Center for Research on Environmental Decisions

CDS

Local Warming: Local Weather and Perceptions of Global Warming

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The ‘Snowmageddon Effect’: Irrational Beliefs about Climate

- Remember the ‘Snowpocalypse’ in D.C. in 2010?

The 'Snowmageddon Effect': Irrational Beliefs about Climate

- Could people's beliefs really be so malleable?

People are aware, but conflicted, by news of Climate Change

- 97% of Americans are aware of climate change
- But likely to be a constructed value and belief
  - Poorly integrated and inconsistent
  - Transient factors may influence beliefs
  - Wallet analogy

Weather and Temperature Effects on Important Behaviors

- Classic study: Schwarz and Clore (1983), weather on well-being
- Williams & Bargh (2008), exposure to physical warmth on interpersonal warmth
- Simonsohn: Weather on choices
  - College Admissions decisions (2007)
  - Student enrollment decisions (2010)

Attribute Substitution

(Kahneman & Frederick, 2002)

- We propose that when asked about climate change, sensitivity to relative temperature may be recruited through a process of *attribute substitution*
- Complex, contentious attribute substituted for outdoor temperature, a far easier quantity to evaluate

Empirical Overview

Study 1a: Diverse sample of 582 US residents:

- reported belief and concern in global warming
- reported whether local temperature was warmer or colder than usual, several demographics, zip code

Study 1b: Conducted one week later, 290 Australian residents

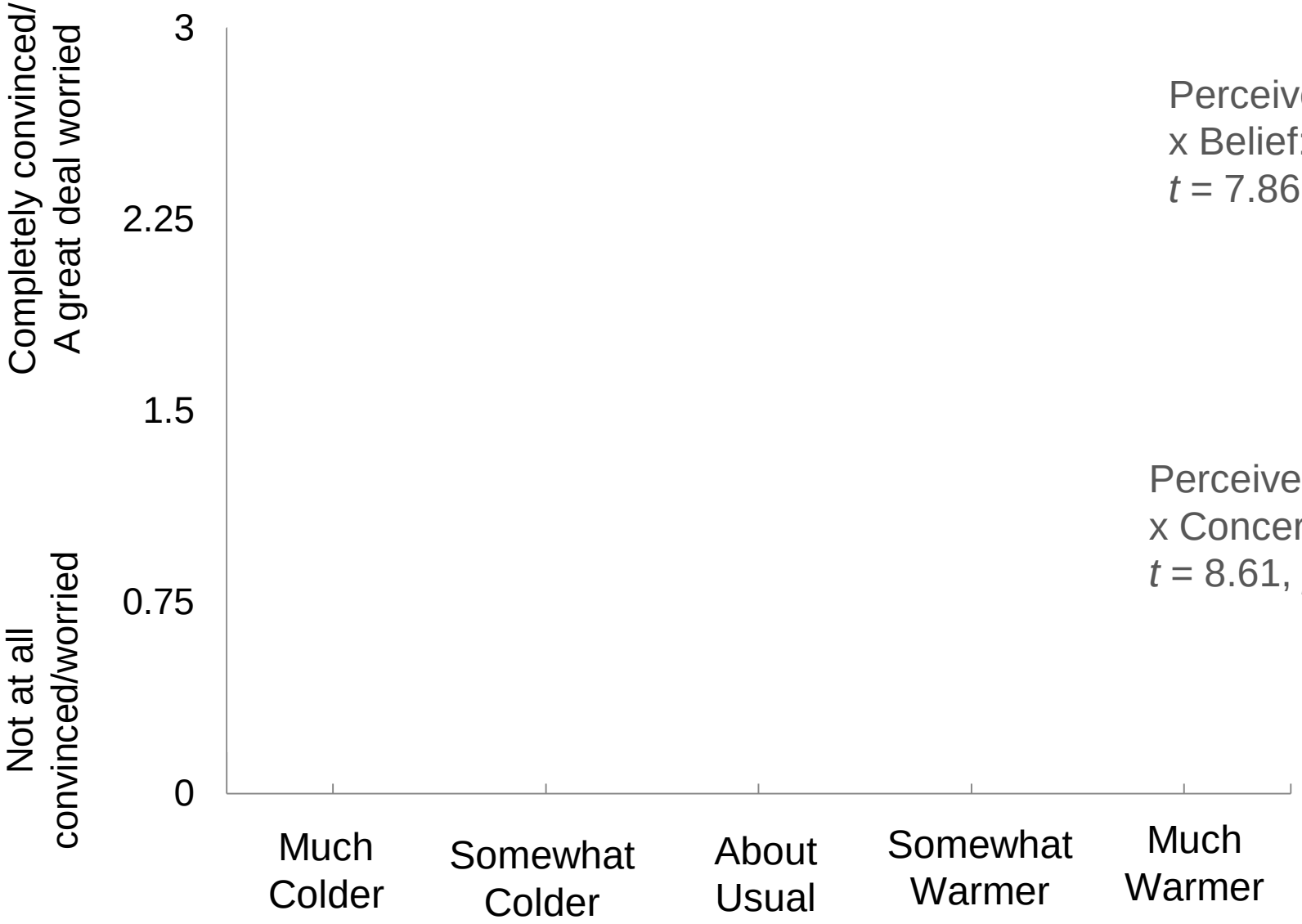
- Study 2: Replication with behavioral measure

