

Supplementary Materials for *Development and Validation of the Climate Capability Scale*

Table S1. Response frequencies to the 70 items tested in Study 1.

Dimension and Sub-theme	Item	Yes	No	Don't Know
Knowledge and Attitudes: Acceptance of anthropogenic climate change	Climate change is happening*	<b>96.90%</b>	0.35%	2.76%
	Most scientists agree that climate change is happening*	<b>93.10%</b>	1.72%	5.17%
	Humans are causing climate change*	<b>91.38%</b>	2.07%	6.55%
	Humans are to blame for climate change*	<b>86.55%</b>	2.41%	11.03%
	Natural processes are the main cause of climate change	8.62%	<b>68.28%</b>	23.10%
	Most scientists agree that humans are causing climate change	<b>84.48%</b>	1.72%	13.79%
	Climate change is caused by carbon dioxide and other greenhouse gases	<b>80.35%</b>	0.69%	18.97%
	Changes in the sun are causing climate change	12.07%	<b>45.52%</b>	42.14%
	Volcanoes are causing climate change	7.24%	<b>53.45%</b>	39.31%
Knowledge and Attitudes: Knowledge of warming trends	Earth is hotter now than it was 100 years ago	<b>79.31%</b>	1.72%	18.97%
	In the next 50 years, Earth is going to get hotter	<b>84.14%</b>	0.35%	15.52%
	In the next 50 years, Earth is going to get colder	3.10%	<b>68.97%</b>	27.93%
	In the next 50 years, sea levels will rise	<b>79.66%</b>	1.38%	18.97%
	In the next 50 years, sea levels will fall	6.55%	<b>69.31%</b>	24.14%
	In the next 50 years, more ice caps will melt*	<b>88.28%</b>	1.72%	10.00%
	In the next 50 years, the ice caps will get bigger	3.45%	<b>77.24%</b>	19.31%
Knowledge and attitudes: Understanding the	Climate change is affecting the planet now*	<b>95.52%</b>	1.03%	3.45%

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consequences of climate change	It will take a long time to see the effects of climate change	20.69%	<b>64.48%</b>	14.83%
	The effects of climate change will be small	2.07%	<b>83.10%</b>	14.83%
	Climate change will have mostly bad effects on the planet*	<b>88.97%</b>	1.38%	9.67%
	Climate change will have mostly good effects on the planet*	2.07%	<b>86.89%</b>	11.02%
	My country will be affected by climate change*	<b>90.69%</b>	1.72%	7.59%
	Climate change will affect me	<b>81.72%</b>	3.45%	14.83%
	Climate change will affect people in other countries*	<b>92.76%</b>	2.41%	4.83%
	Climate change will cause some animals and plant species to go extinct*	<b>88.62%</b>	1.72%	9.66%
Knowledge and attitudes: Climate change scepticism	Scientists exaggerate how much the climate will change	5.17%	<b>75.17%</b>	19.66%
	Scientists exaggerate the effects of climate change	5.52%	<b>76.21%</b>	18.28%
	The media exaggerate how much the climate will change	9.66%	<b>63.45%</b>	26.90%
	The media exaggerate the effects of climate change	10.69%	<b>63.45%</b>	25.86%
Individual behaviours: Private sphere behavioural change	I have made changes to how I live to reduce my effect on the planet	<b>76.90%</b>	20.35%	2.76%
	I would like to make changes to the way I live to reduce my effect on the planet*	<b>87.24%</b>	6.90%	5.86%
	I am going to make changes to the way I live to reduce my effect on the planet	<b>77.24%</b>	6.90%	15.86%
	I have made changes to the food I eat to reduce my effect on the planet	<b>50.69%</b>	45.17%	4.14%
	I would like to make changes to the food I eat to reduce my effect on the planet	<b>65.52%</b>	22.07%	12.41%

	I am going to make changes to the food I eat to reduce my effect on the planet	<b>53.79%</b>	24.48%	21.72%
	I have made changes to what I buy to reduce my effect on the planet	<b>71.38%</b>	24.48%	4.14%
	I have talked to my family about reducing our effect on the planet	<b>66.21%</b>	32.76%	1.03%
	I have made changes to the way I use electricity to reduce my effect on the planet	<b>67.24%</b>	30.69%	2.07%
	I have made changes to the way I travel to reduce my effect on the planet	<b>49.66%</b>	47.93%	2.41%
Governance: Role of Governance	Government action is needed to tackle climate change	<b>90.35%</b>	3.79%	5.86%
	We need new laws to tackle climate change	<b>84.48%</b>	5.17%	10.35%
	The whole system we live in needs to change to tackle climate change	<b>89.66%</b>	2.41%	7.93%
Governance: Engagement with governance	I have chosen to sign petitions about climate change	<b>44.83%</b>	51.03%	4.14%
	Signing petitions about climate change is pointless	24.14%	<b>50.69%</b>	25.17%
	I have chosen to join protests about climate change*	<b>9.31%</b>	89.66%	1.03%
	Joining protests about climate change is pointless	23.10%	<b>53.79%</b>	23.10%
	I have chosen to write to my MP about climate change*	<b>5.17%</b>	93.79%	1.03%
	Writing to my MP about climate change is pointless	37.93%	<b>31.72%</b>	30.35%
Individual behaviours: Information-seeking	I have read news articles about climate change	<b>82.42%</b>	16.90%	0.69%
	I have watched documentary programmes about climate change	<b>73.79%</b>	23.45%	2.76%
	I have watched videos on social media about climate change	<b>58.62%</b>	40.35%	1.03%

