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Imagining climate change: The role of implicit associations and affective psychological distancing in climate change responses

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Abstract

Negative climate change imagery is often criticised on the grounds that it provokes and promotes disempowering responses and psychological distancing. We investigated people's associations with climate change, and their affective content on multiple dimensions, through two studies. In Study 1, we administered an image-elicitation task to 2502 people across Australia to examine the mental images most commonly associated with climate change. We used these common responses from the image-elicitation task to compile 82 actual images. In Study 2, these images were presented to participants at a series of four workshops (N = 52). Participants selected the images they most closely associated with climate change, rated them for affective content on an emotion circumplex, and later discussed evocative images in small groups. The findings suggest (i) a significant proportion of people struggle to form concrete associations; (ii) common associations are typically psychologically distant and iconographic, but some national-level impacts are also salient; and (iii) associations with climate change impacts differ in their affective content: Specifically, associations related to drought and denuded landscapes provoke lower arousal, whereas associations related to disasters and extremes provoke higher arousal. The importance of considering motivated reasoning and multi-dimensional affect in the psychological distancing of climate change is discussed. Copyright © 2014 John Wiley & Sons, Ltd.

INTRODUCTION

There are several features of climate change that combine to form what some have dubbed the ultimate 'wicked problem' (Karl, Curtin, Scarlett, & Hopkins, 2011; Lazarus, 2009). Along with the scale, magnitude, and uncertainty surrounding the effects of climate change, perhaps its most defining characteristic is intangibility. Climate change cannot be directly seen, smelt, heard, or touched. In this respect, it exists in the realm of the conceptual, as its existence is beyond the resources of the majority to be verified by everyday means (O'Neill & Hulme, 2009). Perhaps because of this intangibility, people find it difficult to conceptualise the risks involved with climate change (Budescu, Broomell, & Por, 2009; Whitmarsh, 2009), and thinking about climate change consequently depends on value-laden judgements about the nature and distribution of the perceived risks it poses (Baer & Risbey, 2009). These characteristics have prompted recent calls for further research exploring people's associations with, and mental representations of, climate change (Anderson, 2009; O'Neill, Boykoff, Niemeyer, & Day, 2013; O'Neill & Smith, 2014).

In this paper, we explore associations with climate change via two studies: a large survey containing an image-elicitation task and a series of climate imagery workshops. In the first study, respondents were asked to nominate the first three

images that came to mind when they thought about climate change, in order to generate a nationally representative set of climate change associations. The second study consisted of a series of workshops where physical images based on the common associations from the image-elicitation task were presented to participants. Workshop participants were asked to select the images they most strongly associated with climate change and rate these for their affective qualities. A thematic analysis of workshop group discussions explores whether specific sets of imagery cluster together on the basis of their affective content and subject matter. Together, these studies investigate common associations using two methods of elicitation and explore not only whether these associations are positive or negative but also whether they are likely to motivate or inhibit adaptive responses to climate change.

Climate Change, Motivated Psychological Distancing, and Emotion

Climate change might be exceptional as an attitude object for its properties, but as humans, we are equipped with a range of heuristic devices to make sense of the complex and unfamiliar. One such device is to think about new concepts by making reference to what is already known, or what has already been experienced. Association, or the pairing of two

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discrete stimuli, objects, or thoughts (so that thinking, observing, or being exposed to one will lead to thoughts about the other), captures this 'historical reference sense-making' process (Deutsch & Strack, 2010). When faced with new or uncertain information, people search their existing rules and beliefs to draw conclusions about that information. This accessing of prior knowledge forms cognitive representations (Kunda, 1990). Critically, these rules and beliefs can constrain shifts in opinions and attitudes. From this perspective, identifying prevalent associations with climate change and how they relate to attitudes regarding the existence and anticipated impacts of climate change is key to fostering adaptive responses.

Construal level theory (CLT; Trope & Liberman, 2003) proposes that the psychological distance of an object or event influences how it is represented and evaluated, in turn influencing the perceived set of behavioural response options available to respond to an event. CLT proposes four dimensions of psychological distance: geographical, social, temporal, and the dimension of uncertainty. Spence, Poortinga, and Pidgeon (2012) measured these dimensions of psychological distance in relation to climate change and found that increased psychological distance (with the exception of the dimension of social distance) was associated with reduced concern about climate change and reduced willingness to decrease energy use. Trope and Liberman (2012) suggested that high-level, abstract construals function to preserve the invariant properties of distant events, whereas low-level construals preserve a stimulus in more detail and emphasise its uniqueness. These different levels of construal afford evolutionary advantage in the sense that an individual can accurately predict and evaluate a future event and respond accordingly. In terms of climate change, it might be adaptive to think about it at the abstract level, given the magnitude of impacts set to occur over the medium- and long-term future. But, as the more subtle impacts of climate change are already upon us (e.g. reductions in regional rainfalls), bridging psychological distance to deal with the specific individual-level consequences in the here and now (e.g. reduced water availability) might be equally advantageous.

Psychologically distancing climate change might afford individuals and collectives functional value beyond that hypothesised by Trope and Liberman (2012). According to the motivated reasoning perspective (Kunda, 1990), the search of one's memory for existing rules and beliefs is not necessarily motivated by the desire to reach an accurate conclusion (termed 'non-directionally motivated reasoning'); rather, the search may occur selectively in order to support a pre-desired conclusion (termed 'directionally motivated reasoning') (Kunda, 1990). Distancing the impacts of climate change might fulfil needs and goals sufficiently important to trigger this directional reasoning process. These needs and goals might include the reduction of negative affect (Westen, Blagov, Harenski, Kilts, & Hamann, 2006), reduction of mortality salience (Solomon, Greenberg, & Pyszczynski, 1991), reduction in behavioural effort (Bersoff, 1999), or a reduction in moral engagement and perceived responsibility (Bandura, 1990). That is, if we want to avoid performing the difficult and inconvenient behaviours needed to combat a threat as large as climate change, or if we want to avoid feeling guilty or responsible for something, we might be directionally motivated (albeit unconsciously) to draw upon a subset of pre-existing knowledge

that not just reduces an external threat but also is less troubling to the self.

To date, the connection between affect and psychological distancing remains unclear. Debate exists about whether negative or positive emotions are more conducive to encouraging behaviour that mitigates climate change. On the one side, it is argued that presenting people with a positive picture of an alternative future and stressing the positives about what can be done will motivate people to change their lifestyle and consumption behaviours (Manzo, 2010). But there is also empirical evidence that negative emotions and fear appeals might enhance both environmental attitudes and behaviours (Hine & Gifford, 1991; Leviston & Walker, 2012; Meijnders, Midden, & Wilke, 2001). We suggest there is a key difference between subsets of negative affect: arousal. Fear, anger, and guilt, for example, can be considered moderate to high-arousal (or activation) states, whereas powerlessness, despair, and confusion are examples of low-arousal (or deactivation) states (Feldman Barrett & Russell, 1998).

Affect has been variously measured as uni- or multi-dimensional, and within these dimensions as uni- or bipolar. In a review of empirical work on affective experiences, Feldman Barrett and Russell (1999) concluded that affect is best conceptualised as comprising two bipolar independent dimensions: degree of pleasantness (or evaluation) and degree of activation (or arousal). These two dimensions capture the core affective feelings in mood and emotion. This second dimension is important, as it can lead to motivating or inhibiting behaviour (Carver, 2001). Further, different emotions of the same valence can influence decision making differently (Polman & Ruttan, 2012). To measure these two dimensions, Feldman Barrett and Russell (1998) developed an 'emotion circumplex', which conceptualises emotion along the two dimensions of evaluation and arousal. The issue of arousal, and its failure to be captured by purely evaluative measures of emotion in previous research, may explain some of the conflicting findings in climate change communication. Specifically, affectively negative responses that facilitate approach (as indicated by high-arousal affect) should be considered as discreet from negative responses that facilitate avoidance (as indicated by low-arousal affect). Incorporating this additional dimension is a first step in introducing an affective dimension of psychological distance not previously considered in applications of CLT to climate change. The affective content of climate change associations may increase or attenuate overall psychological distance, and this would have important implications regarding the formation of behavioural intentions designed to deal with the more immediate, concrete consequences of climate change.