Study 1

- Emphasis on *relative* temperature deviation
  - Versus absolute temperature
- Global warming and temperature questions counterbalanced
  - Predicted weaker effect of perceived deviation if temperature question came first

Study 1a & 1b Results

Study 1a & 1b (US/Winter & AUS/Summer) N = 872



Perceived Deviation x Belief: β = .28, *t* = 7.86, ***p* < .0001**

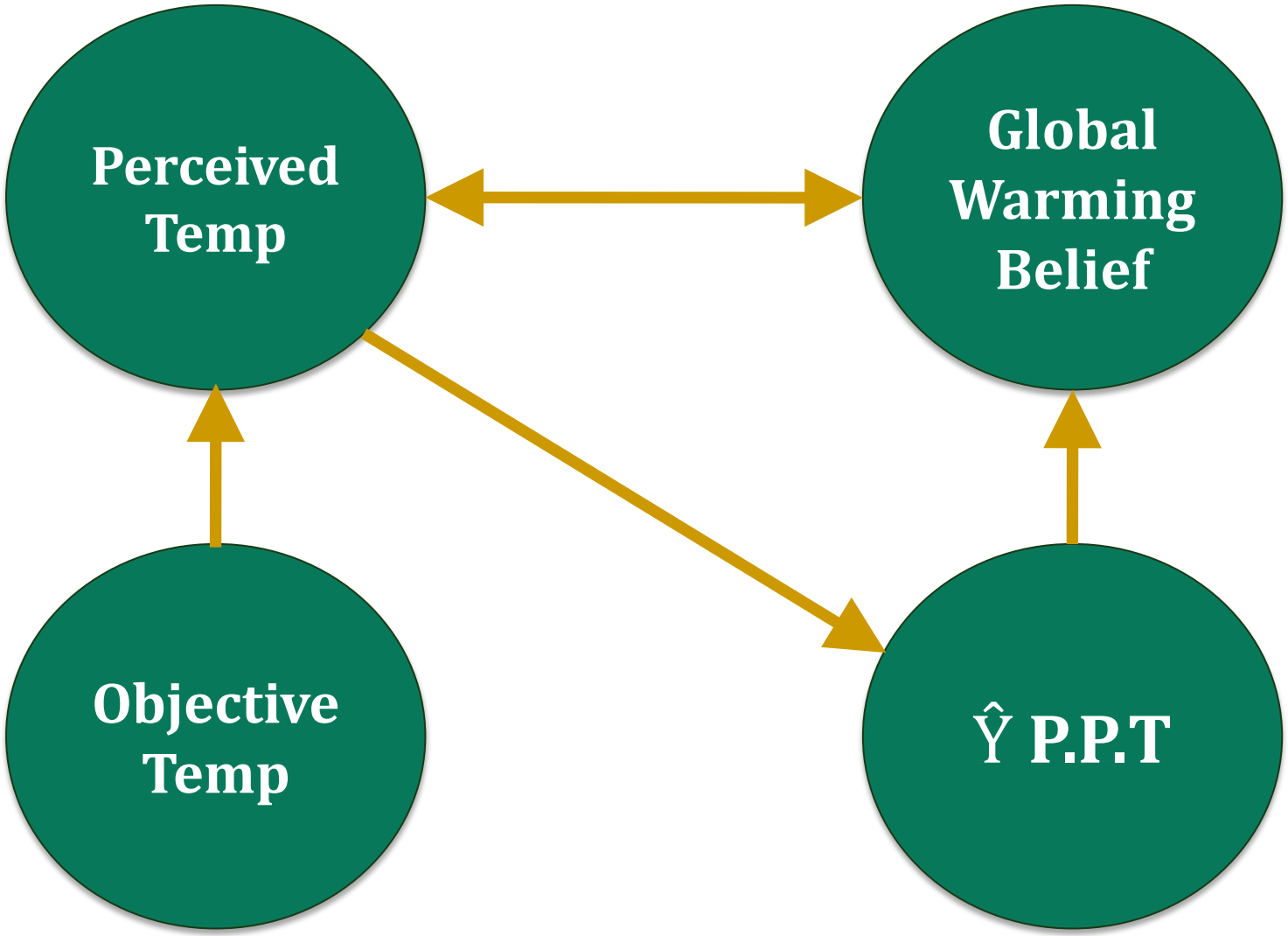
Perceived Deviation x Concern: β = .25, *t* = 8.61, ***p* < .0001**

