Center for Research on Environmental Decisions

Synthesizing CRED research to improve communication with non-academic audiences

Poonam Arora, Sabine Marx, Debika Shome

Introduction

- Importance of communicating CRED research to non-academic audiences
- Outreach and policy initiatives and outputs

Experiential/affective and analytic processing of climate information

Sabine Marx

Motivation and Theoretical Background

Problems with the use of climate forecasts in farming decisions

Relation between reason and emotion*

Dual Process Theories**

*(Bertrand Russell, Tversky & Kahnemann 1974, Nisbett & Ross 1980; Hamill, Wilson, Nisbett, 1980; Hochberg & Krantz 1986; Jenni & Loewenstein 1997; Damasio 1994)

**(Chaiken & Trope 1999; Epstein 1994; Sloman 1996)

Two Mental Processing Systems

Rational/analytic system	*Experiential/affective system*
• Analytic • Logical • Deliberative	• Holistic • Intuitive • Affective – fear, dread, anxiety represent *risks as feelings* (Loewenstein, Weber, et al. 2001)
• Abstract – encodes reality in abstract symbols, words, numbers – rules and algorithms need to be learned (not hardwired) – system needs to be cued; does not operate automatically – neocortical structures	• Vivid – encodes reality in concrete images and narratives, linked in associative networks – operates automatically and without any training (hardwired) – activation of paleocortical brain structures

What does this mean for the communication of climate change information?

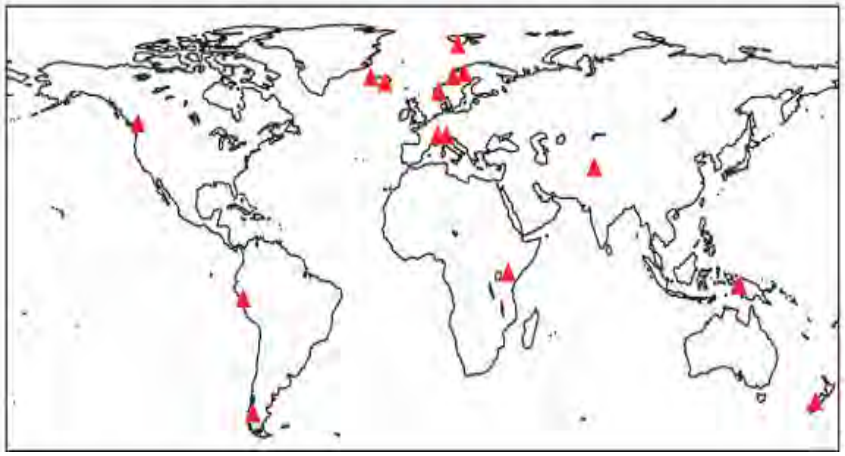
Analytic products (trend analysis, forecast probabilities, and ranges of uncertainty) ought to be valuable contributions to stakeholder decision making