Previous Work on Associations with Climate Change

In their work on psychological distance, Spence et al. (2012) assessed each dimension through a series of attitudinal questions about the anticipated impacts of climate change at different levels of distance. Both proximate and distant impacts were perceived. But what such an elicitation method fails to capture are the spontaneous mental representations people hold, and the distance of these. Representations are important if we are to unpack the implicit and collective understandings

of climate change as a concept. If the representations we employ (or are led to employ) are inaccurate, or if they are employed inappropriately, this can lead to errors in interpretation or judgement and can impede action (Ross & Nisbett 2011). Smith and Joffe (2012) applied a social representations approach to explore shared understandings of climate change. By using a free associations approach, they revealed that the associations that were most accessible for respondents were consistent with dominant visual media representations of the issue. Through follow-up interviews with 56 members of the UK, they identified three dyadic themes employed to frame climate change: self/other, natural/unnatural, and certainty/uncertainty.

The most comprehensive quantitative research to date on associations with climate change comes from the USA and the UK. Leiserowitz (2006) conducted a survey of 673 people in the USA where people were asked to provide the first thought or word that came to mind when they heard the words 'global warming'. The top eight categories, accounting for 97% of responses, were 'melting ice', 'heat', 'nature', 'ozone', 'alarmists' (images of devastation), 'floods/sea-level rise', 'climate change', and 'naysayers'. Holistic negative affect was the strongest predictor of climate change risk perceptions, suggesting risk perception is greatly influenced by emotional and affective factors. Leiserowitz concluded that 61% of Americans provided associations that represented geographically and psychologically distant climate change impacts, and that vivid, concrete, and personally relevant affective images of climate change were lacking.

In a cross-national comparison of people's image associations with the words 'climate change' (UK) and 'global warming' (USA), Lorenzoni, Leiserowitz, and Doria (2006) found both differences and similarities between UK and US respondents. Images of 'weather' were more frequently cited by UK respondents, whereas imagery relating to 'ice melting', 'natural disasters', and 'scepticism' were more common among US respondents. Across both countries, there was a prevalence of negative, psychologically distant associations, with personally relevant impacts and solutions rarely mentioned. Similarly, a survey with Portuguese respondents (Cabecinhas, Lazaro, & Carvalho, 2008) on the social representations of climate change found that free-association mental images with climate change were rated emotionally negatively, and that news media were the main sources of climate change information for people.

The most detailed research of responses to actual climate change imagery, rather than the elicitation of mental imagery, comes from O'Neill and colleagues (O'Neill et al., 2013; O'Neill & Nicholson-Cole, 2009), who used Q-methodology and icon representation to conduct investigations into how people respond to climate change imagery commonly used in the media. Salient imagery included both negative imagery (e.g. smoke stacks), and positive imagery (e.g. solar panels). They found that, although highly affective images that provoked fear grabbed people's attention, these images were also likely to distance and disengage people, suggesting that certain visual and mental imagery can provoke counter-productive responses. Specifically, negative and distant representations led to issue avoidance, disempowerment, and feelings that climate change issues were too overwhelming for individual responses to be efficacious (O'Neill & Nicholson-Cole, 2009).

In a cross-national comparison of Australian, UK, and US responses to climate change imagery, O'Neill et al. (2013)

identified five themes of perceived saliency: climate change impacts, climate pollution, scientific evidence, identifiable people, and climate and religion. Images of climate change impacts, pollution, and scientific evidence were ranked as most salient. Images identified as promoting self-efficacy were much less consistent across the countries however. Images ranked as efficacious depicted energy futures (solar panels, electric cars, traffic jams, home insulation, and wind farms) and to a lesser extent lifestyle choices (red meat, climate protest, and ecohouses). Images ranked as least efficacious varied across the countries: in Australia, it was images of identifiable people; and in the USA and UK, it was images of climate change impacts. The authors concluded that images of climate change impacts are salient but undermine self-efficacy.

A possible limitation of this last set of work is that, by constraining the image pool to dominant media portrayals of climate change (on the basis of content analysis of leading newspapers), certain representations and associations are excluded. Given the intense media coverage of climate change in recent years, it is reasonable to assume that people's associations are heavily influenced by the imagery that accompanies public climate change commentary (Boykoff, 2011). But people systematically prefer certain media outlets over others, often guided by a desire to access information that most accords with their way of thinking about an issue (Iyengar & Hahn, 2009). Further, dominant media outlets arguably preference certain representations over others (they might ignore, for instance, a suite of positive, efficacious representations of climate change response). Although the findings from Smith and Joffe (2012) and Cabecinhas et al. (2008) support the approach of drawing representations from media sources, the media in Australia have arguably been complicit in the misrepresentation and distortion of climate change (Bacon, 2011). Top-down approaches of deriving common associations from media sources might fail to account for the possibility that mainstream media are insufficiently representative of consensual understandings of climate change and overlook that associations are shaped by multiple sources: experience, close others, and so on.

A further limitation of previous work concerns the measurement of affective responses, which is typically constrained to one dimension (either in the form of a valenced evaluation or as a continuum of disempowerment and self-efficacy). Such a focus is understandable given the current debate about the usefulness of negative imagery, and the importance of perceptions of efficacy in responding to climate change (Roser-Renouf & Nisbet, 2008), but, as previously argued, emotions are multi-dimensional and complex, and negative emotions that motivate rather than inhibit behavioural response might also be present.

In order to build on this previous research, we sought to investigate affective responses to climate change, and their role in psychological distancing, using a bottom-up approach. Two studies were undertaken with the following aims: to understand the dominant climate change associations among the Australian public and their affective content; to investigate the relationship between affect and disavowal of climate change threat; to explore whether certain image associations can be grouped together on the basis of their multi-dimensional affective content; and to explore whether motivated psychological distancing might underlie common climate change associations.

STUDY 1: IMAGE-ELICITATION TASK—IMAGES ASSOCIATED WITH CLIMATE CHANGE

In Study 1, a nationally representative survey was undertaken to investigate the following research questions: (i) What image associations are commonly held by the Australian public? (ii) What are the affective evaluations of image associations? (iii) Do image associations and affective evaluations differ according to opinions about the causes of climate change, and across location?

Method

A survey was administered to a sample of 2502 people from across metropolitan, regional, and rural Australia in July and August 2010. The image-elicitation task was part of a broader national survey investigating Australian responses to climate change ($N = 5036$) (Leviston & Walker, 2010).¹ To avoid priming, the image-elicitation task item appeared before all other questions in the survey. Respondents were drawn from an internet research panel of 300 000 individuals. Comparable levels of men (51.2%) and women (48.8%) completed the survey. Fifty-six percent described their location as capital city, 30% as regional town, and 14% as rural area. The age profile of respondents was as follows: less than 24 years of age, 5.2%; 25–34, 14%; 35–44, 16.6%; 45–54, 20.7%; 55–64, 22.1%; 65–74, 17.4%; 75–84, 3.8%; 85 or more, 0.3%. In all, 71.8% owned their place of residence, whereas 26.1% rented (2.2% 'other'). The demographic profile corresponded closely with the known population characteristics of Australians (Australian Bureau of Statistics, 2010).

