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My country or my planet? Exploring the influence of multiple place attachments and ideological beliefs upon climate change attitudes and opinions

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ABSTRACT

Research on people-place relations, specifically place attachment and place identity, is beginning to make an important contribution to understanding human responses to climate change. However, to date there has been a dearth of research on how place attachments at multiple scales, particularly the global, and individual level ideological beliefs combine to influence climate change attitudes and opinions. To address these gaps, survey data was collected from a representative sample of Australian citizens ($N = 1147$), capturing attachments at neighbourhood, city/town, state/territory, country and global scales, as well as a range of climate change belief and individual difference measures. Results show the importance of the interplay between national and global place attachments. Individuals expressing stronger global than national attachments were more likely to attribute climate change to anthropogenic causes, to oppose hierarchy-enhancing myths that legitimize climate inaction, and to perceive positive economic impacts arising from climate change responses, in comparison to individuals indicating stronger national over global place attachments. Individuals with stronger global than national attachments were more likely to be female, younger, and self-identify as having no religion, to be more likely to vote Green and to be characterized by significantly lower levels of right wing authoritarian and social dominance beliefs. Right wing authoritarian and social dominance beliefs mediated the effects of place attachments upon climate change skepticism. Explanations for the findings and implications for future research are discussed.

1. Introduction

Understanding public engagement with climate change has become increasingly important, against a backdrop of compelling scientific evidence of changes to the earth's climate arising from human activities (IPCC, 2013). Geographers (e.g. Hulme, 2008) have argued that climate change should be conceived as a situated phenomenon, implicating relationships between people and places, rather than a decontextualized system of abstract knowledge. A prevalent 'localist' discourse presumes that individuals value only what is spatially and temporally immediate, manifest in the literature on sustainable development (e.g. Meadows et al., 1972, cited in Barr, 2008), sustainable communities (e.g. Bridger and Luloff, 1999) and public engagement with climate change (e.g. Lorenzoni et al., 2007; Hulme, 2008; Milfont, 2010). But is the global necessarily 'distanced and un-situated relative to an individuals' mental world' (Hulme, 2008, 8)?

Heise (2008) claimed that to effectively respond to climate change, we need a 'sense of planet' as much as a 'sense of place'. Jasanoff (2010) argued that ideas of belonging and stewardship can develop on a planetary scale. Such critiques of localism, which entwine human responses to climate change with concepts of place, identity and scale, matter because '*the spatial resolutions at which social processes . . . are perceived to take place, have significant implications for understanding our world*' (Herod, 2011, xiv).

Two decades ago, Feitelson (1991) proposed that global place attachment is significant for public engagement with climate change and concluded that the interplay between national and global place attachments would be critical in influencing public responses. Despite his conclusion that '*the evidence on this topic is mostly anecdotal, and more systemic work is badly needed*' (1991, 405), these issues remain neglected (Devine-Wright, 2013). Many questions are yet to be systematically addressed: can individuals form relations of belonging and stewardship to the whole Earth,

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and not just to the neighbourhood or city where they live? Under what situations? With what consequences? Could public engagement with climate change (defined broadly in terms of cognitive, affective and behavioural aspects, Lorenzoni et al., 2007) arise from global as well as local concerns? This study begins to address these gaps.

2. People-place relations and climate change

Agnew (1987) defined place as comprising three elements: a fixed coordinate or location, a social milieu, and sense of place – an emotional bond connecting individuals to that place. Research on sense of place was led by humanist geographers (e.g. Tuan, 1977) and developed by environmental psychologists who proposed concepts of *place identity* (Proshansky et al., 1983) and *place attachment* (Altman and Low, 1992) to describe the identity-related and emotional aspects of people-place relations. Place attachments and identities influence how climate risks are perceived and responded to (Burley et al., 2007; Harries and Penning-Rowsell, 2011). For example, place attachment was negatively associated with willingness to relocate to another area (Marshall et al., 2007), and with capacity to transform practices in order to adapt to climate change (Marshall et al., 2012). Place attachments underpin 'NIMBY' (Not In My Back Yard) objections to renewable energy projects (Devine-Wright, 2009) and case studies of offshore wind energy (Devine-Wright and Howes, 2010), wave and tidal energy (McLachlan, 2009; Devine-Wright, 2011a,b), nuclear power (Venables et al., 2012) and power lines (Devine-Wright, 2013) have indicated that community acceptance is undermined when technologies are perceived to threaten the distinctive character of a place. Finally, place attachments are relevant for the communication of climate risks. Scannell and Gifford (2013) studied the impact of spatial framings ('local' and 'global) and place attachment upon climate change engagement; regression analysis showed that place attachment was the strongest predictor.

2.1. Place, scale and climate change: from local to global

Although these studies provide strong evidence for the relevance of people-place relations for climate adaptation, mitigation and risk communication, they are limited by a 'localist' focus upon the places nearby to where participants live, with the presumption that these are the only places that people value and form relations of belonging with. However, individuals may feel alienated from local places (Lewicka, 2011a,b) and form relations of belonging to places at more distal scales, including the planet itself: '*At one extreme a favourite armchair is a place, at the other extreme the whole earth*' (Tuan, 1977, 149). That global scale people-place relations may inform understanding of climate change was first suggested by Feitelson (1991), who proposed that climate responses would be fostered by strengthened place attachments at the global level and attenuated attachments at the national level. Yet we know surprisingly little about the extent to which individuals form relations of belonging to the whole Earth, not just to the neighbourhood or city where they live; nor is it clear to what extent multiple forms of belonging are complementary or contradictory (Devine-Wright, 2013).

There is some evidence that global identities are relevant to public engagement with climate change. Qualitative analysis of the Copenhagen climate change negotiations concluded that the emergence of a superordinate international identity would foster coordination amongst nation states (Batahla and Reynolds, 2012). At the individual level, Katzarska-Miller et al. (2012) drew on survey data from three countries to find positive, significant correlations between global identity and concern for global warming (US = .20; Bulgaria = .40; India = .36). Qualitative analysis of data from an open-ended question revealed a range of meanings associated with global identity, including tolerance, connection to others, travel, freedom and rejection of the nation state. With the exception of tolerance, the prevalence of each theme varied significantly across the countries, and rejection of the nation state was most commonly expressed by US participants. This is supported by quantitative analyses from the same survey, which found a significant, negative correlation between national and global identities for US respondents, but significant, positive correlations for Bulgarian and Indian respondents.

Running (2013) investigated four forms of self-identification (as 'global citizen', 'national citizen', 'local community member' and 'autonomous individual') and their relation to the perceived seriousness of climate change, using data from the World Values survey with respondents from fifty seven countries (n = 40,330). 80% of respondents ascribed the label 'global citizen' to themselves. Logistic regression analysis indicated that only a combined global citizen/autonomous individual variable was significant in predicting the perceived seriousness of climate change, controlling for personal characteristics; identification with each level in isolation was non-significant.

