**
"How much have you personally experienced the effects of climate change?"	-.07**
"How personally relevant is climate change to you?"	-.19**
"How much do you think human activity contributes to climate change, as a percentage of overall climate change?"	-.22**

**** *p* < .001, * *p* < .01**

Participants were asked to state who they had voted for in the last federal election. Figure 42 details participants' opinions on climate change by who they voted for in the last federal election. There was a medium strength, statistically significant effect[36] for voting behaviour. On average, those who voted for the Labor party or the Greens were more likely to state that climate change was human-induced. By contrast, those who had voted for the Liberal party or the National party were more likely to state that climate change was happening, but natural.

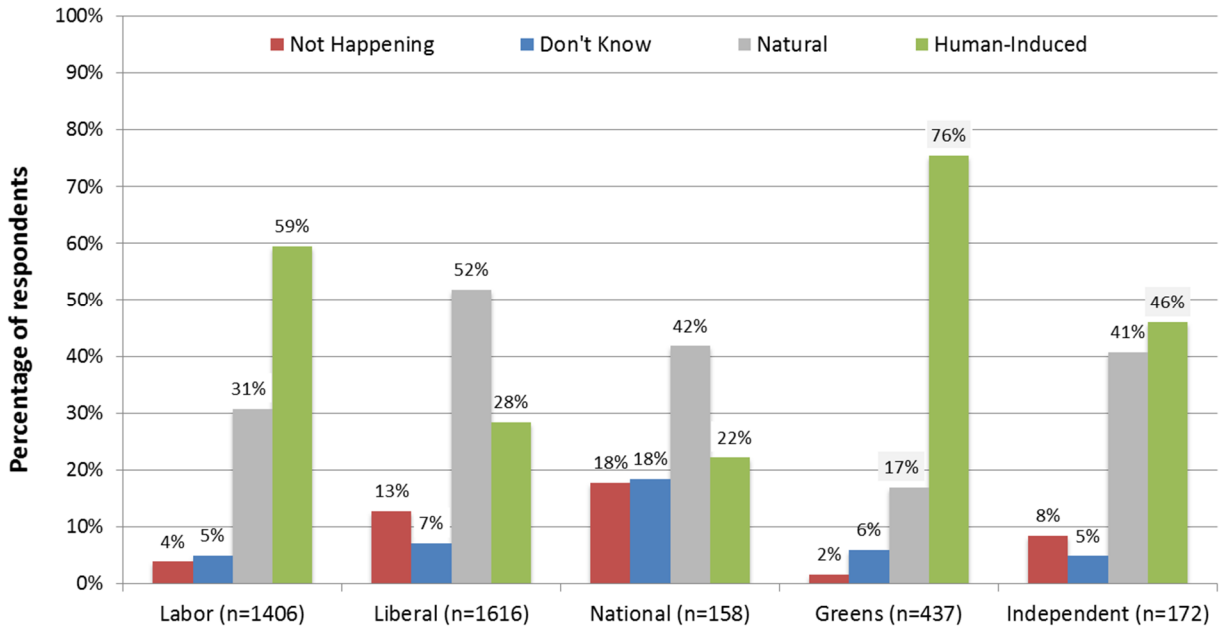


Figure 42 Opinions about climate change by voting behaviour in last federal election, by opinion-type (*N*=3789)[37]

5.2 Environmental worldviews

Respondents were asked to choose from one of four statements that best matched their view about the environment. The statements were adapted from Steg and Sievers (2000), and were designed to capture people's distinct perceptions about environmental risk. Almost half of all respondents (42.5%) endorsed the statement denoting an 'egalitarian' worldview of nature-human relationships (Table 19). The least commonly selected was the statement endorsing an 'individualist' worldview of nature-human relationships.

[36] Cramer's $V = .22$, $p < .001$.

[37] The remaining 1374 participants voted for another party or preferred not to state their voting behaviour.

Table 19 Percentage of respondents selecting each worldview statement (*N*=5163)

WORLDVIEW STATEMENT	WORLDVIEW CATEGORY	PERCENT
The environment is fragile and will only be protected if there are large changes in human behaviour and society	Egalitarian	42.5%
The environment can be managed by the government and experts if there are clear rules about what is allowed	Hierarchical	23.9%
The environment can adapt to changes and technology will solve environmental problems eventually	Individualistic	14.1%
The environment is unpredictable and we can't control what happens	Fatalistic	19.6%

Table 20 shows each worldview broken down by opinion-type. There was a statistically significant, large effect for worldview on opinion-type.[38] The coloured cells represent worldviews that are statistically over-represented for each opinion-type. Those who stated climate change was not happening, or happening but natural, were more likely to have a fatalistic orientation toward the environment, those who didn't know tended to have a hierarchical orientation, and those who thought climate change was happening and human-induced more likely to have an egalitarian orientation.

Table 20 Percentage of respondents selecting each worldview statement, by opinion-type (*N*=5163)

	WORLDVIEW STATEMENT					
		Egalitarian (*n* = 2193)	Hierarchical (*n* = 1,232)	Individualistic (*n* = 726)	Fatalistic (*n* = 1012)	Total
OPINION-TYPE	Not happening	14.3%	13.8%	18.4%	53.6%	100%
	Don't know	18.9%	42.7%	16.7%	21.7%	100%
	Happening, but natural	22.8%	23.5%	22.9%	30.8%	100%
	Happening and human-induced	67.8%	22.8%	5.5%	4.0%	100%
	All respondents	42.5%	23.9%	14.1%	19.6%	100%

Another way of measuring worldviews about humans' relationship with nature was developed by Price, Walker, and Boschetti (2014). These scales, termed Myths of Physical Nature, comprise a series of statements measuring '*ductile*' views, or cultural biases that justify environmental conservation, and '*elastic*' views, or cultural biases that justify environmentally damaging behaviour. Table 21 shows the mean levels of agreement with each of these statements. In general, there was higher endorsement by respondents for '*ductile*' (environmental conservation) statements, than for '*elastic*' (environmental damage) statements.

[38] Cramer's $V = .32$, $p < .001$.

Table 21 Mean levels of agreement with statements measuring 'Myths of Physical Nature' (*N*=5163)

MYTHS OF PHYSICAL NATURE STATEMENT (SCALE: 1=STRONGLY DISAGREE – 5=STRONGLY AGREE)	MEAN	SD
We all have a moral obligation to protect the environment and consume fewer resources (D)*	4.05	0.87
Conservation and protection is the most rational strategy for managing the natural environment (D)	3.83	0.91
The natural environment will become unstable if humans exceed the limits identified by experts (D)	3.77	1.05
The natural environment can be managed if there are clear rules about what is allowed (D)	3.75	0.83
If the balance of the natural environment is upset the whole system will collapse (D)	3.53	1.02
When pushed beyond the limits identified by experts the natural environment will not recover (D)	3.48	1.05
The natural environment is capable of recovering from any damage humans may cause (E)**	2.91	1.14
Individuals should have freedom of choice regardless of the environmental impacts (E)	2.60	1.12
Humans can't control what happens in the natural environment (E)	2.51	1.19
Ultimately, there's nothing individuals can do to manage or change the natural environment (E)	2.44	1.14
Human industry and technology has not caused significant damage to the natural environment (E)	2.34	1.18
There's no point wasting time, energy and resources on trying to manage the natural environment (E)	2.29	1.15

*** Statements with (D) measure 'ductile' worldviews ** Statements with (E) measure 'elastic' worldviews**

These statements were combined into their two scales – Ductile and Elastic – and compared across opinion-type. Strong, statistically significant relationships emerged.[39] Figure 43 shows those who think climate change is not happening endorse Ductile and Elastic statements similarly and weakly, while those who think climate change is human-induced endorse Ductile statements much more strongly than Elastic statements.