Image-Elicitation Task

Respondents were asked the following question: *What are the first 3 images that come to mind when you think about climate change?* Up to three responses were recorded for each respondent. Semantically and thematically similar words, plurals, singular words, and misspellings were categorised under the most frequently occurring response for that category (see Supporting Information, Table S1, for an example of how different responses were combined). Ambiguous responses were put aside and later categorised in consultation with two other coders.

Affective Evaluation

To assess the affective evaluations of each image association, respondents were asked the following: *Using the following scale, how would you rate each of these images in relation to climate change?* Responses were measured on a scale from -5 (*very negative*) to $+5$ (*very positive*), with 0 (*neutral*).

Opinion About the Causes of Climate Change

Opinions about the causes of climate change were assessed with the question *Which of the following statements best describes your thoughts on climate change?* Respondents

selected one of the following four statements: 'I don't think that climate change is happening'; 'I have no idea whether climate change is happening or not'; 'I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures'; and 'I think that climate change is happening, and I think that humans are largely causing it'. These last two statements distinguished between different perceived causes of climate change: natural (i.e. non-human-induced) climate change, and human-induced, or anthropogenic, climate change.

Results and Discussion

Image Associations Commonly Held by the Australian Public

A total of 215 distinct image categories emerged after coding. The most commonly nominated image associations were 'rising sea levels', 'drought', 'melting ice caps', and 'floods' (Table 1; a list of all image categories is included in Supporting Information as Table S2).

Common associations were characterised by generalised, often geographically remote, impacts of climatic processes (e.g. 'rising sea levels', 'melting ice caps', and 'global warming'), reflecting the findings of previous research that localised, personally relevant imagery is not commonplace (Leiserowitz, 2006). Another characteristic of commonly nominated associations concerned event-based physical impacts (e.g. 'drought', 'water shortage', and 'floods'), several of which have relevance to natural disasters historically commonplace in Australia, and to forecasted areas of future national vulnerability (Bates & Hughes, 2009). These findings suggest that associations surrounding physical impacts, in contrast to climatic processes, might attenuate geographical psychological distance. The inability to nominate an association was common (as designated by 'don't know' responses), suggesting many have difficulty constructing concrete mental representations of climate change.

Image Associations and Opinions About the Causes of Climate Change

'Rising sea levels', 'drought', 'melting ice caps', and 'pollution' were the most commonly elicited images for respondents who thought climate change was happening and human-induced, and those who thought it was happening but natural. By contrast, 'don't know' was the most common response for those who did not know whether climate change was happening, and those who thought climate change was not happening at all (Table 2) (Figures S2 to S5 in Supporting Information provides graphics for the most commonly elicited images for each opinion type).

Those who endorsed the notion of anthropogenic climate change were more often able to nominate an association. The prevalence of 'don't know' as a response for those who thought climate change was not happening, did not know, or thought it was a natural phenomenon raises a question of causality: Do more concrete mental representations influence acceptance, or does a sceptical orientation to anthropogenic climate change prevent the formation of concrete images? A directionally motivated reasoning account suggests that people search their rules and beliefs selectively for associations that

¹The other half of respondents performed a similar *word*-elicitation task. These results are presented elsewhere (Moloney et al., in press).

Table 1. Most frequently nominated image associations by location and mean affective evaluation ($N=2502$)

Image	All respondents ($N=2502$)	Capital city ($n=1360$)	Regional town ($n=735$)	Rural town ($n=343$)	Mean affective evaluation
Rising sea levels	411 (16.4% ^a)	209 (15.4%)	128 (17.4%)	61 (17.8%)	-2.57
Drought	328 (13.1%)	174 (12.8%)	92 (12.5%)	50 (14.6%)	-3.05
Melting ice caps	256 (10.2%)	147 (10.8%)	79 (10.7%)	25 (7.3%)	-3.35
Floods	200 (8.0%)	121 (8.9%)	51 (6.9%)	25 (7.3%)	-2.80
Pollution	193 (7.7%)	118 (8.7%)	48 (6.5%)	24 (7.0%)	-2.50
Hot weather	167 (6.7%)	94 (6.9%)	50 (6.8%)	22 (6.4%)	-1.20
Don't know	154 (6.2%)	85 (6.3%)	46 (6.3%)	23 (6.7%)	-0.7
Water shortage	139 (5.6%)	81 (6.0%)	32 (4.4%)	21 (6.1%)	-2.28
Global warming	132 (5.3%)	80 (5.9%)	33 (4.8%)	17 (5.0%)	-2.27
Vegetation	127 (5.1%)	71 (5.2%)	35 (4.8%)	19 (5.5%)	+1.98
Hot sun	123 (4.9%)	72 (5.3%)	36 (4.9%)	13 (3.8%)	+0.28
Waterways	122 (4.9%)	69 (5.1%)	29 (3.9%)	21 (6.1%)	+0.11
Rising temperature	122 (4.9%)	61 (4.5%)	34 (4.6%)	19 (5.5%)	-1.51
Ozone layer	121 (4.8%)	57 (4.2%)	45 (6.1%)	16 (4.7%)	-1.77

^aWithin-group percentage.

Table 2. Most frequently nominated image association broken down by climate change opinion

Image rank	Opinion on the cause of climate change			
	'Not happening' ($n=89$)	'Don't know' ($n=89$)	'Happening, but natural' ($n=990$)	'Happening and human-induced' ($n=1286$)
1	Don't know	Don't know	Rising sea levels	Rising sea levels
2	No such thing	Rising sea levels	Drought	Drought
3	Scam	Drought	Melting ice caps	Melting ice caps
4	Hot sun	Melting ice caps	Floods	Pollution
5	Drought	Floods	Natural phenomenon	Floods
6	Rising sea levels	Pollution	Don't know	Hot weather
7	Crap/rubbish	Hot weather	Hot weather	Water shortage
8	Weather	Confusion	Pollution	Global warming
9	Pollution	Global warming	Water shortage	Ozone layer
10	Natural phenomenon	Vegetation	Vegetation	Severe storms

are less troubling, or less threatening to the self. If the perceived impacts of climate change are overwhelmingly negative, a failure to form any representation may be a functional way to avoid negative affect.

The Affective Evaluations of Common Image Associations

Eleven of the 14 most common image associations were, on average, rated negatively by respondents (Table 1) (a graphic of affective evaluations is provided in Supporting Information as Figure S1), again reflecting findings from previous research (e.g. Cabecinhas et al., 2008; Leiserowitz, 2006). 'Melting ice caps', 'desert', and 'smoke stacks' were given the most negative evaluations on average, whereas 'vegetation' (and to a lesser extent 'hot sun' and 'waterways') was given a positive evaluation.

With regard to all images elicited, on average, associations with climate change were moderately negatively evaluated ($M=-1.60$; $SD=3.11$). A one-way analysis of variance was conducted to test for differences in the affective evaluation of image associations based on different opinions about the causes of climate change. There was a small but significant difference on affective evaluation based on opinion type: $F(3, 2501)=48.12$, $p<.001$; $\eta^2=0.05$. Post-hoc comparisons using the Tukey honest significant difference test indicated

those who thought climate change was human-induced rated their image associations as significantly more negative ($M=-2.31$; $SD=3.04$) than all other opinion types. There were no significant differences in affective evaluations for those who thought climate change was not happening ($M=-0.60$; $SD=3.42$), did not know ($M=-1.02$; $SD=2.98$), or thought it was happening but natural ($M=-0.88$; $SD=3.04$).

