

Appendix A – Drought

Table A1 – Study 1 Sample Demographics by Condition – Drought

		1. Human-Single	2. Human- Group	3. Animal-Single	4. Animal-Group	Analytical Sample
Sample	N	89	111	88	81	369
Gender	% Female	49.44	46.85	47.73	56.79	49.86
	% Male	48.31	51.35	51.14	42.31	48.78
	% Other	2.25	1.80	1.14	0.00	1.36
Age	% Gen Z	8.99	6.31	5.68	14.81	8.67
	% Millennials	23.60	26.13	34.09	17.28	25.47
	% Generation X	22.47	28.83	23.86	23.46	24.93
	% Baby Boom/Silent G	44.94	38.74	36.36	44.44	40.92
Education	% HS or Less	38.20	43.24	39.77	38.27	40.11
	% Some College	20.22	18.02	18.18	18.52	18.70
	% College Grad	26.97	26.13	25.00	27.16	26.29
	% Professional	14.61	12.61	17.05	16.05	14.91
Political	% Democrat	54.55	52.25	44.32	55.56	51.63
	% Republican	27.27	36.04	37.50	23.46	31.52
	% Independent	18.18	11.71	18.18	20.99	16.85

Vote	% Voted in Last Election - Yes	77.53	79.28	80.68	77.78	78.86
Race	% White	66.29	81.08	76.14	69.14	73.71
	% Other	33.71	18.92	23.86	30.86	26.29
Income	% earning up to \$19,999	15.12	14.81	11.63	21.05	15.45
	% earning \$20,000 - \$29,999	13.95	20.37	19.77	10.53	16.57
	% earning \$30,000 - \$39,999	11.63	11.11	11.63	15.79	12.36
	% earning 40,000 - \$49,999	10.47	12.96	9.30	13.16	11.52
	% earning 50,000 - \$74,999	20.93	22.22	20.93	18.42	20.79
	% earning 75,000 or more	27.91	18.52	26.74	21.05	23.31
	PD	PD Composite	0.44	0.42	0.40	0.36
EE	Emotional Engagement Composite	2.60	2.61	2.56	2.55	2.58
	<i>Positive Emotions</i>	2.89	2.98	2.97	2.97	2.95
	<i>Negative Emotions</i>	2.30	2.24	2.14	2.14	2.21
	Behavioral Intent	5.27	4.79	5.28	5.50	5.18
	Donation Behavior (% Donated)	49.44	42.34	43.18	58.02	47.70
	Belief in Climate Change (% Believe)	100.00	100.00	100.00	100.00	100.00
	Climate Concern	4.07	3.93	3.94	4.31	4.05

Note

categorical - chi
square, less than
.05 was race

PD composite change because the scale was
standardized from 0 to 1.

*Please note for all supplementary analysis PD was
measured using the full scale and index provided by
Spence et al., 2012.

Table A2 Study 1 Correlations

<i>Independent Variables</i>	Vote	Climate Concern	Sex	Education	Political	Race	Income
Vote	1.00						
Climate Concern	0.09	1.00					
Sex	-0.01	-0.05	1.00				
Education	0.23	0.15	0.13	1.00			
Political	-0.36	-0.29	0.04	-0.09	1.00		
Race	-0.16	0.11	-0.08	-0.11	-0.12	1.00	
Income	0.25	0.02	0.18	0.41	0.08	-0.08	1.00

<i>Dependent Variables</i>	Behavior Intent	Positive Emotions	Negative Emotions	PD Geographic	PD Social	PD Hypo	PD Temporal	PD Composite	Donation
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Behavior Intent	1.00								
Positive Emotions	0.33	1.00							
Negative Emotions	0.28	0.15	1.00						
PD Geographic	-0.40	-0.17	-0.14	1.00					
PD Social	-0.24	-0.06	0.08	0.41	1.00				
PD Hypo	-0.25	-0.02	-0.02	0.42	0.39	1.00			
PD Temporal	-0.34	-0.11	-0.11	0.44	0.31	0.43	1.00		
PD Composite	-0.43	-0.13	-0.08	0.78	0.68	0.73	0.77	1.00	
Donation	0.39	0.11	0.10	-0.30	-0.16	-0.33	-0.23	-0.34	1.00

Supplementary Analysis 1- Mediation Analysis Drought Study 1.