These disparate studies provide some evidence that relationships with places at multiple scales are relevant for understanding climate change opinions. Whether global and national identities are complementary or contradictory seems to be context specific, and likely to be influenced by the ways in which globalization and the nation state are socially represented in different milieux. This conclusion is supported by qualitative studies investigating the politics of climate change. Hovden and Lindseth (2004) investigated how different framings of climate change were mobilized, contested and evolved over time in Norwegian policy making during the 1990s. They identified two prevalent discourses – 'national interest' and 'thinking global' – reflecting different positions taken on the relationship between actions within and without national borders to reduce carbon emissions. Kurz et al.'s (2010) analysis of political speeches during the 2007 Australian election campaign revealed discourses of the 'national interest' and 'preserving our lifestyle'. In both these studies, climate change responses were emplaced at multiple scales, predominantly the national, and what was argued over was whether the continued exploitation of indigenous fossil-fuels for economic benefit could be considered compatible with a responsible position on climate change. They indicate how discourses of the global – regardless of whether explicitly related to climate change – are often framed in terms of negative impacts upon national interests (see also Snider et al., 2013), in particular reducing economic growth, employment and standards of living.

Several tentative conclusions may be drawn: (1) that individuals can form attachments at the global level; (2) that attachment and identification at both national and global scales are influential in shaping individual opinions and collective responses to climate change; (3) whether climate change responses, typically framed in terms of national (typically economic) interests, are argued to be complementary or contradictory with supra-national (i.e. global) or sub-national (i.e. community or individual) levels varies by context. Yet a number of weaknesses in these studies can be identified.

First, the potential relevance of place attachments and identities at local and regional as well as national and global scales for climate change beliefs and opinions has yet to be investigated in a single study. Second, climate change opinions have been narrowly researched in these studies in terms of perceived seriousness or concern, neglecting issues such as attributions of causality (anthropogenic vs. natural), perceived risks and impacts. Third, survey research has relied upon

opportunistic sampling whereas representative sampling would provide a firmer evidence base from which to generate conclusions and potential policy implications.

More broadly, attempts to relate national or global place attachments and identities with public engagement with climate change must take account of societal and psychological processes that give rise to human-environment relationships. Past research has typically examined the influence of socio-demographic, social and physical environment variables on (local) place attachments (Lewicka, 2011a,b). It is arguable that researching national or global attachments requires going beyond a characterization of the 'social' purely in terms of community ties, social capital or collective efficacy (Bonaiuto et al., 1999; Brown et al., 2004; Lewicka, 2005). Research should investigate the extent to which individuals endorse prevailing social systems that are environmentally unjust since these have broad environmental implications (Feygina, 2013), and can determine responses to climate change (Feygina et al., 2010).

Research has shown that individuals' acceptance of inequality and social change is linked to political ideology (Jost et al., 2003), which has clear relationships with climate change beliefs (Leiserowitz et al., 2011; Leviston and Walker, 2012). The preferences underpinning political orientation are encapsulated in the constructs of: right-wing authoritarianism (RWA; Altemeyer, 1988), which describes acceptance of conventional modes of authoritarian submission and aggression; and social dominance orientation (SDO; Sidanius and Pratto, 1999), described as an inclination towards hierarchical inter-group relations (Jost et al., 2003). People high in RWA are typified as valuing traditional beliefs, morality, and lifestyles, while those low in RWA value change and innovation. People high in SDO advocate the right of more powerful groups to dominate weaker groups, supporting systematically inequitable distribution of resources (cultural, financial, or environmental). They tend to oppose environmental conservation, and assume nationalistic perspectives (Pratto et al., 1994). These elements of ideological orientation shape risk perceptions by differentially directing attention to specific types of hazards, and have been linked to concern about climate change (Choma et al., 2013).

Ideological orientations concerned with inequality and social change also shape public discourse on contentious issues. According to Social Dominance Theory (Sidanius and Pratto, 2012), group-based inequalities are maintained or challenged by 'legitimizing myths'. These can be 'hierarchy-enhancing' or 'hierarchy-attenuating'. Hierarchy-enhancing myths involve moral and intellectual justifications of pre-existing inequalities, while hierarchy-attenuating myths *challenge* existing social structures and promote equality and democracy; the latter are concerned with how people and institutions *should* behave and the former with how people and institutions *do* behave (Sidanius and Pratto, 2012). There is a constant tension between these two kinds of myths that keeps systems relatively stable, and ultimately determines the amount of hierarchy within a society. These myths are forms of ideological justifications that are commonplace in social discourse – they are sense-making mechanisms to explain why things are as they are, serving to satisfy people's drive to think the world is just and fair, and increasing satisfaction with one's own situation and life circumstances (Lerner, 1980).

To our knowledge, no studies have been conducted that examine how individual differences in ideology or legitimizing myths relate to place attachments or identities at any scale; nor has research investigated how these factors might interact to shape climate change beliefs. The current study seeks to address these gaps. Three research questions were posed:

(1) To what extent do individuals feel attached to places at multiple scales, from the neighbourhood to the whole Earth? More specifically, what is the relationship between place attachments (used as a label for the remainder of this paper to encompass attachment bonds and place-related identities, cf. Manzo and Devine-Wright, 2013) at neighbourhood, city, state, country and global scales?
(2) In what ways do multiple place attachments relate to climate change beliefs, specifically perceived causes, legitimizing myths and perceived economic impacts of climate action?
(3) How do individuals' personal characteristics relate to their place attachments at different spatial scales? More specifically, are ideological orientations regarding right wing authoritarianism and social dominance related to strong global attachment? Additionally, can relationships between place attachments and climate change beliefs be accounted for, or mediated by, SDO and RWA?

3. Method

An online survey was administered to 1147 people across metropolitan, regional, and rural Australia in March 2013. Respondents were drawn from an internet research panel of 300,000 individuals and randomly assigned to one of the two survey conditions. A split-sample design was used since each survey also contained an experimental manipulation towards the end of the survey (after the place attachment and individual difference items, and before questions about climate change attitudes), designed to measure unrelated research questions. The manipulation in the first survey condition comprised an additional sentence indicating levels of consensus in anthropogenic climate change in either scientific or community circles (plus a control where no information was given). The manipulation in the second survey condition consisted of a piece of text about anthropogenic climate change from either a left-wing information source or right-wing information source (plus a control where no information was given). Subsequent analyses determined that these manipulations had no significant effect on stated climate change attitudes, therefore, for questions that were common to both survey conditions, the two samples were combined.

