Imagining a Sustainable World:
Measuring Cognitive Alternatives to the Environmental Status Quo

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*All data is open and available here: <https://osf.io/dws9g/>

**Preregistration for Study 1 and Study 2 are available here: <https://osf.io/dws9g/registrations>

Abstract

We build on social identity models of environmental collective action by considering the role of people's access to cognitive alternatives to the environmental status quo. We developed a new measure of cognitive alternatives to the environmental status quo, and examined its ability to predict environmental activist identification and willingness to engage in environmental activism. In Study 1 ($N = 386$), we developed the initial scale, and found evidence for its reliability and validity. The ability to imagine cognitive alternatives was associated with other relevant social identity and environmental variables including perceived legitimacy of the current environmental status quo, pro-environmental consumer and activist behavior, and beliefs in anthropogenic climate change. In Study 2 ($N = 393$), we confirmed the factor structure of the scale and found that it was a strong predictor of environmental activist identification, explaining variance beyond extensive control variables including identification with nature. It also explained additional variance in willingness to engage in activist behavior beyond even environmental activist identification. Our results suggest that the ability to imagine cognitive alternatives to the environmental status quo might have important implications for whether people engage in pro-environmental collection action to mitigate climate-change and other environmental problems.

Keywords: social identity, cognitive alternatives, environmental activism, pro-environmental behavior

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The 2018 special report from the Intergovernmental Panel on Climate Change (IPCC, 2018) details the extreme risks of not strengthening efforts to mitigate anthropogenic global warming. According to the report, limiting global warming to 1.5 degrees Celsius would require “transformative system change” (p. 315). Governments across the globe have been slow to enact sensible climate policy, in part because powerful vested interests have successfully blocked policy change and have encouraged climate change denial through disinformation campaigns (Klein, 2014; Magdoff & Foster, 2011). Therefore, we assume that successful climate change mitigation will require collective action—social protests and social movements to change the system in order to protect the environment (Bamberg, Rees, & Schulte, 2018).

Social psychologists have begun to apply the wealth of theorizing and evidence from intergroup relations to understand the predictors of pro-environmental collective action (Bamberg et al., 2018; Fielding & Hornsey, 2016). In this paper, we consider a potentially important predictor of pro-environmental collective action that has been overlooked in the literatures on environmental collective action and in collective action more generally—the ability of people to imagine what a sustainable world would be like. Within social identity theory (SIT; Tajfel & Turner, 1979), being able to imagine a different relationship between groups than the relationship at present is described as having access to cognitive alternatives to the status quo. Cognitive alternatives are theorized to be a precursor of action to create social change, and thus we consider the possibility that people are more likely to work to create a more sustainable world the more easily that they can imagine what a sustainable world would be like. To begin addressing this question, we developed and validated a measure of cognitive alternatives to the

status relations between humans and the rest of the natural world. Subsequently, we examined the ability of this measure to predict identification with environmental activism and willingness to engage in environmental collective action.

Predictors of Environmental Collective Action

The social identity approach to intergroup behavior recognizes that people can define themselves in collective terms, and when they do, they tend to show ingroup favoritism and group protective behaviors (Brewer, 1999; Wright, 2015; Yzerbyt & Demoulin, 2010). Thus the social identity approach explains collective action as resulting from collective identification with a group whose identity and interests are served by that action (van Zomeren, Postmes, & Spears, 2008). For example, just as identification with human categories tends to predict action on behalf of those categories, identifying with the category “nature” predicts engagement in pro-environmental behaviour (Mackay, 2019; Mayer & Frantz, 2004; Nisbett, Zolenski, & Murphy, 2009). When it comes to collective action, however, politicized identities—identification with a group actively working for social change—tend to be stronger and more proximal predictors than identification with a larger social category (Simon & Klandermans, 2001; Simon et al., 1998; van Zomeren et al., 2008). Similarly, identification with environmental activists or an environmental organization predicts environmental activism (Bamberg, Rees, & Seebauer, 2015; Brunsting & Postmes, 2002; Dono, Webb, & Richardson, 2010; Fielding, McDonald, & Louis, 2008), and is a more proximal predictor than identification with nature (Schmitt et al., 2019). Group identities can also promote collective action by increasing a sense of efficacy to affect change (Bamberg et al., 2015; Rees & Bamberg, 2014; van Zomeren, Spears, & Leach, 2008), by encouraging collective emotions such as moral outrage (Rees & Bamberg, 2014; Rees, Klug, & Bamberg, 2015; van Zomeren et al., 2008), or by encouraging conformity to pro-environmental

ingroup norms (Fritzsche, Barth, Jugert, Masson, & Reese, 2018; Hamann, Reese, Seewald, & Loeschinger, 2015).

In the social identity approach, intergroup behaviour also depends on subjective understandings of the social structure and status relationships between groups (Tajfel & Turner, 1979). In part, SIT suggests that individuals are more likely to engage in collective action when the status relations are perceived as “insecure”—as illegitimate and unstable (Reicher & Haslam, 2006; Tajfel & Turner, 1979). In other words, people will act to create social change for the benefit of an ingroup when they believe that such change would be more legitimate than the status quo, and when it appears possible to create the desired change (Tajfel & Turner, 1979). Judgments of instability predict collective attempts at social change (Ellemers, van Knippenberg, & Wilke, 1990). Similarly, perceptions of illegitimacy have been found to predict collective action intentions (Tee, Ramis, Fernandez, & Paulsen, 2017). In the environmental context, believing it is illegitimate for humans to rule over the rest of nature is related to more pro-environmental behavior (Maxwell-Smith, Conway, Wright, & Olson, 2018). More generally, people may be more likely to work for pro-environmental social change when they perceive insecurity in the relations between humans and nature, and in the relations between people trying to protect the environment and those with a vested interest in maintaining the status quo.