These results provide circumstantial support for a directionally motivated reasoning account; that selectively accessing specific rules and beliefs to support a pre-desired conclusion (in this case, a sceptical orientation toward the notion that humans are responsible for climate change) functions to reduce negative affect. The relationship between negative associations and opinion type might also elucidate previous findings that negative emotions toward climate change are often associated with higher levels of pro-environmental behaviour (e.g. Hine & Gifford, 1991).

Associations Across Localities and Across Countries

The most commonly elicited images were similar across capital city respondents, regional respondents, and rurally located respondents (Table 1), although there were some minor differences in rank orders for 'pollution', 'hot weather', 'don't

know', 'waterways', and 'ozone layer', suggesting intra-national location does not play a significant role in shaping associations.

Although image associations, particularly those related to climatic processes, were not clearly associated with phenomena that were psychologically close, there was some suggestion that associations concerning event-based physical impacts had national-level relevance, and these provide evidence of less geographical psychological distance. Table 3 presents a comparison of the top associations found in the current study with those found in association studies from the UK and the USA (Lorenzoni et al., 2006). There are many similarities between the three response sets; however, a clear difference is the prominence of drought among Australian respondents. This high rating was consistent across location, suggesting that issues of climate-related drought are salient in the minds of all Australians, not just those from regional and rural areas. Other associations that figured prominently among Australian respondents were 'hot sun' and 'hot weather', possibly reflecting Australia's warmer climate more generally. 'Floods' was also prominent in the Australian sample, as were associations relating to water shortages. This perhaps reflects the highly publicised increasing pressures on potable water supplies in many areas of Australia, including urban centres. Other associations, including 'rising sea levels' and 'melting ice caps', are more remote but reflect impacts more specifically associated with climate change. The emphasis of drought, water shortages, and flood is consistent with the notion that people's associations with climate change reflect the specific historical and cultural climatic context of the respondent (Nicholls, 2005).

STUDY 2: IMAGERY ASSOCIATIONS WORKSHOPS

In Study 1, associations were measured by asking people to write down the first three images that came to mind when they thought about climate change, consistent with traditional ways of eliciting associations. This method reduces biases introduced by closed questions, and responses are relatively spontaneous and unconstrained (Lorenzoni et al., 2006; Szalay,

Table 3. Cross-national comparison of most commonly elicited associations with climate change in descending order

Australia (2010)	USA (2002) ^a	UK (2003) ^a
Rising sea levels	Other	Don't know
Drought	Don't know	Other
Melting ice caps	Melting ice	Weather
Floods	Heat	Ozone
Pollution	Nature	Global warming
Hot weather	Disaster	Flood /sea level
Don't know	Flood/sea level	Changing climate
Water shortage	Ozone	Pollution
Global warming	Changing climate	Disaster
Vegetation	Weather	Rain
Hot sun	Pollution	Ice melting
Waterways	Dry/desert	Heat
Rising temperatures	Sceptic	Nature
Ozone layer	Places	Greenhouse

^aSource: Lorenzoni et al. (2006).

1978). Yet it is also possible that respondents will engage in a considered, deliberative process when responding, particularly when they are responding in private with no externally imposed time constraints. One way to overcome this is to present people with visual stimuli in a controlled setting and direct them to make spontaneous evaluations.

In Study 2, we undertook a series of workshops to (i) elicit climate change associations such that the automaticity of responses would be maximised; (ii) introduce a multi-dimensional measure of affect, such that a motivational element as well as an evaluative component was accounted for; and (iii) explore, through a thematic analysis of small-group discussions, whether motivated psychological distancing might underlie common climate change associations.

Method

A total of 82 images were selected to represent the 215 image association categories emerging from Study 1. Several considerations guided this process. First, the set of images had to be small enough that participants could sift through the entire set in a short timeframe (see Procedure). Second, preference was given to the more commonly elicited image categories in Study 1. Third, where multiple images could be used to denote the same category, and that category was a common survey elicitation, multiple images were selected. For example, for 'drought', imagery might be about landscape (e.g. a barren field) or might involve a human component (a struggling farmer) or an animal component (suffering livestock). Fourth, a combination of local (i.e. clearly Australian) and remote imagery was selected.

Images were sourced from the internet using Google Image search.² A typical search term consisted of the word(s) of that category coupled with the phrase 'climate change'. Photos and images were validity tested by piloting the images on a convenience sample of five people and asking them to select a word (or words) they thought the image best portrayed. Images that produced too varied a response, or responses too removed from the original image elicitation, were discarded and replaced by another image until consensus was established. Table S3 in Supporting Information displays the image description and web source of each image. Sets of images were printed on 10 cm × 15 cm photo paper. Each image had a reference number printed on its back.

Procedure

We conducted four workshops with a total of 52 participants. Two workshops were held in December 2010 (11 and 8 participants) and two in March 2011 (14 and 19 participants). All workshops were conducted in Perth, Western Australia. Participants for the first two workshops were recruited by telephone, using randomised telephone lists of households in suburbs local to the workshop venue. Participants for the final two workshops were recruited through university notice boards and email lists targeting post-graduate students from the University of Western Australia. During recruitment, potential participants were invited to attend a workshop aimed at

²Only those images labelled for reuse were used, to avoid copyright infringement.

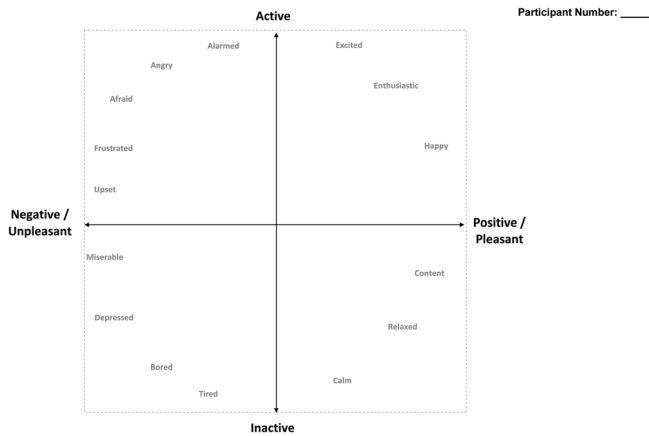


Figure 1. Emotion grid based on Feldman Barrett and Russell's emotion circumplex

understanding how people in Perth feel about climate change, and the effects of different images of climate change. Participants received shopping vouchers to the value of \$50 as recompense for their time and associated travel costs. Slightly more men (58%) than women (42%) completed the survey. The age profile of respondents was as follows: less than 24 years of age, 19.5%; 25–34, 9.8%; 35–44, 4.9%; 45–54, 24.4%; 55–64, 14.6%; and 65 or more, 26.8%.

Each participant was given a complete set of the 82 images. These sets were randomised to reduce any order effects. Participants were asked to scan through all 82 images and 'quickly and instinctively' sort them into two piles: a pile for images they immediately associated with climate change and a pile for images they did not immediately associate with climate change. This direction was given to maximise the implicitness of participants' responses. Once participants had sorted through all the images, they were asked to sort through their pile of associated images and rank and record the 10 images they most closely associated with climate change in order of strength of association.³

After all participants had ranked their selections, they were asked to place the corresponding number of each image on an emotion grid in accordance with the instruction: 'How does this image make you feel?' This grid, pictured in Figure 1, was taken from Feldman Barrett and Russell's (1998) emotion circumplex. Once all respondents had completed these exercises, they participated in an approximately half-hour discussion in groups of four to eight people. Just prior to these discussions, participants were asked to bring along their top images and express any thoughts they had regarding them. Discussions commenced by asking each participant, in turn, to talk about one or two of the images they had selected. After this process, discussion was opened up for a less-structured general conversation about the images. Prompts were given by moderators to investigate the topics of personal relevance and levels of affect associated with the image sets. Speaking prompts were also given to ensure the contribution of each participant was roughly equivalent. Discussions were audio-recorded with the consent of participants, and transcripts were produced from these audio recordings, supplemented with written notes made during the workshop.