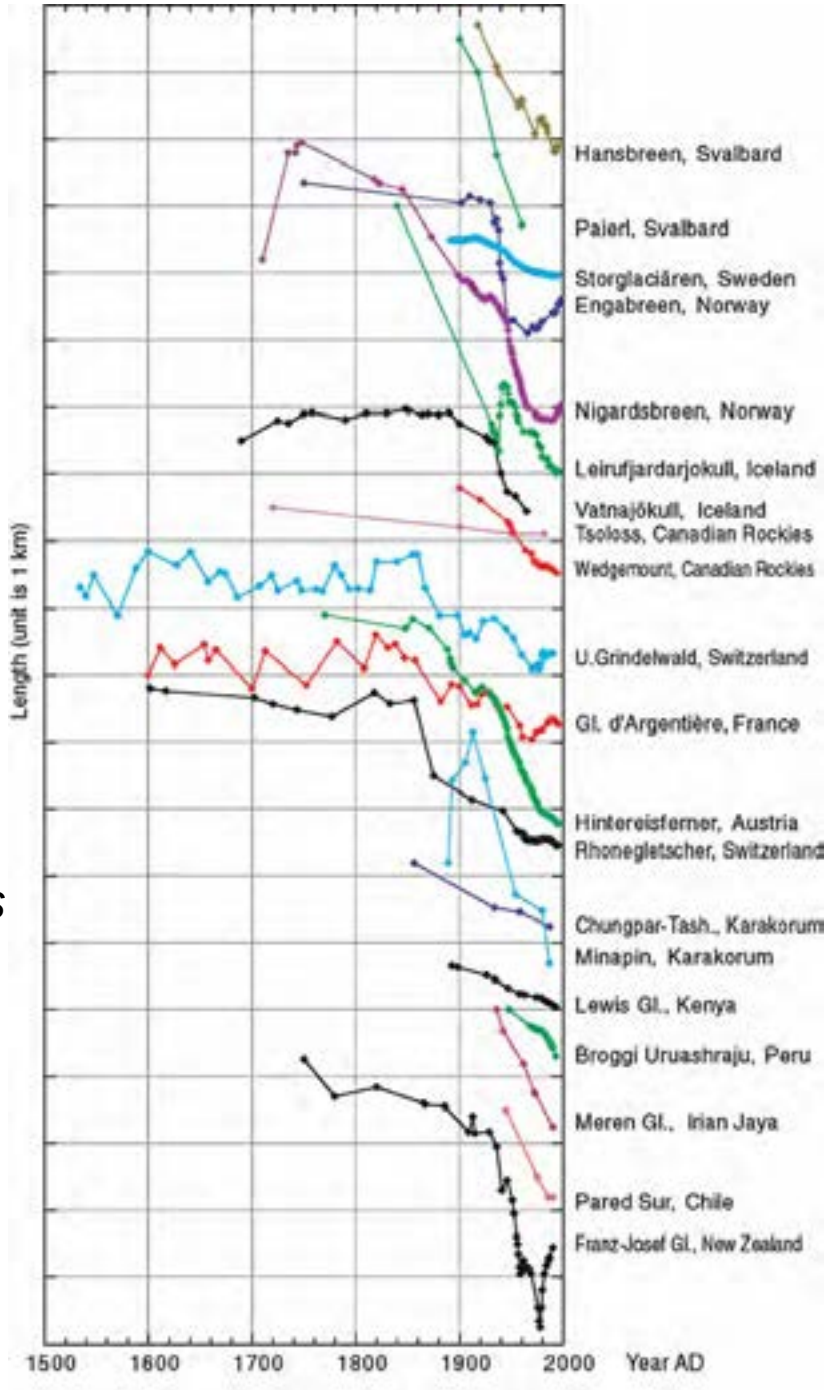
Yet decision makers also listen to the inner and communal voices of personal and collective experience, affect and emotion, and cultural values.

Climate Science Research shows global warming is one of the greatest threats to humanity

Why are many governments, industry, general public not worried (yet)?

How can we present or translate statistical summary information into a format that is more appealing to the experiential and affective processing system?





Map and Graph of World Glacial Retreat
A collection of twenty glacier length records from different parts of the world.

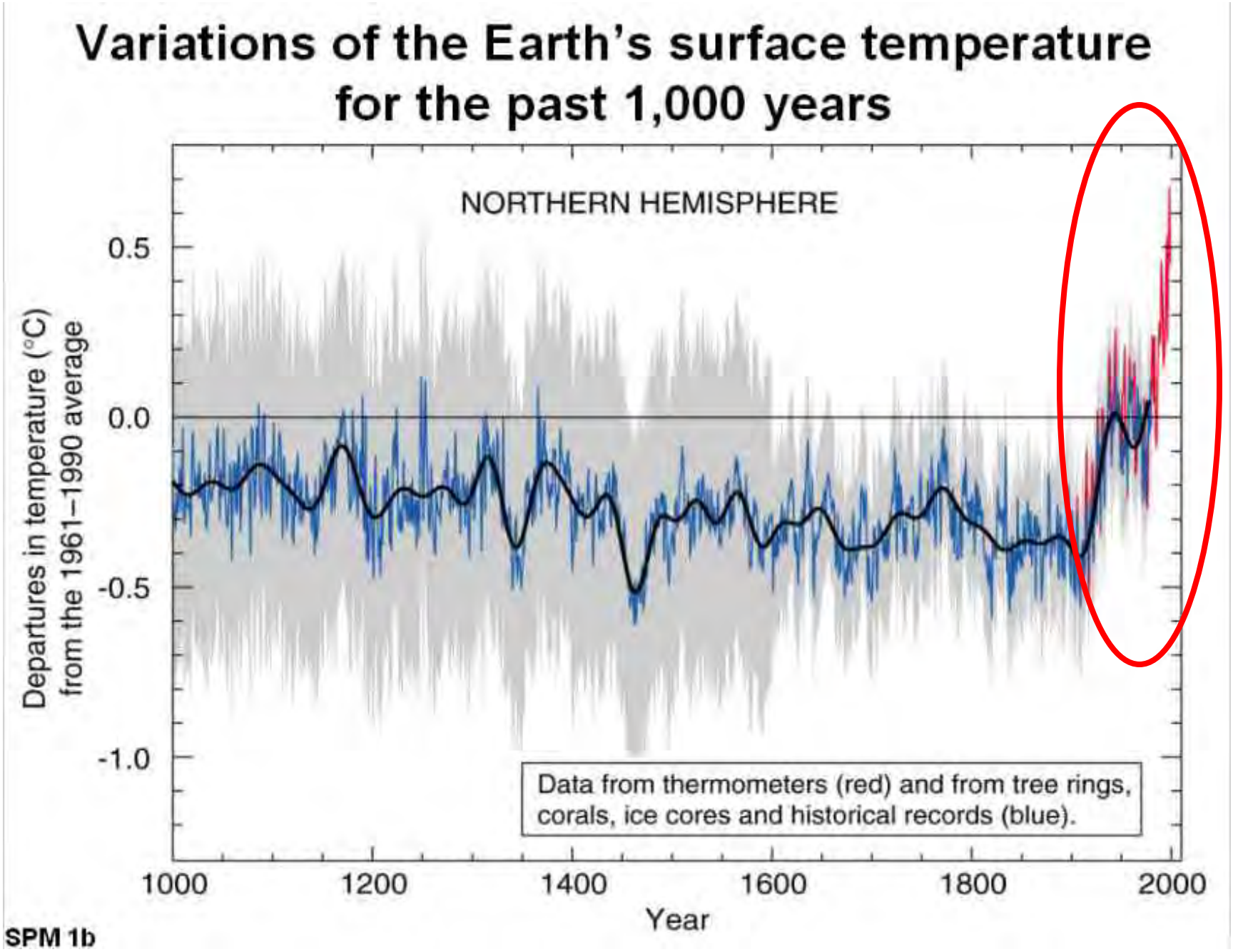
http://www.grida.no/climate/ipcc_tar/wg1