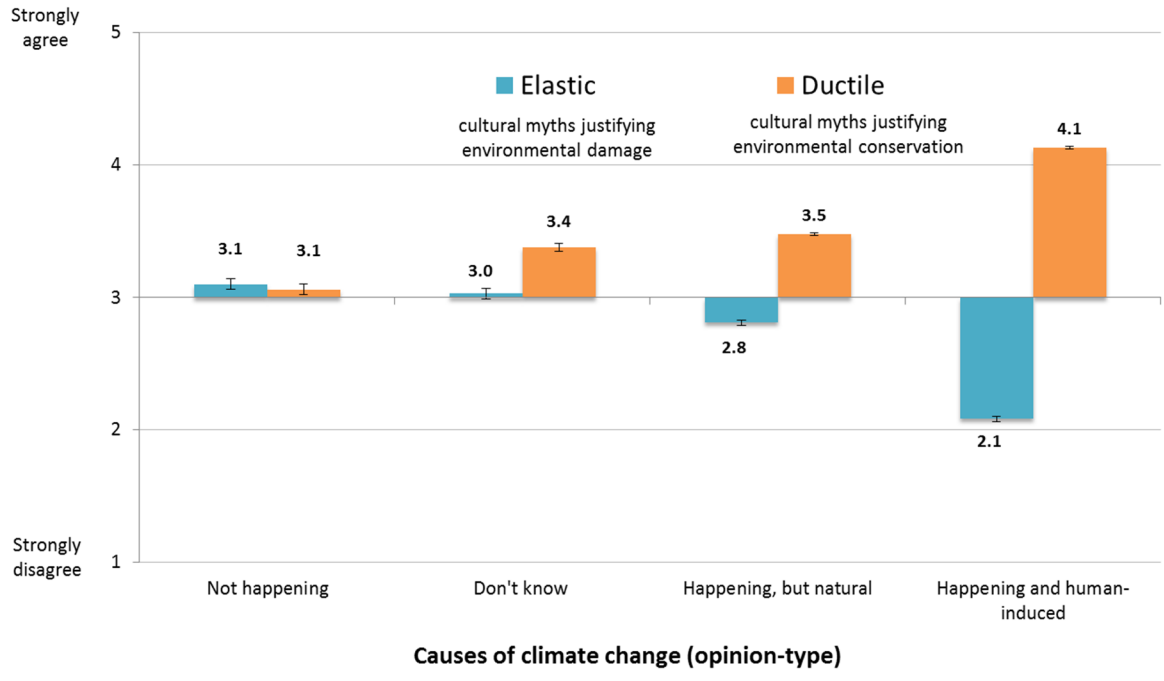


Figure 43 Levels of agreement with 'Ductile' and 'Elastic' myths of nature scales, by opinion-type (*N*=5163)

[39] For the Ductile scale: F (3, 5159) = 615, 61, $p < .001$, $\eta^2 = .36$; for the Elastic scale: F (3, 5159) =.16** 456, 68, $p < .001$, $\eta^2 = .27$.

Respondents were asked to rate the importance of a series of values as life-guiding principles, drawn from a short-form version of the Schwartz Values Survey (Lindeman & Verkasalo, 2005; Schwartz, 1992).[40] The value universalism (that is, valuing principles such as broad-mindedness, social justice, equality, and environmental protection) was the most strongly correlated with behavioural engagement and support for adaptation initiatives. Valuing security (that is, valuing principles such as national security, family security, and social order) was negatively related to behavioural engagement but positively related to support for adaptation initiatives.

Table 22 Correlations between importance of life-guiding values and individual behaviour, community behaviour, and support for adaptation initiatives (*N*=5163)

VALUE (SCHWARTZ'S VALUE SURVEY)	INDIVIDUAL BEHAVIOURS	COLLECTIVE BEHAVIOURS	ADAPTATION INITIATIVE SUPPORT
Power **(that is, social power, authority, wealth)**	-.02	-.11**	-.23**
Achievement **(that is, success, capability, ambition, influence on people and events)**	.-.04**	-.03*	-.09**
Hedonism **(that is, gratification of desires, enjoyment in life, self-indulgence)**	-.04*	-.09**	-.22**
Stimulation **(that is, daring, a varied and challenging life, an exciting life)**	.04**	.05**	-.06**
Self-direction **(that is, creativity, freedom, curiosity, independence, choosing one's own goals)**	.02	.15**	.13**
Universalism **(that is, broad-mindedness, beauty of nature and arts, social justice, a world at peace, equality, wisdom, unity with nature, environmental protection)**	.19**	.27**	.27**
Benevolence **(that is, helpfulness, honesty, forgiveness, loyalty, responsibility)**	.04**	.14**	.21**
Tradition **(that is, obedience, honouring parents and elders, self-discipline, politeness)**	-.07**	-.15**	.02
Security **(that is, national security, family security, social order, cleanliness, reciprocation of favours)**	-.11**	-.14**	.09**

*** *p* < .01 ** *p* < .001**

[40] Mean responses from the Schwartz Value items were person-centered, to indicate the *relative* importance of each value in an individual's value system (Schwartz, 2005).

6 Trust: Who do people trust for climate change information?

Most of the community are not climate scientists, and lack the time and resources needed to arrive at conclusions on the basis of scientific and empirical data on our own. Therefore notions of trust become critical to the way people respond to information about climate change. In this section, we examine how trust in different people, agencies, and organisations shape people's responses to climate change. We begin by looking at how much people trust different sources to tell them the truth about climate change, and whether this has changed over time. We then examine how trust is related to opinions on the causes of climate change, behavioural engagement, and support for adaptation initiatives. We conclude by examining levels of trust and credibility in climate scientists.

6.1 Trust in different sources to tell the truth about climate change

Respondents were asked how much they trusted a series of sources to tell them the truth about climate change (Figure 44). University scientists were most trusted, followed by environmental scientists, environmental organisations, and friends and family. Government, car companies, and oil companies were the least trusted sources. Only university scientists, environmental scientists, environmental organisations, and friends and family were rated on average above the scale midpoint of 'neither trust nor distrust'; all other groups were rated on average on the distrust side of the scale midpoint.

