Access to Environmental Cognitive Alternatives Predicts Pro-Environmental Activist Behavior

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Funded through a grant from the Social Sciences and Humanities Research Council of Canada (SSHRC) to the second author.

This study was preregistered here: <https://osf.io/b56ry>

Open materials and data for this paper can be found here: <https://osf.io/24yeq/>

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The work presented in this manuscript took place on the unceded traditional territories of the Squamish, Tsleil-Waututh, Musqueam, and Kwikwetlem Nations.

Abstract

We extend social identity models of pro-environmental collective action by expanding on the plausible role of access to cognitive alternatives to the environmental status quo (i.e., the ability of people to imagine what a sustainable relationship with nature would look like). Using a representative Canadian survey on age, gender, and ethnicity ($N = 1029$) we evaluate the associations between access to environmental cognitive alternatives and politicized environmental identity and willingness to engage in pro-environmental activist behavior.

Additionally, we extend research using exclusively self-reported outcomes by giving participants the opportunity to write and sign a pro-environmental letter to the Canadian Minister of the Environment and Climate Change. Our results suggest that envisioning specific ways in which the status quo can be changed is associated with stronger politicized environmental identity, greater willingness to engage in pro-environmental activist behavior, and increased likelihood of writing and signing a pro-environmental letter to the Canadian Minister of the Environment and Climate Change. All methods and analyses follow our preregistration (<https://osf.io/b56ry>) and all materials and data are openly available (<https://osf.io/24yeq/>).

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

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The 2018 special report from the Intergovernmental Panel on Climate Change makes clear that the climate crisis will not be resolved without a global change to energy, land, urban, and industrial systems (IPCC, 2018). Achieving systemic change requires large-scale collective action to pressure governments to enact systemic change because “...current national pledges on mitigation and adaptation are not enough” (IPCC, 2018). Millions of individuals around the globe responded to calls for collective action to limit the damaging effect of climate change by engaging in mass protests (Crawford, Eagland, & Saltman, 2019). For example, on September 27, 2019, an estimated 100,000 protestors gathered in Vancouver, Canada to demand action to combat the climate crisis (Eagland & Crawford, 2019). How can these collective acts in support of climate action be explained, and how can further collective action in support of pro-environmental initiatives be promoted? Drawing on Social Identity Theory (SIT), Wright, Schmitt, Mackay, & Neufeld (2020) proposed that engagement in environmental collective action would be more likely for people who can clearly imagine what a sustainable world would be like. In two studies, they demonstrated that being able to imagine what a sustainable world would be like is associated with self-reported pro-environmental behavior and self-reported willingness to engage in pro-environmental collective action in the future. In the present study, we extend that work by examining actual behavior and by extensively controlling for additional theoretical variables from other models that help explain variability in pro-environmental behavior.

Social Identity Theory and Environmental Action

Social Identity Theory (SIT) is a model of intergroup behavior and social change, which posits that individuals can define themselves in collective terms (Tajfel & Turner, 1979). When

they do, individuals activate collective processes in their desire for the ingroup to be distinctive in evaluatively positive ways (Hogg, 2018; Tajfel & Turner, 1979). One of the pathways in which individuals may pursue positive evaluation of the ingroup is by engaging in direct competition with an outgroup in order to raise the status of the ingroup (Tajfel & Turner, 1979). Such collective action can, in part, be explained as resulting from collective identification with a group whose identity and interests are served by that action (van Zomeren, Postmes, & Spears, 2008). This connection between strength of identification with a social group and collective action on behalf of that social group has been documented in numerous contexts (Brewer, 1999; van Zomeren, Postmes, & Spears, 2008; Wright, 2015; Wright & Esses, 2017; Wright, 2018; Yzerbyt & Demoulin, 2010). While identification with human categories tends to predict action on behalf of those categories, identification with nature—a non-human category—also predicts engagement in collective action on behalf of the natural environment (Mackay & Schmitt, 2019). Additionally, there is evidence that politicized identities—identification with activist groups—is a stronger and more proximal predictor of collective action than identification with broader categories (Schmitt, Mackay, Droogendyk, & Payne, 2019; Simon & Klandermans, 2001; Simon et al., 1998). For example, Schmitt et al. (2019) and Wright et al. (2020) found stronger correlations between politicized environmental identification and pro-environmental activist behaviors than between identification with nature and pro-environmental activist behaviors. Additionally, the effect of identification with nature on pro-environmental activism was indirect through politicized environmental identification (Schmitt et al., 2019). Both identification with nature and politicized identification are collective level identifications. However, individual level identification as an environmentally friendly person—environmental self-identity—has also been shown to be associated with pro-environmental behaviors (van der Werff, Steg, & Keizer, 2013).

Environmental self-identity is distinct from both identification with nature and identification with environmental activists are because environmental self-identity is not rooted in the collective. Rather, it integrates individual environmental beliefs and values into the self-concept.