1990
2001

Muir Glacier, Alaska

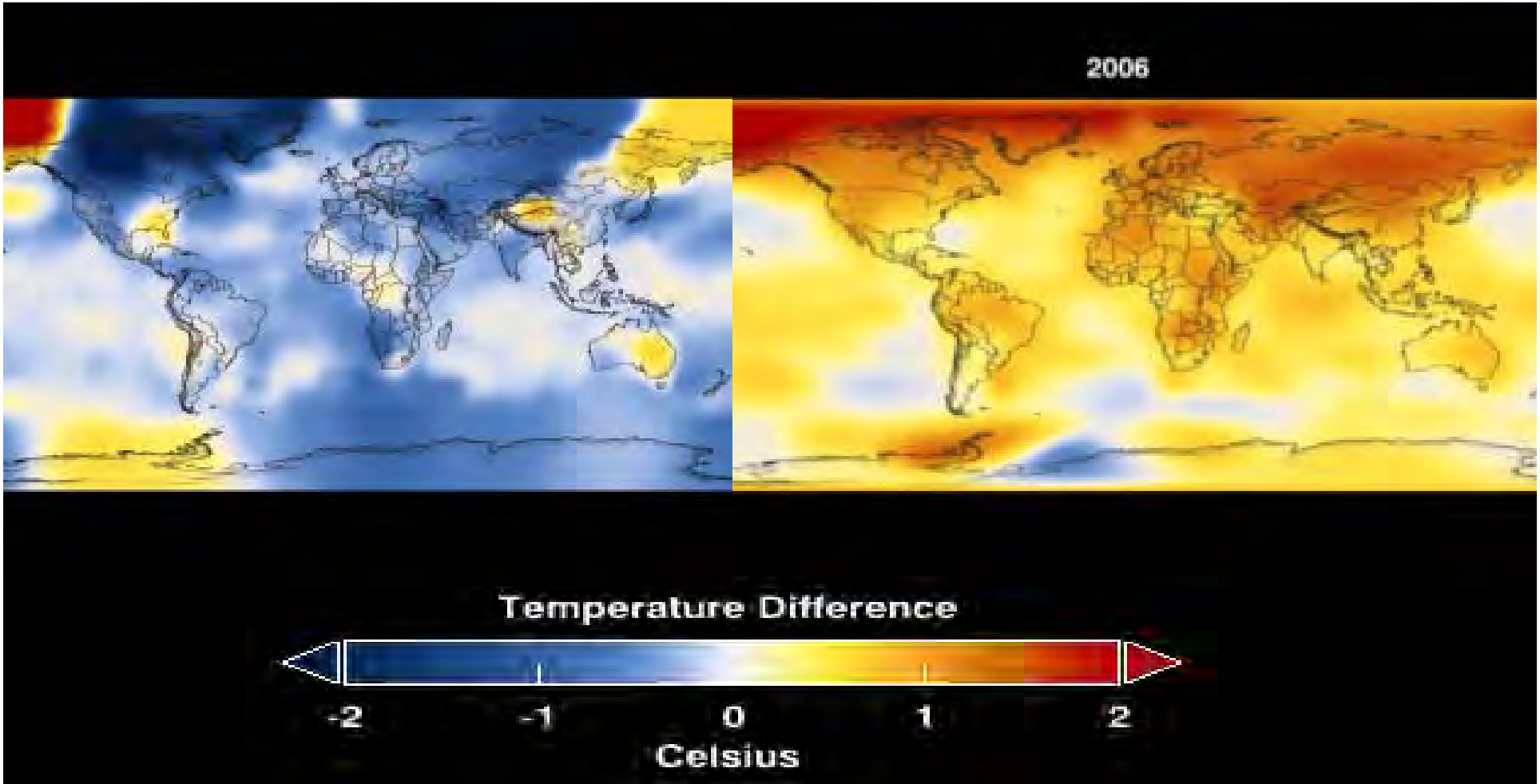
1941

2004



Source: : IPCC, Working Group I, Summary for Policy Makers (SPM), Third Assessment Report (TAR).