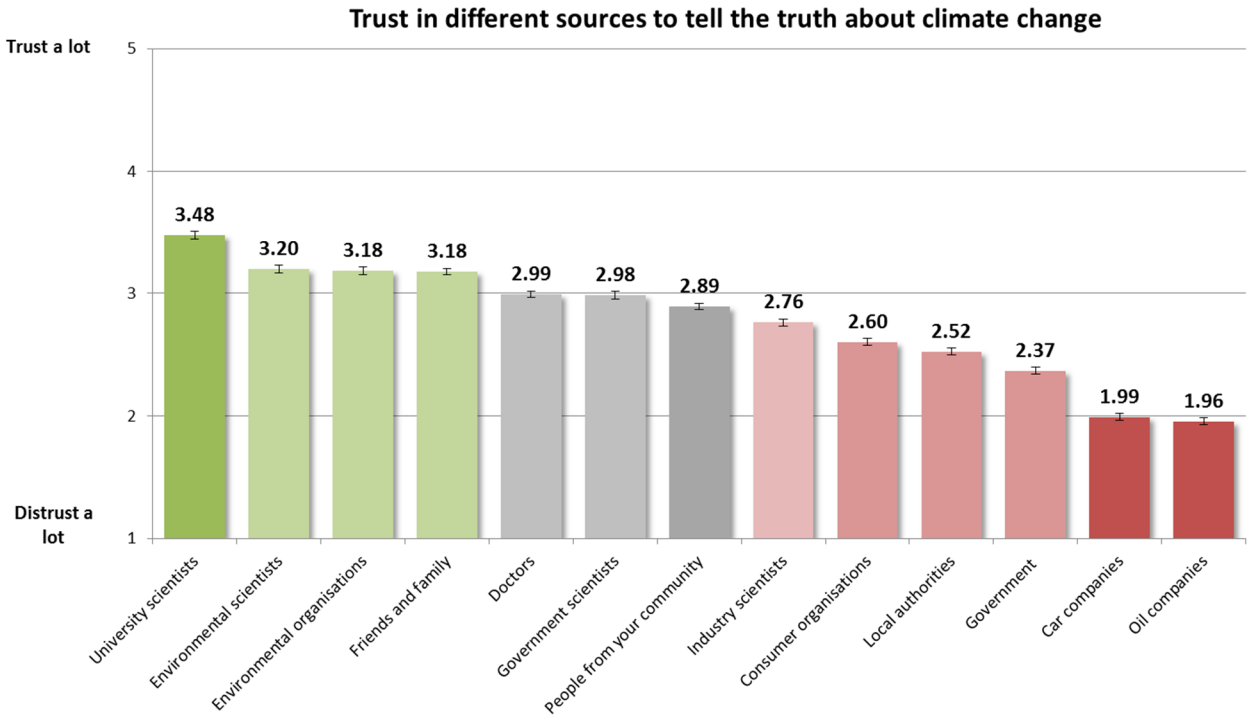


Figure 44 Ratings of trust in organisations to provide truthful information about climate change (*N*=5163)

6.2 Trust: Changes over time

Table 23 shows how trust in different information sources changed over time, using the 269 respondents who completed all five surveys. Trust in oil companies, car companies, and industry scientists increased between 2010 and 2011, with trust in oil companies and industry scientists decreasing again slightly, but not significantly, between 2011 and 2012 and remaining stable through to 2014. There was a slight increase in trust in environmental group scientists between 2011 and 2014, and in Government and local authorities between 2010 and 2013.

Table 23 Mean ratings of trust in different information sources over time (*n*=269)

INFORMATION SOURCE	2010	2011	2012	2013	2014	SIG	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
Consumer organisations	2.48 a	2.58 a	2.59 a	2.57 a	2.55 a	*p* = .54	.01	-	-
Environmental organisations	2.87 a	2.80 a	2.86 a	2.82 a	2.91 a	*p* = .18	.02	-	-
University scientists	3.36 a	3.39 a	3.28 a	3.28 a	3.38 a	*p* = .05	.04	-	-
Government scientists	2.87 a	3.00 a	2.96 a	2.91 a	3.01 a	*p* = .10	.03	-	-
Industry scientists	2.61 a	2.82 b	2.65 a, b	2.63 a	2.61 a	*p* = .002	.06	Fluctuating	Med.
Environmental group scientists	2.87 a, b	2.78 a	2.85 a, b	2.85 a, b	2.96 b	*p* = .01	.05	Fluctuating	Small
People from your community	2.70 a	2.69 a	2.63 a	2.71 a	2.76 a	*p* = .33	.02	-	-
Friends and family	3.07 a	3.01 a	3.03 a	2.99 a	3.02 a	*p* = .61	.01	-	-
Doctors	2.89 a	2.81 a	2.91 a	2.93 a	2.90 a	*p* = .45	.01	-	-
Government	2.15 a	2.29 a, b	2.30 a, b	2.30 b	2.19 a, b	*p* = .03	.04	Fluctuating	Small
Local authorities	2.22 a	2.34 a, b	2.36 a, b	2.39 b	2.38 a, b	*p* = .01	.05	Increasing	Small
Oil companies	1.64 a	1.83 b	1.73 a, b	1.75 a, b	1.76 a, b	*p* = .004	.06	Fluctuating	Med.
Car companies	1.66 a	1.84 b	1.75 a, b	1.82 b	1.82 b	*p* = .003	.06	Increasing	Med.

a **Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test**

6.3 Trust and opinions about the causes of climate change

Figure 45 displays trust ratings broken down by opinion on the causes of climate change. There were large differences in trust ratings on the basis of opinion-type, with those who think climate change is happening being generally the most trusting of these sources, and those who think it is not happening the least. There were only small variations in trust ratings for different sources for those who didn't know whether climate change was happening or not.