³One participant had fewer than 10 images in this pile and was directed to rank only the ones he had selected.

Results and Discussion

The most commonly selected images in participants' top 10 are displayed in Table 4 (the frequency of selection for all images is included in Supporting Information as Table S4).

Affective ratings of participants' selected images were most commonly located in the high-arousal, negative evaluation quadrant of the emotion circumplex (62.9% of all affective ratings, Figure 2). The low-arousal, negative evaluation quadrant was the next most populated (21.1%), followed by the high-arousal, positive evaluation quadrant (11.9%). The least populated quadrant was the low-arousal, positive evaluation quadrant (4.1%).

Thematic Analysis

We performed a thematic analysis on transcripts of workshop discussions. Themes were established by sequentially applying several decision criteria, as follows. First, groups of images co-located on the emotion circumplex (based on average ratings) were identified. As a substantial proportion of images were closely located in the top left-hand quadrant, these images were then broken into different themes on the basis of similarity of image content, and by grouping images that were typically discussed together during workshop discussions (Braun & Clarke, 2006). That is, we identified patterns in the workshop transcripts (and from our recollections of the workshops) of groups of images that were often talked about in close conjunction with one another. The identified themes were labelled as follows: icons and ice; climate solutions and leadership; pollution; disasters and extremes; drought and denuded landscape; and missing images.

For the proceeding sections, quotations are selected on the basis of their utility in representing each theme. Multiple quotations on the same topic are employed to indicate the frequency of an elicited sentiment. The first six themes relate directly to the images themselves, whereas the last reflects a theme emerging from discussions of the set of images as a whole. Themes are presented in order of the frequency with which all the images in each of those themes emerged (see Table S4 in Supporting Information for frequency totals).

Figures 3–7 display the average affective evaluations for each image, where the size of each point indicates the frequency of selection (individual affective ratings for the top four images are presented in Figure S6 in Supporting Information). The images selected for these figures reflect those images frequently selected or frequently nominated in workshop discussions.

Disasters and Extremes

Images of natural disasters featured heavily in participants' selections (Figure 3). These images were consistently rated negatively and were generally given high-arousal ratings.

The image of a flooded Sydney was the most commonly selected natural disaster image, despite its obvious artificiality. 'It's a fake but it really made me jump'; 'It's familiar and reminded me of Japan'⁴; and 'I'm from Sydney so it was

⁴This workshop occurred shortly after the Japanese earthquake and ensuing tsunamis of March 2011.

Table 4. Most commonly selected images in participants' top 10 (N=52)

Image	Image description	Times selected
Polar bear	Polar bear balanced precariously on melting iceberg	33
Collapsing ice shelf	Large chunk of ice shearing off shelf into ocean	28
Flooded Sydney	Dramatised mock-up of Sydney Opera House and harbour inundated with water	25
Parched earth	Cracked and dry landscape with solitary tree in background	22
Smoke stacks	Three industrial smokestacks on sepia background	21
Coal-powered station	Landscape with coal power station cooling towers in distance	18
Polar cap	Graphical representation of arctic polar ice retreat	15
Submerged island	Beach hut partially submerged in tropical waters	15
Bushfire	Australian firefighting vehicle in front of high intensity bushfire	14
Pollution cars	Heavy car traffic on smog-filled multi-lane highway	14
Wind farm	Set of five wind turbines against blue skies on green landscape	14
Solar panel	Large bank of solar panels on green countryside landscape	13

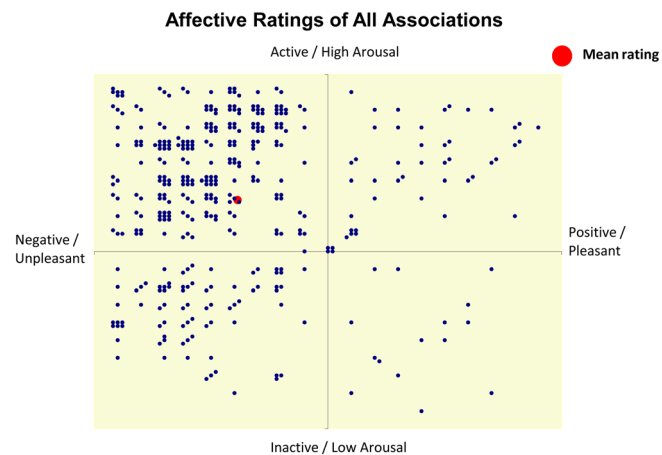


Figure 2. Affective ratings of all image associations (red point denotes the average placement over all images)

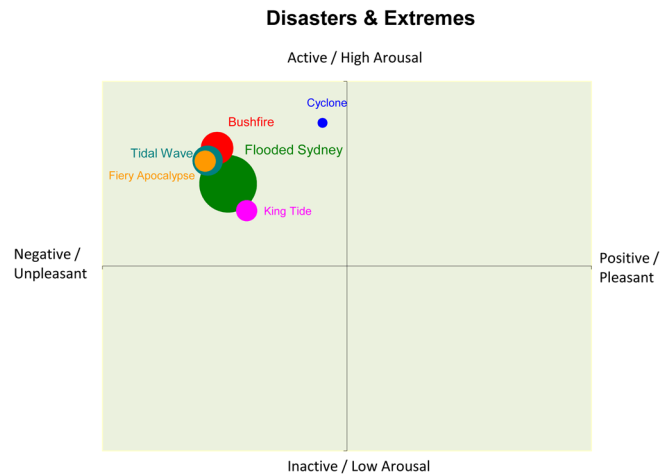


Figure 3. Mean affective ratings of images associated with disasters and extremes (the size of each point indicates the frequency of selection)

relevant'. But the most discussed of these images was the Victorian bushfires,⁵ which was noted for its personal relevance and immediacy: 'This is happening already and we

⁵A series of bushfires, known as the 'Black Saturday Bushfires', swept through the Australian state of Victoria in February 2009, killing 173 people. These bushfires occurred during unprecedentedly extreme bushfire conditions, a combination of record-high temperatures for the state and high winds.

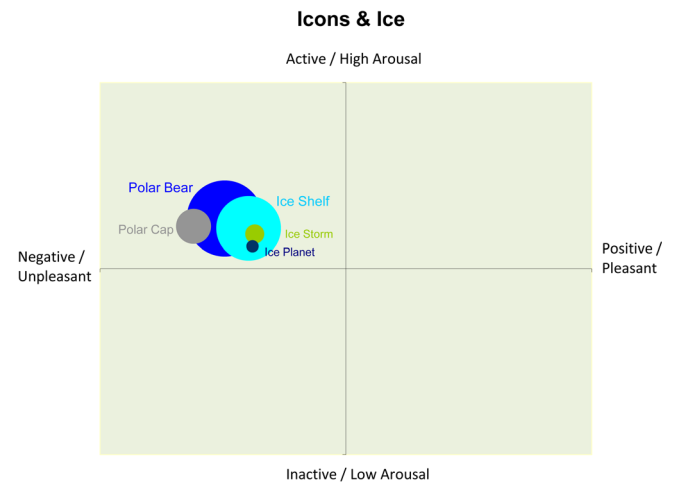


Figure 4. Mean affective ratings of images associated with climate change icons and ice (the size of each point indicates the frequency of selection)