The whole sample was asked the same questions about socio-demographics, place attachments and climate change attitudes. In addition to these common questions, respondents in sample 1 were asked additional questions about social dominance orientation and right-wing authoritarianism, whereas respondents in sample 2 were asked additional questions about specific climate change attitudes such as levels of concern, perceived seriousness of the threat, perceived risk and perceived impacts. Questions about individuals' social psychological characteristics and place attachment were asked prior to questions about climate change beliefs, to minimize the potential for priming effects. Demographic characteristics of survey respondents are presented in Table 1.

3.1. Materials

3.1.1. Whole sample

3.1.1.1. Place attachment. Place attachment was measured using a similar form of wording to Gustafson (2009). Participants were asked: *'To what extent do you feel a weak or a strong sense of belonging to the following areas?'* with responses focusing upon 'The neighbourhood where you live', 'The city where you live' (if relevant), 'The state or territory where you live', and 'Australia'. In this study, a further option was presented to add a global level of belonging: 'The Earth/The whole world'. Response options varied from 1 (No sense of belonging) to 5 (Very strong sense of belonging).

Table 1
Demographic characteristics of participants.

Demographic	Category	Sample 1 (n = 576)	Sample 2 (n = 571)	Whole sample (N = 1147)
Age	18–24	4.7%	7.9%	4.6%
	25–34	16.3%	16.3%	18.0%
	35–44	21.4%	22.2%	21.8%
	45–54	20.0%	18.0%	19.0%
	55–64	12.2%	10.9%	11.5%
	65–74	18.2%	16.8%	17.5%
	75–84	6.3%	6.1%	6.2%
	>85	1.0%	1.8%	1.4%
Gender	Male	43.1%	43.6%	43.3%
	Female	56.9%	56.4%	56.7%
Location	Capital city	61.9%	64.4%	63.2%
	Regional town	28.4%	27.0%	27.7%
	Rural area	9.7%	8.6%	9.2%

3.1.1.2. Climate change belief type. Opinions about the existence and causes of climate change were assessed with the question: *Which of the following statements best describes your thoughts on climate change?* In response, participants 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*; *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' (that is, non-human-induced) climate change, and human-induced, or 'anthropogenic', climate change. These statements are referred to as *deny*, *don't know*, *natural*, and *human-induced* for the remainder of the article. This question framing has been demonstrated to have better predictive validity than other similar measures of opinion in relation to five criterion variables commonly used in the climate change literature, including pro-environmental behaviour (Greenhill et al., 2013).

3.1.2. Sample 1

3.1.2.1. Anthropogenic causes of climate change. Beliefs in the anthropogenic causes of climate change were assessed using two continuous measures. Participants were asked to respond to the following items on a sliding measure of 0–100: "*By moving the cursor on the slide, how much do you think human activity contributes to climate change, as a percentage of overall climate change?* and "*Move the cursor to the place on the slide which best represents how sure you are that humans contribute to climate change*".

3.1.2.2. Legitimizing myths. Eight statements were developed to measure respondents' legitimizing myths about the potential impacts of responding to climate change. These statements were developed by drawing on the results of discursive analyses of how climate change is discussed in community and political spheres in Australia (Glasson, 2011; Kurz et al., 2010). Five 'hierarchy-attenuating' statements concerned potential positive outcomes associated with responding to climate change, and three 'hierarchy-enhancing' statements concerned potential negative outcomes associated with responding to climate change. Responses were measured on 5-point Likert scales from 1 (Strongly disagree) to 5 (Strongly agree).

A maximum likelihood factor analysis with direct oblimin rotation was performed on the eight items, using SPSS version 21. This revealed the presence of two factors with eigenvalues exceeding 1, explaining 53.5% and 17.1% of the variance. The rotated solution revealed the presence of a simple structure, with both components showing a number of strong loadings and all variables loading substantially on only one component. Five items representing hierarchy-attenuating myths used to legitimize climate action loaded on component one (*Doing something about climate change is an opportunity to be part of something bigger than ourselves*; *The challenge of climate change will provide people with a sense of purpose*; *Climate change will foster greater community spirit and connectedness*; *Climate change may mean that wealth and resources end up being distributed more fairly*). Reliability analysis revealed that these items have good internal consistency (Cronbach alpha = 89). The sum of the items was averaged to create a Hierarchy-attenuating myth score. Three items representing hierarchy-enhancing myths that legitimize climate inaction loaded on component two (*Trying to do something about climate change will mean a lot of people lose their jobs*; *Responding to climate change will cost Australia a lot of money*; *There's nothing Australia can do about climate change that will make a meaningful difference*). Reliability analysis revealed that these items have adequate internal consistency (Cronbach alpha = 78). The sum of these items was averaged to create a Hierarchy-attenuating myth score.

3.1.2.3. Right-wing authoritarianism. Right-wing authoritarianism was measured by 18 items based on Duckitt et al.'s (2010) short-form Authoritarianism-Conservatism-Traditionalism measurement scale (e.g. *Our country will be great if we show respect for authority and obey our leaders*). Responses were measured on 5-point Likert scales from 1 (Strongly disagree) to 5 (Strongly agree) (alpha = .87).

3.1.2.4. Social dominance orientation. Social dominance orientation was measured by eight items based on Pratto, Sidanius, Stallworth and Malle's (1994) social dominance orientation measurement scale (e.g. *Some groups of people are simply inferior to others*). Respondents were asked whether they had a positive or negative feeling towards each statement. Responses were measured on 7-point Likert scales from 1 (Very negative) to 7 (Very positive) (alpha = .86).

3.1.3. Sample 2

3.1.3.1. Perceived economic impacts. Perceived economic impacts of climate change were assessed through a nominal measure. Participants were asked to select one of the five options that best matched their view in response to the following question: "*What do you think would be the economic impact on Australia of making significant reductions in greenhouse gas emissions, as part of global action involving all major countries?*" The options provided were as follows: "Reducing Australian greenhouse gas emissions would: (1) cause our living standards to fall from today's level; (2) slow the

improvement in our living standards while the economy adjusts; (3) have no noticeable effect on our living standards; (4) improve our living standards in the long run, or protect them from future threats; and (5) not sure/don't know".

4. Results

The following analyses investigate the interplay between place attachment at different spatial scales and social psychological characteristics in shaping individual's opinions about climate change causation and climate change action.

4.1. To what extent do individuals feel attached to places at multiple scales?

To assess the extent of place attachment at multiple spatial scales, and relationships between different place attachments, a range of analyses were conducted. Using the whole sample, descriptive statistics were computed that indicated mean levels above the mid-point (3) for place attachment at each scale. Overall, national attachment was strongest ($M = 4.14$, $SD = 1.0$) and neighbourhood attachment weakest ($M = 3.65$; $SD = 1.10$) (Table 2).

To examine inter-relations amongst place attachments, bivariate correlations were computed. Positive correlations were observed, suggesting complementary rather than contradictory relations (Table 2). The strength of associations was moderate to strong overall, suggesting an effect of proximity, with global scale place attachment most strongly correlated with national attachment, and least strongly correlated with neighbourhood attachment.