	I have read blogs and websites about climate change	<b>54.48%</b>	42.41%	3.10%
	I have talked about climate change with my friends	<b>78.28%</b>	20.35%	1.38%
	I have talked about climate change with my family	<b>76.55%</b>	23.10%	0.35%
	I look for news articles about climate change	<b>40.00%</b>	56.55%	3.57%
	I look for documentary programmes about climate change	<b>39.31%</b>	57.24%	3.45%
	I look for videos on social media about climate change	<b>25.86%</b>	71.38%	2.76%
	I look for blogs and websites about climate change	<b>23.10%</b>	73.45%	3.45%
Individual behaviours: Self-efficacy	I know a lot about climate change	<b>31.72%</b>	46.55%	21.72%
	I know very little about climate change	23.79%	<b>63.79%</b>	12.41%
	I know more than other people my age about climate change	<b>24.48%</b>	38.97%	36.55%
	I know less than other people my age about climate change	14.14%	<b>49.31%</b>	36.55%
	I know how to reduce my effect on the planet	<b>76.55%</b>	11.38%	12.07%
	I know very little about how to reduce my effect on the planet	15.52%	<b>75.86%</b>	8.62%
	I know where to find good information about climate change	<b>55.52%</b>	27.24%	17.24%
	I know what sources of information I can trust to learn more about climate change	<b>51.38%</b>	26.55%	22.07%
	I know how to find more about how much different activities affect the planet	<b>63.10%</b>	24.83%	12.07%
Optimism	I am hopeful that we can stop climate change**	<b>67.93%</b>	17.93%	14.14%
	I am hopeful that we can slow down climate change**	<b>83.45%</b>	6.55%	10.00%

	I am hopeful that we can reduce the effects of climate change**	<b>82.76%</b>	6.21%	11.03%
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Note: The response that corresponds to higher Climate Capability is shown in bold. \*Item screened out due to low variability in responding. \*\*Item screened out due to weak item-total correlations ( $r < .1$ ).

Table S2. Item-level comparisons between adolescent and adult responses to the CCS

Item	Adolescents (n = 458)			Adults (n = 559)			Cramer's V
	Yes	No	Don't Know	Yes	No	Don't Know	
1. Earth is hotter now than it was 100 years ago	84.50	4.15	11.36	82.83	1.25	15.92	.109*
2. In the next 50 years, Earth is going to get hotter	87.12	2.62	10.26	86.23	1.79	11.99	.038
3. In the next 50 years, sea levels will rise	86.25	3.28	10.48	85.33	2.50	12.17	.034
4. Scientists exaggerate how much the climate will change	11.14	66.16	22.71	6.62	79.79	13.60	.154**
5. Scientists exaggerate the effects of climate change	10.48	68.78	20.74	6.08	81.93	11.99	.153**
6. The media exaggerate how much the climate will change	22.49	49.13	28.38	13.95	69.41	16.64	.206***
7. The media exaggerate the effects of climate change	21.40	50.87	27.73	14.67	69.41	15.92	.191**
8. I have made changes to how I live to reduce my effect on the planet	47.82	34.93	17.25	79.43	17.71	2.86	.349***
9. I am going to make changes to how I live to reduce my effect on the planet	57.64	32.10	10.26	81.40	7.69	10.91	.263***