We also examined the extent to which PD and emotional engagement mediate these effects.

RQ1: Do emotional engagement and PD mediate the relationship between experimental condition and pro-environmental intentions and environmental donations?

H1: Emotional engagement will mediate the relationship between experimental condition and (a) pro-environmental behavioral intent and (b) environmental donations

H2: PD will mediate the relationship between experimental condition and (a) pro-environmental behavioral intent and (b) environmental donations

We also find that psychological distance functions as a mediator, suggesting that animal-focused articles (vs. the human-focused article) increased donations via a reduction in perceived distance.

Mediation Analyses

We further explored the proposed mediation model. The absence of a direct effect between an independent and dependent variable does not preclude the possibility of mediation because one mediator can suppress other indirect effects (Hart, 2011). Consequently, we estimate two mediation models for each dependent variable using methods recommended by Hayes and Preacher (2014). Confidence intervals (95%) were estimated using bias-corrected asymmetric bootstrapping based on 10,000 bootstrap samples (PROCESS, Model 4 v 3.5). In the

analyses shown here, the reference group is set at human-individual. These analyses assessed whether the experimental manipulations affected positive emotion, negative emotion, and PD; and whether those three variables mediated the relationship between condition and pro-environmental behavioral intent and donation behavior.

The PD composite was not normally distributed; therefore, we used a log transformation. We then used the Jarque-Bera goodness of fit test to confirm the transformed distribution met the normality threshold, and the errors were normally distributed. The transformed distribution of PD was then standardized for ease of interpretation.

Figure 1 and Table A3 in Appendix A present the mediation analysis results. Results reveal that condition had no significant impact on positive or negative emotions. However, condition did affect PD. More specifically, the animal-individual and animal-group conditions were associated with lower PD levels relative to the reference group (human-individual). In addition, the three mediating variables were significantly associated with pro-environmental behavioral intent. Positive and negative emotions both positively predicted pro-environmental intentions. PD was also negatively associated with pro-environmental behavioral intent suggesting that as PD declined, pro-environmental intentions increased.

Model results revealed that, PD partially mediated the effect of condition on intentions (indirect effect of animal-individual = 0.18, 95% confidence interval [CI] = 0.01 – 0.36; indirect effect of animal-group = 0.34, 95% CI = 0.17 – 0.54). The estimated means of PD across the four experimental conditions are shown in Figure 3. We can see from this figure that both human conditions were associated with higher PD levels than animal conditions. There is further evidence that PD was higher among the participants assigned to the animal-individual versus the animal-group condition. Contrary to expectations, the animal frames appear to shrink PD more than the human frames, but there was a unique impact of featuring a group of animals.

Figure 2 and Table A4 presents the mediation analysis results predicting pro-environmental donation behavior. Like in the previous model, PD functioned as a mediator, suggesting that the animal (vs. human) manipulation increased donations via a reduction in perceived distance. Unlike the prior model, there was a small and marginally significant relationship between negative emotion and donations ($\beta = 0.23$, $p = .06$), but no effect of positive emotions ($\beta = 0.17$, $p = .22$). In short, emotions generally played a smaller role in predicting donations relative to behavioral intentions. This model revealed no direct effect of condition on the dependent variable.