The general emphasis on strength of identification, while important, is only one important aspect of intergroup behavior within a more complex phenomenon. More recent work has integrated the role of social identification with other collective processes, such as awareness of environmental threats (Frantz & Mayer, 2009; Schmitt, Akinin, Axsen, & Shwom, 2018), moral obligation to protect the environment (Bratanova, Loughnan, & Gatersleben, 2012), perceptions of collective efficacy (Fritzsche, Barth, Jugert, Masson, & Reese, 2018; Zomerren, Postmes, & Spears, 2008) and collective anger (Becker, Tausch, & Wagner, 2011). In the original statement of Tajfel & Turner's Social Identity Theory (SIT; 1979, 1989), subjectively perceived aspects of the social structure were central features of the theory and were theorized to influence when groups will engage in collective action in order to change the status quo. These include how legitimate the perceived status quo is perceived to be, how stable the current status quo is perceived to be, and beliefs about whether an alternative to the status quo is conceivable (Hogg, 2018, Tajfel & Turner, 1979). It is the latter construct, cognitive alternatives to the status quo, that we focus on in this paper.

Cognitive Alternatives

Cognitive alternatives reflect envisioning specific ways in which the status quo can be changed (Reicher & Haslam, 2006). Cognitive alternatives are distinguishable from perceptions of stability and legitimacy in that cognitive alternatives reflect the ability to conceive of *how* the status quo could be different, not whether it *will* or *should* be different. Within the environmental status quo, cognitive alternatives can take several forms and involve multiple intergroup

relations. A detailed account of cognitive alternatives within the environmental context is given in Wright et al. (2020). At a basic level, cognitive alternatives reflect a vision of how the status relations between humans and the rest of nature could be different. Within SIT, the emphasis is on positive cognitive alternatives—how status relations can be altered to improve the status of the ingroup (Cinnirella, 1998; Iyer, Zhang, Jetten, Hao, & Cui, 2017; Reicher & Haslam, 2006; Zhang, Jetten, Iyer, & Cui, 2013). In this context then, cognitive alternatives intuitively reflect ways in which humans might live in harmony with the rest of nature, rather than dominating and abusing it. This intergroup relation reflects humans as the dominant group, set to lose status vis-à-vis the rest of nature.

However, humans are not a unified group and there are intergroup relations within the category humans that are also relevant to addressing climate change. How humans relate to nature depends, in part, on other intergroup relations, such as those “between industry, capital, and government, between citizens and government, between corporations and citizens, between elite groups and the majority of people on the planet, and between activist groups that challenge fossil fuel infrastructure projects and the businesses and governments that support those projects” (Wright et al., 2020). Environmental cognitive alternatives will also likely include changes to these status relations as well, reducing the status and power of the higher status group and increasing the status and power of lower status groups, leading to direct confrontation between the two. Even in non-environmental contexts, cognitive alternatives have rarely been measured and when they have, this has involved ad hoc measures (e.g., Zhang et al., 2013). To fill this gap, Wright et al. (2020) introduced the Environmental Cognitive Alternatives Scale (ECAS), and found that environmental cognitive alternatives (e.g., imagining a world without fossil fuels or imagining a world in which governments reflect the interests of the natural environment rather

than the interests of the wealthy) explained variability in willingness to engage in pro-environmental activist behaviors even when controlling for other known antecedents of collective action.

Focus on Behavioral Outcomes

An important limitation of much work in the behavioral sciences is that outcome measures usually reflect self-reported behavior, not actual behavior (Baumeister, Vohs, & Funder, 2007). Attitudes, intentions, or willingness to engage in a behavior may have only moderate to weak associations with actual behavior and there are numerous barriers to engaging in actual pro-environmental behavior (e.g., Kormos & Gifford, 2014), which could reduce the effects seen in studies with non-behavioral outcomes. While the preliminary evidence from Wright et al. (2020) is promising, in the current study, we focus on an actual behavior that has the potential to positively alter the status relations between humans and the rest of nature—petitioning the Canadian Minister of Environment and Climate Change. We focus on this behavior because it is doable for most people, has the potential to influence change, is an important mechanism within democratic governments, and is frequently included in self-report measures of activism.

Current Study

In the current study we examine the relationship between environmental cognitive alternatives and pro-environmental collective action. In a preregistered study, we attempt to replicate the factor structure of the recently devised ECAS (Wright et al., 2020). Additionally, we examine the scale's discriminant validity with two more general, but related, constructs (imagination and consideration of future consequences) to confirm that the ECAS is measuring

specific access to environmental cognitive alternatives rather than general ability that applies across contexts. Further, we attempt to replicate two effects within Wright et al. (2020):

1. Positive association between the ECAS and identification with environmental activists when controlling for current models of collective action.
2. Positive association between the ECAS and willingness to engage in pro-environmental activist behaviors when controlling for current models of collective action.

