College Students’ Understanding of and Reactions to Global Warming

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The principles underlying global climate change involve a complex interconnection between many scientific concepts that are difficult for students to understand. This study examined whether persuasive texts would impact readers’ willingness to take mitigative action to reduce the impacts of human-induced climate change. College students participating in the study were randomly assigned to read a persuasive text about global warming or the same text accompanied by a persuasive image. Both groups showed statistically significant increases in their knowledge about global warming and their willingness to take action to reduce its effects. This research demonstrates that persuasive text can produce not only change in students’ thinking about a controversial topic like global climate change, but may also promote a willingness to take action. This is significant because in the case of this topic, a change in students’ knowledge may not be a sufficient criterion for successful learning. It may be as important to promote willingness in future generations to take efforts to reduce their individual impact on the environment.
Purpose of Our Research

• To examine whether a persuasive text could promote:
  – More accepting attitudes towards global climate change
  – Greater willingness to commit to take mitigative action against human-induced climate change

• To explore the relationship among personal dispositions, attitudes, and commitment to action
Theoretical Framework

• Attitude change and persuasion (Petty & Cacioppo, 1986)
  – Social psychological models account for how individuals who hold a set of beliefs or attitudes can be persuaded based on exposure to complex messages
Theoretical Framework, cont.

• Persuasive Pedagogy (Alexander et al., 2004; Sinatra & Kardash, 2004)
  – Useful teaching approach when learning situation involves beliefs, attitudes, or knowledge that conflicts with the teacher, textbook, or learning materials

• Similar to Controversial Conceptual Change (CCC) (Sinatra & Mason, 2008)
  – CCC describes the process of changing students’ thinking about controversial issues
  – Attitude change, like CCC, involves a host of “hot” constructs (i.e., beliefs, dispositions, resistance to change, commitments, emotions, threats to identity)
Research Method

• College students read text on global warming edited from NY Times article on findings from Intergovernmental Panel on Climate Change
  – With or without persuasive picture

• Measured dispositions toward thinking deeply and open-mindedness

• Examined shifts in attitude and in willingness to take action (drive smaller cars, change to efficient light bulbs, etc.)
Demographics

140 UNLV UGs
- 85% Females
- 15% Males

Mostly Ed Majors
- 42% El Ed
- 17% Sec Ed
- 41% Other

Mostly Jrs.
- 3% Freshman
- 17% Sophomore
- 60% Jr.
- 20% Sr.

Most politically interested
- 6% Not interested
- 20% A little interest
- 21% Somewhat
- 37% Interested
- 16% Very Interested

Most Not Politically Active
- 37% < 1
- 15% @ 1
- 15% 1-2
- 11% @ 2
- 22% >2
Measures

1. Attitudes towards global warming
1. **Attitudes towards global warming**

1. Scientific evidence points to a warming trend in global climate.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Measures

1. Attitudes towards global warming
2. Measure of commitment to act
# Measures

## 2. Measure of commitment to act

1. I’m willing to replace all the light bulbs in my house with energy efficient fluorescent bulbs.

<table>
<thead>
<tr>
<th>Not Willing at All Enough</th>
<th>Somewhat Willing</th>
<th>Totally Willing to convince others</th>
<th>Willing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Measures

1. Attitudes towards global warming
2. Measure of commitment to act
3. Persuasive text/text plus picture
Persuasive Text with and w/o Persuasive Picture

Climate Change Debate: Doubt Gives Way to Certainty

NY Times, February 3, 2007
Measures

1. Attitudes towards global warming
2. Measure of commitment to act
3. Persuasive text/text plus picture
4. Need for Cognition
## Measures

### 4. Need for Cognition

1. I would prefer complex to simple problems.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Measures

1. Attitudes towards global warming
2. Measure of commitment to act
3. Persuasive text/text plus picture
4. Need for Cognition
5. Need for Closure
5. Need for Closure

1. I dislike unpredictable situations

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Moderately Disagree</th>
<th>Slightly Disagree</th>
<th>Slightly Agree</th>
<th>Moderately Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Procedures

1. Pre Attitudes
Procedures

1. Pre Attitudes

2. Pre Commit
Procedures

1. Pre Attitudes

2. Pre Commit

3. Text W or w/o picture
Procedures

1. Pre Attitudes
2. Pre Commit
3. Text W or w/o picture
4. Post Attitudes
Procedures

1. Pre Attitudes
2. Pre Commit
3. Text W or w/o picture
4. Post Attitudes
5. Post Commit
Shifts Pre to Post Reading

Attitudes towards Climate Change

Commitment to Take Action to Mitigate Climate Change

Read Persuasive Text or Text + Picture
Significant shift in Attitude
$F(1,138) = 206.0, p < .001, \eta^2 = .60$

Significant shift in Commitment to Action
$F(1,138) = 93.9, p < .001, \eta^2 = .41$

Shifts Pre to Post Reading

Attitudes towards Climate Change

Commitment to Take Action to Mitigate Climate Change
Significant shift in Attitude
$F(1,138) = 206.0, \ p < .001, \ \eta^2 = .60$

Significant shift in Commitment to Action
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No differences between text groups.
Commitment to Action: High Pre and More Post

“I’m willing to replace all the light bulbs in house with energy efficient fluorescent bulbs.”

I’m willing to stop using plastic grocery bags and use recycled bags instead.”
Commitment to Action: An Interesting Comparison

“I’m willing to pay a 50 cent surcharge per gallon of gas to go toward greenhouse gas reduction.”

“I’m willing to pay more money to buy a hybrid car.”
Used structural equation modeling (SEM) to:

– examine how students’ attitudes, dispositions, and commitment to action influence each other

– understand the patterns of correlations among these variables

– develop a theoretical model
Theoretical Model of Commitment to Take Action to Mitigate Climate Change

- Need for Cognition
  - Pre-Commitment
  - Pre-Attitude
  - Close-Mindedness
    - .34*

- Pre-Commitment
  - Post-Commitment
    - .86*
  - Pre-Attitude
    - .30*

- Pre-Attitude
  - Post-Attitude
    - .74*
  - .34*

- Post-Attitude
  - .15*
Climate change is a challenging topic:
  – Conceptually difficult
  – Requires an open-minded attitude and
  – Willingness to think deeply

• Persuasive pedagogy could promote greater appreciation of issues as well as a willingness to take action