4.2. To what extent do different scales of place attachment relate to climate change opinions?

4.2.1. Place attachment and climate change belief type

Further analyses were performed to establish whether people with different types of climate change beliefs differed in their levels of place attachment at multiple spatial scales. Using the whole sample, a mixed between within groups analysis of variance was conducted to assess the impact of climate change belief type, as an independent variable, on levels of place attachment at different spatial scales as dependent variables. There was a moderate significant main effect for place attachments, $F(4, 1055) = 17.52$, $p < .0005$, Wilks lambda = .94, partial eta square = .06, with significantly higher levels of attachment recorded at the national scale compared to all other scales (estimated marginal means for place attachment at: *Neighbourhood* ($M = 3.64$, Std error = .05, 95% CI = 3.53–3.73); *City* (M = 3.68, std error = .05, 95% CI = 3.58–3.78); *State* ($M = 3.69$, std error = .05, 95% CI = 3.58–3.79); *Australia* ($M = 3.99$, std error = .05, 95% CI = 3.90–4.09); *Earth* ($M = 3.74$, std error = .05, 95% CI = 3.63–3.84)). The main effect comparing climate change belief types on the transformed average of place attachments at different scales was not significant: $F(3, 1058) = 2.35$, $p = .07$. There was a small significant interaction between climate change belief type and place attachments, $F(12, 2791) = 3.74$, $p < .0005$, Wilks lambda = .96, partial eta square = .014.

Analyses of simple effects using one-way ANOVAs, with a Bonferroni adjusted alpha of .01, revealed significant differences between the climate change belief types and attachment at the national scale, $F(3, 1058) = 5.06$, $p = .002$, eta squared = .01; and global scale, $F(3, 1058) = 7.47$, $p < .0005$, eta squared = .02, only. Post hoc comparisons using Tukey's HSD revealed that those who believe that climate change is happening and human induced recorded significantly ($p < .05$) higher levels of attachment at the global scale compared to all other belief types; whereas, those who believe that climate change is happening but just a natural fluctuation in earth's temperatures recorded significantly ($p < .05$) higher attachment at the national level compared to those who deny climate change and those who are uncertain (Table 3). These analyses indicate that those who believe in anthropogenic climate change have an inverse pattern of attachments to those who deny climate change, demonstrating relatively weak attachment at proximal local scales and relatively strong attachment at the global scale (Fig. 1).

Based upon these analyses, particularly the interplay between national and global place attachments with perceived causality of climate change, two new variables were computed. Place attachment scores at the national scale were subtracted from scores at the global scale for each individual to create a continuous variable of global relative to national place attachment. Positive scores represent a greater sense of attachment at the global level and negative scores represent greater attachment at the national level. A categorical variable with three levels was then created from the continuous variable of global relative to national place attachment: (1) those for whom global place attachment was stronger than national (the 'Planet First' subgroup, $n = 117$); (2) those from whom national belonging was the same as global (the

Table 2
Descriptive data and bivariate correlations for multiple place attachments.

	Mean *SD* *N*	Neighbourhood	City	Territory/State	National/Australia	Global/Earth
Neighbourhood	3.65 (1.10) 1107	1	.75**	.56**	.41**	.29**
City/town	3.69 (1.04) 1114		1	.74**	.51**	.36**
State/territory	3.72 (1.06) 1111			1	.63**	.42**
National	4.14 (1.00) 1116				1	.57**
Global	3.89 (1.08) 1080					1

Table 3
Place attachment at different scales for climate change belief types.

Place attachments	Deny ($n = 51$)		Don't know ($n = 63$)		Natural ($n = 386$)		Human induced ($n = 562$)	
	Mean	*SE*	*Mean*	*SE*	*Mean*	*SE*	*Mean*	*SE*
Neighbourhood*	3.78	0.15	3.40	0.14	3.78	0.06	3.61	0.05
City	3.77	0.15	3.51	0.13	3.76	0.05	3.68	0.04
Territory	3.67	0.15	3.60	0.13	3.78	0.05	3.70	0.04
Nation**	3.77	0.14	3.84	0.13	4.21	0.05	4.15	0.04
Planet***	3.47	0.15	3.65	0.13	3.81	0.05	4.02	0.05

Groups statistically significantly different:
* <05,
** <005,
*** <.0005.

'Both equals' subgroup; $n = 675$) and (3) those for whom national belonging was stronger than global (the 'Country First' subgroup; $n = 285$).

4.2.2. Place attachment, anthropogenic causes of climate change, and legitimizing myths

To investigate whether place attachment sub-groups differed in a range of climate change opinions, further analyses were conducted. Using the data from sample 1, a one-way between-groups multivariate analysis of variance was conducted to assess the effect of place-attachment sub-group, as an independent variable, on four climate change opinions as dependent variables (i.e. certainty that climate change is anthropogenic, perceived extent of human contribution, hierarchy-attenuating myths legitimizing climate action, and hierarchy-enhancing myths legitimizing climate inaction). Multivariate outliers were excluded first based on critical values for Mahalanobis distances. There was a small statistically significant difference between the place attachment subgroups on the combined dependent variables, $F(8, 1046) = 3.78$, $p < .0005$, Wilks' lambda = .95, partial eta squared = .028.

When the results for the dependent variables were considered separately, small to moderate statistically significant differences were observed for all variables, using a Bonferroni adjusted alpha level of .017 (Table 4). More specifically, there was an effect for: *perceived human contribution to climate change*, $F(2,525) = 11.77$, $p < .0005$, partial eta squared = .043; *certainty that humans contribute to climate change*, $F(2,525) = 9.98$, $p < .0005$, partial eta squared = .037; *hierarchy attenuating myths legitimizing climate action*, $F(2,525) = 9.94$, $p < .0005$, partial eta squared = .036; *hierarchy enhancing myths legitimizing climate inaction*, $F(2,525) = 9.05$, $p < .0005$, partial eta squared = .033.

Post hoc tests using Tukey's HSD revealed that the 'Country First' subgroup, when compared to the other two groups, was significantly ($p < .005$) more likely to: rate the amount of human contribution to climate change as lower; be less certain that humans contribute to climate change; endorse hierarchy-enhancing myths that legitimize climate inaction; and oppose hierarchy-attenuating myths that legitimize climate action. The 'Country first' and 'Planet first' sub-groups demonstrated an inverse pattern of hierarchy-attenuating and hierarchy-enhancing myths (Fig. 2).