Finally, we expand on these findings to examine whether the ECAS predicts the likelihood that individuals will write a letter urging the Canadian Minister of the Environment and Climate Change to fulfill Canada's commitment to reducing carbon emissions and we give individuals the opportunity to sign their letters if they desire to do so. This leads to our third hypothesis:

3. Positive association between the ECAS and likelihood of writing and signing a pro-environmental letter when controlling for current models of collective action.

Method

Participants

We contracted Qualtrics Panels to recruit 1000 participants representative of the Canadian population on gender, ethnicity, and age. Prior to receiving the sample, Qualtrics screened out respondents who did not confirm Canadian residency, failed the included attention check question, or failed Captcha verification. We received 1031 valid responses from Qualtrics. Once we received the data, we reviewed the open-ended responses, which were completed by a portion of the sample as part of a behavioral dependent variable. Nonsensical responding (e.g., a single random word or random digit inserted into a textbox) can be indicative of a bot programmed to

complete online surveys or could be indicative of a careless respondent. We excluded data from two respondents on the basis of nonsensical responding to the open-ended portion of the study. This resulted in a final sample of 1029 Canadian residents who are representative of the Canadian population on gender (52.9% Female, 47.1% Male), age ($M = 47.12$, $SD = 17.10$) and ethnicity (see Table 1). All exclusions followed the preregistration (<https://osf.io/b56ry>).

Table 1.

Ethnic Distribution of Sample.

Ethnic Category	<i>n</i>	% of Sample
White	766	74.4
South Asian	58	5.6
Filipino	25	2.4
Chinese	55	5.3
Southeast Asian	11	1.1
Arab	28	2.7
Korean	5	0.5
Black	37	3.6
Latino	14	1.4
West Asian	5	0.5
Japanese	5	0.5
Aboriginal	54	5.2
Other	6	0.6

Procedure and Measures

Following informed consent, participants completed demographic questions, which included country of residence, age, gender, ethnicity, and political orientation. Additionally, participants completed a scale measuring identification with nature. Country of residence was used by Qualtrics to screen out non-Canadian residents, and age, gender and ethnicity were used to match quotas representative of the general population of Canada. While we provide brief descriptions of measures in text, the full measures are available here: <https://osf.io/24yeq/>.

Political orientation. Participants were asked to describe their views on both economic and social issues on a scale ranging from 1, “very liberal” to 7, “very conservative”. Both items were highly correlated ($r = .78$) and combined for reporting zero-order correlations. Higher scores reflect greater conservatism.

Identification with nature. Participants reported their agreement with 8 items (e.g., “I feel strong ties to other parts of nature”) adapted from Cameron (2004). Higher scores are indicative of a stronger identification with nature ($\alpha = .84$).

Following these two scales, participants read the framing paragraph for the Environmental Cognitive Alternatives Scale (Wright et al. 2020):

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 behavior 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 then completed the following measures in the order described. Except where indicated, all measures were responded to on a scale from 1, “strongly disagree” to 7, “strongly agree”, relevant items were reverse-scored, and items were averaged so that higher scores are indicative of more of the construct of interest.

Environmental cognitive alternatives. Participants completed the 10-item Environmental Cognitive Alternatives Scale (ECAS: Wright et al. 2020), which measures the extent to which individuals can imagine alternatives to the current status relation between humans and the rest of nature ($\alpha = .91$).

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 (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) for the environmental context ($\alpha = .64$).

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”) and five items representing the perceived legitimacy of the inequality in how human groups are affected by climate change and inequality in the power of groups to determine environmental policy (e.g., “It is unfair that some groups will be more affected by climate change than others”). The scales reflected marginal internal consistency ($\alpha = .59$ & $.64$ respectively).

Perceived environmental threat. We measured perceived threat to the environment with four items from the New Environmental Paradigm scale (e.g., “Over-consumption is posing a serious risk to humankind and life on planet earth”; Dunlap, Van Liere, Mertig, & Jones, 2000). The scale reflected good internal consistency ($\alpha = .85$).

Moral obligation. We measured moral obligation with five items (e.g., “I feel that I have a duty to preserve the environment for future generations”; Schmitt et al., 2019). The scale reflected good internal consistency ($\alpha = .86$).

Collective anger. We measured collective anger toward humans’ treatment of the environment (e.g., “I feel anger about the way humans treat the environment”) and collective anger at the unequal effects of climate change on human groups (e.g., “It makes me mad to think about how some groups are exposed to more pollution than others”) with three items each. Items

were adapted from Becker, Tausch, & Wagner (2011). These items were combined into one collective anger measure given the high correlation between the two scales ($r = .71$) and an exploratory factor analysis that suggested a single factor structure. The scale reflected good internal consistency ($\alpha = .91$).

Efficacy. We measured participative efficacy (e.g., “As an individual, I can contribute greatly to humans working together to stop environmental degradation”) and group efficacy (e.g., “As a group, humans can stop environmental degradation”) using four items each adapted from van Zomeren, Saguy, & Schellhass (2013). These items were combined into one efficacy measure given the high correlation between the two scales ($r = .74$) and an exploratory factor analysis that suggested a single factor structure. The scale showed good internal consistency ($\alpha = .93$).

