Efficacy Beliefs Promote Energy Conservation

Erika Salomon, Jesse L. Preston, & Melanie B. Tannenbaum
Department of Psychology, University of Illinois

Introduction

- Scientists are convinced that climate change is occurring as a result of human-caused carbon emissions.[1]
- The American public is increasingly convinced as well.[2]
- Despite awareness and acceptance of climate change, efforts to reduce individual energy use are thwarted by low perceived efficacy: How much does recycling one bottle or washing one load of laundry affect global temperatures, ocean acidification, or drought in far off places?
- Behavioral apathy may be reduced through messages that focus on **individual efficacy** (e.g., reducing *personal* carbon footprint).
- **Hypotheses:** Telling participants that simple behavioral changes will create substantial reductions in personal carbon footprints will lead to:
  - Stronger intentions to conserve energy (Studies 1, 2, & 3).
  - Greater moralization of energy use and waste (Studies 1, 2, & 3).
  - Support for more energy conservation policies (Study 1, 2, & 3).
  - Greater efforts to conserve energy (Study 3).

Study 1: High vs. Low Efficacy

Participants: 282 Mechanical Turk workers.

Manipulation: All Ps read an article about climate change. Final paragraph differed by condition:
- *Low Efficacy:* Concluded that individual conservation behaviors are difficult to implement and have little effect on global carbon footprint.
- *High Efficacy:* Concluded that individual conservation behaviors are easy to implement and have strong effects on personal carbon footprint.

Measures:
- *Conservation Intentions:* Mean of 12 items (e.g., "I intend to recycle at home"), rated on 7-point scale (1 = *not at all*; 7 = *very much*)
- *Energy Use Moralization:* Mean of 11 items ("Using too much energy is morally wrong"), rated on 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*)
- *Energy Policy Support:* Number of policies supported (e.g., "A fee for each disposable plastic shopping bag used"), rated with *yes/no*.

Results: (See Figure 1)

Dependent Measure	M (SD)		
	High Efficacy	**Low Efficacy**	**t-test**
Conservation Intentions	4.50 (*1.26*)	4.83 (*1.15*)	$t(280) = 2.31$, $p = .02$, $d = .28$
Energy Use Moralization	4.24 (*1.36*)	4.50 (*1.21*)	$t(280) = 1.65$, $p = .10$, $d = .20$
Energy Policy Support	3.77 (*1.90*)	4.31 (*1.85*)	$t(280) = 2.44$, $p = .02$, $d = .29$

References: [1] IPCC. (2007). *Climate Change 2007: The Physical Science Basis.* [2] Gallup. (2013). *Gallup poll social series: Environment.*
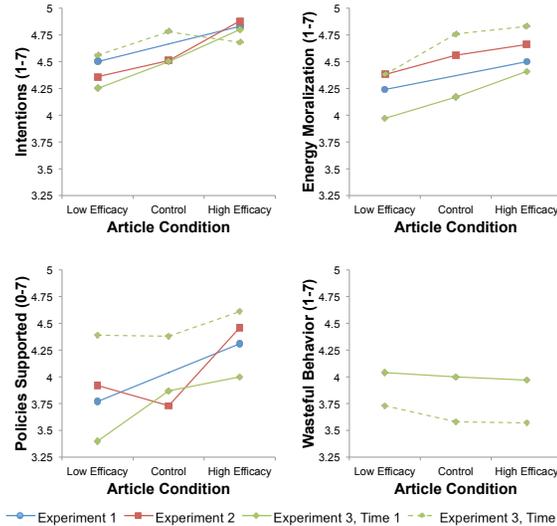
Figure 1. Energy conservation attitudes and behaviors following exposure to articles about the effect of individual action on carbon emissions. Experiment 1 did not include a Control condition. Behavior was reported only in Experiment 3.

Legend: Experiment 1 — Experiment 2 — Experiment 3, Time 1 — Experiment 3, Time 2

Study 2: Replication with Control Condition

Participants: 240 Mechanical Turk workers.

Manipulation: Same as in Study 1 with the addition of a *Control* condition, in which Ps received no efficacy information.

Measures: Same as in Study 1.

Results: Due to the ordinal manipulation (Low Efficacy < Control < High Efficacy), data were analyzed using Somer's *d*, which can be interpreted like *r* as the strength of association between the independent and dependent variables.[3] (See Figure 1)

Dependent Measure	M (SD)			
	High Efficacy	**Control**	**Low Efficacy**	**Somer's d**
Conservation Intentions	4.36 (*1.19*)	4.51 (*1.45*)	4.88 (*1.08*)	$d = .14$, $p = .01$
Energy Use Moralization	4.38 (*1.38*)	4.56 (*1.39*)	4.66 (*1.15*)	$d = .15$, $p = .005$
Energy Policy Support	3.92 (*1.80*)	3.73 (*1.95*)	4.46 (*1.61*)	$d = .15$, $p = .02$

[3] Ferguson, C. J. (2009). An effect size primer: A guide for clinicians and researchers. *Profess. Psychol.: Res. and Practice, 40*, 532-538.

Study 3: Measuring Behavior

Participants: 296 Mechanical Turk workers completed the study at Time 1. 221 of these responded to an email to complete a second survey one week later at Time 2.

Manipulation: Same as in Study 2.

Measures: At both time points, Ps completed the same measures as in Study 1 and a Wasteful Behavior Scale consisting of 7 items (e.g., "Compared to a typical week, did you drive more or fewer miles this week") rated on 7-point response scales (1 = *many fewer/much less than normal*; 7 = *many/much more than normal*).

Results, Time 1: (See Figure 1)

Dependent Measure	M (SD)			
	High Efficacy	**Control**	**Low Efficacy**	**Somer's d**
Conservation Intentions	4.25 (*1.32*)	4.50 (*1.14*)	4.80 (*1.13*)	$d = .14$, $p = .01$
Energy Use Moralization	3.97 (*1.61*)	4.17 (*2.02*)	4.41 (*1.75*)	$d = .15$, $p = .005$
Energy Policy Support	3.40 (*1.86*)	3.87 (*1.94*)	4.00 (*1.86*)	$d = .09$, $p = .09$
Wasteful Behavior	4.04 (*0.24*)	4.00 (*0.31*)	3.97 (*0.33*)	$d = -.08$, $p = .15$

Dependent Measure	M (SD)			
	High Efficacy	**Control**	**Low Efficacy**	**Somer's d**
Conservation Intentions	4.56 (*1.27*)	4.78 (*1.04*)	4.68 (*1.11*)	$d = .01$, $p = .88$
Energy Use Moralization	4.38 (*1.22*)	4.76 (*1.19*)	4.83 (*1.20*)	$d = .15$, $p = .02$
Energy Policy Support	4.39 (*1.71*)	4.38 (*1.68*)	4.61 (*1.63*)	$d = .04$, $p = .50$
Wasteful Behavior	3.73 (*0.52*)	3.58 (*0.52*)	3.57 (*0.52*)	$d = -.15$, $p = .01$

Conclusions, Implications, and Future Directions

- Efficacy messages are a promising intervention in climate change communication.
- A simple, quick intervention increased energy conservation intentions, moralization of energy use, and support for energy conservation policies and reduced energy waste.
- Efficacy messages may be important in creating public support for energy conservation policies.
- More specific messages targeted at individual behaviors may produce even greater changes.
- Repeated exposure to efficacy messages may also increase their effectiveness.