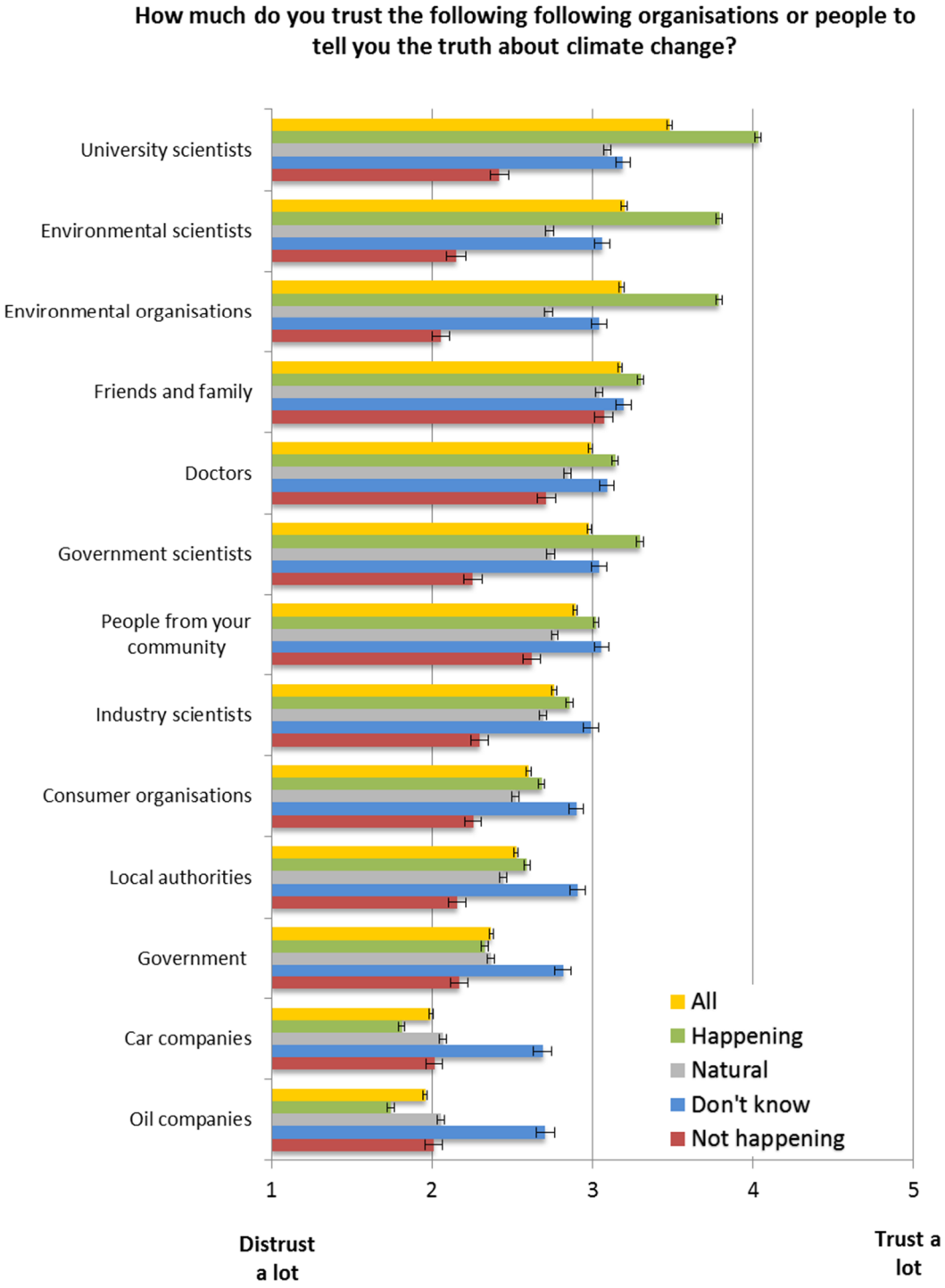


Figure 45 Mean ratings of trust in different information sources, by opinion-type (*N*=5163)

6.4 Trust, behavioural engagement, and support for adaptation initiatives

Table 24 lists the correlations between levels of trust in information sources and behavioural engagement and support for adaptation initiatives. In general, greater trust was associated with greater behavioural engagement and initiative support, with a few exceptions: greater trust in oil and car companies was related to performing more individual behaviours, but lower trust related to performing more community behaviours and higher support for adaptation initiatives. High levels of trust in environmental organisations, university scientists, and environmental group scientists were the most strongly related to behavioural engagement and support for initiatives.

Table 24 Correlations between levels of trust in information sources and levels of individual behaviour, community behaviour, and support for adaptation initiatives (*N*=5163)

INFORMATION SOURCE	INDIVIDUAL BEHAVIOUR CORRLEATIONS	COMMUNITY BEHAVIOUR CORRELATIONS	SUPPORT FOR ADAPTATION INITIATIVES CORRELATION
Consumer organisations	.19**	.09**	.10**
Environmental organisations	.36**	.36**	.42**
University scientists	.30**	.33**	.44**
Government scientists	.25**	.19**	.27**
Industry scientists	.16**	.07**	.12**
Environmental group scientists	.36**	.36**	.40**
People from your community	.27**	16**	.19**
Friends and family	.20**	.15**	.19**
Doctors	.23**	.15**	.22**
Government	.14**	.00	.02
Local authorities	.20**	.09**	.10**
Oil companies	.13**	-.06**	-.13**
Car companies	.13**	-.05**	-.12**

*** *p* < .01 ** *p* < .001**

6.5 Source credibility: How much do people trust climate scientists?

Respondents were asked a series of questions adapted from Frewer and colleagues' (1996) scale to measure perceived source credibility, that is, the reasons underlying people's basis for trusting or distrusting information. The responses (Table 25) indicate weak to moderate agreement with all statements, including statements designed to elicit the bases of distrust (e.g., *have vested interests in promoting a particular view*).

Table 25 Levels of agreement with statements measuring trust in climate science (higher scores indicate greater agreement) (*N*=5163)

TO WHAT EXTENT DO YOU THINK CLIMATE SCIENTISTS...	MEAN (1 = NO VESTED INTEREST – 7 = A GREAT DEAL OF VESTED INTEREST)	STANDARD DEVIATION
...feel a responsibility to provide accurate information	4.71	1.55
...are knowledgeable about the risks	4.66	1.37
..have vested interests in promoting a particular view	4.46	1.70
...are concerned about public welfare	4.33	1.56
...provide sensationalised information	4.23	1.64
...have been proven wrong in the past	3.99	1.41
...are accountable if mistakes are made	3.62	1.72

Table 26 demonstrates that source credibility is strongly associated with opinions on the causes of climate change. In particular, ratings of scientists' knowledge about risks, responsibility to provide accurate information, and concern for public welfare depended on whether respondents thought climate change was happening or not.

Table 26 Levels of agreement with statements measuring trust in climate science, by opinion-type (*N*=5163)

TO WHAT EXTENT DO YOU THINK CLIMATE SCIENTISTS...	NOT HAPPENING	DON'T KNOW	NATURAL	HAPPENING	EFFECT SIZE (ETA SQUARED)
...feel a responsibility to provide accurate information	3.53 [a]	4.26 [b]	4.23 [b]	5.39 [c]	.22*
...are knowledgeable about the risks	3.52 [a]	4.26 [b]	4.30 [b]	5.24 [c]	.20*
..have vested interests in promoting a particular view	4.89 [c]	4.38 [b]	4.83 [c]	4.09 [a]	.05
...are concerned about public welfare	3.18 [a]	4.20 [c]	3.83 [b]	4.98 [d]	.19*
...provide sensationalised information	5.06 [d]	4.32 [b]	4.78 [c]	3.62 [a]	.15*
...have been proven wrong in the past	4.77 [c]	4.28 [b]	4.49 [b, c]	3.38 [a]	.19*
...are accountable if mistakes are made	2.96 [a]	3.91 [c]	3.21 [a, b]	4.04 [c]	.07

*** denotes large effect size**

7 Emotions: How does climate change make people feel?

The potential consequences of climatic changes to both the environment and society are profound, and therefore potentially deeply disturbing to many people. In this section, we explore the emotions people experience when they think about climate change. We will start by examining how the issue of climate change makes people feel across a range of emotions, and whether this has changed over time. We will then explore how different emotions are related to opinions on the causes of climate change, behavioural engagement, and support for adaptation initiatives.