Identification with environmental activists. We measured identification with environmental activists using eight items (e.g., “I feel strong ties to environmental activists”; Cameron, 2004). The scale showed good internal consistency ($\alpha = .90$).

Environmental self-identity. We measured environmental self-identity using three items (e.g., “Acting environmentally friendly is an important part of who I am”; van der Werff et al., 2013). The scale showed good internal consistency ($\alpha = .88$).

Activist behavior. We measured willingness to engage in activist behavior with 10 items (e.g., “Give money to environmental groups”; Schmitt et al., 2019). Participants responded with their willingness to engage in each behavior presented on a scale ranging from 1, “Very unwilling” to 7, “Very willing”. The scale showed good internal consistency ($\alpha = .96$).

Climate change beliefs. We measured three beliefs about climate change: that climate change is occurring (e.g., “I am quite sure that global warming is occurring now”), that climate

change is mostly caused by human activity (e.g., “The main causes of global warming are human activities”), and that climate change will result in negative consequences (e.g., “The consequences of global warming will be harmful for the environment”; Heath & Gifford, 2006). For each belief, participants responded to three statements. All nine climate change belief items were combined into one score because all three climate change beliefs were highly correlated with one another (r 's = .73-.78) and an exploratory factor analysis suggested all nine items reflected a single common factor. The scale showed good internal consistency ($\alpha = .92$).

Imagination. We measured trait levels of imagination with nine items derived from the International Personality Item Pool (IPIP), which were designed as an open source alternative to the “fantasy” facet of the openness to experience factor from the NEO-PI-R (e.g., “Have a vivid imagination”). The IPIP imagination scale correlates highly with the NEO-PI-R fantasy scale ($r = .74$) and showed adequate internal consistency in our sample (.82).

Consideration of future consequences. We measured the extent to which participants consider future consequences in decision-making with eight items (e.g., “Often I engage in a particular behavior in order to achieve outcomes that may not result for many years”; Petrocelli, 2003). The scale reflected good internal consistency ($\alpha = .82$).

Letter writing. In the final section of the survey, we gave participants the opportunity to contact their government minister and express their views on the environment in a letter. All participants viewed the following:

Now that you have completed the study, we would like to give you the opportunity to contact your government and express your views on the environment.

As you may know, the Canadian government signed the 2016 Paris Climate Accords. In part, this agreement calls for halting the global increase in

temperature by reducing greenhouse gas emissions to below 30% of 2005 levels. Despite this, current carbon emissions within Canada are not on track to meet the goals of the Paris Climate Accords. We would now like to provide you an opportunity to write an anonymous letter to Catherine McKenna, Federal Minister of Environment and Climate Change, urging her to fulfill Canada's commitment to reducing carbon emissions. If you choose to write a letter, we will print and mail your letter to Catherine McKenna's office on your behalf. Regardless of whether you choose to write a letter or not, this will not affect your compensation for participating in this study. Would you like to write a letter now?

If a participant responded “yes” then they were provided a textbox from which to type their letter. Following this task, we then provided the option of signing one’s name to the letter. Whether an individual wrote a letter or signed their letter acts as a behavioral dependent variable to examine the predictive effect of the ECAS on one specific pro-environmental activist behavior. Because respondents could select the option to write a letter but subsequently leave the textbox blank or could agree to sign the letter but leave the signing box blank, we examined each of these and recoded as necessary to reflect whether a respondent actually wrote a letter in support of climate change initiatives and signed their name.

Results

We report descriptive statistics for all measured variables in Table 2.

Confirmatory Factor Analysis

In line with our preregistered analytic plan, we first examined the factor structure of the ECAS. We conducted a confirmatory factor analysis with maximum likelihood estimation with

robust standard errors and specified preregistered correlated residuals between item four (“I can imagine a world where politicians care more about minimizing the population’s negative impact on the environment than economic growth”) and six (“I can easily imagine a system in which the government reflects the interests of the natural environment rather than the interests of the wealthy”). All 10 items were specified to load on one cognitive alternatives factor. This model showed excellent fit to the data, $\chi^2(34) = 137.95$, RMSEA = .055 [.045, .064], CFI = .97, TLI = .96, SRMR = .03. Factor loadings ranged from .63 to .77 ($M = .71$).

Discriminant Validity

In line with our preregistered analytic plan, we examined the correlations between the ECAS and both imagination ($r = .22$) and consideration of future consequences ($r = .16$). We consider both of these correlations evidence that imagined cognitive alternatives is distinct from the personality facet of imagination and the ability to imagine future consequences of behaviors. While these general qualities may predispose someone to a greater ability to imagine environmental cognitive alternatives, they are distinct constructs.

Table 2.