http://svs.gsfc.nasa.gov/vis/a000000/a003300/a003375/index.html



Animation of global temperature anomalies from 1880 to 2006 taken as a five-year moving average. Dark blue indicates areas cooler than average. Dark red indicates areas warmer than average. This animation is annotated with the year that ends the five-year time span used in calculating the moving average. http://svs.gsfc.nasa.gov/vis/a000000/a003300/a003375/index.html

Downsides of affective/experience-based processing of information

- **"Finite Pool of Worry" Effect** (Linville & Fisher, 1991)

We can only deal with so much bad news at a time

Appealing to, and engaging, the emotional system works in the short term, but then our attention will shift to other things

Downsides (cont'd)

- **Numbing**

The effect wears off

Caution: Don't overuse and make sure to vary emotional appeals

Projects under CRED Research Theme of Learning and Information Processing

1. Climate change detection and behavior in regions experiencing significant climate change (field)
   - Alaska
   - Follow-up projects in Alaska, Florida, NYC
2. Climate change, vicarious experience, and the social amplification of risk / “The Day After Tomorrow” studies (lab/field)
3. Glacial retreat and perceptions of climate change (field)
4. Public perceptions of the “cone of probability” (field)
5. Mental representations and framing (lab)
6. Making sense of forecasts: the role of group discussion in understanding climate information (field)
7. Perceptions of climate in colonizing Grasslands (history)
8. Agricultural decision making in the Argentine Pampas (field)
9. Temporal discounting of environmental outcomes (lab)

- Application to research projects (analysis and outreach: retranslation of statistics through analogies)
  - Uganda, Alaska, etc.
- Peer reviewed papers (Leiserowitz 2004, 2006; Weber 2006, Marx et al. 2007)
- Outreach with communicators (e.g., scientists) and general public
  - Make them aware of the phenomenon of dual processing through
    - Learning modules (online) and survey
    - Lectures (C&S MA program, AMNH, high schools, Earth Day)
    - Combined learning exercise, questionnaire, lecture with report of survey results (high school, Columbia students)
    - Inclusion into communications guide

CRED GOES TO ALBANY

An Invitation To Share What We Know and Study

- NYSERDA (NY State Energy Research and Development Authority)
- Traditional programs targeting energy use
  - For Institutions and Individuals
  - Based on Economics (Savings)
- Interested in exploring how findings from “behavioral decision making” could help them both with current and potential programs.

CRED's Role

- Fund Research: How to write a RFP for Researchers
- Practical:
  - How can CRED's research help NYSERDA target their programs to individual's better?
- Policy:
  - How should NYSERDA think about future programs?
  - How can CRED's research inform future policy?

What Did We Tell Them?

- Choices are locally constructed (Slovic, 1995)
  - "What does a person like *me* do in a *situation* like this?" (Weber et al, 2004)
- Context makes certain goals more accessible (Higgins, 1996)
  - Presence of a group increases group or social goals (Tajfel, 1973)
- Social context – affiliation can be a rapid, automatic and basic process (Schacter, 1959, Brewer, 2001, Krantz, 2006)

– Decision makers make tradeoffs between economic and social goals, which can be a major factor in context-dependent choice.

What Does This Mean For Environmental Decisions?

- Environmental decisions can be thought of as social dilemmas where the outcomes for any one decision maker is affected by the actions of others
  - Require integration of multiple goals.
- Whenever outcomes for a decision maker are affected by the choices of the others, social affiliations come into play
- Decision maker goals need to be better understood in the context of the decisions they are being asked to make.
  - Social norms and obligations can be strong motivators

A Cooperative Goal Changes How Payoffs Are Viewed

- Decision matrix with added cooperative goal for 2-person dilemma

Player 2 Player 1	Cooperate	Defect
Cooperate	3+ C_1 3+ C_2	1 4
Defect	4 1	2 2 Nash Equilibrium