Li, Y., Johnson, E.J., & Zaval, L. (2011). Local Warming: Daily Temperature Change Influences Belief in Global Warming. *Psychological Science.*

Consistent, but correlational

- Good news:
  - Robust: Nonparametric analysis using ordered logit
  - No effect on question order suggests limited awareness
- Problem: Correlational
  - Reverse causality? Third variable?
- Approach 1: control variables
- Approach 2: instrumental variable regression

Instrumental Variable Regression



Actual deviation predicts, mediates global warming beliefs

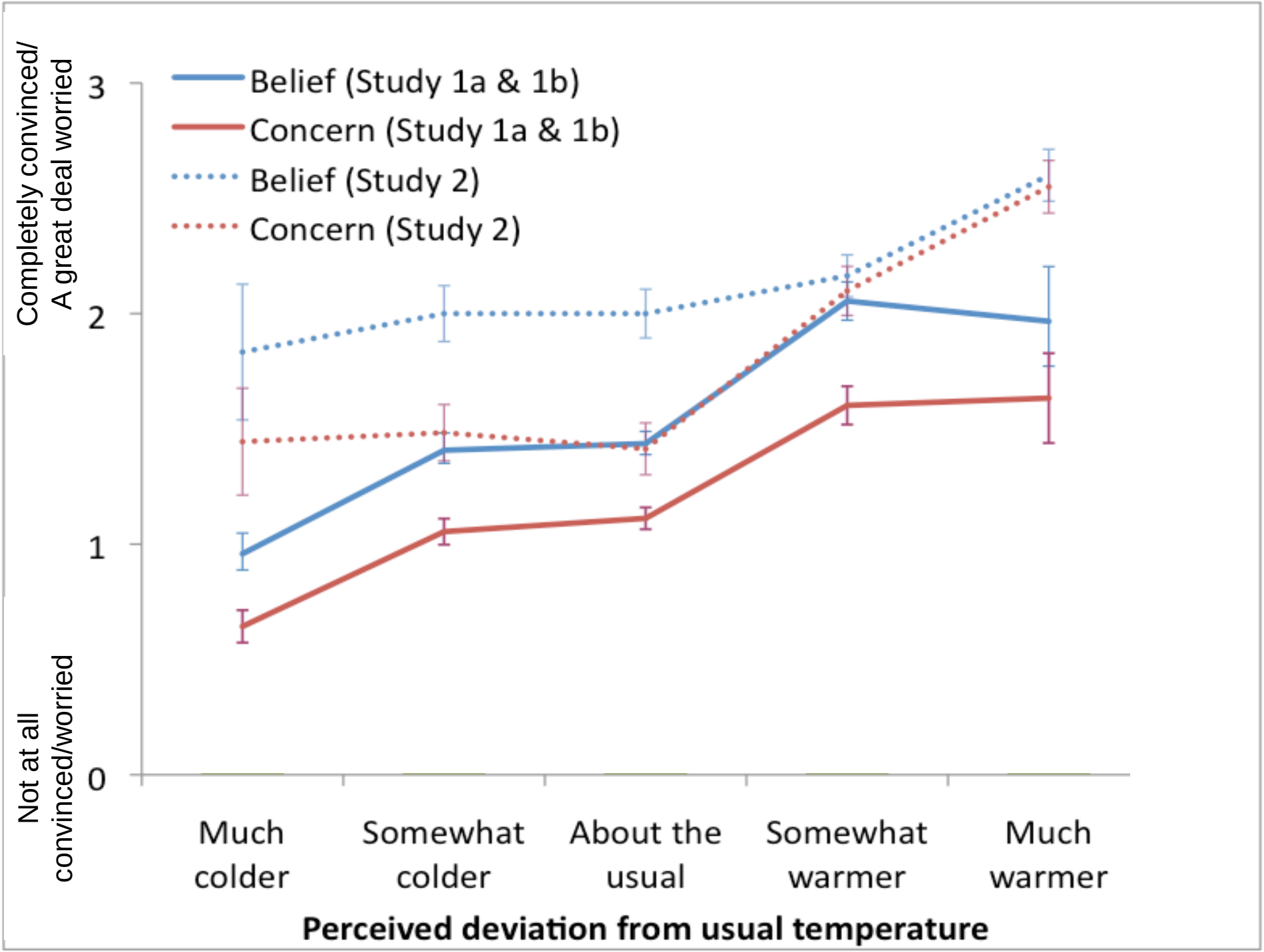
- Predicted values of perceived deviation had significant effects on belief and concern
  - $\beta = 0.41$, $z = 4.36$, $p < .0001$ for Belief
  - $\beta = 0.26$, $z = 3.38$, $p < .001$ for Concern
- Actual Temperature Deviation correlated with Perceived Deviation ($r = .49$)
- Complete mediation by perceived deviation of actual temperature on belief direct (bootstrapped Sobel's $Z = 5.80$, $p < .0001$)