Zero-order correlations.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. ECAS																	
2. Imagination	.22																
3. FC	.16	.17															
4. PO	-.23	-.20	-.20														
5. Nature ID	.49	.32	.42	-.27													
6. Stability	-.35	.01	.02	.06	-.12												
7. LHH	.03	-.16	-.38	.26	-.23	-.18											
8. LHN	-.03	-.14	-.49	.24	-.31	-.12	.57										
9. PET	.30	.19	.40	-.35	.41	.10	-.35	-.51									
10. MO	.54	.17	.35	-.28	.54	-.17	-.17	-.31	.61								
11. Anger	.42	.22	.27	-.26	.44	-.00	-.27	-.36	.64	.66							
12. Efficacy	.58	.15	.21	-.23	.43	-.36	-.06	-.17	.47	.72	.56						
13. Activist ID	.57	.16	.24	-.31	.50	-.20	-.04	-.12	.41	.59	.48	.60					
14. ESI	.53	.15	.30	-.18	.54	-.20	-.08	-.19	.40	.66	.55	.60	.55				
15. CCBeliefs	.26	.17	.42	-.40	.36	.02	-.36	-.48	.76	.55	.54	.45	.41	.35			
16. AB	.58	.21	.21	-.33	.46	-.22	-.04	-.08	.42	.64	.52	.60	.71	.58	.41		
17. # Characters	.17	.06	.17	-.05	.19	-.04	-.03	-.03	.12	.16	.13	.15	.21	.19	.14	.22	
18. Wrote Letter	.20	.08	.14	-.09	.21	-.12	-.04	-.05	.15	.20	.14	.20	.24	.23	.18	.27	.61
19. Signed	.22	.07	.13	-.06	.20	-.13	.00	-.03	.12	.19	.14	.17	.23	.22	.15	.26	.63
<i>M</i>	4.50	4.77	4.62	3.66	4.85	4.26	3.23	2.49	5.59	5.44	5.52	5.31	3.75	5.35	5.70	4.18	39.24
<i>SD</i>	1.20	1.06	.98	1.41	1.01	1.15	1.13	1.28	1.22	1.07	1.14	1.12	1.27	1.10	1.17	1.54	161.70
α	.91	.82	.82	.78 ¹	.84	.64	.64	.59	.85	.86	.91	.93	.90	.88	.92	.96	

Note: ECAS = Environmental Cognitive Alternatives Scale; FC = Consideration of Future Consequences; PO = Political Orientation; Nature ID = Identification with Nature; LHH = Legitimacy of Human to Human relations; LHN = Legitimacy of Human to Nature relations; PET = Perceived Environmental Threat; MO = Moral Obligation; Anger = Collective Anger; Activist ID = Identification with Environmental Activists; CCBeliefs = Climate Change Beliefs; AB = Willingness to engage in activist behavior

¹ Pearson's correlation.

Environmental Activist Identity

Following our preregistered analytic plan, we used MPLUS and maximum likelihood estimation with robust standard errors (MLR) to regress identification with environmental activists on the ECAS, identification with nature, perceptions of stability, perceptions of legitimacy, and beliefs about climate change. In a second model we examined whether the relationship between the ECAS and environmental activist identity is retained when additional controls are included. These include environmental self-identity, perceived environmental threat, moral obligation, collective anger at environmental inequality, and efficacy. As seen in Table 3, the ECAS continues to predict environmental activist identity even once extensive controls are included, $\beta = .22$, 95% CI: [.16, .29]. Those who can more clearly imagine alternative possibilities to the current way that humans treat the natural world are also more inclined to identify as environmental activists.

Table 3.

The effect of environmental 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
ECAS	.40	.33, .46	.37	.31, .44	.23	.16, .30	.22	.16, .29
Nature ID	.31	.23, .40	.25	.18, .31	.20	.12, .28	.16	.10, .22
Stability	-.03	-.09, .03	-.03	-.08, .03	.02	-.04, .09	.02	-.04, .08
Legitimacy-N	.06	-.00, .13	.06	-.00, .13	.09	.03, .15	.09	.03, .15
Legitimacy-H	.07	.00, .14	.06	.00, .12	.05	-.01, .11	.04	-.01, .10
CCBeliefs	.30	.24, .36	.28	.22, .33	.14	.07, .21	.13	.06, .20
ESI					.13	.05, .21	.11	.04, .18
PET					.02	-.06, .10	.02	-.06, .10

MO	.12	.02, .21	.10	.02, .17
Anger	.05	-.03, .13	.05	-.02, .12
Efficacy	.23	.13, .32	.20	.12, .28
R^2	.45		.51	

Note: ECAS = Environmental Cognitive Alternatives Scale; Nature ID = Identification with Nature; Legitimacy-N = Legitimacy of the current status between humans and nature; Legitimacy-H = Legitimacy of the current inequality in how human groups influence climate change; CCBeliefs = Believe that climate change is real, caused by humans, and has negative consequences; ESI = Environmental Self-Identity; PET = Perceived Environmental Threat; MO = Moral Obligation; EFF = Efficacy

Willingness to Engage in Environmental Activism

Following our preregistered analytic plan, we used MPLUS and maximum likelihood estimation with robust standard errors (MLR) to regress environmental activism on the ECAS, identification with nature, identification with environmental activists, perceptions of stability, perceptions of legitimacy, and beliefs about climate change. In a second model we examined whether the relationship between the ECAS and environmental activism is retained when additional controls are included. These include environmental self-identity, perceived environmental threat, moral obligation, collective anger at environmental inequality, and efficacy. As seen in Table 4, the ECAS continues to predict willingness to engage in activist behaviors even once extensive controls are included, $\beta = .11$, 95% CI: [.05, .17]. Those who can more clearly imagine alternative possibilities to the current way that humans treat the natural world are more willing to participate in activist environmental behaviors.