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10. I have made changes to what I eat to reduce my effect on the planet	32.10	57.64	10.26	49.91	45.44	4.65	.192**
11. I have made changes to what I buy to reduce my effect on the planet	43.23	39.30	17.47	74.42	21.29	4.29	.330***
12. I have talked to my family about reducing our effect on the planet	42.80	50.87	6.33	64.04	34.35	1.61	.227***
13. Government action is needed to tackle climate change	89.52	4.37	6.11	93.92	2.86	3.22	.082
14. We need new laws to tackle climate change	80.79	7.86	11.35	87.12	4.65	8.23	.089
15. The whole system we live in needs to change to tackle climate change	78.82	9.17	12.01	90.16	4.29	5.55	.158**
16. I look for news articles about climate change	19.00	74.89	6.11	37.57	59.21	3.22	.207***
17. I look for documentary programmes about climate change	26.42	67.25	6.33	45.08	52.24	2.68	.201***
18. I look for videos on social media about climate change	12.45	81.44	6.11	25.58	73.70	0.72	.216***
19. I look for blogs and websites about climate change	10.26	84.28	5.46	17.53	80.86	1.61	.143*
20. I know a lot about climate change	46.94	26.20	26.86	31.66	50.98	17.35	.252***
21. I know where to find good information about climate change	57.86	24.45	17.69	52.59	28.27	19.14	.054
22. I know what sources of information I can trust to learn more about climate change	55.46	24.89	19.65	53.67	24.87	21.47	.023
23. I know how to find out how much different activities affect the planet	57.86	23.80	18.34	60.11	26.12	13.78	.063

24. I know how much different activities affect the planet	66.16	17.47	16.38	60.29	23.61	16.10	.077
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Note: \* Cramer's  $V \geq .10$ ; \*\* Cramer's  $V \geq .15$ ; \*\*\* Cramer's  $V \geq .20$

#### **Study 4 reanalysis without the boys' school data (n = 214)**

These additional analyses were conducted to assess the impact of the gender imbalance in the adolescent sample on the results. For these analyses, we excluded the 244 participants recruited from School 1, which is an all boys' school. Gender was not recorded from one school (n = 33) due to an oversight. Of the remaining 181 participants, 45.30% identified as female, 47.51% identified as male, 2.21% identified as non-binary/third gender, and the remaining 4.97% chose not to report their gender. Year group data was missing for four participants (1.87%). Of the remaining 210 participants, 24.76% were in Year 8 (aged 12-13), 74.76% were in Year 9 (aged 13-14), and 0.48% were in Year 10 (aged 14-15).

#### **Internal reliability**

Internal reliability was good, as assessed by Cronbach's  $\alpha$  (.805) and McDonald's  $\omega$  (.803; 95% CI [.765, .841]). These were slightly lower than for full adolescent sample, but still within acceptable bounds.

As with the full sample, all items positively correlated with the total score; the smallest item-rest correlation was .127 (Item 3: "In the next 50 years, sea levels will rise"). Reliability would not have been meaningfully improved by dropping any individual items.

#### **Confirming the factor structure in adolescent respondents**

A Confirmatory Factor Analysis was conducted, applying the six factor structure from the adult data, using Maximum Likelihood estimation with robust standard errors. The fit indices were very similar to those found for the adult participants. The RMSEA was .058,

90% CI [.049, .068], which was slightly higher than in the full sample, but still within acceptable bounds. Both the CFI (.876) and TLI (.856) were slightly below the values for the full sample. The McDonald's  $\omega$  for each of the six subscales are shown in Table S3; for ease of comparison, the corresponding figures for the full sample are also shown. For most subscales, reliability was similar in the reduced sample as in the full sample. The largest reduction was in the Knowledge of Warming Trends subscale.

Table S3. McDonald's  $\omega$  (with 95% Confidence Intervals) for the CCS subscales in the reduced and full adolescent samples

Subscale	Full sample	Reduced sample
Knowledge of Warming Trends	.70 [.66, .75]	.61 [.52, .70]
Scepticism	.78 [.75, .81]	.76 [.71, .82]
Behaviour change	.81 [.78, .84]	.82 [.78, .86]
Role of Governance	.66 [.61, .72]	.68 [.60, .78]
Information seeking	.73 [.69, .77]	.75 [.70, .81]
Self-efficacy	.69 [.64, .73]	.66 [.59, .73]

To investigate this possibility that there may be a more parsimonious factor structure for the adolescent data, we conducted an Exploratory Factor Analysis, with Oblique promax rotation and Parallel analysis. In contrast to the full dataset, a six factor structure emerged, which followed the factor structure of the adult sample very closely.

As with the full adolescent sample, item 24 ("I know how much different activities affect the planet") did not significantly load on any factor (loading beneath .4). However, the



overall scale reliability was not substantially improved by its removal. Furthermore, the reliability of the Self-Efficacy subscale would have been adversely affected by its removal, indicating that the item should be retained in the CCS when used with adolescents.

### **Comparing the reduced adolescent sample with adult participants**

The mean CCS score for the reduced sample of adolescents was 31.09 ( $SD = 7.44$ ). We compared adolescents' total CCS scores with adults' total CCS scores from the pooled Study 2 and 3 sample ( $M = 33.54$ ,  $SD = 8.81$ ) using a Mann-Whitney U test. As in the full sample, adolescents' scores on the CCS were significantly lower than adults' scores,  $U = 48313$ ,  $p < .001$ ,  $r = .192$ .