7.1 Emotions

Respondents were asked to rate their experience of a list of possible emotions, on a scale from 1 (strongly disagree) to 5 (strongly agree), according to how climate change made them feel. Average ratings are displayed in Figure 46. The most strongly rated emotions were negative (angry, fearful, powerless), but overall, respondents only moderately agreed with feeling these emotions in connection with climate change.

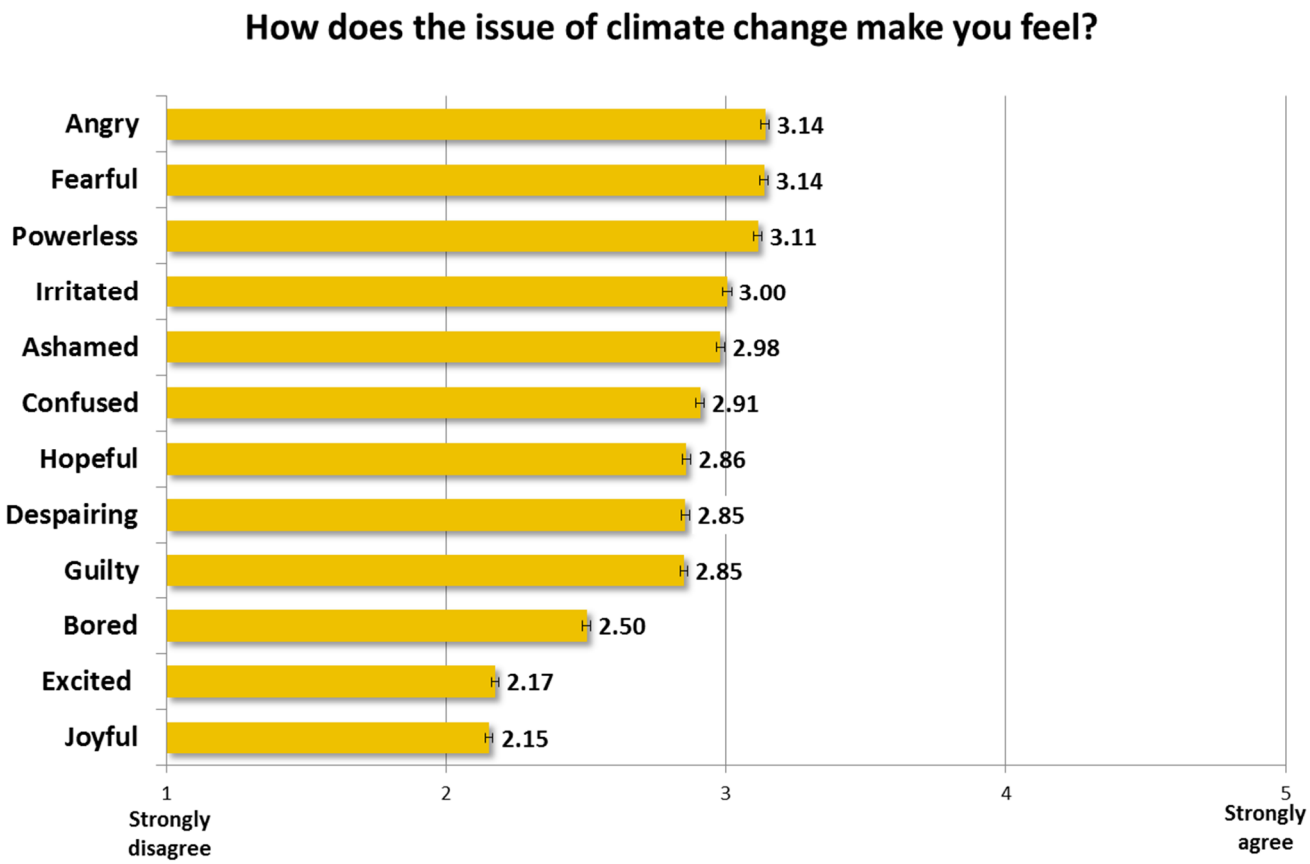


Figure 46 Mean ratings of agreement with emotions prompted by climate change (*N*=5163)

7.2 Emotions: Changes over time

Table 27 displays how emotions associated with climate change changed over time, using the 269 respondents who completed all five surveys. Hope, joy, and excitement all reduced over time, hope in 2011, joy in 2014, and excitement in 2012. Levels of shame rose between 2011 and 2014, feelings of powerless reduced between 2011 and 2013, and boredom decreased between 2011 and 2014.

Table 27 Mean ratings of emotion over time (*n*=269)

EMOTION	2010	2011	2012	2013	2014	SIG	η_p^2	DIRECTION OF CHANGE	EFFECT SIZE
Angry	3.05 a	3.13 a	3.01 a	3.01 a	3.06 a	*p* = .31	.02	-	-
Ashamed	2.70 a, b	2.54 a	2.62 a, b	2.68 a, b	2.71 b	*p* = .02	.04	Fluctuating	Small
Guilty	2.50 a	2.45 a	2.45 a	2.51 a	2.51 a	*p* = .63	.01	-	-
Fearful	2.84 a	2.71 a	2.72 a	2.70 a	2.81 a	*p* = .05	.04	-	-
Hopeful	3.16 b	2.81 a	2.87 a	2.88 a	2.79 a	*p* < .001	.14	Reducing	Large
Powerless	2.99 b	2.97 b	2.90 a, b	2.76 a	2.87 a, b	*p* = .01	.05	Fluctuating	Small
Joyful	2.15 b	2.13 b	2.12 b	2.12 b	1.96 a	*p* = .003	.06	Reducing	Medium
Confused	2.81 a, b	2.82 a, b	2.89 b	2.73 a, b	2.68 a	*p* = .06	.03	-	-
Despairing	2.62 a	2.65 a	2.61 a	2.59 a	2.66 a	*p* = .79	.01	-	-
Excited	2.32 b	2.22 b	2.15 a	2.13 a	2.00 a	*p* < .001	.10	Reducing	Medium
Bored	2.52 a, b	2.78 c	2.67 b, c	2.62 b, c	2.42 a	*p* < .001	.10	Fluctuating	Medium
Irritated	2.89 a	3.04 a	2.92 a	2.94 a	2.84 a	*p* = .11	.03	-	-

a **Mean scores with different subscripts are significantly different on the basis of Tukey's HSD test**

7.3 Emotions and opinions about the causes of climate change

Figure 47 shows emotion ratings broken down by different opinions on the causes of climate change. Those who thought climate change was human-induced indicated feeling higher levels of fear, anger, shame, powerlessness, guilt, and despair. By contrast, those who thought climate change was either happening but natural, or not happening, indicated higher levels of irritation and boredom.