Table 4.

The effect of environmental cognitive alternatives on willingness to engage in activist behaviors.

	Model 1				Model 2			
	<i>b</i>	95% CI	β	95% CI	<i>b</i>	95% CI	β	95% CI
ECAS	.26	.18, .34	.20	.14, .26	.14	.07, .22	.11	.05, .17
EAI	.59	.52, .67	.49	.43, .55	.48	.41, .55	.39	.34, .45
Nature ID	.11	.03, .19	.07	.02, .13	.01	-.07, .09	.00	-.05, .06
Stability	-.05	-.11, .01	-.04	-.08, .00	-.04	-.09, .02	-.03	-.07, .02
Legitimacy-N	.09	.03, .16	.08	.02, .13	.13	.07, .20	.11	.06, .16
Legitimacy-H	.01	-.06, .08	.01	-.04, .06	.00	-.06, .06	.00	-.05, .05
CCBelief	.23	.16, .30	.17	.12, .22	.10	.02, .18	.08	.02, .14
ESI					.13	.05, .21	.09	.03, .15
PET					-.00	-.09, .08	-.01	-.07, .06
MO					.29	.18, .40	.20	.13, .27
Anger					.11	.03, .19	.08	.02, .14
Efficacy					.05	-.05, .14	.03	-.04, .10
R^2	.57				.62			

Note: ECAS = Environmental Cognitive Alternatives Scale; Nature ID = Identification with Nature; Legitimacy-N = Legitimacy of the current status between humans and nature; Legitimacy-H = Legitimacy of the current inequality in how human groups influence climate change; CCBeliefs = Believe that climate change is real, caused by humans, and has negative consequences; ESI = Environmental Self-Identity; PET = Perceived Environmental Threat; MO = Moral Obligation; EFF = Efficacy

Activist Behavior

To extend our understanding beyond self-report outcomes, we examined the role of imagining cognitive alternatives in predicting a direct activist behavior: writing a pro-environmental letter to a government representative and signing the letter. Following our

preregistered analytic plan, we conducted a multinomial logistic regression with having not written a letter as the reference category. This analysis compares those who wrote a letter but did not sign it to the reference category and compares those who wrote and signed their letter to the reference category. As evidenced in Table 5, being able to imagine cognitive alternatives was associated with an increased likelihood that an individual wrote and signed a letter in support of climate change action, OR = 1.37 [1.03, 1.83]. Once additional controls were included (see Table 6), this effect was reduced, OR = 1.30 [.96, 1.77].

Table 5.

The effect of environmental cognitive alternatives on writing and signing a pro-environmental letter.

	Model 1: Wrote Letter/Not signed				Model 1: Wrote and Signed Letter			
	<i>b</i>	<i>p</i>	OR	95% CI	<i>b</i>	<i>p</i>	OR	95% CI
ECAS	-.10	.58	0.90	0.63, 1.30	.32	.03	1.37	1.03, 1.83
EAI	.21	.23	1.24	0.88, 1.74	.28	.03	1.32	1.03, 1.69
Nature ID	.16	.47	1.18	0.75, 1.84	.34	.05	1.41	1.00, 1.98
Stability	-.15	.34	0.86	0.64, 1.17	-.27	.02	.76	.61, .96
Legitimacy-N	.19	.32	1.20	0.84, 1.74	.06	.65	1.06	.82, 1.37
Legitimacy-H	-.25	.20	0.78	0.53, 1.14	.17	.21	1.18	.91, 1.53
CCBelief	.53	.04	1.69	1.03, 2.78	.60	.002	1.83	1.24, 2.69
<i>R</i> ²	.18							

Table 6.

The effect of environmental cognitive alternatives on writing and signing a pro-environmental letter.