1 = least preferred
4 = most preferred

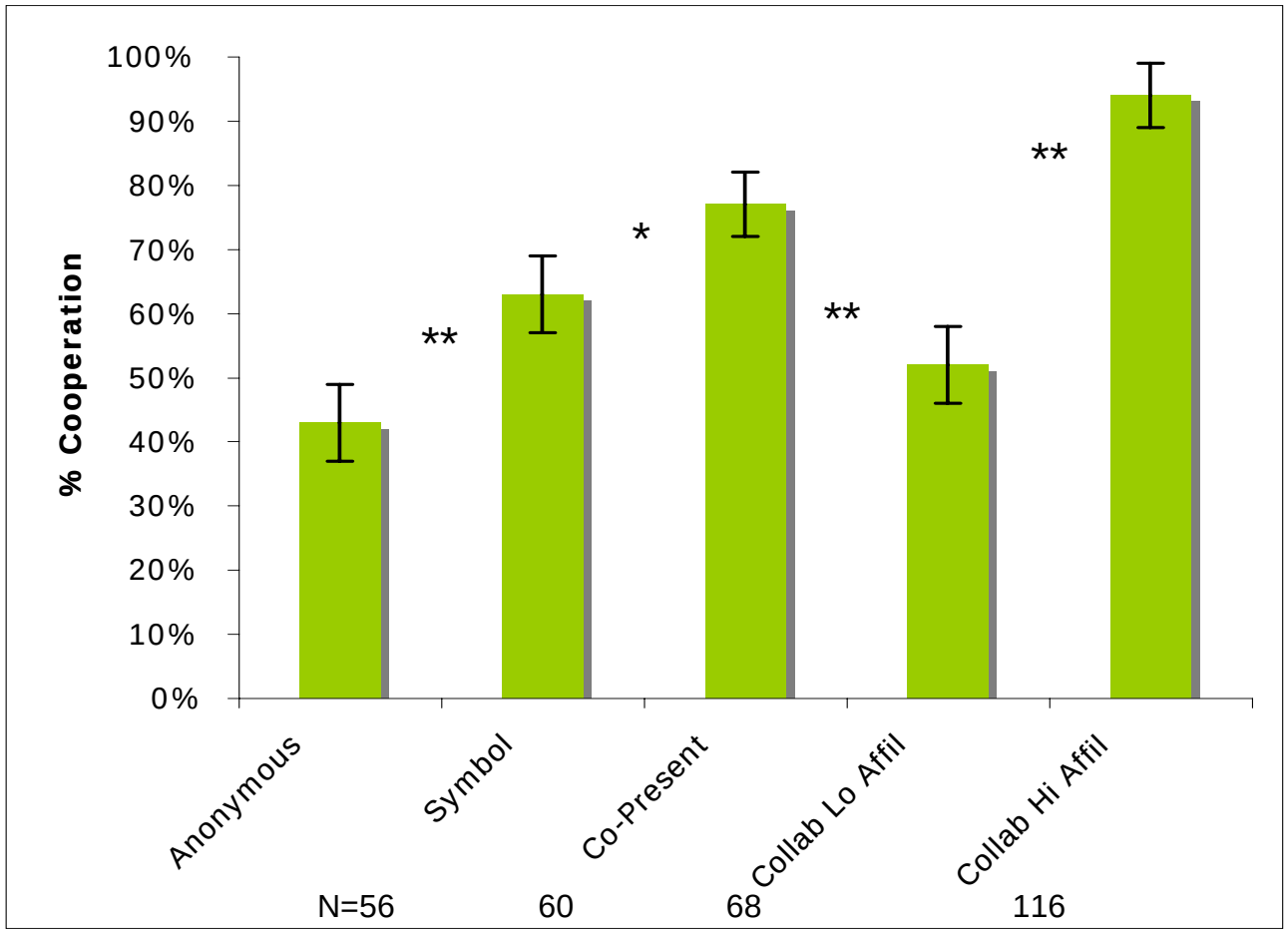
Two CRED Studies

- 2 Studies carried out with 4-person laboratory groups using a dilemma task with commons-dilemma payoffs.
- Study 1 manipulated and measured the activation of temporary affiliation for each player within a laboratory group.
- Study 2 replicated results of the first study and compared a commons dilemma with immediate payoffs to one where the transactions were all to occur in 6 months.

Findings From CRED Research

- In Study 1 we hypothesized and found that
  - Merely signaling affiliation by a symbol increased cooperation compared to the control with no signaling.
  - Physical co-presence of group members (without interaction) had an even larger effect.
  - Interaction with group members a fourth condition, groups were asked to cooperate in an unrelated task before the dilemma, and observers coded each subject's affiliation strength during that task. Subjects who showed strong affiliation cooperated at close to 100% in the dilemma.
  - Manipulated affiliation changed the evaluation of payoffs and the valence associated with them.