Discussion

In RQ1, we theorized that positive emotions, negative emotions, and PD would mediate the relationship between experimental condition and the outcome variables. Neither positive nor negative emotions acted as mediators. For this reason, H3a was not supported. There was some evidence that PD partially mediated the relationship between the animal frames and behavioral intent, providing some support for H3c. Overall, the messages emphasizing impacts on animals appeared to shrink perceived PD, resulting in increased intentions to adopt pro-environmental action and donation behavior. People seemed to feel closer to animals than humans, which runs counter to findings

suggesting that featuring animals in climate appeals could be less effective (O'Neill and Nicholson-Cole, 2009; Hart, 2011). These results point to a promising area of future inquiry that more closely looks at the role of emotional engagement and PD when foregrounding certain types and quantities of characters.

Although condition had no impact on positive or negative emotions (failing to support H3b), both emotion variables independently predicted pro-environmental intentions. Though, their relationship with donation behavior was relatively minimal. Emotions, especially negative emotions, are considered compelling in driving behavioral responses. For example, Chu and Yang (2019) found that participants who self-reported greater levels of general anger and anxiety after reading articles about climate change impacts scored higher on pro-environmental behavioral intent. Researchers acknowledge that more research is needed on how emotions operate in environmental communication (Chapman et al., 2017). We add to this body of research by looking at negative and positive emotions but raise questions about the generalizability of findings from intentions to behavior. Here, for example, we see that positive emotions impact pro-environmental behavioral intent but not environmental donations.