Cognitive Alternatives to the (Environmental) Status Quo

Although the insecurity of group relations has been examined almost entirely in terms of perceptions of stability and legitimacy, Reicher and Haslam (2006) argue that insecurity “is characterized by the fact that individuals are aware of cognitive alternatives to the status quo and hence can envisage specific ways in which it could be changed” (Reicher & Haslam, 2006, p. 5). Cognitive alternatives reflect awareness of possible alternatives to the existing social reality

(Abrams & Hogg, 1990; Turner & Brown, 1978) and typically contain a positive future direction entailing improved status, opportunities, and resources for the group (Iyer, Zhang, Jetten, Hao, & Cui, 2017; Zhang, Jetten, Iyer, & Cui, 2013). For example, Tajfel and Turner (1979) argued that Black American's ability to imagine a better world resulted in Black Nationalism and a direct confrontation with the unequal status of Whites and Blacks in the United States. The power of cognitive alternatives was demonstrated in the BBC prison study, in which experimenters created a mock prison with participants assigned to be prisoners or guards (Reicher & Haslam, 2006). At one point, the experimenters introduced a new prisoner who was a labour negotiator. As the experimenters intended, the new prisoner quickly developed cognitive alternatives to the status quo and shared these ideas with other prisoners. The subsequent actions of the prisoners led to a new formal process for negotiation and the eventual breakdown of the prisoner-guard dichotomy, to be replaced by a commune in which former prisoners and guards were now members of the same group.

Within the environmental context, environmental collective action might depend, in part, on the ability of individuals to conceive of ways that humans might relate to the rest of the natural world in more harmonious and sustainable ways. This might include imagining a world without fossil fuels, powered by solar and wind energy, imagining a population that integrates with nature rather than trying to dominate it, or a world that prioritizes the environment over economic growth. It might also include a change in human social relations that increases the power of groups who want to protect the environment vis-à-vis those who want to maintain the status quo. In effect, if people cannot imagine some plausible version of a sustainable future where humans live in harmony with nature, how can they begin to work to create it?

Cognitive alternatives to the status quo are important within SIT (Abrams & Hogg, 1990;

Tajfel & Turner, 1979; Turner & Brown, 1978), have some evidentiary support in generating collective action in other contexts (Reicher & Haslam, 2006) and appear to be a logical precursor to collective behavior. However, cognitive alternatives have yet to be examined in the context of environmental activism. Indeed, in other intergroup contexts as well, cognitive alternatives have been measured only rarely (Wright, 2009), and when it has been measured, researchers used ad hoc measures with unknown reliability or validity (Zhang et al., 2013). We aimed to develop a scale of cognitive alternatives to the status relations between humans and the rest of the natural world and examine whether cognitive alternatives are predictive of environmental collective action.

Overview of the Current Studies

Following a common approach to scale construction (DeVellis, 2017; Hinkin, 1998), we developed an initial item pool that included plausible ways that society could alter the status quo between humans and the rest of nature and one's ability to imagine these alternatives (e.g., I can easily imagine a world in which we supply all of our energy needs without harming the natural world). We then examined the factor structure of the scale, reduced the number of items, examined the scale's reliability and validity, confirmed the factor structure of the scale in an independent sample, and demonstrated the use of the scale in predicting meaningful variance in important outcome variables.

Because SIT would expect cognitive alternatives to the status quo to be negatively related to perceptions of legitimacy and stability, these relationships are important tests of convergent validity. The ability to imagine cognitive alternatives could conceivably require knowledge about the current state of the environment and knowledge about ways of improving that current state. Thus, environmental knowledge should also be associated with the ability to imagine cognitive

alternatives. Other convergent constructs include pro-environmental consumer behaviors, pro-environmental activist behaviors, and beliefs that anthropogenic climate change is occurring and has negative consequences. Recognizing the role of humans in the destruction of nature could presumably promote thinking about alternative ways of doing things that are better for the planet. In effect, recognizing a problem should be associated with imagining solutions. We also tested for convergent validity by asking participants to generate cognitive alternatives in an open-ended format and then examining whether proxy variables created from these open-ended responses are positively associated with our newly generated closed-ended scale of the ability to imagine cognitive alternatives.

Study 1

In study 1 we began the scale construction process by developing an initial item pool, examining the factor structure of this item pool, reducing the number of items, and examining the reliability and validity of the retained items.

Method

Participants. We recruited 406 participants from the United States using the TurkPrime platform (Litman, Robinson, & Abberbock, 2017). Participants were recruited for a study on “beliefs about the natural world” and offered \$1.20 USD for 10 minutes of their time. We restricted recruitment to individuals with minimum 95% approval ratings on the Mechanical Turk platform (Peer, Vosgerau, & Acquisti, 2014). We blocked accounts with suspicious geolocations and restricted duplicate IP addresses.