Study 1: Cooperation Levels by Condition and Observed Group Affiliation



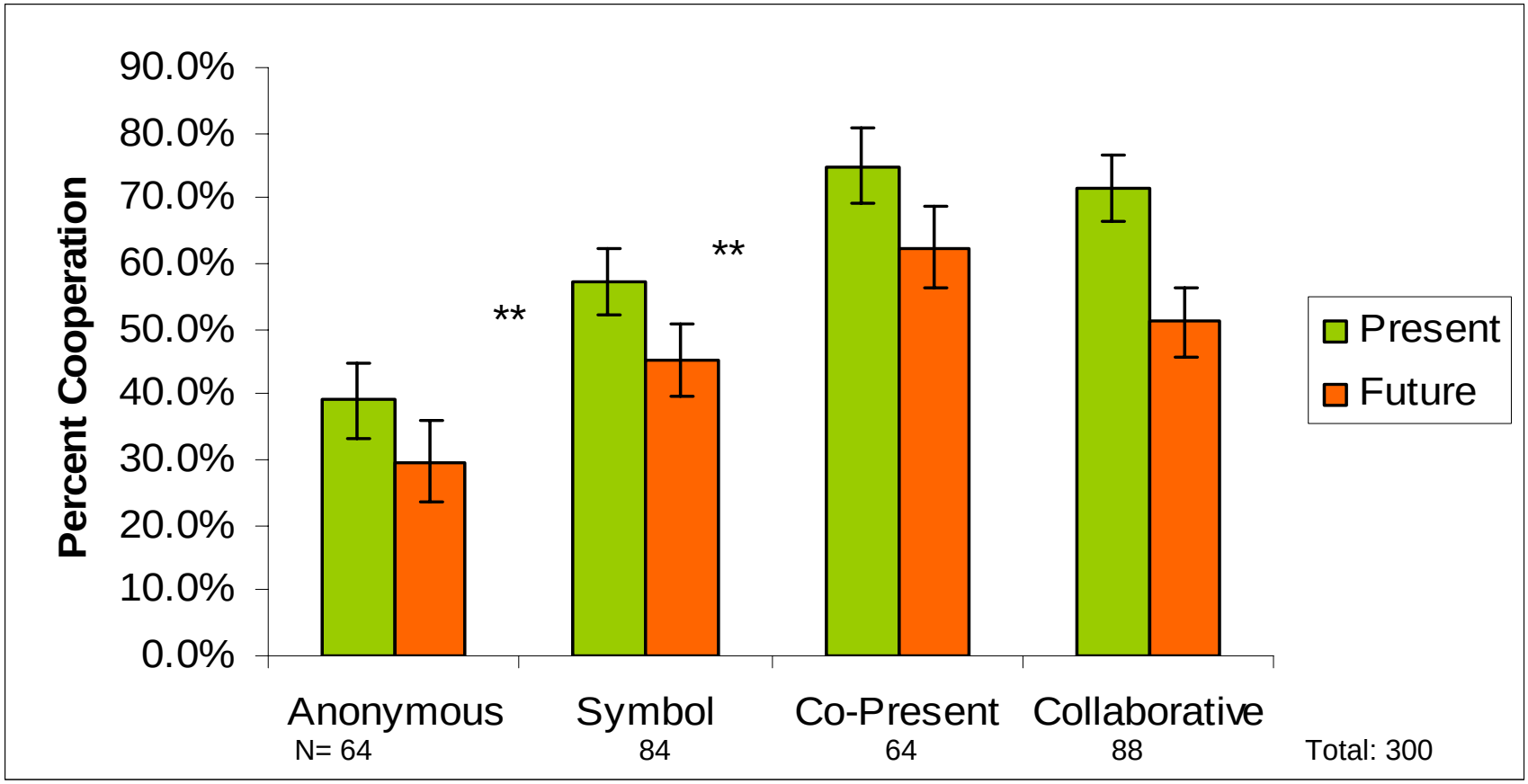
Error Bars = 95% CI

F(4, 295)=13.04, p<.001, Independent t-tests: **:p<.01, *:p<.05

Findings From CRED

- Study 2 replicated results from Study 1 while also comparing immediate payoffs to payoffs in 6 months.
- Cooperative choices increased as manipulated affiliation increased in both the present and future scenarios, but were on average, lower for the future scenario in all conditions.
- Cooperative choice was strongly associated with
  - Greater emphasis on social rather than neutral alternatives in an implicit word completion task
  - Reduction in the importance of one's own gain
  - Higher self-rated level of affiliation with the group.

Cooperation Over Time: Present vs. Future



Error Bars = 95% CI

$F_{present}(3,296)=8.17$, $p<.01$; $F_{future}(3,296)=5.03$, $p<.01$; Independent t-tests: **:$p<.01$

Findings From CRED

- Both studies collectively show that relative tradeoffs between social and economic goals are central to context-dependent choice.
- Increase in affiliation increases the saliency of social goals making cooperative action more likely and changing the perception of payoffs and relative importance of one's own gain.
- Changes in the temporal dimension can attenuate this increased saliency of social goals vis-à-vis economic goals.