Do constructed responses change behavior?

- Study 2: Diverse sample of 251 participants from CDS Virtual Lab
- Same questions and methodology as in Study 1
- Participants asked to donate part of their earnings to climate change charity, Clean Air-Cool Planet
  - Research questions separated by unrelated tasks

Study 2 Results

- Replicated effect of perceived deviation on global warming beliefs/concern
- Behavioral result: Regression β = 0.25, $t(249) = 2.00$, $p < .05$.
  - Much Colder= $.48, 24% of participants.
  - Much Warmer= $2.04, 63% of participants, about 25% of their earnings.


Belief (Study 1a & 1b)
Concern (Study 1a & 1b)
Belief (Study 2)
Concern (Study 2)
Completely convinced/
A great deal worried
Not at all
convinced/worried
3
2
1
0
Much
colder
Somewhat
colder
About the
usual
Somewhat
warmer
Much
warmer
Perceived deviation from usual temperature

Conclusions

Discussion

- Why are beliefs still so malleable?
  - Many conflicting, complex messages.
  - Attribute substitution
  - Follow-up studies reveal that this relationship persists:
    - Global warming vs. climate change wording
    - Increase knowledge of the relationship between climate change and today's temperature

Political Implications

- The issue's complexity may cause people to draw temporary conclusions, and to reconsider their belief each time they are surveyed
- Raises questions about the role of public opinion in policy formation

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- Precourt Energy Efficiency Center

'I'm building a climate change skeptic'

Thank you!