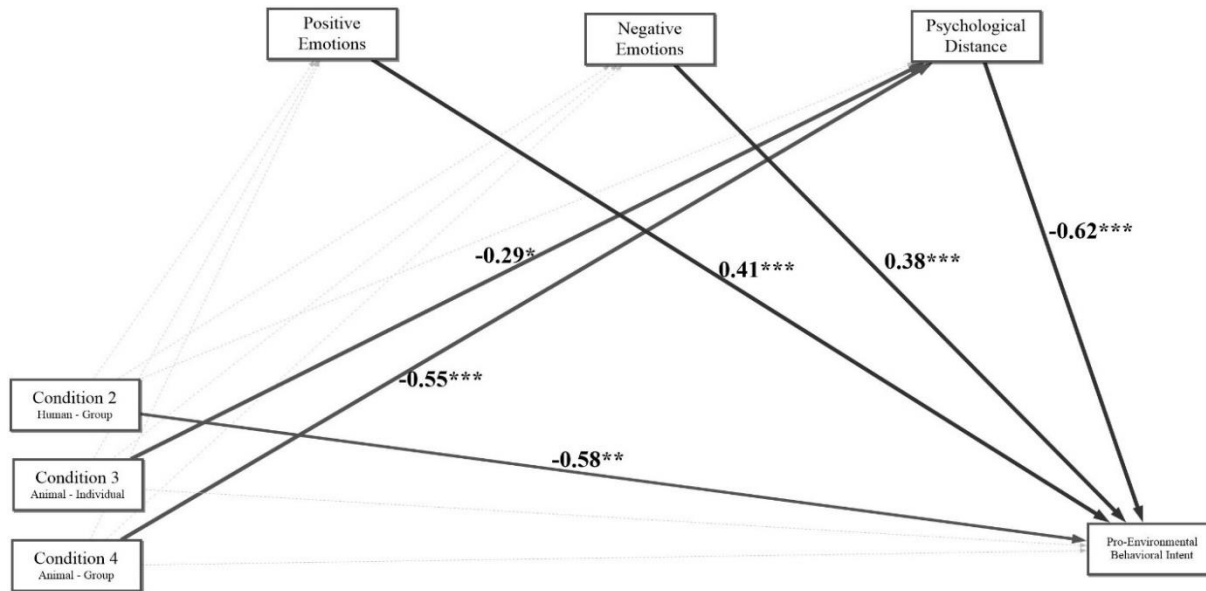


Figure 1 Study 1 Mediation Analysis for Pro-Environmental Behavioral Intent

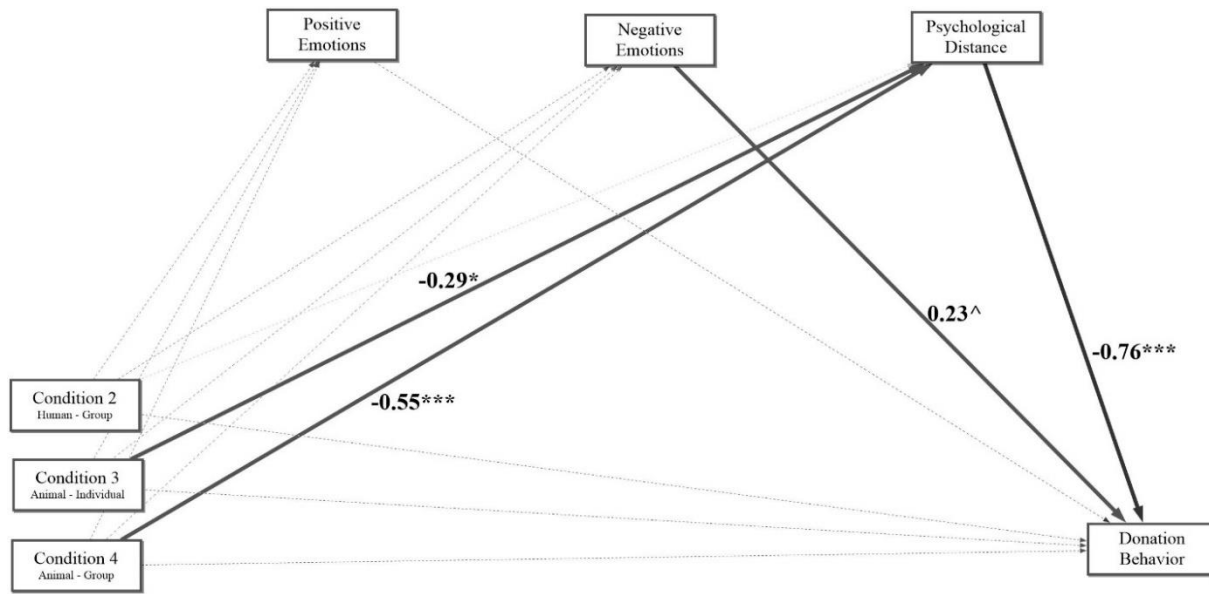


Figure 2 Study 1 Mediation Analysis for Environmental Donation

Table A3 Study 1 Mediation Pro-Environmental Behavioral Intentions

Full bootstrapped mediation model for E1					
Model	Independent Variable(s)	Dependent Variables (s)	b	std. error	p
Xs predicting Y	Condition 2	Behavioral Intent	-0.58	0.21	0.01**
	Condition 3	Behavioral Intent	-0.14	0.23	0.53
	Condition 4	Behavioral Intent	-0.08	0.24	0.72
Xs predicting Ms	Condition 2	Positive Emotions	0.09	0.12	0.45
	Condition 3	Positive Emotions	0.08	0.13	0.52
	Condition 4	Positive Emotions	0.08	0.13	0.56
	Condition 2	Negative Emotions	-0.06	0.13	0.65
	Condition 3	Negative Emotions	-0.17	0.14	0.22
	Condition 4	Negative Emotions	-0.16	0.14	0.24
	Condition 2	Psychological Distance	-0.13	0.13	0.31
	Condition 3	Psychological Distance	-0.29	0.14	0.04*
	Condition 4	Psychological Distance	-0.55	0.14	0.00***
Xs and Ms predicting Y	Positive Emotions	Behavioral Intent	0.41	0.09	0.00***
	Negative Emotions	Behavioral Intent	0.38	0.09	0.00***
	Psychological Distance	Behavioral Intent	-0.62	0.09	0.00***

Table A4 – Mediation Pro-Environmental Behavior Environmental Donation

Full bootstrapped mediation model for E1					
Model	Independent Variable(s)	Dependent Variables (s)	b	std. error	p
Xs predicting Y	Condition 2	Donation Behavior	-0.42	0.31	0.17