What Did NYSERDA Find Interesting?

- Economics doesn't always sell!
  - "Why aren't more home owners willing to sign up for an energy audit even if it could save them $500/year?"
- Community and affiliations matter – what seems to be an individual decision, may not be so.
  - "Should we be sharing how many home have had an energy audit with others in the neighborhood?"
- The individual (even when functioning as an independent individual) is not isolated from social and contextual influences.
  - "Why do residents in more affluent communities insist on leaving the light bulbs that burn at their front gates on all night long?"

Next Steps

- Individual Programs: targeting a full community
- Consider taking a more group-based approach
  - Change materials of current programs
  - Re-think what perspective new programs should take

Outreach Initiatives

Debika Shome

Education seminars

High School for Environmental Studies, April 2006

James Baldwin High School, May 2006

Public lectures and exhibits

American Museum of Natural History, International Year of Polar Exploration Exhibition, February 2007

Lamont Doherty Earth Observatory Open House, October 2005

CUNY The City University of New York

Policy Work


Urban Climate Change
Research Network
(UCCRN)


NYSERDA
New York State Energy Research and Development Authority

Outreach materials

- Guide to Communicating Climate Change

CRED Guide to Climate Change Communication

- Use social science research to help policy makers, government leaders, local organizations, and individuals incorporate information about climate uncertainty and environmental risk into their decision making.
- Audience
  - scientists looking to make their message more far reaching,
  - decision makers and policymakers who want to talk more effectively about climate change, and
  - anyone who wants to communicate about climate change more effectively.

- Synthesis of CRED research findings to help readers more effectively discuss and explain climate change information to the audiences they are speaking with.

- Made up of lab & field research, case studies, and real world examples.

2 Highlights from the Guide

- Translate scientific/statistical (abstract concepts) descriptions into concrete (vicarious) experience

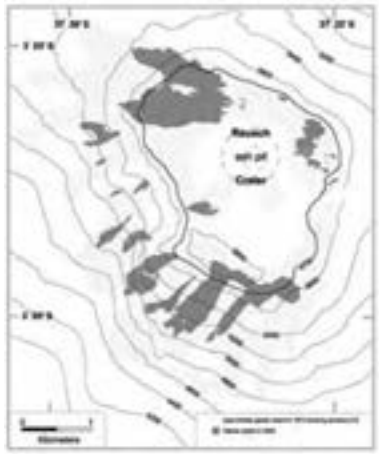
- Get your audience’s attention

Translate scientific/statistical (abstract concepts) descriptions into concrete (vicarious) experience

- Analytic

Table: Two Information Processing Systems of the Brain

Rational processing system	Affective processing system
Analytic Logical Deliberative	Holistic Intuitive Affective (fear, dread, anxiety, etc.)
Abstract • encodes reality in abstract symbols, words, numbers • rules and algorithms need to be learned (not hardwired); system needs to be cued; does not operate automatically • activation of neocortical structures, evolutionary younger	Vivid • encodes reality in concrete images and narratives, linked in associative networks • operates automatically and without any training (hardwired) • activation of paleocortical brain structures, evolutionary older



Map of glacial retreat at Mt. Kilimanjaro in 2003.

- Experiential

Mt. Kilimanjaro in 1993 and 2000.

New York City Recycling Advisory

Town of Barnstable
Department of Public Works
Solid Waste Division
45 Flint Street, Marstons Mills, MA 02648

Office: 508-420-2158
Fax: 508-428-9139

L. Glenn Santos
Solid Waste Supervisor

"Town of Barnstable book recycling"

The Town of Barnstable in partnership with the nonprofit organization Hands Across the Water, has recently installed a "surplus books for charity" collection container at the Barnstable Transfer Station Recycling Center located at 45 Flint Street in Marstons Mills.

The hours of operation are Tue-Sat 7:30 a.m.-3:30 p.m.

The container will be available for all to use to dispose of their excess reading material-for a good cause!

Hands Across the Water will send the books at no charge to needy schools and libraries in needy areas all over the world. Use of the container by individual households, as well as by local schools and libraries, to dispose of their surplus books will hopefully not only lower area trash disposal costs by diverting unwanted books from the trash stream, but will provide badly needed books for Third World schools and libraries.

Hands Across the Water (HATW) is a dual purpose charity which promotes both local conservation and global literacy and education.

Hands Across the water, Inc. (HATW) is a nonprofit organization established in Massachusetts and recognized as a public charity by the IRS under IRC Section 501 (C) (3).

HATW has attracted considerable positive attention from the Massachusetts Department of Environmental Protection.