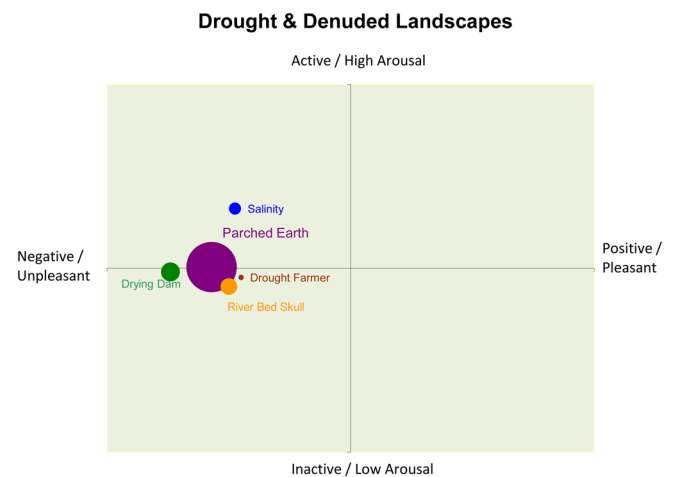


Figure 5. Mean affective ratings of images associated with drought and denuded landscapes (the size of each point indicates the frequency of selection)

are powerless to stop it. A friend of mine was affected by the fires in Victoria. It's a significant and powerful image'; and 'It's the thought of people suffering. This is the consequence and it's happening now. We have to do something about it'.

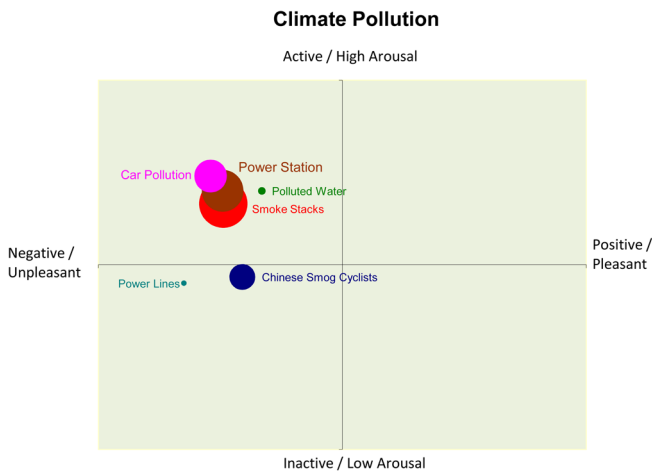


Figure 6. Mean affective ratings of images associated with climate pollution (the size of each point indicates the frequency of selection)

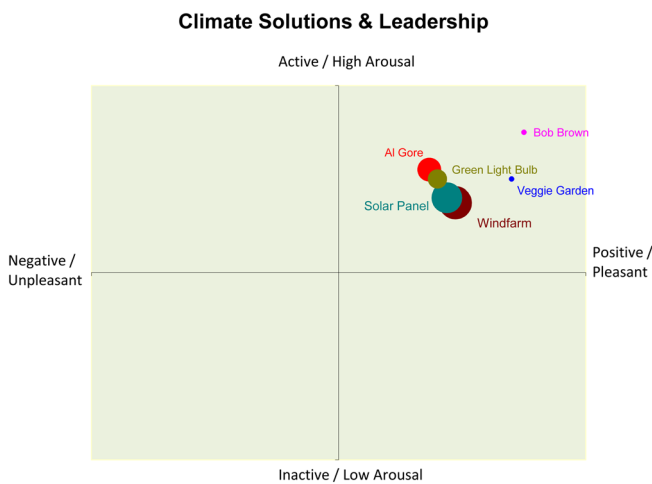


Figure 7. Mean affective ratings of images associated with climate leadership and solutions (the size of each point indicates the frequency of selection)

Icons and Ice

Among the most commonly selected single images of the set were those relating to ice (Figure 4). These images were consistently negatively evaluated, with moderate to high ratings of arousal. For many participants, the image of the polar bear stranded on a small piece of ice represented an iconic image of climate change. ‘It’s clichéd, but if you see it you think: “climate change”’. For some, the image of the polar bear represented more than the endangerment of the species itself but evoked the broader natural world and fauna in general: ‘It’s about the natural world rather than one species. It’s symbolic’; ‘All of our mega fauna are doomed’. For one participant, the image had a more metaphorical meaning: ‘It has a wider reference to ice caps, but portrays a sense of clinging to something not there’. Emotive elements were also expressed: ‘The polar bear is just holding out and it’s very emotional. How the mighty have fallen. It’s a top line predator’; and ‘Animals are innocent so it’s an emotive response’. For another participant, the polar bear image was comical: ‘It made me laugh... “well you f*****d up then!”. I had to respond somewhere between content and bored. There was a Monty Python aspect to it’.

The collapsing ice shelf, the second most commonly selected image, was described as ‘clear and unambiguous’ by one participant; by another, ‘the most vivid representation of the photos, it’s the most representative’. The ice planet for one participant represented returning to a ‘primordial state after our interference’, whereas for others, it was a reminder of the changeability of Earth’s climate: ‘I went to a seminar which detailed the past history of the ice age. Whatever your viewpoint about human effects, it demonstrated that that the climate can change’.

The map of the polar cap was talked about in different terms. For the participants who discussed this image, it represented formal, scientific evidence of climate change: ‘It’s the best evidence of change’; ‘It’s irrefutable’; ‘[it] visually shows the change’; ‘People who deny climate change are ignoring this information’.

The preponderance of ice-related images was explained by one participant in the following way: ‘Cold is more fearful than warm...More people die through winter than [through] heat stress’. But the lack of personal relevance of ice-related images was also mentioned: ‘To Australians it can’t resonate though’. By contrast, one participant chose three ice images because of that person’s time living in Alaska, where they ‘saw the glaciers retreating; so it’s an emotional connection’. For another, the collapsing ice shelf was a reminder of something closer to home: coastal erosion.

Drought and Denuded Landscapes

Drought-related images were selected relatively infrequently by participants when compared with other themes (drought-related images were selected by 11.4% of respondents), despite being one of the most common associations in the image-elicitation task (Figure 5). This set of images was rated as producing lower arousal levels relative to other negative image groups.

Participants who talked about the drought-related images expressed the sentiment that they were about issues broader than climate change, and in this sense, some had hesitancy in selecting them. For the drought farmer image, ‘this is not exclusively a climate change thing, so again I’m uncertain’, whereas for another participant, ‘It’s a natural photo, but it is very evocative now of global warming’. The most commonly selected image of this group, parched earth, had the most resonance, even though it was arguably the least representative of drought specific to Australia⁶: ‘At first I chose all the harsh land images. But I wanted ones that were related to climate change. This one is, with the red earth and the one tree’. But again, there was a proviso by another participant who selected this image: ‘The other image I loved, but which is not definitive, is the scorched earth’.

Climate Pollution

Climate pollution, whether through localised industrial and vehicle emissions, or as a by-product of power generation, formed a set of images that featured prominently in people’s selected image associations (Figure 6). These images were

⁶Compare this image with ‘drought farmer’ and ‘distressed sheep’, for instance.

negatively evaluated and produced a mixture of moderate- to high-arousal ratings.

The image of smoke stacks had particular resonance, even though many participants disputed its link with climate change: '[The smoke stacks are] iconic if not accurate'; 'Smokestacks are very powerful, even if they are an exaggeration of pollution'; 'That is water vapour, but regardless we all have to breathe pollution in'. The disempowering and depressing nature of the image was articulated: 'It makes me feel helpless and disempowered. The subject is overwhelming, out of reach, but all you can do is talk'.