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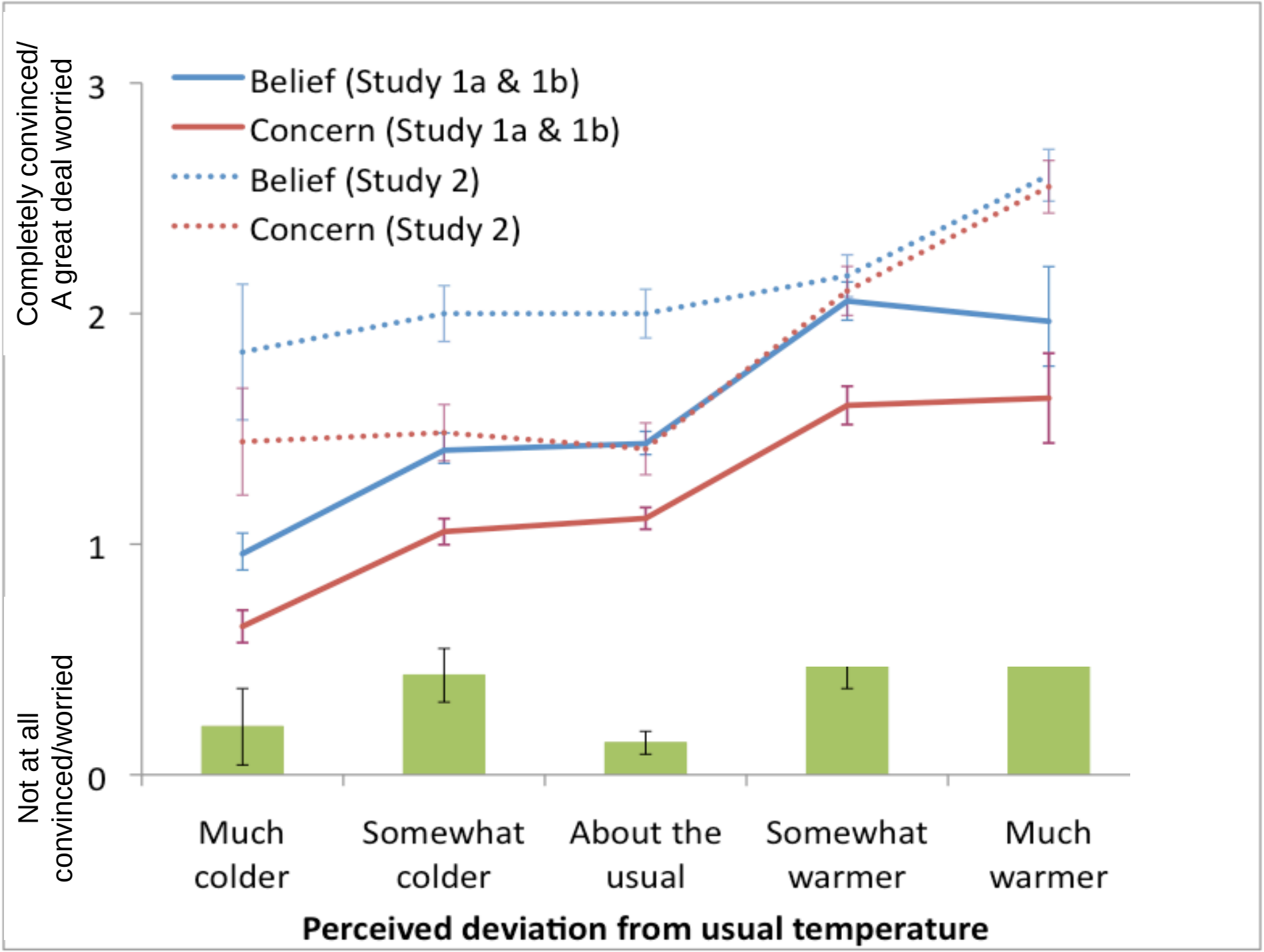
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Much colder
Somewhat colder
About the usual
Somewhat warmer
Much warmer
Perceived deviation from usual temperature

Evidence consistent with local warming

- Schuldt & Schwarz (2008), Joireman, Truelove & Duell (2010), Egan & Mullin relate objective temperature to beliefs, including survey results.

- Risen & Critcher (in press) demonstrate room temperature in the laboratory.

Survey Questions

- How convinced are you that global warming is happening?”/ How much do you personally worry about global warming?” (4 point scale)
- Is the local weather warmer or colder than usual for this time of year? (5-point scale)