Procedure and measures. Following informed consent, participants read:

Humans do not currently have a sustainable relationship with the rest of the natural world. Human actions have wreaked havoc on

the earth's ecosystems, including the warming of the planet and resulting climatic changes. Human behaviour has damaged the health of the planet to such a degree that environmental problems now pose threats to the health and existence of the human species.

Participants were then asked, "Can you imagine a world, different from the current state of our own, in which humans have a harmonious and sustainable relationship with the rest of the natural environment?" If "no" was selected, participants were directed to the remaining measures described below. If participants selected "yes", they were asked to describe what that world would be like and told to place each specific point in one of the six text boxes that followed. Following this, participants continued with the following measures.

Cognitive alternatives. Participants rated their agreement with 36 items representing cognitive alternatives to the status relations between humans and the rest of nature. Each item was rated from 1, "strongly disagree" to 7, "strongly agree". All 36 items are reported in the online supplement. Four different researchers independently generated items. Each item was subsequently edited by two of these researchers for clarity and to ensure each item was theoretically viable.

Legitimacy. Participants rated their agreement with three items representing the perceived legitimacy of the current relationship between humans and the rest of the natural world (e.g., "Humans are entitled to use the natural world in whatever way they see fit"). Items were adapted from Mummendey, Klink, Mielke, Wenzel, & Blanz (1999) and responded to on a scale ranging from 1, "strongly disagree" to 7, "strongly agree". Items were averaged to create scale scores with higher scores indicating greater perceived legitimacy and the scale showed adequate internal consistency ($\alpha = .80$).

Stability. Participants rated their agreement with three items representing the perceived stability of the current relationship between humans and the rest of the natural world. Items were adapted from Mummendey et al., (1999) and responded to on a scale ranging from 1, “strongly disagree” to 7, “strongly agree”. The three items showed no convergence. Inter-item correlations ranged from -.06 to .01. Because the items were unrelated, we adopted the most face valid item for use as a measure of stability (“I think the current relationship between humans and the rest of the natural world will remain stable for the next few years”) in our analyses of convergent validity. A higher score indicated greater perceived stability.

Environmental knowledge. We measured knowledge about environmental issues using a 12-item assessment, which covered a broad range of topics, including carbon emissions, generation of electricity, causes of pollution, renewable resources, disposal of nuclear waste, and greenhouse gases (Kaplowitz & Levine, 2005). Items were summed to create scale scores ranging from 0-12, with higher scores indicating greater knowledge about environmental issues. The scale showed adequate internal consistency ($\alpha = .76$).

Past consumer behavior. Participants reported the frequency with which they engaged in each of six behaviors over the past year (e.g., using reusable containers rather than disposable ones; Schmitt et al., 2019). Responses ranged from 1, “never” to 5, “always/at every opportunity”. Items were averaged to create scale scores with higher scores indicating a greater frequency. The scale showed adequate internal consistency ($\alpha = .72$).

Past activist behavior. Participants reported the frequency (never, once, twice, three times, or four or more times) in which they engaged in each of four activist behaviors over the past year (e.g., donating money to an environmental organization). Items were adapted from

Moskalenko and McCauley (2009) and were averaged to create scale scores with higher scores indicating a greater frequency. The scale showed good internal consistency ($\alpha = .90$).

Beliefs about climate change. Participants responded to three items that reflected belief that climate change is occurring (e.g., I am quite sure that global warming is occurring now), three items that reflected belief that climate change is caused by human activity (e.g., The main causes of global warming are human activities), and three items that reflected belief that climate change has negative consequences (e.g. The consequences of global warming will be harmful for the environment; Heath & Gifford, 2006). All items were responded to on a scale from 1, “strongly disagree” to 7, “strongly agree” and internal consistency was adequate for each scale ($\alpha_{\text{occurrence}} = .84$; $\alpha_{\text{cause}} = .88$; $\alpha_{\text{consequences}} = .81$). Relevant items were reversed coded and items were averaged to create scale scores with higher scores indicating a greater belief that climate change is occurring, that it is caused by human activity, and that the consequences are negative.

Finally, participants reported their age, gender, ethnicity, and political orientation on both social and economic dimensions. An attention check was placed approximately halfway through the survey.

Results

Prior to conducting analyses, we screened the open-ended responses for nonsensical responding (e.g., a single random word or random digit inserted into each textbox). This can be an indicator of a bot. We removed 16 respondents for this reason and an additional four respondents who failed the attention check. The final sample for analysis was 386, including 217 men, 167 women, and 2 participants who did not report their gender. The majority of participants identified as “White or Caucasian” ($n = 287$), but the sample also included participants identifying as “Black or African American” ($n = 52$), “American Indian or Alaskan Native” ($n =$

3), “Asian” ($n = 42$), “Native Hawaiian or other Pacific Islander” ($n = 2$), “Hispanic, Latino, or Spanish” ($n = 19$), and three individuals who preferred an identification not listed. Participants ranged from 19 to 77 years old ($M = 36.46$, $SD = 11.31$) and leaned liberal on both social ($M = 3.41$, $SD = 1.82$) and economic dimensions ($M = 3.88$, $SD = 1.81$).