Climate Solutions and Leadership

Despite the majority of workshop images being negatively evaluated, a small number of images were rated positively, including images relating to renewable or efficient power generation, and politicians and figureheads related to positive action on climate change (Figure 7).

The wind farm and solar panel images were consistently evaluated positively. For many who selected these, they represented 'things that combat [climate change] and have positive effects'. The wind farm 'represents technology and [suggests] that it's not all doom and gloom'. These alternative power sources were seen as solutions to a problem. Solar panels were described by one participant as representing 'your visible green credentials'.

At several points in discussions, it emerged that some who had selected these images had done so after a process of considered deliberation (despite being instructed to select 'quickly and instinctively'). This deliberative process is illustrated in the following interchange between two participants: 'Things that represent climate change are negative, but the solutions are positive. But we were asked to find images that represent climate change, not the solution'. In response: 'I did the opposite because windfarms and so on are the solution, not the causes which represent panic. I've been conditioned into associating climate change with panic'. And from another participant, 'I changed my images because they were all too negative and I wanted to represent positives too'.

Images representing politicians were selected with relative infrequency, but discussions surrounding these images, once brought up, were often protracted. Figureheads of green movements, Al Gore and Bob Brown,⁷ were seen by most of the participants who selected these images as representing hope. Of Al Gore: 'He was the only person in the world to stand up. Copenhagen and Cancun didn't work. Al put his money where his mouth is and was flying the flag for us'. Of Bob Brown: 'We need icons. I think of climate change as a war, and we need a leader to follow. Government reflects the people'. Participants were not unanimous in this view though: 'I have a strong view that he [Al Gore] is a hypocritical fraud'.

Missing Images

Participants were asked whether they thought anything was missing from the bank of images. Most considered the image

set to contain an exhaustive list of associations. On probing, a few suggestions were made of images, or concepts, that were not present in the image set. Some participants stated that, although it was easy to demonstrate the environmental impacts of climate change, they had difficulty selecting images that represented humanity's contribution to climate change. Other suggested images included stunted drought crops, 'because that's what climate change is doing to farms'; more evocative images of violence and food riots: 'lots of people don't realise what it means, when food won't grow. People in the city don't realise; they're complacent. The food and water situation is horrific. It's going to happen'; more evocative images of impacts to animals, or a representation of how 'future generations will have no animals'; 'People walking around on the street in water, like what will happen in low-lying areas like Bangladesh'; 'graphs, charts and maps' a representation of 'deniers' or 'the other side of the argument'; recent 'floods in Queensland'; more Indigenous people: 'there was a lot of Western culture images', 'climate change is supposed to be global, but all these images are Western'; and images evocative of war: 'There is nothing now saying "fight for your planet"'.

GENERAL DISCUSSION

The current research reveals that impacts dominate climate change associations among the Australian public, but that these impacts differ in their affective content and subject matter. Although nearly all impacts are negatively evaluated, extreme events and disasters typically provoke a high-arousal response, although drought and denuded landscapes provoke a lower arousal response. Impacts associated with the causes of climate change, rather than the outcomes, provoke negative evaluation and moderate arousal levels. In contrast, associations relating to solutions and leadership, though less common, are positively evaluated and provoke a high-arousal response. Together, the results provide initial support for the notion that certain climate change associations may function to motivate adaptive responses to the more immediate impacts of climate change—extremes and disasters—by attenuating affective psychological distance.

There was considerable evidence that people's image associations reflected dominant media representations, in line with previous research (Cabecinhas et al., 2008; Smith & Joffe, 2012). The polar bear on the iceberg was a salient association in the workshops, not only as a selected image but also in subsequent discussions. It is also arguably the most iconic representation of climate change in the Western world (Manzo, 2010). Many participants found it evocative, despite also remarking on its being clichéd. From the perspective of terror management theory (Solomon et al., 1991), the evocation of an animal, rather than humans, may function to reduce the connection between humans and nature in the face of a threat to one's mortality. Viewing oneself as distinct from nature serves an important existential function because it allows for the denial of one's connection to nature—mortality (Vess & Arndt, 2008). Another explanation for its salience may be derived from its metaphorical power in expressing the experience of loss ('clinging to something not there'). In this sense, the

⁷At the time of the workshops, Senator Bob Brown was leader of the Australian Greens Party.

image may 'concretise the abstract'. Similar explanations might be provided for the wind farms and solar panels. Culturally cultivated landscapes affirm the symbolic distinction between humans and the rest of nature and are preferred when we are reminded of our mortality—images of wild nature are rated more negatively than cultivated landscapes, for instance (Koole & Van den Berg, 2005). However, the positive valence of vegetation imagery in Study 1 suggests that exploring the dimensions of landscapes and flora, and interactions with climate change response seems warranted, particularly as measures of connectedness to the natural world have shown strong associations with opinions on climate change (Price, Walker, & Boschetti, 2014).

Retreating glaciers and melting ice, among the most frequently chosen images in the workshops, are also iconic media representations of climate change. A possible problem with these images—and images of the environment in general—is that they may act to deny moral agency and therefore the moral relevance of the victims of climate change (Bandura, 1990). If the victims of climate change are other animals, not humans, it lies outside of our 'moral community' (Opatow & Weiss, 2000). As well as being socially remote, Doyle (2007) considered such imagery problematic because it represents, temporally, the already seen effects of climate change. But the obvious mock-ups of the flooded Sydney Opera House and an impossible tidal wave threatening high rises on a beach were also popular selections. These images are a sign of things to come, rather than what has been, and suggest that imagined futures are also influential in making sense of climate change, an indication that distancing and abstraction might serve an adaptive function. Several images of the already seen effects of climate change that had particular resonance (and personal relevance for many) were images of local, spatially close, natural disasters, such as the Victorian bushfires. Perhaps it is these localised impacts that become the known anchor point (based on our prior knowledge) from which representations of future impacts are formed (Moscovici, 1988).

Natural disasters such as bushfires and floods were frequently selected both in the image-elicitation task and in the workshops. For many participants, these had personal relevance, often because they knew someone who had directly experienced them. In this sense, these impacts are activating enough to capture attention (such as communication about switching your lights off perhaps *doesn't*),⁸ and if not directly personal, are vicariously personal. It is this 'vicarious emotional reaction', mediated by perceived similarity with victims, that is bypassed in Bandura's conception of dehumanisation and moral disengagement (Bandura, 1990). Designing communication that has direct or vicarious personal relevance (at both an individual and social level) may help promote more active engagement in climate change issues as it may prevent moral disengagement.

Numerous references to 'people' were made during discussions about missing images (although images that *did* contain people were rarely selected). But again, distancing elements were evident in these discussions. For example, when discussing possible impacts on animals, it was noted how this

would impact on *future generations* of people. Similarly, representing the 'other side of the argument' (deniers) removes the focus (and perhaps the responsibility to act) from the individual who accepts climate change. And food riots were talked about as future events in foreign lands. These discussions reflect Smith and Joffe's (2012) thematic dyad of self/other, whereby psychological distance is achieved through 'othering': 'the othering distanced the threat by locating it *out there*' (p. 23, italics added).