4.2.3. Place attachment and perceived economic impacts of climate change action

Further analyses were conducted to identify whether place attachment sub-groups differed in their perceptions of the economic impacts of national climate change action. Using sample 2 data, chi-square analysis revealed significant differences between the place attachment subgroups in terms of the frequency of perceived economic impacts of Australia making significant reductions in greenhouse gas emissions, $\chi^2(8, n = 536) = 17.79$, $p < .05$. Approximately 53.4% of the 'Planet First' subgroup believed that reductions in emissions would improve living

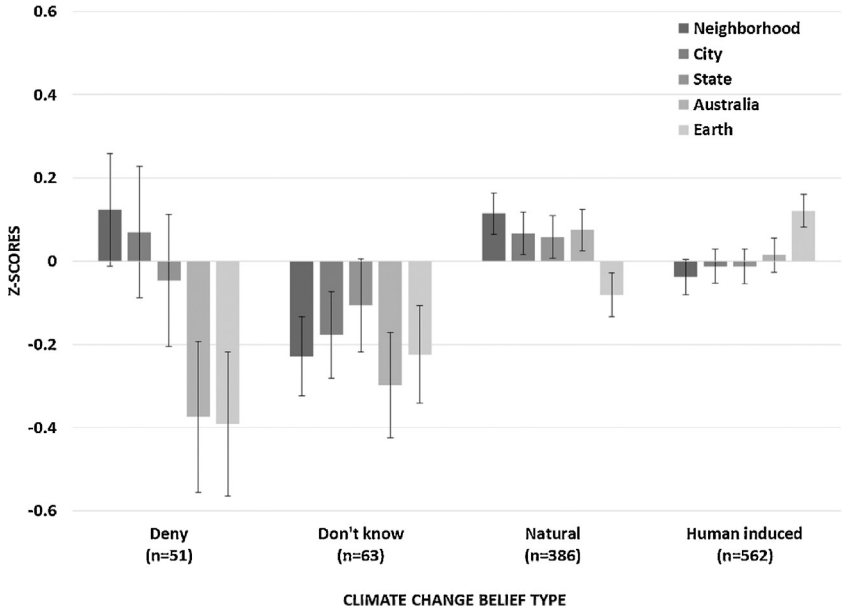

Fig. 1. Place attachment at different scales for climate change belief types: Mean *z*-scores (standardized so that: 0 = total sample mean; ±1 = 1 Standard deviation ≥ mean; −1 = 1 standard deviation ≤ mean) and standard errors.

Table 4
Climate change opinions of place attachment subgroups.

Climate change opinions		Planet First	Both equals	Country First	Total
Certainty anthropogenic*** (0–100%)	*N*	59	332	150	541
	Mean	75.29	68.48	59.98	66.86
	SD	24.32	25.94	28.50	26.89
	SE	3.17	1.42	2.33	1.16
Human contribution*** (0–100%)	*N*	59	332	150	541
	Mean	70.08	65.02	55.35	62.89
	SD	24.76	25.02	26.24	25.77
	SE	3.22	1.37	2.14	1.11
Hierarchy-attenuating myths*** (1–5)	*N*	59	332	150	541
	Mean	3.46	3.44	3.11	3.35
	SD	0.99	0.81	0.90	0.87
	SE	0.13	0.04	0.07	0.04
Hierarchy-enhancing myths*** (1–5)	*N*	59	332	150	541
	Mean	2.69	2.97	3.25	3.02
	SD	1.01	0.95	0.97	0.98
	SE	0.13	0.05	0.08	0.04

*** Groups statically significantly different at $p < 0005$.

standards in the long run compared to just 33.3% of 'Country First' subgroup (Fig. 3). This supports the previous finding that the 'Country First' subgroup is more likely to endorse hierarchy-enhancing myths that legitimize climate inaction, whilst opposing hierarchy-attenuating myths that legitimize climate action. Taken together, these results suggest that stronger attachment to the nation compared to planet is linked to opposition to action on climate change.

4.3. How do place attachments relate to individuals' personal and social-psychological characteristics?

A series of analyses were run to test for socio-demographic differences between place attachment subgroups (see Appendix A). A number of significant differences were found, although the effect sizes were either small or very small. Individuals in the 'Planet First' subgroup were more likely to be slightly younger, female, to state having no religion, vote for the Greens Party, and reside in capital cities, relative to the other groups. Those in the 'Country First' subgroup were more likely to be older, male, Christian, vote for the Conservative Liberal Party, and reside in rural areas, relative to the other groups.

In order to test whether the place attachment subgroups also differed in terms of individual differences in ideology, further analyses were conducted. A one-way between-groups multivariate analysis of variance was conducted to assess the effect of place-attachment sub-group on social dominance orientation and rightwing authoritarianism as dependent variables. Multivariate outliers were excluded first based on critical values for Mahalanobis distances. There was a small statistically significant difference between the place attachment subgroups on the combined dependent variables: $F(4, 1072) = 6.83$, $p < .0005$, Wilks' lambda = .95, partial eta squared = .025. When the results for the dependent variables were considered separately, small to moderate statistically significant differences were observed for both variables using a Bonferroni adjusted alpha level of .025: *SDO*, $F(2,539) = 5.81$, $p = .003$, partial eta squared = .021; and *RWA*, $F(2,539) = 9.05$, $p < .0005$, partial eta squared = .037. Post hoc tests using Tukey's HSD revealed that the 'Planet First' subgroup, when compared to the other two groups, had significantly ($p < .05$) lower

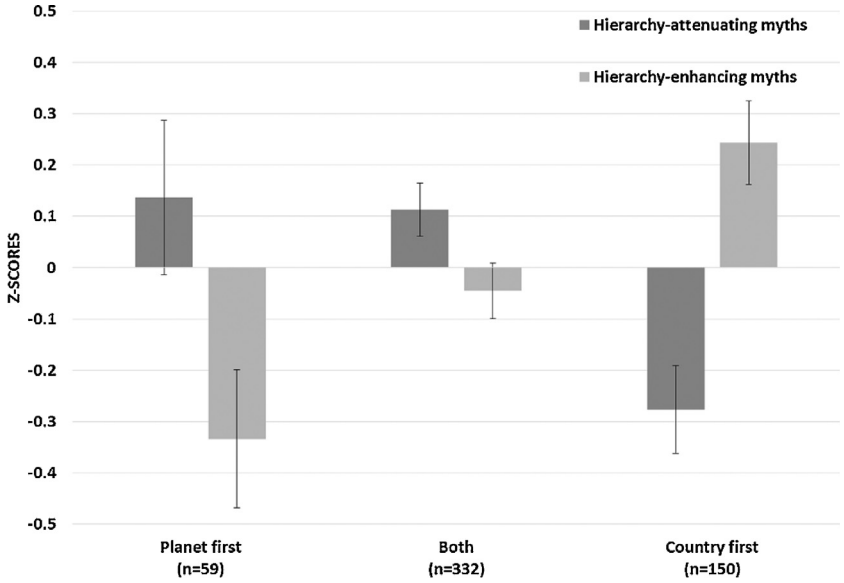

Fig. 2. Place attachment subgroups and legitimizing myths about climate change: Mean *z*-scores and standard errors.