Factor analysis. We subjected the 36 cognitive alternative items to an exploratory factor analysis using principal axis factoring. We removed items with low factor loadings ($< .50$) and reexamined the new loadings after each removal. We then considered the redundancy of the remaining items. When selecting between redundant items we considered the factor loading (preferring higher loadings), the skew of the item (preferring less skewed), the extent to which the items were comparatively system focused (preferring items with more system vs. personal focus), and the clarity and simplicity of the comparative items (preferring simpler items to more complex items). Since our goal was to develop a short, single-factor scale of cognitive alternatives that was not overly loaded to one specific content domain, we also made sure to retain items from across conceptual domains, such as renewable energy, natural habitats, pollution, and government policy.

The final set of 10 items reflects items with high factor loadings, minimal content overlap, little redundancy, minimal skew, and high face validity. Three different methods indicated a single-factor solution: the Kaiser criterion, a scree plot, and parallel analysis (Fabrigar & Wegener, 2012). The eigenvalues, scree plot, and randomly generated eigenvalues used in the parallel analysis are displayed in Figure 1. The single factor explained 58% of the variance in the retained items, which are presented in Table 1 with the inter-item correlations ($M = .53$) and factor loadings ($M = .73$).

Figure 1. Single factor solution using eigenvalues larger than one, the scree plot, and parallel analysis.

Table 1

Retained Items for the 10-item Environmental Cognitive Alternatives Scale (ECAS).

Retained Items	1	2	3	4	5	6	7	8	9	10
1. I can easily imagine a world in which we supply all of our energy needs without harming the natural world.		.66	.65	.55	.52	.53	.65	.61	.68	.47
2. It is easy to imagine a world where we no longer use fossil fuels.	.58		.58	.51	.52	.58	.61	.55	.59	.44
3. I can clearly imagine a world where we exclusively use agricultural practices that protect the natural habitats of animals.	.60	.52		.56	.46	.60	.66	.62	.67	.48
4. I can imagine a world where politicians care more about minimizing the population's negative impact on the environment than economic growth.	.50	.39	.53		.36	.79	.67	.54	.58	.49
5. I can think of numerous methods of achieving a world where carbon emissions are reduced below current levels.	.51	.46	.51	.42		.39	.51	.52	.51	.47
6. I can easily imagine a system in which the government reflects the	.55	.49	.56	.73	.44		.68	.55	.63	.47

interests of the natural environment rather than the interests of the wealthy.										
7. I can easily imagine a world where people see themselves as integrated with nature, rather than masters over the natural world.	.61	.53	.65	.53	.49	.57		.60	.70	.53
8. When I imagine what an ecologically sustainable existence for humans would be like, I can picture it in detail.	.63	.48	.66	.53	.50	.53	.57		.70	.63
9. A harmonious relationship between humans and the natural world is easy for me to imagine.	.70	.52	.63	.55	.45	.65	.71	.66		.55
10. I have a clear understanding of all the ways that a sustainable human existence would differ from our current state of affairs.	.42	.34	.47	.37	.47	.41	.41	.54	.45	
<i>Study 1</i>										
<i>Factor Loading</i>	.79	.65	.79	.69	.63	.75	.78	.78	.83	.58
<i>Mean</i>	5.13	4.83	5.08	4.35	5.19	4.56	4.91	4.81	5.05	4.85
<i>SD</i>	1.56	1.66	1.43	1.80	1.40	1.79	1.61	1.47	1.49	1.46
<i>Study 2</i>										
<i>Factor Loading</i>	.80	.74	.79	.71	.62	.74	.83	.79	.85	.66
<i>Mean</i>	5.02	4.82	5.08	4.47	5.13	4.48	4.90	4.76	4.84	4.90
<i>SD</i>	1.58	1.78	1.57	1.85	1.47	1.87	1.65	1.58	1.65	1.50

Note: Inter-item correlations below the diagonal are from Study 1 and values above the diagonal are from Study 2.

Convergent validity. Descriptive statistics and correlations between all measures are presented in Table 2. Participants who claimed “yes”, in the dichotomous measure of cognitive alternatives scored considerably higher on the ECAS ($M = 5.22$, $SD = .95$) than those who reported an inability to imagine an alternative world ($M = 3.32$, $SD = .93$), $t(384) = 15.08$, $p < .001$, $g = 2.01$. Additionally, we used two methods to estimate the ability to imagine cognitive alternatives in the open-ended measure.¹ First, we summed the number of open-ended response boxes used by each participant. Second, we summed the number of characters across all boxes

¹ While a complete analysis of the qualitative data is outside the scope of the current paper, the content reflected that which we included in our scale. Participants frequently discussed a future with less pollution and cleaner cities, technologies that reduce carbon emissions, sustainable energy sources and agricultural practices, a world with fewer environmental disasters, a post-industrial world with a smaller population that prioritizes nature over the economy, a world that respects the welfare of animals, and a world in which humans treat each other with dignity and equality.

that a participant used. Considering these as indicators of the number of cognitive alternatives and the level of detail of responses, we correlated these values with the ECAS. Scale scores were positively correlated with both the number of boxes used ($r = .55, p < .001$) and the total characters typed ($r = .35, p < .001$).