Xs predicting Ms	Condition 3	Donation Behavior	-0.48	0.32	0.14
	Condition 4	Donation Behavior	-0.01	0.33	0.98
	Condition 2	Positive Emotions	0.09	0.12	0.45
	Condition 3	Positive Emotions	0.08	0.13	0.52
	Condition 4	Positive Emotions	0.08	0.13	0.56
	Condition 2	Negative Emotions	-0.06	0.13	0.65
	Condition 3	Negative Emotions	-0.17	0.14	0.22
	Condition 4	Negative Emotions	-0.16	0.14	0.24
	Condition 2	Psychological Distance	-0.13	0.13	0.31
	Condition 3	Psychological Distance	-0.29	0.14	0.04*
Xs and Ms predicting Y	Condition 4	Psychological Distance	-0.55	0.14	0.00***
	Positive Emotions	Donation Behavior	0.17	0.13	0.22
	Negative Emotions	Donation Behavior	0.23	0.12	0.06^
	Psychological Distance	Donation Behavior	-0.76	0.13	0.00***

Appendix B – Wildfires

Table B1 Study 2 Sample Demographics by Condition

	1. Human- Single	2. Human- Group	3. Animal- Single	4. Animal- Group	Analytical Sample
N	119	82	86	91	378

% Female	57.14	50.00	52.33	52.75	53.44
% Male	42.02	50.00	47.67	47.25	46.30
% Other	0.84	0.00	0.00	0.00	0.26
% Gen Z	10.08	9.76	6.98	5.49	8.20
% Millennials	42.86	26.83	32.56	27.47	33.33
% Generation X	15.97	20.73	18.60	29.67	20.90
% Baby Boom/Silent G	31.09	42.68	41.86	37.36	37.57
% HS or Less	42.86	31.71	38.37	39.56	38.62
% Some College	12.61	20.73	23.26	20.88	18.78
% College Grad	31.93	32.93	18.60	21.98	26.72
% Professional	12.61	14.63	19.77	17.58	15.87
% Democrat	57.98	57.50	66.28	62.22	60.80
% Republican	28.57	32.50	23.26	17.78	25.60
% Independent	13.45	10.00	10.47	20.00	13.60
% Voted in Last Election - Yes	84.87	93.90	81.40	82.42	85.45
% White	73.11	64.63	69.77	72.53	70.37
% Other	26.89	35.37	30.23	27.47	29.63
% earning up to \$19,999	15.24	16.88	17.28	14.77	15.95
% earning \$20,000 - \$29,999	8.57	14.29	17.28	21.59	15.10
% earning \$30,000 - \$39,999	13.33	11.69	17.28	6.82	12.25
% earning 40,000 - \$49,999	13.33	11.69	3.70	13.64	10.83
% earning 50,000 - \$74,999	20.95	19.48	19.75	18.18	19.66

% earning 75,000 or more	28.57	25.97	24.69	25.00	26.21
PD Composite	0.39	0.41	0.40	0.40	0.40
Emotional Engagement Composite	2.60	2.63	2.86	2.54	2.65
<i>Positive Emotions</i>	3.00	3.08	3.26	2.94	3.07
<i>Negative Emotions</i>	2.19	2.17	2.46	2.14	2.23
Behavioral Intent	5.08	5.46	5.23	5.22	5.23
Donation Behavior (% Donated)	47.90	52.44	44.19	48.35	48.15
Belief in Climate Change (% Believe)	100.00	100.00	100.00	100.00	100.00
Climate Concern	4.18	4.11	4.38	4.09	4.19

Note

categorical - chi square, less than .05 was

race

PD composite change because scale was standardized from 0 to 1.