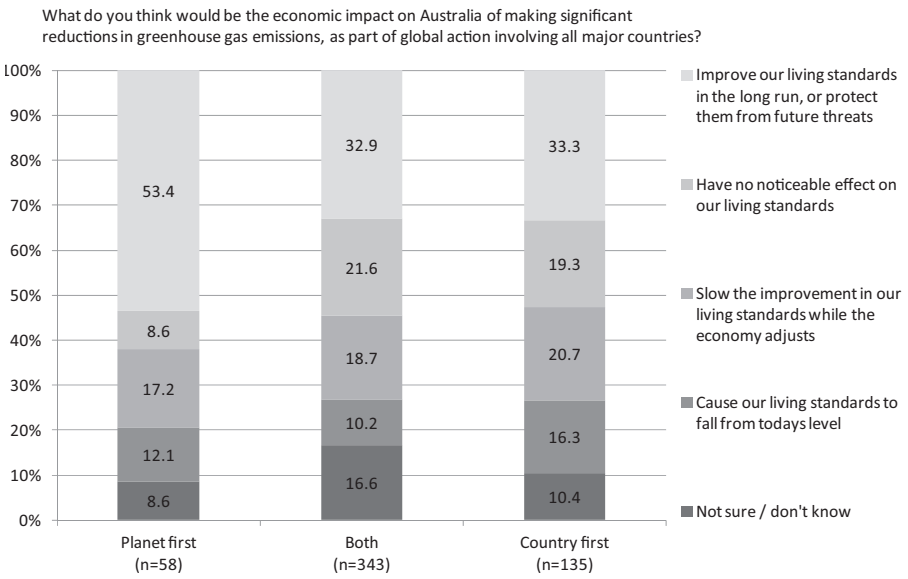

Fig. 3. Difference between place attachment subgroups and perceived economic impacts of climate change action.

levels of SDO and significantly ($p < .0005$) lower levels of RWA (Table 5).

4.3.1. Is the relationship between place attachment and belief in anthropogenic climate change mediated by SDO and RWA?

To test whether RWA and SDO mediated the relationship between global relative to national place attachment (as a continuous variable) and perceived human contribution to climate change, further analyses were conducted. The outcome variable used in this analysis is a combination of two indicators designed to measure people's assessment of the anthropogenic causes of climate change (i.e. certainty that climate change is anthropogenic and perceived extent of human contribution). The correlation between the two variables was .76 ($p < .0005$).

Multiple regression analyses were conducted to assess each component of the proposed mediation model. First, it was found that relative global place attachment was positively associated with acceptance of anthropogenic causes of climate change ($B = 4.71$, t (539) = 4.43, $p < .0001$). Second, relative global place attachment was negatively related to RWA ($B = -.11$, t (539) = −4.33, $p < .0001$) and SDO ($B = -.11$, t (539) = −2.21, $p = .03$). Third, results indicated that the mediators negatively associated with acceptance of anthropogenic causes of climate change (RWA: $B = -6.32$, t (539) = −3.66, $p = .0003$) (SDO: $B = -4.19$, t (539) = −4.44, $p < .0001$). Because both the a-path and b-path were significant, mediation analyses were tested using the bootstrapping method with bias-corrected confidence intervals (MacKinnon et al., 2004; Preacher and Hayes, 2004). The 95% confidence intervals of the indirect effects were obtained with 5000 bootstrap samples (Preacher and Hayes, 2008). Results of the mediation analysis confirmed the mediating roles of RWA and SDO in the relationship between relative global place attachment and acceptance of anthropogenic causes of climate change (RWA: $B = 1.14$; CI = .26–2.10) (SDO: $B = .43$; CI = .07–1.02). The results indicated that the direct effect of relative global place attachment on acceptance of anthropogenic causes of climate change remained significant ($B = 3.55$, t (539) = 3.40, $p = .001$) when controlling for RWA and SDO, suggesting partial mediation. Fig. 4 displays the results.

We followed the recommendations of Preacher and Hayes (2004), who suggest using a bootstrapping procedure to compute a confidence interval around the indirect effect (i.e., the path through the mediator). If zero falls outside this interval, mediation can be said to be present. We used the SPSS macros PROCESS that Preacher and Hayes provide for this procedure. In these analyses, relative global place attachment was the independent variable, anthropogenic causes of climate change was the dependent variable, and right-wing authoritarianism and social dominance orientation were the mediators.

The indirect effect via RWA was .71, the 95% confidence interval ranging from .25 to 1.46 ($SE = .30$). The indirect effect via SDO was .44, the 95% confidence interval ranging from .05 to 1.07 ($SE = .25$) The fact that zero falls outside these intervals indicates a

Table 5
Social dominance orientation and rightwing authoritarianism of place attachment subgroups: estimated marginal means.

		Planet First	Both equals	Country First
SDO	*Mean*	2.42	2.88	2.99
	SE	0.15	0.06	0.09
	95% CI	2.13–2.71	2.76–3.00	2.82–3.17
RWA	*Mean*	3.06	3.40	3.50
	SE	0.08	0.03	0.05
	95% CI	2.90–3.22	3.34–3.47	3.40–3.59

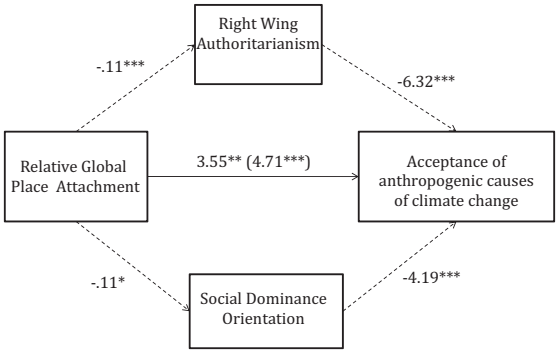

Fig. 4. Indirect effect of relative global place attachment on acceptance of anthropogenic climate change through right wing authoritarianism and social dominance orientation.

significant mediation effect, $p < .05$, $n = 541$. The direct effect of place attachment on perceived extent of anthropogenic climate change was also significant, $p = .001$, suggesting RWA and SDO partially mediate the relationship between relative global place attachment and beliefs about the human contribution to climate change.

5. Discussion

This study aimed to make a significant contribution to the literature on public engagement with climate change in two ways. First, it empirically investigated how climate change attitudes and opinions relate to place attachments at both nearby and distant scales. In doing so, it took up a neglected call for research on the relevance of global place attachments for climate change responses made two decades ago (Feitelson, 1991) and challenged a prevalent 'localist' perspective that presumes objects of value to be nearby rather than distant, an assumption of 'psychological distance' (Milfont, 2010). Second, it explored for the first time the relationship between place attachments and ideological beliefs, specifically right wing authoritarianism and social dominance orientation, and how these influence climate change attitudes and opinions.