Table 2

Descriptive Statistics and Correlations

	1	2	3	4	5	6	7	8	9	10	11
1. ECAS											
2. Environmental Knowledge	-.01										
3. Stability	.01	-.18									
4. Legitimacy	-.16	-.33	.26								
5. Activist Behavior	.26	-.38	.03	.18							
6. Consumer Behavior	.34	-.03	-.10	-.19	.36						
7. Occurrence	.21	.32	-.27	-.49	-.09	.20					
8. Human Cause	.25	.17	-.26	-.41	-.01	.23	.78				
9. Negative Consequences	.16	.34	-.25	-.52	-.17	.15	.83	.75			
10. Number of Boxes	.55	.06	.12	-.11	.17	.21	.13	.14	.09		
11. Total Characters	.35	-.01	.11	.01	.25	.19	.07	.04	-.02	.51	
<i>Mean</i>	4.88	8.49	4.33	2.71	1.63	3.39	5.60	5.39	5.85	3.38	258.81
<i>SD</i>	1.19	2.73	1.49	1.39	.99	.70	1.42	1.51	1.17	2.13	304.10

Note: ECAS = Environmental Cognitive Alternatives Scale. “Occurrence”, “Human Cause”, and “Negative Consequences” refer to beliefs about climate change—that it is occurring, that it is caused by humans, and that it has negative consequences. “Number of Boxes” refers to the number of text-boxes completed in the open-ended

cognitive alternatives measure, while “Total Characters” refers to the total number of characters written across all completed boxes in the open-ended measure.

Subsequently, we examined the correlations between the ECAS and theoretically-related constructs to test for convergent validity. In accordance with preregistered predictions, a greater ability to imagine cognitive alternatives was associated with less perceived legitimacy ($r = -.16$), more frequent pro-environmental activist behavior ($r = .26$), more frequent pro-environmental consumer behavior ($r = .34$), and stronger beliefs that climate change is occurring ($r = .21$), that climate change is caused by human activity ($r = .25$), and that climate change has negative consequences ($r = .16$). In contrast to our preregistered predictions, ECAS scores were unrelated to environmental knowledge or perceptions of stability.

Discriminant validity. We preregistered a formal test of discriminant validity for legitimacy and stability (see Fornell & Larcker, 1981). However, a formal test of discriminant validity is superfluous given the weak correlation with legitimacy and the non-existent correlation with stability. Additional support for discriminant validity comes from the finding that the ECAS showed a higher correlation with the open-ended cognitive alternatives measures than with any other constructs in this study.

Discussion

In Study 1 we developed a scale measuring the extent to which individuals can imagine cognitive alternatives to the current status relations between humans and the rest of nature. We provided preliminary evidence of the scale’s single-factor structure, internal consistency, convergent validity with an open-ended cognitive alternatives task, and convergent and discriminant validity from conceptually similar constructs in the social identity framework. Two convergent validity predictions were not confirmed in this study. There was no relationship between cognitive alternatives and our measure of stability. Due to the lack of convergence

among the three items used as a stability measure, this relationship was tested using only a single item with unknown validity or reliability. In Study 2 we revised the stability items. Additionally, there was no relationship between the ECAS and environmental knowledge. One possibility is that our environmental knowledge items were too broad. Knowing about hazardous waste or biodiversity would not necessarily enable one a greater ability to imagine possible alternative social realities.

Study 2

In Study 2 we first attempted to confirm the factor structure of the ECAS in an independent sample. Then we further examined its psychometric properties and its predictive validity in explaining environmental activist identification and willingness to engage in environmental activist behavior. Environmental activist identification refers to a politicized identity and politicized identities are strong predictors of social change behavior (Schmitt et al., 2019). There is a strong correlation between identification with environmental activists and environmental activism (Dono et al., 2010) and identification with environmental activists is a more proximal predictor of environmental activism than identification with nature (Schmitt et al., 2019). A strong claim for cognitive alternatives as an important predictor of environmental activist identification could be made if cognitive alternatives were able to predict variance beyond the strong predictor of nature identification. Likewise, a strong claim for cognitive alternatives as an important predictor of environmental activism could be made if cognitive alternatives were able to predict variance beyond the strong predictor of environmental activist identification.

Methods

Participants. We recruited 404 participants from the United States using the TurkPrime platform (Litman et al., 2017). All participants from Study 1 were blocked from participating in Study 2.

Procedure and measures. Following informed consent, participants completed the following measures in the order described.

Identification with nature. We measured identification with nature using eight items adapted from Cameron (2004) (e.g., “I have a lot in common with other species”). Each item was rated on a scale from 1, “strongly disagree” to 7, “strongly agree”. After reverse coding relevant items, scores were averaged with higher scores indicative of a stronger identification with nature. The scale showed good internal consistency ($\alpha = .87$).

Open-ended cognitive alternatives. Participants then completed the open-ended measures of cognitive alternatives as described in Study 1, before continuing with the following measures.

ECAS. Participants rated their agreement to the 10-item ECAS, as described in Study 1 ($\alpha = .93$).

Legitimacy. Participants rated their agreement to the same three items representing the perceived legitimacy of the current relationship between humans and the rest of the natural world, as in Study 1 ($\alpha = .80$).