Table B2 Study 2 Correlations

<i>Independent Variables</i>	Vote	Climate Concern	Sex	Education	Political	Race	Income
Vote	1.00						
Climate Concern	0.14	1.00					
Sex	0.12	-0.10	1.00				
Education	0.28	0.18	0.22	1.00			
Political	-0.29	-0.35	0.06	-0.13	1.00		

Race	0.09	-0.09	0.07	0.00	0.11	1.00	
Income	0.23	0.08	0.18	0.46	-0.08	0.10	1.00

<i>Dependent Variables</i>	Behavior Intent	Positive Emotions	Negative Emotions	PD Geographic	PD Social	PD Hypo	PD Temporal	PD Composite	Donation
Behavior Intent	1.00								
Positive Emotions	0.27	1.00							
Negative Emotions	0.24	0.12	1.00						
PD Geographic	-0.33	-0.05	-0.10	1.00					
PD Social	-0.17	0.05	-0.04	0.37	1.00				
PD Hypo	-0.22	0.00	0.00	0.41	0.33	1.00			
PD Temporal	-0.24	-0.06	-0.09	0.46	0.31	0.47	1.00		
PD Composite	-0.33	-0.03	-0.09	0.79	0.64	0.73	0.78	1.00	
Donation	0.30	0.00	0.13	-0.30	-0.25	-0.41	-0.23	-0.40	1.00

Supplementary Analysis 2- Mediation Analysis Wildfire Study 2

Mediation Analyses

Again, we estimate two mediation models for each dependent variable using the same procedures described in Study 1. The PD composite was, again, not normally distributed and, therefore we used the log transformed distribution.

Figure 3 and Table B3 in Appendix B present the mediation analysis results predicting pro-environmental behavioral intent. Results reveal that only the animal-individual condition significantly impacted both positive emotions ($\beta = 0.25$, $p = .04$) and negative emotions ($\beta = 0.27$,

$p=.05$). This suggests that the animal-individual condition did affect emotions. More specifically, the animal-individual condition was associated with higher levels of both positive and negative emotions relative to the reference group (human-individual).

The three mediating variables all had significant associations with pro-environmental behavioral intent. More specifically, positive and negative emotions positively and independently predicted pro-environmental intentions (positive emotions: $\beta = 0.43$, $p < .001$; negative emotions: $\beta = 0.31$, $p < .001$). The former effect reveals that positive emotions partially mediated the effect of animal-individual condition on intentions (indirect effect of animal-individual = 0.11, 95% confidence interval [CI] = 0.01 – 0.23). We also looked at the effect of animal-individual condition on intentions via negative emotions, which was not significant (indirect effect of animal-individual = 0.08, 95% confidence interval [CI] = 0.00 – 0.20).

The estimated means of both positive and negative emotions across the four experimental conditions are shown in Figure 3. We can see from this figure that the animal-individual condition was associated with higher levels of both positive and negative emotions than the other conditions. It appears there was a unique impact of featuring an individual animal that activated emotion irrespective of whether it was positive or negative.

The association between PD and pro-environmental behavioral intent was also significant ($\beta = -0.38$, $p < .001$), suggesting that as PD declined, pro-environmental intentions increased. There also remained a small direct effect of condition on behavioral intent. The animal-individual condition was again associated with lower pro-environmental behavioral intent than the other conditions ($\beta = 0.40$, $p = .08$).

Figure 4 and Appendix B Table B4 present the mediation analysis results predicting pro-environmental behavior or donation behavior. Unlike in the previous model, negative emotions did function as a mediator, suggesting that the animal (vs. human) manipulation increased donations via an increase in negative emotions (indirect effect of animal-individual = 0.09, 95% confidence interval [CI] = 0.001 – 0.24). Like the prior model, there was a significant relationship between negative emotion and donations ($\beta = 0.35$, $p < .001$), but no effect of positive emotion on donations ($\beta = 0.02$, $p = 0.90$). This model revealed no direct effect of condition on the dependent variable.