The findings of this study suggest that global place attachment is prevalent amongst Australian adults, second only to national belonging, and significantly higher than attachment at the neighbourhood, city/town and state/territory scales. Taken together with recent research showing 80% ascription of the 'global citizenship' label (Running, 2013), the findings challenge the view that the global is '*distanced and un-situated relative to an individual's mental world*' (Hulme, 2008). The findings also inform debate regarding relations amongst place attachments from local to global scales. Positive correlations were found between multiple levels, yet diminishing in strength by proximity. Given that the results of previous studies are varied (Gustafson, 2009; Katzarska-Miller et al., 2012), future research would seem warranted.

The findings offer empirical support to research that has criticized the ways that place attachments and identities have been overlooked in climate change research and policy making (Agyeman et al., 2009; Adger et al., 2011; Devine-Wright, 2013). Empirically, the study extends the literature by employing a representative sample of Australian adults, measures of place attachment at multiple scales, and a range of categorical and continuous measures of public engagement with climate change, showing a consistent pattern of response: individuals expressing stronger global than national belonging were more likely to believe in anthropogenic causes of climate change, and the need for climate change action.

A critical finding is that it is not attachment at the global level per se that is important, but the interplay between global and national attachments, showing the necessity for future research to adopt a relational approach to multiple forms of belonging, rather than seeing each as discrete. Finally, the study breaks new ground by showing links between place attachments and ideological individual difference variables such as social dominance orientation and right wing authoritarianism; for the first time providing evidence for the mediating role that these ideologies play in the relationship between place attachment and perceived human contributions to climate change.

Within these broad contributions to the literature, several specific strands are notable.

First, the findings inform our understanding of the factors influencing climate change beliefs. Hitherto, studies of climate change beliefs have focused upon the relevance of ideology, gender, religious views and values (Dunlap and McCright, 2008; Greenhill et al., 2013; Kahan et al., 2012; McCright and Dunlap, 2011). This study extends this literature by showing the relevance of place attachments, in particular that individuals holding a stronger sense of belonging at global than national levels were significantly more likely to perceive climate change to be anthropogenic rather than naturally caused. In contrast, individuals with stronger national than global belonging were significantly more likely to perceive 'natural causes' and to disagree with human causality. Furthermore, those who believe in anthropogenic climate change demonstrated an inverse pattern of attachments to those who deny climate change, with relatively weak attachment at proximal local scales and relatively strong attachment at the global scale. Empirically, the use of both categorical and continuous measures with consistent findings provides strong evidence for this result. The findings show a complex relationship between national forms of belonging and climate change beliefs, with individuals perceiving human induced and natural causality both showing high levels of national belonging (see Fig. 1). Taken together, these findings suggest the merit of future studies to replicate these findings regarding the interplay of national and global place attachments, not just in Australia but other national contexts as well.

Second, the study informs our understanding of how risks and opportunities associated with climate change action are perceived. The 'Planet First' subgroup sees opportunities arising from climate change response, believing that a national programme of climate change mitigation would *improve* living standards in the long term (see Fig. 2), whereas the 'Country First' subgroup was more likely to believe that climate change will bring negative or no noticeable effects on living standards in Australia. The 'Planet First' subgroup was also more likely to perceive other social benefits arising from climate change response – providing people with a sense of purpose, an opportunity to foster stronger connections between people and build a sense of community, in comparison to the 'Country First' subgroup. As such, those with relatively strong global attachment were more likely to oppose hierarchy-enhancing myths that legitimize climate inaction, whilst supporting hierarchy-attenuating myths that legitimize climate action. These results suggest that individuals with strong global attachments are not solely focused upon economic aspects of climate change response, also placing importance in quality of life and sense of community.

While the study showed some interesting, if relatively weak, relationships between multiple place attachments and socio-demographic characteristics (e.g. the 'Planet First' subgroup were more likely to be female, younger, to have no religion, to be more likely to vote Green and to live in urban areas), it broke new ground in relation to individual differences, specifically SDO and RWA. The 'Planet First' subgroup showed significantly lower levels of SDO and RWA in comparison to the 'Country First' subgroup. Climate change threats bolster support for inequitable systems in those who identify highly with their nation (Fritsche et al., 2012), consistent with this study's findings that 'Country First' individuals held significantly higher levels of RWA. Previous research has also shown a negative correlation between SDO and the extent to which the environment plays an important part in a person's self-definition (Clayton, 2008).

According to Social Dominance Theory, power hierarchies are maintained at a system level by 'legitimizing myths': moral and intellectual justifications of the hierarchy. There is evidence that attitudes about the impacts of collective action on climate change (e.g. job losses, or national financial cost) are employed as justifications for inaction (Leviston, 2013), and in this respect can be thought of as synonymous with the hierarchy-enhancing legitimizing myths proposed by Social Dominance Theory. As such the 'Country first' group's relatively high endorsement of statements regarding the costs and inefficacy of responding to climate

change may be explained by their elevated levels of SDO. Social Dominance Theory also posits that there are also hierarchy-attenuating myths: those that promote equality and democracy, not in what is, but in what should be. The relatively low SDO of the 'Planet first' group may therefore account for higher levels of support regarding potential positive outcomes from responding to climate change.

That individual ideologies partly mediate the relationship between place attachment and beliefs about human contributions to climate change suggests that feelings of belonging at national and global scales form part of interrelated sets of beliefs about equality, status, hierarchy and relationships. Katzarska-Miller et al. (2012) found the theme of tolerance to be consistently associated with global identity across cultural contexts, which suggests that global belonging is typically associated with inclusive relations towards others, for example by empathizing with individuals in distant places that are vulnerable to climate change impacts. But geographical research has consistently argued that people-place relations are fraught with relations of exclusion as well as inclusion, for example who is deemed to be 'out of place' in a locality (Cresswell, 2003) as well as revealing multiple discourses of the global, including imperialist as well as environmentalist discourses (Cosgrave, 1994). Taken together, these findings suggest the value of future research to examine the reasons for this partial mediation in more depth, as well as the value in using both qualitative and quantitative measures of belonging and associated meanings at multiple scales.

These contributions to the literature must be set in the context of several study weaknesses. First, the use of a single-item measure of place attachment leaves open the question as to whether participants conceived the target of belonging in social or environmental terms or some mixture of both. To address this weakness, future research could employ multi-item measures that can be operationalized at each scale, and can include open-ended, qualitative analyses to probe place-related meanings (cf. Katzarska-Miller et al., 2012). Second, although the sample was representative of the Australian adult population, participants were recruited from an online panel and the study was delivered online, with the possibility that internet-using individuals may be more likely to show stronger forms of belonging at more distal (e.g. global) scales. Finally, use of a correlational design leaves open any firm conclusions about relations of causality between place attachments, ideological beliefs and climate change opinions. It is equally plausible that ideological beliefs are a precursor to place attachment. Characteristics of individuals high in RWA include a sense of nationalism and patriotism; foreigners, outgroups, and minorities in general are less favoured (Adorno et al., 1950; Altemeyer, 1988). High SDO has also been found to correlate with prejudice based on nationalism (Sidanius and Pratto, 1999). Whether the social and psychological functions of place attachment are super-ordinate to the functions served by ideologies is as yet unclear, as is the extent to which these place attachment and ideological characteristics vary (or covary) over time.