Stability. Participants rated their agreement to three items representing the perceived stability of the current relationship between humans and the rest of the natural world (e.g., It is unlikely that humans will be able to make much progress mitigating climate change over the next 15 years). Items were adapted from Mummendey et al., (1999) and responded to on a scale ranging from 1, “strongly disagree” to 7, “strongly agree”. After reverse coding relevant items,

scores were averaged with higher scores indicative of greater perceived stability. The scale showed adequate internal consistency ($\alpha = .69$).

Identification with environmental activists. We measured identification with environmental activists using eight items from Cameron (2004) (e.g., “I feel strong ties to environmental activists”). Each item was rated on a scale from 1, “strongly disagree” to 7, “strongly agree”. After reverse coding relevant items, scores were averaged with higher scores indicative of a stronger identification with environmental activists. The scale showed good internal consistency ($\alpha = .91$).

Pro-environmental consumer behavior. Participants reported their willingness to engage in each of ten behaviors (e.g., Use reusable containers rather than disposable ones; Schmitt et al. 2019). Responses ranged from 1, “very unwilling” to 7, “very willing”. Items were averaged to create scale scores with higher scores indicating a greater willingness to engage in pro-environmental consumer behaviors. The scale showed good internal consistency ($\alpha = .88$).

Pro-environmental activist behavior. Participants reported their willingness to engage in each of ten behaviors (e.g., Give money to environmental groups; Schmitt et al., 2019). Responses ranged from 1, “very unwilling” to 7, “very willing”. Items were averaged to create scale scores with higher scores indicating a greater willingness to engage in pro-environmental activist behaviors. The scale showed good internal consistency ($\alpha = .95$).

Beliefs about climate change. Participants responded to the same items from Study 1, which reflect belief that climate change is occurring ($\alpha = .86$), belief that climate change is caused by human activity ($\alpha = .88$), and belief that climate change has negative consequences ($\alpha = .80$).

Climate change knowledge. We measured knowledge about climate change using nine items developed from the National Climate Assessment Report from the United States Global Change Research Program (2017). Correct answers for each question were summed to create scale scores ranging from 0-9, with higher scores indicating greater knowledge about climate change issues. The scale showed marginal internal consistency ($\alpha = .62$).

Finally, participants reported their age, gender, ethnicity, and political orientation on both social and economic dimensions. We placed an attention check approximately halfway through the survey and included captcha verification, which is a common automated Turing test to reduce exposure to bots.

Results

Prior to conducting analyses, we removed six cases with nonsensical responses to the open-ended question (i.e., an indication of bots), and removed five respondents who failed the attention check. The final sample for analysis was 393, including 206 males, 179 females, seven participants who identified as non-binary, and one that preferred a different label. The majority of participants identified as “White or Caucasian” ($n = 284$), but the sample also included participants identifying at “Black or African American” ($n = 58$), “American Indian or Alaskan Native” ($n = 6$), “Asian” ($n = 38$), “Native Hawaiian or other Pacific Islander” ($n = 1$), “Hispanic, Latino, or Spanish” ($n = 17$), and four individuals who preferred an identification not listed. Participants ranged from 19 to 95 years old ($M = 36.77$, $SD = 12.36$) and leaned liberal on both social ($M = 3.55$, $SD = 1.86$) and economic dimensions ($M = 3.76$, $SD = 1.85$).

Confirmatory factor analysis. We subjected the ECAS to a confirmatory factor analysis using maximum likelihood estimation with robust standard errors in MPLUS. All items were specified to load onto one latent factor. This model showed marginal fit to the data, $\chi^2(35) =$

162.70, $p < .001$, RMSEA = .096 [.082, .112], CFI = .92, TLI = .89, SRMR = .05; however, the residuals of items 4 and 6 shared variance. Both items concern the role of government in managing the status relations between the economy and the environment. Thus we ran a second model that allowed these residuals to correlate. This model had excellent fit, $\chi^2(34) = 81.97$, $p < .001$, RMSEA = .06 [.043, .077], CFI = .97, TLI = .96, SRMR = .03 (Hu & Bentler, 1999; Kline, 2011). Factor loadings ranged from between .62 and .85 ($M = .75$). All factor loadings and descriptive statistics are displayed in Table 1.

Convergent validity. We first examined the relationship between the ECAS and the open-ended measure of cognitive alternatives. Participants who claimed “yes”, in the dichotomous measure of cognitive alternatives scored considerably higher on the ECAS ($M = 5.25$, $SD = .97$) than those who reported an inability to imagine an alternative world ($M = 3.37$, $SD = 1.23$), $t(391) = 15.00$, $p < .001$, $g = 1.83$.

As in Study 1, ECAS scores were positively correlated with the number of boxes completed in the open-ended measure ($r = .57$, $p < .001$) and the total characters typed ($r = .37$, $p < .001$). In accordance with predictions regarding convergent validity, higher ECAS scores were associated with stronger identification with nature ($r = .41$), stronger identification with environmental activists ($r = .54$), lower perceptions of legitimacy ($r = -.13$) and stability ($r = -.33$), more willingness to engage in pro-environmental consumer behavior ($r = .48$), more willingness to engage in more pro-environmental activist behavior ($r = .47$), and greater belief that climate change is occurring ($r = .17$), is caused by human activity ($r = .17$), and has negative consequences ($r = .17$). In contrast to our prediction, ability to imagine cognitive alternatives was unrelated to climate change knowledge. Correlations between all variables are reported in Table 3.