	Model 2: Wrote Letter/Not Signed				Model 2: Wrote and Signed Letter			
	<i>b</i>	<i>p</i>	OR	95% CI	<i>b</i>	<i>p</i>	OR	95% CI
ECAS	-.140	.46	.87	.60, 1.26	.26	.09	1.30	.96, 1.77
EAI	.15	.44	1.16	.80, 1.67	.23	.09	1.25	.96, 1.63
Nature ID	.11	.66	1.11	.70, 1.77	.25	.16	1.29	.91, 1.83
Stability	-.05	.76	.95	.68, 1.32	-.26	.04	.77	.61, .99
Legitimacy-N	.22	.26	1.24	.85, 1.80	.03	.83	1.03	.79, 1.34
Legitimacy-H	-.32	.11	.73	.49, 1.07	.16	.25	1.17	.90, 1.53
CCBelief	.43	.17	1.53	.84, 2.81	.70	.002	2.01	1.29, 3.15
ESI	.23	.36	1.26	.77, 2.05	.56	.01	1.74	1.14, 2.68
PET	.28	.33	1.32	.75, 2.32	-.20	.33	.82	.55, 1.22
MO	-.09	.78	.92	.50, 1.67	.19	.45	1.20	.74, 1.95
Anger	-.47	.05	.63	.40, .99	-.09	.62	.91	.63, 1.33
Efficacy	.42	.14	.53	.87, 2.68	-.27	.20	.76	.50, 1.16
<i>R</i> ²	.20							

As an additional preregistered exploratory dependent variable, we examined the models reported in Tables 3 and 4 using the character count from the letter writing task as the dependent variable. We reasoned that the amount individuals' write could be a metric of dedication to the pro-environmental letter writing task and thus could be indicative of pro-environmental behavior beyond the choice to write a letter. These analyses are reported in the supplemental materials online (<https://osf.io/24yeq/>); however, we found no evidence that imagining cognitive alternatives was related to the amount of text individuals wrote in their letters once control

variables were included. We did find that environmental activist identity, $\beta = .12$, 95% CI [.01, .23] was associated with the character count of the letters beyond our control variables. Subsequently, we examine a series of preregistered mediation models that conceptualize environmental activist identity as a proximal predictor of pro-environmental behavior and we conceptualize an indirect effect of imagining cognitive alternatives on pro-environmental behavior through strengthening environmental activist identity.

Preregistered Mediation Models

Willingness to engage in activist behavior. Given prior literature suggesting that environmental activist identity is a proximal predictor of environmental activist behavior, we conducted a preregistered mediation model with activist identity mediating the effect of environmental cognitive alternatives on willingness to engage in activist behavior. We used maximum likelihood with robust standard errors in MPLUS to estimate the mediation model and specified latent variables with parcels as the indicators of each latent variable.² We used an item-to-construct balanced approach to create parcels, which balances average item loading across the parcels (Little, Cunningham, Shahar, & Widaman, 2002). This approach minimizes random error variance and improves stability of parameter estimates (Bandalos, 2002; Matsunaga, 2008). Figure 1 displays this mediation model with parameter estimates for the mediation paths and factor loadings for the latent variables. This model had excellent fit to the data, $\chi^2 (24) = 56.05$, $p < .001$, RMSEA = .04 [.02, .05], TLI = .99, SRMR = .02. The model is consistent with an indirect effect of environmental cognitive alternatives on willingness to engage in activist behavior, $\beta = .38$ [.33, .42].

² Items within each parcel are detailed on the OSF: <https://osf.io/24yeq/>

Figure 1. Environmental activist identity mediates the relationship between environmental cognitive alternatives and willingness to engage in activist behavior.

Signing a pro-environmental letter. We examined whether environmental activist identity mediates the relationship between environmental cognitive alternatives and writing and signing a pro-environmental letter for distribution to the Canadian Minister of the Environment and Climate Change. We used the same estimation approach described above since MPLUS handles logistic regression within maximum likelihood estimation. When using maximum likelihood with categorical dependent variables in MPLUS, model fit indices are not defined; therefore, model fit is appropriately not provided for this analysis. Figure 2 displays this mediation model with parameter estimates for the mediation paths and factor loadings for the latent variables. The model is consistent with an indirect effect of environmental cognitive alternatives on writing and signing a pro-environmental letter, $\beta = .18 [.07, .29]$.

Figure 2. Environmental activist identity mediates the relationship between environmental cognitive alternatives and writing and signing a pro-environmental letter.

Finally, we examined the same mediation model using character count from the letter writing task as the dependent variable. Figure 2 displays this mediation model with parameter estimates for the mediation paths and factor loadings for the latent variables. The model is consistent with an indirect effect of environmental cognitive alternatives on how much people wrote in the letter writing task, $\beta = .11$ [.03, .19].

Discussion

Pro-environmental collective action is necessary for achieving positive systemic change to protect the natural environment (IPCC, 2018). By demonstrating the importance of imagining cognitive alternatives to the environmental status quo, our paper contributes meaningfully to social identity models of pro-environmental collective action, which can be used to understand, predict, and promote the necessary systemic change. Our results confirm findings from Wright et

al., (2020), and strengthen the validity of those findings by using quota sampling that matches the national demographics on key characteristics, and by assessing the actual behavior of participants, rather than self-reports.