Links with Prior Research and Future Research Directions

The current study both supports and contradicts findings from previous research. O'Neill et al. (2013), in investigating climate change imagery commonly used by the media, identified five themes of perceived saliency: climate change impacts, climate pollution, scientific evidence, identifiable people, and climate and religion. In the current study, the images most commonly associated with climate change by members of the Australian public centred on climate impacts (62% of associations). The emotional responses to different *types* of climate change impacts were varied however. Three affective clusters of climate change impact imagery emerged: (i) disasters and extremes, which prompted alarm, anger, and fear (flooding, submerged islands, bushfire, tidal waves, and coastal erosion); (ii) ice and icons, which prompted upset and frustration (polar bear, collapsing ice shelf, polar cap, and cold weather); and (iii) drought and denuded landscapes, which prompted upset and misery (parched earth, extreme heat, drying dam, and dried river bed). Hence, unlike the O'Neill et al. findings, climate change impact images were generally identified as promoting negative yet *motivating* or *arousing* emotions rather than undermining self-efficacy. By providing participants with the option to identify a range of emotional responses, the present study arguably uncovered subtle yet important nuances between different types of climate change impacts (for a more detailed comparison between the themes emerging from the two studies, see Table S4 in Supporting Information).

Two additional affective clusters were identified in the current study in addition to the three climate impact clusters: (iv) climate pollution, which prompted frustration, upset, and misery (smoke stacks, coal-powered station, car pollution, and coal mining); and (v) climate leadership and solutions, which prompted excitement, enthusiasm, and happiness (wind farm, solar panel, Al Gore, and recycling). The affective qualities of the former cluster suggests the constant coupling of climate change in the media with imagery of belching smoke stacks risks perpetuating the notion that, as individuals, we are up against it to effect meaningful change. Further, the imagery content in this cluster might reinforce a tendency to morally distance climate change responses: that those responsible for climate change in the first place are big industry, not 'us'. This combination of moral and affective distancing (feelings of misery, for instance) might work in tandem to allow the individual to morally disengage from climate change. The images in the latter cluster were unified by the positive emotional responses they promoted, suggesting possible pathways for promoting positive associations (although such pathways should be mindful of triggering politically polarising associations; Hart & Nisbet, 2011).

⁸See Lowe (2006) for a discussion of how seemingly trivial everyday solutions to climate change can reduce engagement rather than promote it.

Another distinguishing feature of the current study was the lack of climate change associations connected to science imagery. Although scientific evidence was ranked as salient in the O'Neill et al. (2013) study, scientific images were mostly absent from the Australian publics' image associations, perhaps signalling an inability to concretely imagine scientific phenomena.⁹ This absence corroborates findings that individual perceptions of climate change are informed more by personal experiences, values, and worldviews than they are by science (Dessai et al., 2004).

Much of the content of the workshop discussions suggested an element of dissonant or dilemmatic thinking within individuals, supporting the Spence et al. (2012) finding that climate change is at once both distant and close. Consider the following statement by one participant: 'This is happening already and we are powerless to stop it. A friend of mine was affected by the fires in Victoria'. The personal relevance and immediacy of climate change is acknowledged, but it is coupled with feelings of powerlessness. On the one hand, there is a motivation to hold climate change at arm's length, yet there is a countervailing force imposing the personal and immediate aspects of climate change and the implications these have on people's moral responses. Whether immediacy and personal relevance spur this person to take action, or whether powerlessness means she cannot see the point of acting, is difficult to determine. How this tension is managed might best be established at the level of the individual, with more in-depth methods than small-group discussions, perhaps through the individual interviews.

Limitations

The differences in findings between the two studies, most notably the absence of drought in Study 2, might well stem from the limitations imposed by our methodologically plural approach, which had several limitations. First, the task in Study 1 arguably engaged a more deliberative, cognitive process. Presenting people with imagery (as we did in Study 2) engages experiential processes, and shapes emotional responses (O'Neill et al., 2013; Leiserowitz, 2006). As such, differences in the automaticity of responses between the two tasks might account for the differences in content. Second, participants in all workshops were from Perth, rather than the whole of Australia as in the word-elicitation task, arguably contributing to inconsistency of content. It should be noted, however, that Perth and surrounds have suffered as much as many regions in Australia from extended periods of severe drought, culminating in persistent potable water shortages in the metropolitan region and crop failures in the surrounding wheat-belt area (Bates & Hughes, 2009). As such, it is arguable that drought-related images should be just as topical and salient, if not more so, to residents of Perth than to other Australian communities. Third, the workshop participants, although roughly representative in age and gender, should not be thought of as a truly representative subset of the Australian population, and may have been non-representative in regard to

⁹Interestingly, the polar cap image was seen by some as a proxy for climate science, and graphs and charts were noted as 'missing' images. But the images used to represent science (such as a chart indicating weather variability) were rarely chosen.

their opinions on the causes of climate change. Finally, although solutions to the impacts and causes of climate change were rated positively, subsequent discussions with participants suggested these were sometimes outcomes of explicit, cognitive processes, rather than implicit emotional responses. Although revealing, these admissions suggest more controlled measures are necessary. Future investigations employing methods such as the implicit association test (Greenwald, McGhee, & Schwartz, 1998) to explore the differences between implicit and explicit representations, using the same participants, would circumvent many of these problems.

Another limitation of the present research is the assumption that the associations tested in Study 2 indicate consensual meaning. Images associated with climate change varied appreciably (nearly all of the 82 images were selected by at least one participant), suggesting that implicit associations may not be consensual but may reflect individual understandings and levels of construal. Future research might assess not only how and why these representations differ from person to person but also how they differ within people; that is, how do representations change over time and situation?

The directionality of influence between media representations and social representations is another area ripe for further research. Do media reflect people's understanding of climate change, or do media dictate our level of construal, thus biasing expectations of the likely outcomes? Priming different levels of psychological distance and assessing subsequent perceptions of threat might unpack the question of causality and elucidate understanding on the implicit defensive functions of distancing.

Finally, the results surrounding drought and denuded landscapes present something of a contradiction: On the one hand, it is spatially and socially close for an Australian audience, yet affectively distant and de-motivating. Future research might investigate this paradox by testing whether implicit and affective responses to drought and denuded landscapes are similar for people in the Northern Hemisphere. Such research might also investigate whether drought is conceptualised alongside climatic processes rather than with other event-based climate impacts.

CONCLUSION

The traditional argument against the use of conventional climate change imagery is that it is disempowering and depressing. As such, there has been a concerted effort to 'move beyond' polar bears and develop a more creative, personally meaningful, and powerful set of imagery (Manzo, 2010). The results from ratings on the emotions circumplex, however, suggest that some of the imagery most associated with climate change produces higher levels of arousal than this argument suggests, and that the emotional states they produce are often psychologically close (anger and fear) rather than psychologically distancing (depression and withdrawal). The present research suggests that the impacts associated with climate change should not be thought of as a homogenous, disempowering group of representations. Instead, different subsets of impacts tend to coalesce with different levels of

arousal, or affective distance, and negative associations might not always de-motivate.

The results here suggest we lack a coherent positive narrative about climate change. For as long as this remains the case, we can expect people to employ a host of defensive functions (including psychological distancing) to protect from overwhelmingly negative, and often de-motivating, associations. The lack of positive associations might also promote climate change scepticism, as people search their prior knowledge selectively for associations that are less troubling, or less threatening to the self. Concerted efforts to frame the impacts of climate change in personally meaningful and beneficial ways—such as focussing on impacts specific to the nation or locale, and the social benefits of collective response—may be an effective means to communicate climate change in a way that avoids disempowerment. This last task will be difficult given that climate change is not, for the most part, implicitly associated with positive outcomes. Constant coupling of climate change with the positive corollaries of action will be required over the long term. Promoting a narrative that provides people with the opportunity to discuss a range of response options to deal with the negative impacts of climate change might uncover some unexpected and heretofore unconsidered positive outcomes.

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Supporting information

Additional supporting information may be found in the online version of this article at publisher's web-site.

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