Table S4 shows comparisons between the reduced adolescent samples and adults on each of the six subscales. We applied a Bonferroni-correlated alpha level of .008 (.05 / 6) to these comparisons. The results were qualitatively similar to the full dataset; adolescents scores were significantly lower than adults on the Skepticism, Behaviour Change, Role of Governance, and Information Seeking subscales. Adolescents' scores were significantly higher than adults' scores on the Information Seeking subscale. Scores on the Knowledge of Warming Trends subscale were not significantly different for adolescents and adults.

Table S4. Comparisons between adults and adolescents' CCS subscale scores

Subscale	Adolescents	Adults	Comparison
	<i>M (SD)</i>	<i>M (SD)</i>	
Knowledge of Warming Trends	5.48 (1.09)	5.49 (0.99)	$U = 64928.5, p = .014, r = .086$
Skepticism	5.69 (2.32)	6.59 (2.25)	$U = 46736.0, p < .001, r = .219$
Behaviour Change	5.25 (3.33)	7.23 (3.09)	$U = 41784.5, p < .001, r = .301$
Role of Governance	5.18 (1.31)	5.59 (1.10)	$U = 53076.0, p < .001, r = .113$
Information Seeking	1.60 (2.23)	2.60 (2.72)	$U = 49292.0, p < .001, r = .176$
Self-Efficacy	6.68 (2.74)	6.05 (3.16)	$U = 68109.0, p = .003, r = .139$

Table S5. Item-level comparisons between the reduced adolescent and adult responses to the CCS

Item	Adolescents (n = 214)			Adults (n = 559)			Cramer's V
	Yes	No	Don't Know	Yes	No	Don't Know	
1. Earth is hotter now than it was 100 years ago	90.65	7.94	1.40	82.83	1.25	15.92	.104*
2. In the next 50 years, Earth is going to get hotter	90.65	7.48	1.87	86.23	1.79	11.99	.065
3. In the next 50 years, sea levels will rise	90.19	2.80	7.01	85.33	2.50	12.17	.075
4. Scientists exaggerate how much the climate will change	7.94	69.16	22.90	6.62	79.79	13.60	.119*

5. Scientists exaggerate the effects of climate change	9.35	70.09	20.56	6.08	81.93	11.99	.130*
6. The media exaggerate how much the climate will change	19.63	51.40	28.97	13.95	69.41	16.64	.172**
7. The media exaggerate the effects of climate change	18.69	53.74	27.57	14.67	69.41	15.92	.154**
8. I have made changes to how I live to reduce my effect on the planet	50.00	29.44	20.56	79.43	17.71	2.86	.344***
9. I am going to make changes to how I live to reduce my effect on the planet	58.41	11.68	29.91	81.40	7.69	10.91	.250***
10. I have made changes to what I eat to reduce my effect on the planet	30.84	57.48	11.68	49.91	45.44	4.65	.193**
11. I have made changes to what I buy to reduce my effect on the planet	42.52	34.58	22.90	74.42	21.29	4.29	.344***
12. I have talked to my family about reducing our effect on the planet	43.46	49.07	7.48	64.04	34.35	1.61	.183**
13. Government action is needed to tackle climate change	92.99	2.80	4.21	93.92	2.86	3.22	.024
14. We need new laws to tackle climate change	81.78	6.54	11.68	87.12	4.65	8.23	.068
15. The whole system we live in needs to change to tackle climate change	82.24	6.54	11.22	90.16	4.29	5.55	.112*
16. I look for news articles about climate change	20.09	73.83	6.08	37.57	59.21	3.22	.172**
17. I look for documentary programmes about climate change	28.51	64.49	7.01	45.08	52.24	2.68	.169**
18. I look for videos on social media about climate change	14.02	79.44	6.54	25.58	73.70	0.72	.205***

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19. I look for blogs and websites about climate change	11.22	83.18	5.61	17.53	80.86	1.61	.130*
20. I know a lot about climate change	46.73	21.50	31.78	31.66	50.98	17.35	.270***
21. I know where to find good information about climate change	59.35	23.36	17.29	52.59	28.27	19.14	.062
22. I know what sources of information I can trust to learn more about climate change	56.08	24.77	19.16	53.67	24.87	21.47	.027
23. I know how to find out how much different activities affect the planet	61.68	19.63	18.69	60.11	26.12	13.78	.082
24. I know how much different activities affect the planet	67.29	15.42	17.29	60.29	23.61	16.10	.090

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Note: \* Cramer's  $V \geq .10$ ; \*\* Cramer's  $V \geq .15$ ; \*\*\* Cramer's  $V \geq .20$