Study 1a & 1b (US/Winter & AUS/Summer) N = 872

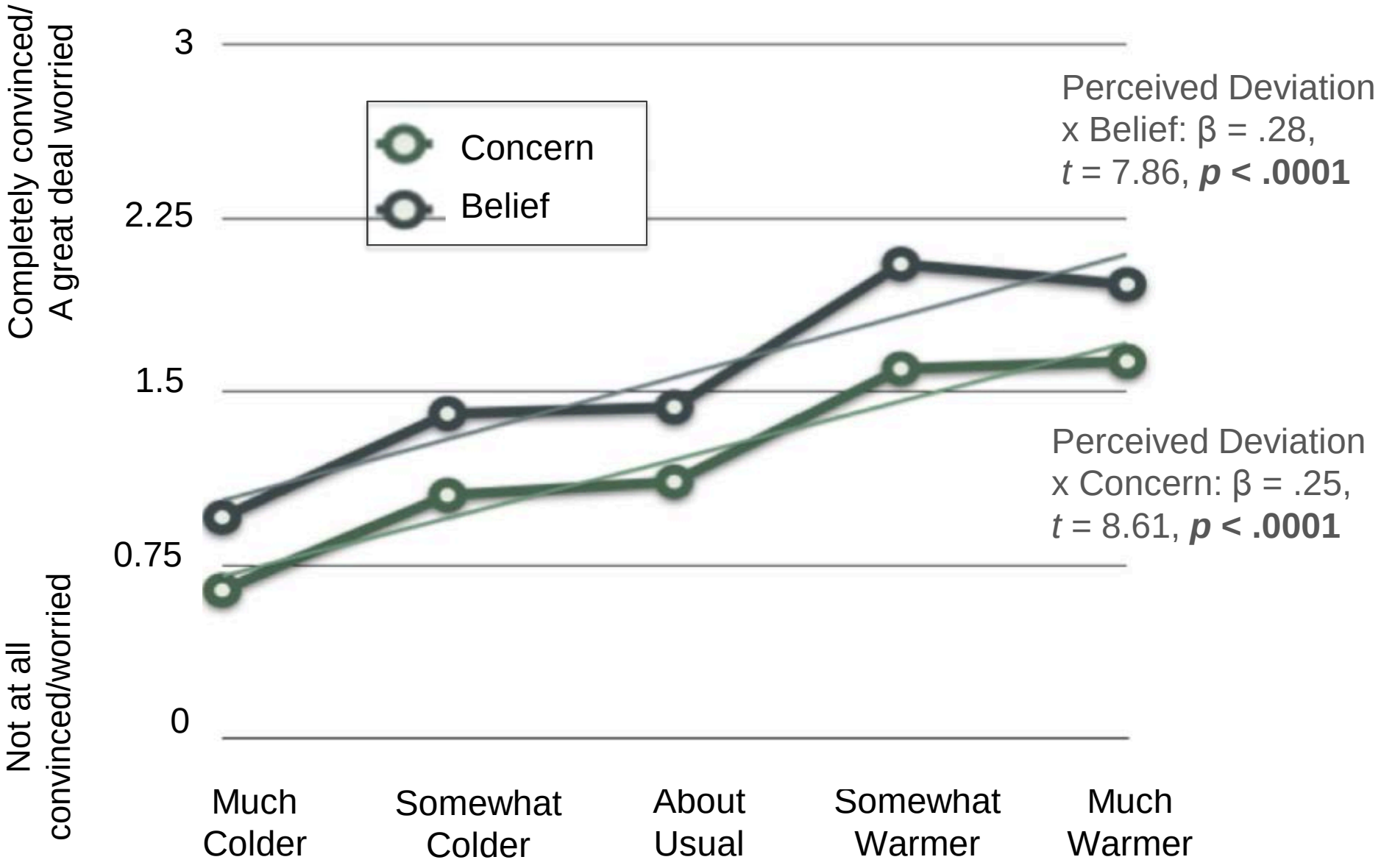

Table 3B. Linear regressions for concern about global warming in Study 2.

Model	1	2	3	4
Perceived deviation	0.262***	0.286***	0.193***	0.226***
	(0.290)	(0.316)	(0.218)	(0.254)
Actual temperature		-0.00128		-0.00204
		(-0.0147)		(-0.0235)
Actual deviation		-0.00875		-0.0142
		(-0.0565)		(-0.0891)
Female			0.174	0.171
			(0.0905)	(0.0887)
Education			0.00166	0.00251
			(0.0262)	(0.0396)
Age			-0.0208	-0.0177
			(-0.0364)	(-0.0310)
Income (thousands)			0.0044***	0.0045***
			(0.306)	(0.314)
Democrat (relative to Other)			0.416***	0.405***
			(0.215)	(0.209)
Republican (relative to Other)			0.0105	-0.00685
			(0.00408)	(-0.00265)
Constant	1.622***	1.622***	1.035***	0.988***
	(1.672)	(1.672)	(1.074)	(1.025)
Observations	251	251	223	223
R^2	0.084	0.087	0.204	0.212

References

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