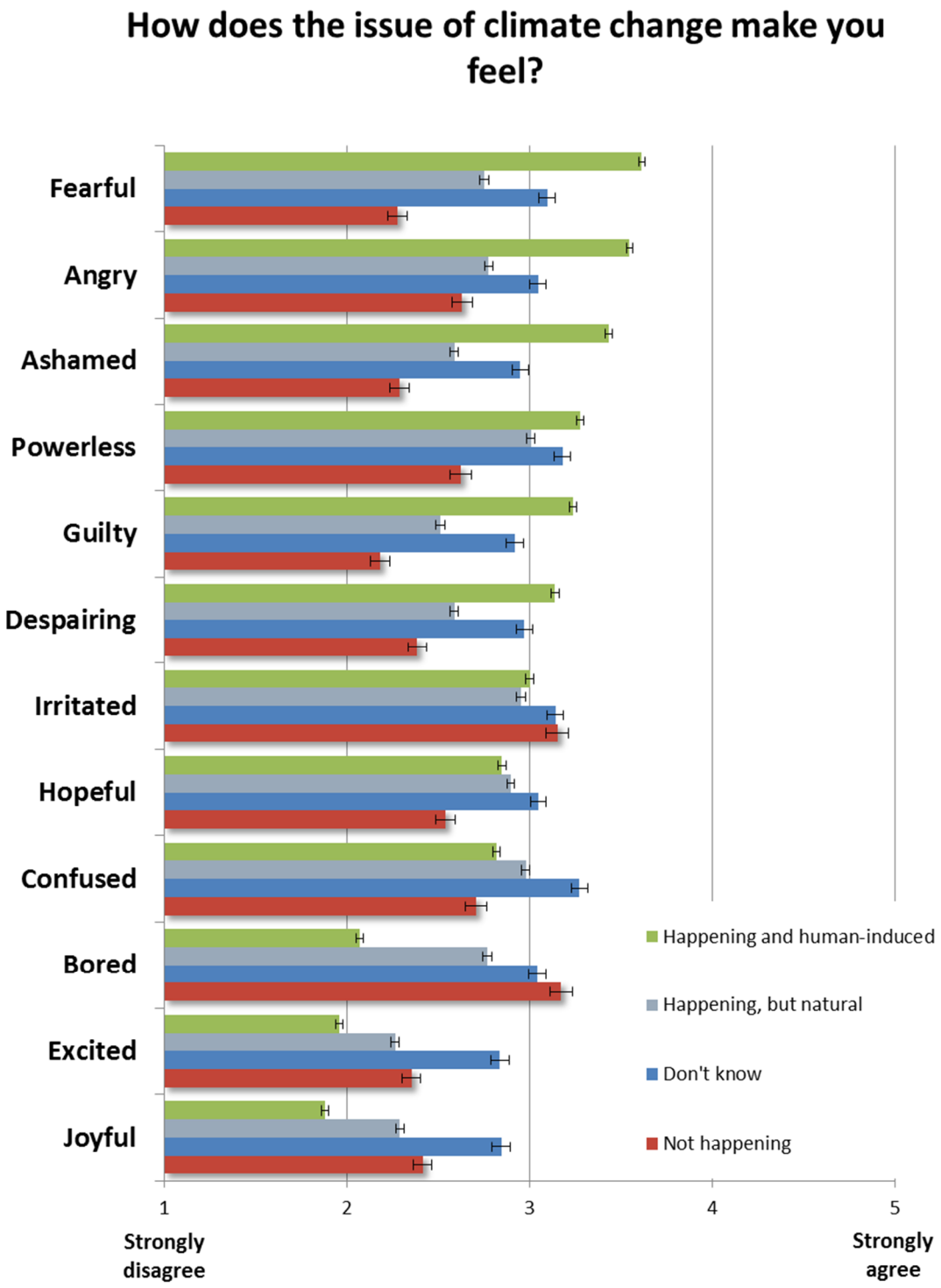


Figure 47 Mean ratings of agreement with emotions prompted by climate change, by opinion-type (*N*=5163)

7.4 Emotions, behavioural engagement, and support for adaptation initiatives

Table 28 lists the correlations between levels of emotions associated with climate change and behavioural engagement and support for adaptation initiatives. Feeling angry, ashamed, guilty, fearful, powerless, and despairing were all positively related to behavioural engagement and support for adaptation initiatives. Feeling hopeful was also positively related. Feeling bored was negatively related to behavioural engagement and support for adaptation initiatives.

Table 28 Correlations between emotions associated with climate change and levels of individual behaviour, community behaviour, and support for adaptation initiatives (*N*=5163)

EMOTION	INDIVIDUAL BEHAVIOUR (PEARSON CORRELATIONS)	COMMUNITY BEHAVIOUR (PEARSON CORRELATIONS)	SUPPORT FOR ADAPTATION INITIATIVES (PEARSON CORRELATIONS)
Angry	.32**	.33**	.28**
Ashamed	.33**	.31**	.31**
Guilty	.32**	.27**	.28**
Fearful	.32**	.29**	.34**
Hopeful	.22**	.06**	.14**
Powerless	.12**	.06**	.17**
Joyful	.06**	-.14**	-.17**
Confused	.05**	-.07**	.05**
Despairing	.25**	.21**	.23**
Excited	.10**	-.08**	-.13**
Bored	-.15**	-.26**	-.28**
Irritated	.06**	.05**	.00 (.00)

8 Predicting behaviour and support: Which values and attitudes matter most?

In the previous sections, we have seen that a wide range of values and attitudes are related to behavioural engagement and support for adaptation initiatives. But are there particular values and attitudes that tell us more about whether people might or might not be engaged, or lend support, than others? In this section, we explore the power of our survey questions in predicting engagement and support. We begin by defining a set of constructs by combining attitudes and values that measure similar things. We then run three regression analyses to ascertain how much variation in levels of engagement and support can be explained by these constructs, and which constructs are the more powerful in each case.

8.1 Developing constructs

As a precursor to performing predictive tests, a series of factor analyses and reliability analyses were conducted to define a list of measures that were theoretically and statistically distinct from one another.[41] These measures are listed in Table 29.

[41] Such a step is necessary prior to regression analyses to avoid problems of multicollinearity; that is, when multiple variables are very highly correlated with one another.

Table 29 Description of measures constructed to predict behavioural engagement and support for adaptation initiatives (*N*=5163)

MEASURE NAME	ITEMS	RANGE	CRONBACH'S ALPHA	*M*	*SD*
Certainty climate change is happening	How sure are you that climate change is happening?	Min 1 Max 4	NA	2.58	1.04
Personal experience with climate change	How much have you personally experienced the effects of climate change?	Min 1 Max 4	NA	2.08	.88
Salience of climate change	How worried are you about climate change? How personally relevant is climate change to you? How important is the issue of climate change to you personally?	Min 3 Max 14	.91	8.73	2.94
Ethical and moral obligation	I feel it is my ethical responsibility to change my individual behaviour to combat climate change I feel a moral duty to do something about climate change	Min 1 Max 5	.88	3.47	.92
Political orientation	Which best represents your political views? from Left Wing to Right Wing	Min 0 Max 100	NA	52.58	23.29
Ductile worldview	The natural environment will become unstable if humans exceed the limits identified by experts The natural environment can be managed if there are clear rules about what is allowed If the balance of the natural environment is upset the whole system will collapse Conservation and protection is the most rational strategy for managing the natural environment When pushed beyond the limits identified by experts the natural environment will not recover We all have a moral obligation to protect the environment and consume fewer resources	Min 1 Max 5	.86	3.74	.73
Elastic worldview	The natural environment is capable of recovering from any damage humans may cause Ultimately, there's nothing individuals can do to manage or change the natural environment There's no point wasting time, energy and resources on trying to manage the natural environment Individuals should have freedom of choice regardless of the environmental impacts Human industry and technology has not caused significant damage to the natural environment Humans can't control what happens in the natural environment	Min 1 Max 5	.87	2.52	.89
Feelings of efficacy	There's nothing Australia can do about climate change that will make a meaningful difference (R) Individuals working together can make a difference to climate change The impacts of climate change are really beyond my control (R) Individuals can make a difference to climate change There are meaningful things I can do to reduce the impact of climate change The impacts of climate change are inevitable now so there's not much point worrying about it (R)	Min 1 Max 5	.83	3.38	.75