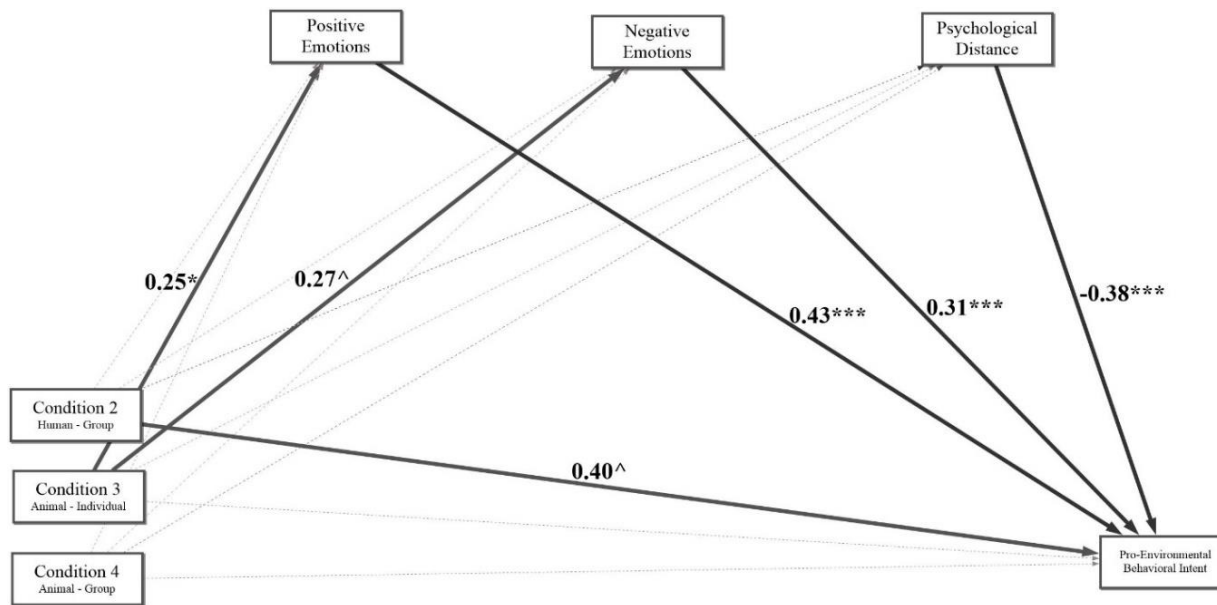


Figure 3. Study 2 Mediation Analysis for Pro-Environmental Behavioral Intent

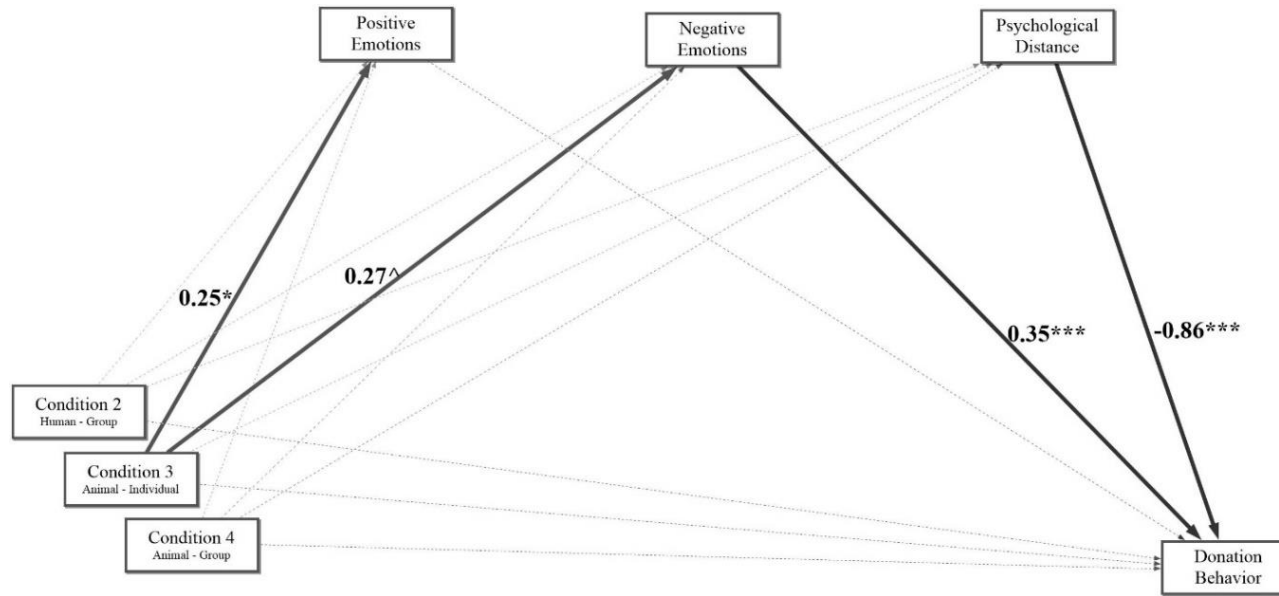


Figure 4. Study 2 Mediation Analysis for Environmental Donation

Table B3 Study 2 Mediation Analyses Pro-Behavioral Intent

Full bootstrapped mediation model for E2					
Model	Independent Variable(s)	Dependent Variables (s)	b	std. error	p
Xs predicting Y	Condition 2	Behavioral Intent	0.40	0.22	0.08^
	Condition 3	Behavioral Intent	-0.05	0.22	0.81
	Condition 4	Behavioral Intent	0.16	0.22	0.45
Xs predicting Ms	Condition 2	Positive Emotions	0.07	0.12	0.55

Xs and Ms predicting Y	Condition 3	Positive Emotions	0.25	0.12	0.04*
	Condition 4	Positive Emotions	-0.07	0.12	0.55
	Condition 2	Negative Emotions	-0.02	0.14	0.88
	Condition 3	Negative Emotions	0.27	0.14	0.05^
	Condition 4	Negative Emotions	-0.04	0.13	0.74
	Condition 2	Psychological Distance	0.11	0.13	0.39
	Condition 3	Psychological Distance	-0.02	0.13	0.86
	Condition 4	Psychological Distance	-0.04	0.12	0.75
	Positive Emotions	Behavioral Intent	0.43	0.09	0.00***