Discriminant validity. As in Study 1, the relationships between the ECAS and stability and legitimacy were too small to require a more stringent test of discriminant validity. General support for discriminant validity is evident by the moderate correlations with other relevant constructs but having no correlations that suggest it is duplicating these constructs. Additionally, the cognitive alternatives scale shows strong correlations with both variables from the open-ended cognitive alternatives measure.

Table 3.

Descriptive Statistics and Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ECAS													
2. Nature ID	.42												
3. Activist ID	.50	.55											
4. Stability	-.33	-.12	-.21										
5. Legitimacy	-.13	-.40	-.32	-.05									
6. Consumer Behavior	.48	.49	.49	-.15	-.45								
7. Activist Behavior	.47	.37	.68	-.20	-.12	.58							
8. Occurrence	.17	.23	.38	.08	-.52	.33	.32						
9. Human Cause	.17	.21	.41	.01	-.46	.33	.34	.83					
10. Negative Consequences	.17	.26	.39	.03	-.59	.41	.30	.83	.81				
11. Climate Change Knowledge	.02	.28	.16	.10	-.42	.24	.04	.47	.35	.44			
12. Number of Boxes	.57	.26	.28	-.19	-.11	.33	.29	.10	.10	.09	.10		
13. Total Characters	.37	.26	.20	-.09	-.17	.22	.17	.09	.09	.10	.14	.56	
<i>Mean</i>	4.84	4.87	3.85	4.49	2.55	5.70	4.22	5.63	5.46	5.83	5.79	3.20	249.47
<i>SD</i>	1.29	1.18	1.38	1.26	1.39	.93	1.57	1.51	1.51	1.27	1.90	2.21	264.95

Note: ECAS = Environmental Cognitive Alternatives. “Occurrence”, “Human Cause”, and “Negative Consequences” refer to beliefs about climate change—that it is occurring, that it is caused by humans, and that it has negative consequences. “Number of Boxes” refers to the number of text-boxes completed in the open-ended cognitive alternatives measure, while “Total Characters” refers to the total number of characters written across all completed boxes in the open-ended measure.

Predictive validity. To test predictive validity of the ECAS, we regressed identification with environmental activists on identification with nature, perceptions of legitimacy and stability, belief that climate change is occurring, belief that climate change is caused by humans, belief that the consequences of climate change will be negative, and knowledge of climate change. In a second model, we added the ECAS as a predictor. As seen in Table 4, the ECAS explains an additional 5% of variance in identification with environmental activists and retains a moderate effect size.

Table 4.

Predictive validity of cognitive alternatives on identification with environmental activists.

	Model 1				Model 2			
	<i>b</i>	95% CI	β	95% CI	<i>b</i>	95% CI	β	95% CI
Nature ID	.57	.47, .67	.49	.40, .57	.45	.34, .56	.38	.29, .48
Stability	-.17	-.27, -.07	-.16	-.25, -.07	-.09	-.19, .01	-.08	-.18, .01
Legitimacy	.01	-.10, .12	.01	-.10, .12	.01	-.11, .09	.01	-.11, .09
Occurrence	.13	-.02, .28	.14	-.02, .31	.08	-.06, .22	.09	-.06, .24
Human Cause	.19	.05, .33	.21	.05, .36	.19	.05, .33	.21	.06, .36
Negative Consequences	.04	-.15, .22	.03	-.14, .20	.03	-.14, .21	.03	-.13, .20
Climate Change Knowledge	-.08	-.15, -.02	-.11	-.20, -.03	-.06	-.12, .00	-.08	-.16, .00
ECAS					.27	.17, .38	.26	.16, .35
R^2	.43				.48			

Note: ECAS = Environmental Cognitive Alternatives Scale. “Occurrence”, “Human Cause”, and “Negative Consequences” refer to beliefs about climate change—that it is occurring, that it is caused by humans, and that it has negative consequences. “Number of Boxes” refers to the number of text-boxes completed in the open-ended cognitive alternatives measure, while “Total Characters” refers to the total number of characters written across all completed boxes in the open-ended measure.

In order to determine whether cognitive alternatives explains additional variance beyond other common predictors of willingness to engage in environmental activism, we regressed willingness to engage in activism on identification with nature, identification with environmental activists, perceptions of legitimacy and stability, belief that climate change is occurring, belief that climate change is caused by humans, belief that the consequences of climate change will be negative, and knowledge of climate change. In a second model, we added ECAS scores as a predictor. As seen in Table 5, ECAS scores explain an additional 2% of variance in willingness to engage in environmental activism and retains a small to moderate effect.²

Table 5.

Predictive validity of cognitive alternatives on willingness to engage in environmental activism.