Validity of the ECAS

Our results confirm the single factor structure of the ECAS reported in Wright et al., (2020), and demonstrates that the ECAS has clear discriminant validity from more general traits such as general imagination or ability to think about future consequences of actions. Likewise, we demonstrate that the ECAS shows clear convergent validity with other relevant constructs such as (in)stability of the current environmental status quo, identification with nature, identification with environmental activists, political liberalism, and beliefs that climate change is occurring, is caused by humans, and has negative consequences.

Replicating Prior Findings

Corroborating prior research (Wright et al., 2020) we demonstrated a robust association between the ECAS and identification with environmental activists. This relationship held when replicating the model from Wright et al. (2020) and was robust to additional control variables, which included theoretically relevant constructs not previously accounted for. Likewise, we demonstrated a robust association between the ECAS and self-reported willingness to engage in environmental activist behaviors. This relationship held when replicating the model from Wright et al. (2020) and was robust to additional control variables.

There are limitations to addressing behavior with self-report instruments. Notably, there are often weak to moderate associations between self-reported traits, attitudes, and behavior and corresponding behavioral outcomes (Cyders & Coskunpinar, 2011; Peterson & Kerin, 1981; Prince et al., 2008). In the pro-environmental literature, Kormos & Gifford (2014) found

moderately strong correlations between self-reported and objective behavior, although this still leaves substantial divergence between self-report and objective measures. Additionally, behaviors examined generally reflected low effort behaviors such as reducing energy or water usage. In behaviors that require more effort or commitment, such as writing petitions or protesting, there may be even more divergence between self-report and behavioral measures because of increased barriers to action. Our results extend our understanding of the ECAS by demonstrating its association with actual pro-environmental behavior.

Our model based upon Wright et al. (2020) demonstrates that the ECAS does predict an increased likelihood of engaging in writing and signing a pro-environmental letter to be sent to the Canadian Minister of the Environment and Climate Change. The caveat to this is that when additional controls are included, this effect is reduced and becomes non-statistically significant based upon traditional criteria. Importantly, the behavior in question is a very specific instance of a pro-environmental activist behavior. As with research on the attitude-behavior link (Maio & Haddock, 2010), broad level constructs (e.g., ECAS) and specific behaviors (e.g., writing a letter) may have weak associations because of lack of correspondence between the specificity of the behavior and the generality of the predictor. Additionally, greater correspondence can be generated by aggregating various behaviors, as is done in common self-report measures (Rushton, Brainerd, & Pressley, 1983). While it may be the case that an individual who scores highly on the ECAS desires to engage in pro-environmental activism, their choice of activist behavior may not necessarily be reflected in writing and signing a letter. The association between the ECAS and environmental activist behavior may be deflated by the specificity of our behavioral task and the lack of aggregation of alternative behaviors.

In order to extend work on environmental cognitive alternatives and activist behavior, we examined a basic exploratory mediation model to demonstrate how, even absent a direct association between the ECAS and activist behavior, the ECAS still has importance for understanding activist behavior more generally. Because identification with environmental activists is a proximal predictor of pro-environmental activism (Schmitt et al., 2020), we considered this as a plausible mediator between access to environmental cognitive alternatives and activist behavior. Our results suggest plausible indirect effects, which reflect the theoretical position that having access to cognitive alternatives may increase identification with an activist group that is willing to engage in behaviors that alter the status quo (Reicher & Haslam, 2006; Tajfel & Turner, 1979). As identification with the activist group heightens, bidirectional effects are likely to take place since increased identification will lead to more involvement with the group. That opens up the possibility for increased identification to lead to access to additional cognitive alternatives through leaders, who can bring cognitive alternatives into being and encourage individuals to act on them (Reicher & Haslam, 2012).

Future Directions

The current research has two main strengths over prior work. First, we used sampling with quotas on key demographic characteristics to ensure that our inferences are drawn from a sample generally reflective of the adult population of Canada. Second, we examine actual behavior in the form of writing and signing a pro-environmental letter to be sent to the Canadian Minister of the Environment and Climate Change. Expanding on our understanding of the role of access to environmental cognitive alternatives involves pursuing multiple lines of inquiry. For example, to what extent can access to cognitive alternatives be promoted in individuals and groups? Are certain kinds of environmental cognitive alternatives more important for promoting

pro-environmental activist behavior than others? A foray into experimental approaches of manipulating cognitive alternatives in participants would be instructive. These experimental approaches can be situated within promising and complex mediational models that more fully encapsulate the routes of influence that access to cognitive alternatives may have, and the myriad factors that may alter access to cognitive alternatives.

The number of potential cognitive alternatives is vast, but they might reasonably be separated into cognitive alternatives that focus on changing status relations between humans and the rest of the natural world and cognitive alternatives that focus on changing status relations between various human groups. Whether these types of cognitive alternatives differentially predict different types of activist behaviors is an interesting direct for future research. Research on access to cognitive alternatives to the status quo has been a generally understudied aspect of SIT (Tajfel & Turner, 1979) and focus on actual behavior has taken a backseat to self-reported measures (Baumeister et al., 2007). We hope our focus on both of these helps spur additional research in this area.

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