HATW uses federal government aid to recycle excess books from our relatively affluent society over to nonprofit educational institutions and community libraries in book hungry Third World countries overseas, where many people rarely get a chance to own or even borrow a book.

vs

Get your audience’s attention

- Frame your message
- Talk about climate change holistically

Definition of Framing

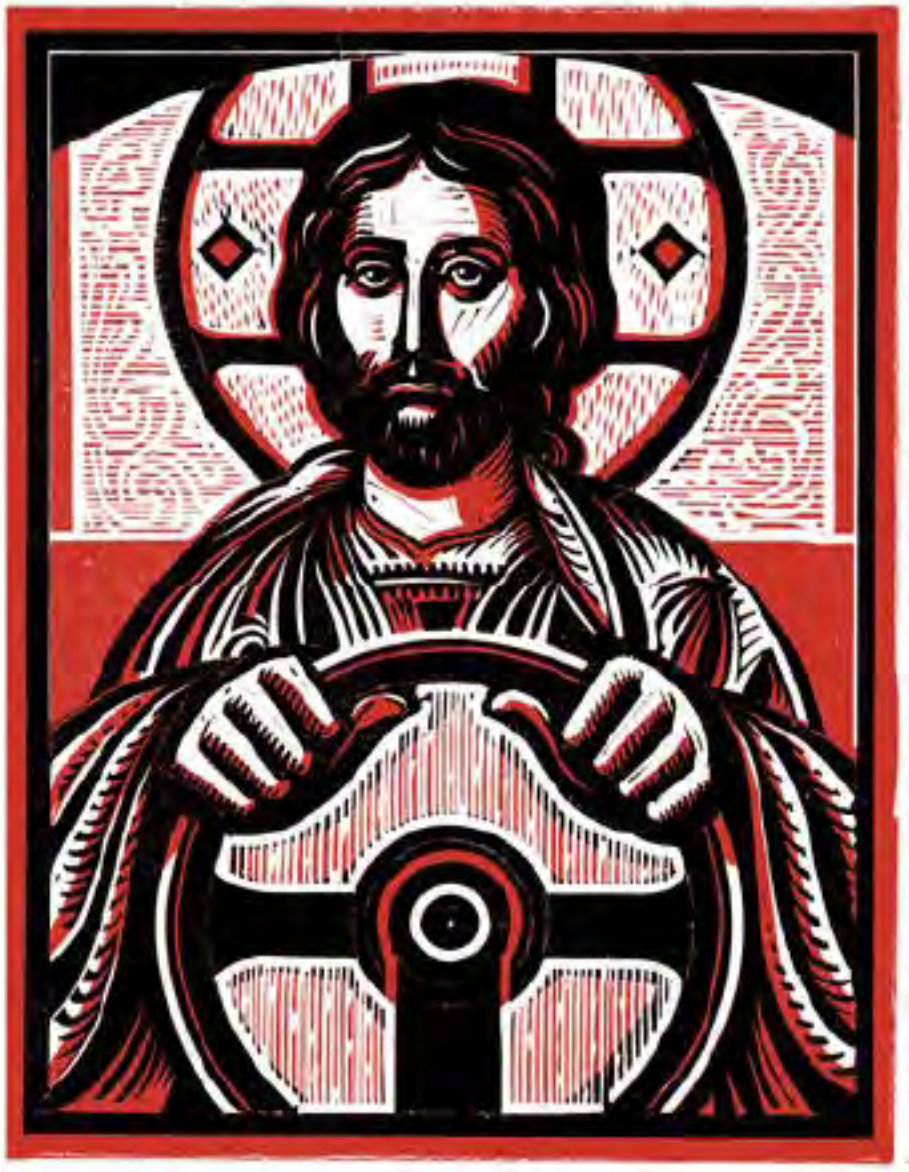
- **Frames organize central ideas on an issue**. They endow **certain dimensions of a complex topic with greater apparent relevance** than the same dimensions might appear to have under an alternative frame.

- They help communicate why an issue might be a problem, who or what might be responsible, and what should be done.

- **Frames can be communicated in short hand by condensing symbols**: catch-phrases, slogans, historical references, cartoons, and images.

  - Scheufele & Nisbet (*in press*). Encyclopedia of Political Communication

Moral Framing and WWJD?



“We believe the Risen Lord Jesus cares about what we drive. Pollution from vehicles has a major impact on human health and the rest of God's creation. It contributes significantly to the threat of global warming. Our reliance on imported oil from unstable regions threatens peace and security. Obeying Jesus in our transportation choices is one of the great Christian obligations and opportunities of the twenty-first century.”

- Evangelical Environmental Network

Talk about climate change holistically

- Climate change and national security

- Climate change and human health

Future Plans

- Expand
  - Participatory Processes
  - Social Affiliation
- New
  - Environmental discounting

Q & A

- What are other DMUU centers already doing? Future plans?