	Model 1				Model 2			
	<i>b</i>	95% CI	β	95% CI	<i>b</i>	95% CI	β	95% CI
Nature ID	.08	-.05, .22	.06	-.04, .17	.03	-.11, .17	.02	-.08, .13
Activist ID	.70	.60, .83	.62	.52, .72	.65	.52, .77	.57	.46, .67
Stability	-.07	-.17, .02	-.06	-.13, .01	-.03	-.12, .07	-.02	-.10, .06
Legitimacy	.20	.08, .31	.17	.07, .28	.19	.07, .30	.17	.07, .27
Occurrence	.17	.04, .30	.16	.04, .29	.14	.01, .28	.14	.00, .27
Human Cause	.02	-.12, .16	.02	-.11, .16	.04	-.10, .18	.04	-.10, .18
Negative Consequences	.05	-.13, .23	.04	-.10, .19	.05	-.13, .23	.04	-.10, .18

² Although not the present focus, we found that cognitive alternatives also predicted pro-environmental consumer behaviors, beyond the other examined predictors, see online supplement on the OSF here: <https://osf.io/3ahds/>

Climate Change Knowledge	-.09	-.16, -.01	-.11	-.19, -.02	-.07	-.14, -.00	-.09	-.17, -.00
ECAS					.19	.08, .31	.16	.07, .25
R^2	.50				.52			

Note: ECAS = Environmental Cognitive Alternatives Scale. “Occurrence”, “Human Cause”, and “Negative Consequences” refer to beliefs about climate change—that it is occurring, that it is caused by humans, and that it has negative consequences. “Number of Boxes” refers to the number of text-boxes completed in the open-ended cognitive alternatives measure, while “Total Characters” refers to the total number of characters written across all completed boxes in the open-ended measure.

Discussion

In Study 2 we confirmed the ECAS’s single factor structure, internal consistency, convergent validity with measures derived from an open-ended cognitive alternatives measure, and discriminant validity from conceptually similar constructs in the social identity framework. After using a different set of three items to measure stability, we found the predicted negative correlation between perceptions of stability and cognitive alternatives. The only test of convergent validity that was not supported was the relationship between cognitive alternatives and climate change knowledge. We also provided evidence for incremental predictive validity of the cognitive alternatives construct in predicting identification with environmental activists and willingness to engage in environmental activism.

General Discussion

Researchers have begun to adapt social identity theory to explain collective action in the environmental context (Bamberg et al., 2015; Dono et al., 2010; Fielding & Hornsey, 2016; Schmitt et al., 2019). However, one of the most important theoretical variables within SIT for explaining when people engage in attempts at social change—cognitive alternatives to the status quo—has not been given much attention in research on environmental activism or in collective action research more generally. We began to address this gap by developing a measure of

cognitive alternatives to the environmental status quo. Within SIT, the ability to imagine cognitive alternatives helps determine when individuals will engage in direct competition with outgroups in order to change the status relations between groups. Being able to imagine alternatives to the way humans and the rest of the natural world currently interact, as well as alternatives to who has power to determine how humans relate to the natural world, can encourage people to create a world in which humans interact harmoniously and sustainably with nature.

In two studies we demonstrated the reliability and validity of the Environmental Cognitive Alternatives Scale. Our scale correlated in predictable ways with other relevant constructs within the social identity approach, such as identification with nature, identification with environmental activists, and perceptions of legitimacy and stability. Importantly, the ECAS was positively correlated with past environmental activism and willingness to engage in environmental activism in the future—the exact kind of behavior that should be predicted by imagining cognitive alternatives (Tajfel & Turner, 1979). We tested the predictive validity of the ECAS and found that it explains identification with environmental activism beyond other known predictors, such as identification with nature (Schmitt et al., 2019). In a more stringent test, we found that scores on the ECAS explained additional variance in willingness to engage in environmental activism beyond that explained by identification with environmental activism—a strong proximal predictor of environmental activist behavior (Schmitt et al., 2019). Thus our initial findings suggest that cognitive alternatives to the environmental status quo might play an important role in motivating people to engage in pro-environmental action and support pro-environmental social change. Those attempting to promote support for pro-environmental social

change are likely to be more successful when they present clear and plausible alternatives to the status quo with specific steps on how to achieve these alternative worlds.

Future Directions

To be clear, our work should not be misunderstood as an attempt to reduce the complex theoretical concept of cognitive alternatives to the status quo to an individual difference variable. Rather, we developed a measure of cognitive alternatives to the environmental status quo as a way of bringing attention to this overlooked construct, and to create a novel tool for testing theoretical predictions regarding the role of cognitive alternatives in promoting collective action. While our measure is novel and useful, it is only a tool and cannot capture all of the complexities of a construct like cognitive alternatives to the status quo. For example, while we developed a broad and general measure, future research should examine how differences in the cognitive alternatives people have access to influence the particular kinds of actions they engage in. Similarly, future research should attend to the factors that lead people to generate alternatives, and how alternatives become disseminated across people. In particular, researchers might consider the ways in which successful leadership often involves the use of cognitive alternatives, as leaders create visions of “who we are” and “what we might become” (Reicher & Haslam, 2012). In addition, while our focus has been on the role of cognitive alternatives in promoting collective action, it is also worth considering the reverse—the ways in which engaging in collective action can give rise to cognitive alternatives (Drury & Reicher, 2005; Reicher & Haslam, 2012).

Conclusion

We provided good evidence for the reliability and validity of the ECAS—a scale measuring the ability to imagine cognitive alternatives to the status relations between humans

and the rest of nature. This scale offers the possibility of improving our understanding of the causes of environmental activist behavior. It also offers the possibility of testing additional predictions derived from social identity theory within environmental psychology, and provides an example for others who may be interested in developing reliable and valid measures of other cognitive alternatives in other contexts. Our analyses suggest that cognitive alternatives to the current state of human-nature relations may provide the motivation people need to engage in collective action that prevents further degradation of the environment.

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