Future studies could employ a longitudinal framework to tease out these causal influences. Similarly, experimental designs might investigate the impacts of making global and national attachments salient upon climate change opinions, building upon existing work by Scannell and Gifford (2013), and ensuring that 'global' framings make 'the whole earth' salient to participants, not just distant places (Devine-Wright, 2013). The consistent pattern of findings regarding global relative to national place attachment also raises questions about whether these variables are underpinned by another construct such as self-transcendent versus self-enhancement value orientations (Schwartz, 1992, 1994). Pro-environmental attitudes, such as support for climate change action, may be related to broader notions of self that include other living things (Schultz, 2002). As such, individual differences in the extent to which 'nature' is included in people's representations of self may account for the relationship between relatively strong global attachment and the perceived benefits of responses to climate change.

In conclusion, the study contributed to the literature by showing that 'the global' is not necessarily 'distanced and unsituated relative to an individuals' mental world' (Hulme, 2008, 8) and that this has significant implications for public engagement with climate change. It shows how research at the boundaries of disciplines such as human geography and psychology can produce new hypotheses and research directions. In particular, it has implications for future research, to replicate these findings in other socio-cultural contexts, to broaden the methods and research design employed, and to extend the analyses of multiple place attachments to other global issues and problems (e.g. crime). In terms of policy implications, the findings suggest the need to carefully evaluate the scales at which climate change impacts are communicated to publics. Previous research has shown that making national-level framings salient (not just global or local, cf. Scannell and Gifford, 2013) can influence public engagement with climate change (Rabinovich et al., 2012). Future research can investigate under what circumstances making national *and* global framings salient may increase engagement with climate change by individuals with strong national attachments. The outcome could be to increase a sense of stewardship at the planetary scale (Jasanoff, 2010), in ways that are not perceived to threaten pre-existing forms of belonging.

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Appendix A. Place attachments and socio-demographic differences

There was a small but significant relationship between age and place attachment subgroups: F (2, 1076) = 5.01, p = .007, η^2 = .01. Individuals in the 'Planet First' subgroup were, on average, slightly younger (M = 44.1, SD = 13.9) than individuals in the 'Both equals' (M = 49.0, SD = 17.3) and 'Country First' (M = 49.9, SD = 17) subgroups.

There was a small but significant relationship between religion and place attachments: χ^2 (8, n = 1077) = 21.47, p = .006, *Cramer's V* = .10. Individuals in the 'Planet First' subgroup were more likely to have no religion and less likely to be Christian, while individuals in the 'Country First' subgroup were more likely to be Christian and less likely to have no religion (Table 6).

There was a marginal very small significant effect for gender on place attachment subgroup: χ^2 (2, n = 1077) = 8.02, p = .02, *phi* = .09. Women were slightly more likely to fall into the 'both equals' subgroup, while men were less likely to fall in the 'both equals' category (Table 7).

There was a small but significant relationship between place attachment and federal political voting intention: χ^2 (8, n = 757) = 38.66, $p < .001$, *Cramer's V* = .16. Individuals in the 'Planet First' subgroup were more likely to vote for the Greens Party than other subgroups, 'both equals' were more likely than other subgroups

Table 6
Religious differences between place attachment subgroups ($n = 1107$).

Subgroups	Religion type					
	No religion	Christian	Other religion	Other unspecified	Prefer not to answer	Total
Planet First	51 (43.6%)	42 (35.9%)	6 (5.1%)	14 (12%)	4 (3.4%)	117 (100%)
Both equals	200 (29.6%)	358 (53%)	27 (4%)	64 (9.5%)	26 (3.9%)	675 (100%)
Country First	93 (32.6%)	162 (56.8%)	7 (2.5%)	17 (6%)	6 (2.1%)	285 (100%)
Total	344 (31.9%)	562 (52.2%)	40 (3.7%)	95 (8.8%)	36 (3.3%)	1077 (100%)

Table 7
Gender differences between place attachment subgroups ($n = 1107$).

Subgroups	Gender type		
	Male	Female	Total
Planet First	55 (47%)	62 (53%)	117 (100%)
Both equals	274 (40.6%)	401 (59.4%)	675 (100%)
Country First	143 (50.2%)	142 (49.8%)	285 (100%)
Total	472 (43.8%)	605 (56.2%)	1077 (100%)

Table 8
Voting intention differences between place attachment subgroup ($n = 757$).[a]

Subgroup	Voting intention					
	Labour Party	Liberal Party	National Party	Greens Party	Independent	Total
Planet First	15 (21.4%)	26 (37.1%)	5 (7.1%)	19 (27.1%)	5 (7.1%)	70 (100%)
Both equals	177 (37.0%)	215 (44.9%)	21 (4.4%)	39 (8.1%)	27 (5.6%)	479 (100%)
Country First	58 (27.9%)	114 (54.8%)	12 (5.8%)	14 (6.7%)	10 (4.8%)	208 (100%)
Total	250 (33.0%)	355 (46.9%)	38 (5.0%)	72 (9.5%)	42 (5.5%)	757 (100%)

[a] 350 respondents answered one of the following and were discounted from the analysis for ease of reporting: Family First/Other/I have no idea/I don't vote/I would rather not say.

Table 9
Locational differences between place attachment and location ($n = 1043$[a]).

Subgroup	Location			
	Capital city	Regional town	Rural area	Total
Planet First	79 (70.5%)	23 (20.5%)	10 (8.9%)	112 (100%)
Both equals	393 (60.5%)	203 (31.2%)	54 (8.3%)	650 (100%)
Country First	185 (65.8%)	64 (22.8%)	32 (11.4%)	281 (100%)
Total	657 (63.0%)	290 (27.8%)	96 (9.2%)	1043 (100%)

[a] 64 respondents listed their location as 'Other' and were discounted from the analysis.

to vote for the Labour party, and 'Country First' individuals were more likely than other subgroups to vote for the Liberal party (Table 8).

There was a marginally significant very small relationship between place attachment subgroup and geographic location: $\chi^2(4, n = 1043) = 11.49, p = .02$, *Cramer's V* = .07. 'Planet First' individuals were more likely to reside in a capital city, while 'Country First' individuals were slightly more likely to reside in rural areas (Table 9).

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