Trust in industry and authorities	How much do you trust the following information sources to tell you the truth about climate change? Oil companies; Car companies; Government; Local authorities	Min 1 Max 5	.91	2.21	.91
Trust in science organisations	How much do you trust the following information sources to tell you the truth about climate change? Environmental group scientists; University scientists; Government scientists; Industry scientists	Min 1 Max 5	.89	3.11	.94
Trust in community sources	How much do you trust the following information sources to tell you the truth about climate change? People in your community; Doctors; Friends and family	Min 1 Max 5	.83	3.02	.81
Negative emotions	How does the issue of climate change make you feel? Angry; Ashamed; Guilty; Fearful; Powerless	Min 1 Max 5	.86	3.04	.85
Positive emotions	How does the issue of climate change make you feel? Joyful; Excited	Min 1 Max 5	.89	2.16	.93
Feeling of hope	How does the issue of climate change make you feel? Hopeful	Min 1 Max 5	NA	2.86	.99
Irritation and boredom	How does the issue of climate change make you feel? Irritated; Bored	Min 1 Max 5	.56	2.75	.91
Source credibility	To what extent do you think climate scientists… …have vested interests in promoting a particular view? (R) …have been proven wrong in the past? (R) …are knowledgeable about the risks? …feel a responsibility to provide accurate information? …provide sensationalised information? (R) …are accountable if mistakes are made? …are concerned about public welfare?	Min 1 Max 7	.80	4.09	1.06

(R) indicates items that were reverse coded

Once these constructs were defined, a series of simultaneous multiple regressions were performed to ascertain the relative power of each of these constructs in explaining variations in respondents' reported behavioural engagement (both individual and community), and support for adaptation initiatives.

8.2 Predicting individual behavioural engagement

Table 30 shows the unique contribution each of the constructs made in predicting variations in individual behavioural engagement. The last column presents the standardised beta weights, with larger weights indicating greater explanatory power. How salient climate change was to a person (a combination of how worried someone was, how personally relevant, and how important climate change was) was the strongest predictor of behavioural engagement. This was followed by higher levels of ethical and moral obligation to do something to respond to climate change, and whether one had personally experienced the effects of climate change. Overall, the constructs included in the analysis were able to explain 34% of the variance in levels of individual behavioural engagement.

Table 30 Simultaneous multiple regression analysis for attitude variables predicting individual behaviour (*N*=5163)

SCALE OR ITEM	*r*	*b*	*SE b*	*ß*
(Constant)		-8.18	1.07	
Certainty climate change is happening	.34**	.25	.12	.03
Personal experience with climate change	.45**	1.34	.16	.14**
Salience of climate change	.52**	.87	.07	.30**
Ethical and moral obligation	.45**	1.69	.19	.18**
Political orientation	-.04*	.02	.00	.05**
Ductile worldview	.36**	1.02	.20	.09**
Elastic worldview	-.08**	.83	.16	.09**
Feelings of efficacy	.32**	-.04	.23	.00
Trust in industry and authorities	-.16**	-.10	.16	-.01
Trust in science organisations	.32**	-.08	.16	-.01
Trust in community sources	.27**	.57	.14	.05**
Negative emotions	.35**	-.57	.16	-.06*
Positive emotions	.08**	.46	.14	.05*
Feeling of hope	.22**	.38	.12	.04*
Irritation and boredom	-.06**	-.02	.13	.00
Source credibility	.30**	.00	.13	.00
Amount of variance explained (R squared):		**34%**		

*** *p* < .01 ** *p* < .001**

8.3 Predicting community behavioural engagement

Table 31 shows the unique contribution each construct made to predicting variations in community behavioural engagement. Again, how salient climate change was to a person was the strongest predictor of behavioural engagement. This was followed by the level of certainty that climate change was happening and feeling an ethical and moral obligations to do something to respond to climate change. Political orientation was the next strongest predictor, with more left-wing orientations predicting more engagement. Together, the constructs accounted for 26% of the variance in levels of community behavioural engagement.

Table 31 Simultaneous multiple regression analysis for attitude variables predicting community behaviour (*N*=5163)

SCALE OR ITEM	*r*	*b*	*SE b*	*ß*
(Constant)		-2.33	.30	
Certainty climate change is happening	.38**	.24	.03	.11**
Personal experience with climate change	.31**	.08	.04	.03
Salience of climate change	.47**	.17	.02	.22**
Ethical and moral obligation	.40**	.20	.05	.08**
Political orientation	-.22**	-.01	.00	-.07**
Ductile worldview	.36**	.11	.06	.04
Elastic worldview	-.26**	-.03	.04	-.01
Feelings of efficacy	.38**	.19	.06	.06*
Trust in industry and authorities	-.01	-.11	.04	-.04
Trust in science organisations	.28**	.02	.05	.01
Trust in community sources	.17**	.13	.04	.05*
Negative emotions	.31**	-.02	.05	-.01
Positive emotions	-.12**	-.07	.04	-.03
Feeling of hope	.06**	-.03	.03	-.01
Irritation and boredom	-.13**	.04	.04	.02
Source credibility	.35**	.09	.04	.04
Amount of variance explained (R squared):		**26%**		

*** *p* < .01 ** *p* < .001**

8.4 Predicting support for adaptation initiatives

Table 32 shows the unique contribution each construct made to predicting variations in support for adaptation initiatives. Having a Ductile worldview (endorsing myths justifying environmental conservation) was the strongest predictor of support. This was followed by feeling an ethical and moral obligation to do something to respond to climate change. The next strongest predictor was trust in authorities and industry (oil companies, car companies, Government, and local authorities) to tell the truth about climate change. Here, more trust in these sources was related to *less* support for adaptation initiatives. Conversely, greater trust in science organisations (environmental group scientists, university scientists, government scientists, and Industry scientists) predicted *higher* levels of support for adaptation initiatives. Together, the constructs accounted for 39% of the variance in levels of support for adaptation initiatives.