	Negative Emotions	Behavioral Intent	0.31	0.08	0.00***
	Psychological Distance	Behavioral Intent	-0.38	0.09	0.00***

Table B4 Study 2 Mediation Pro-Environmental Behavior Environmental Donation

Full bootstrapped mediation model for E2					
Model	Independent Variable(s)	Dependent Variables (s)	b	std. error	p
Xs predictiing Y	Condition 2	Donation Behavior	0.31	0.31	0.32
	Condition 3	Donation Behavior	-0.29	0.31	0.35
	Condition 4	Donation Behavior	-0.01	0.30	0.97
Xs predicting Ms	Condition 2	Positive Emotions	0.07	0.12	0.55
	Condition 3	Positive Emotions	0.25	0.12	0.04*

Xs and Ms predicting Y	Condition 4	Positive Emotions	-0.07	0.12	0.55
	Condition 2	Negative Emotions	-0.02	0.14	0.88
	Condition 3	Negative Emotions	0.27	0.14	0.05 [^]
	Condition 4	Negative Emotions	-0.04	0.13	0.74
	Condition 2	Psychological Distance	0.11	0.13	0.39
	Condition 3	Psychological Distance	-0.02	0.13	0.86
	Condition 4	Psychological Distance	-0.04	0.12	0.75
	Positive Emotions	Donation Behavior	0.02	0.13	0.90
	Negative Emotions	Donation Behavior	0.35	0.12	0.00***
	Psychological Distance	Donation Behavior	-0.86	0.14	0.00***