Table 32 Simultaneous multiple regression analysis for attitude variables predicting support for adaptation initiatives (*N*=5163)

SCALE OR ITEM	*r*	*b*	*SE b*	*ß*
(Constant)		40.34	1.96	
Certainty climate change is happening	.30**	.52	.23	.03
Personal experience with climate change	.20**	-1.15	.29	-.06**
Salience of climate change	.42**	.26	.12	.05
Ethical and moral obligation	.52**	4.16	.35	.24**
Political orientation	-.15**	.01	.01	.02
Ductile worldview	.57**	7.21	.36	.33**
Elastic worldview	-.30**	.47	.29	.03
Feelings of efficacy	.43**	-.90	.42	-.04
Trust in industry and authorities	-.04*	-2.77	.29	-.16**
Trust in science organisations	.37**	2.03	.30	.12**
Trust in community sources	.24**	2.13	.26	.11**
Negative emotions	.35**	-.18	.30	-.01
Positive emotions	-.16**	-1.15	.26	-.07**
Feeling of hope	.14**	1.22	.21	.07**
Irritation and boredom	-.17**	.12	.23	.01
Source credibility	.37**	.11	.24	.01
Amount of variance explained (R squared):		**39%**		

*** *p* < .01 ** *p* < .001**

9 Discussion

The results of our longitudinal survey study reveal the consistent findings that a strong majority of Australians think climate change is happening, and support a wide variety of initiatives to both mitigate and adapt to the potential impacts. The data also suggest, however, that there is ongoing disagreement as to whether the causes of climate change are natural fluctuations or are a consequence of human activity. This closely reflects recent findings from the US tracking opinions on climate change from 2010 to 2015 (Hamilton, Hartter, Lemcke-Stampone, Moore, & Safford, 2015).

There are several reasons to be cautious in interpreting basic opinions on the causes of climate change as a definitive 'belief'. First, those who endorse the statement indicating climate change is just a natural fluctuation in Earth's temperatures, also later estimated that nearly half (46.7%) of all climate change could be attributed to human activity. Second, this group also gave moderate to high ratings of responsibility to entities such as big-polluting countries and multinational corporations for both causing and responding to climate change. Third, those who endorsed the opinion statement that climate change was not happening *at all* later estimated around a third (34.6%) of all climate change could be attributed to human activity. This group also gave responses about perceived impacts of climate change not consistent with their position: for instance, on average they thought different groups of people would experience at least some harm from the effects of climate change. The case remains however that one's basic opinion was clearly related to behavioural engagement and support for adaptation initiatives. Taken together, this suggests that people's basic opinions do not represent a static belief, but rather might best be viewed as a 'positioning statement' that gives a broad indication of the perceived threat posed by climate change, and the urgency and magnitude with which a person feels it should be addressed.

Basic opinions and attitudes toward climate change were relatively stable at an aggregate level, but this masks considerable volatility within individuals over time. For instance, nearly half of the repeat respondents changed their opinion at least once during the five surveys. Even between 2013 and 2014, over a quarter of respondents (29%) changed their opinion. There are competing explanations for this volatility: it may reflect limitations in the reliability of the measure, it may reflect uncertainty in the minds of the respondents or changes in their own life circumstances, or it may reflect the influence of societal-level fluctuations such as recent weather events, political events, and scientific findings. It is probably a combination of all of these.

Also stable over time on an aggregate level were misperceptions about what other Australians think, most notably, the consistent overestimation of the number of people who don't think climate change is happening. This is despite frequent polling and surveying, in addition to ours, in that time period consistently finding that actual figures of disavowal of the existence of climate change comprises a small minority of the Australian population. This presents a serious challenge for educators and communicators tasked with increasing engagement with climate change, particularly given the evidence that misperceptions of others' opinions has implications for one's own, and vice-versa (Leviston, Walker, & Morwinski, 2013).

There were rarely sizeable aggregate shifts in our repeat respondents on any of the measures we analysed; however, a small trend was detectable between 2010 and 2011, with decreases in worry, importance, and (oddly) experience with the impacts of climate change, between the two time points. This was mirrored by small shifts in the perceived sentiment of others – with estimates that fewer people in Australia endorsed the opinion that climate change was happening and human-induced in 2011 than in 2010. What might drive these small shifts is difficult to disentangle. It is conceivable that the external environment was a factor. For instance, highly publicised rallies arguing against the introduction of an Emissions Trading Scheme, just prior to the administration of the 2011 survey, may have influenced perceptions about the prevalence of scepticism. Of interest was an apparent lag in the small shifts that occurred in repeat respondents' own opinion-type, where the only noticeable opinion-shift occurred in 2012 and 2013 (before resettling in

2014), that is, *after* initial shifts in basic climate change attitudes and perceptions of others' opinions had occurred.

Most people nominated 'scientific research' as the basis for their climate change opinions, but this depended to some extent on what a person's opinion about climate change was. Friends and family were rarely mentioned as a basis for opinions, even though friends and family were rated as a highly trusted source of climate change information. In fact, friends and family were the *most* trusted source for those who thought climate change was not happening, and the second most trusted (after university scientists) for those who thought climate change was natural. Politicians were also rarely nominated as a basis for opinions, despite the strong associations that opinions had with voting behaviour. This aligns with recent research suggesting politicians and political parties might be more influential than think (McCrea, Leviston, & Walker, 2015). Of note though, is the finding that worldviews about humans' relationship with nature, is more strongly linked with opinions than is either voting behaviour or political orientation.

A striking pattern emerged when people were asked how much climate change would harm different groups of people. In general, people felt they themselves would be harmed the least, and those most unlike them (those in poor, developing nations, and people in the world generally) would be harmed the most. For instance only 16% said climate change would harm them a great deal, while 28.5% said it would harm 'people in your country' a great deal. This pattern held regardless of opinion, and is in keeping with the notion of 'optimism bias' – the belief that one is less likely than other people to experience something negative (Gifford et al., 2009). It is also consistent with the notion of psychological distancing – consigning the impacts of a potential negative event to a future time, in places geographically and socially remote to the individual (Leviston, Price, & Bishop, 2014; Spence, Poortinga, & Pidgeon, 2012). Similar processes might also underlie the consistent rating of 'individuals' as having the least responsibility for both causing and responding to climate change.

Support for a wide variety of adaptation initiatives was high, and in general above the midpoint for all opinion-types. This suggests that people's support for many of these adaptation initiatives does not exist solely because the initiatives address climate change, but because they have other, wider benefits as well. For instance, strong levels of support for investment in renewable energy and public transport, and increased efforts to protect the environment from invasive species, potentially help societies not only adapt to climate change, but have positive ramifications for broader environmental and social health. These co-benefits should be clearly and strongly articulated and promoted, particularly as recent research suggests that asking people to imagine the future co-benefits of adaptation and mitigation initiatives can motivate action across ideological divides, independent of the perceived importance of climate change (Bain et al., 2015). Respondents who valued security as a life-guiding principle also tended to have greater support for adaptation initiatives (but lower behavioural engagement), suggesting many of these initiatives might bridge across competing sets of values.

For both individual and community behavioural engagement, the basic salience of climate change – how prominent it is in the mind of a person – remains a key determinant, along with feeling a moral and ethical responsibility to do something about climate change. Sustained behavioural engagement will necessitate clear and ongoing articulation of the ways in which climate change effects *all* people, and how all people, individually and collectively, can effectively respond.

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