

Helping scientists become strategic science communicators

John C. Besley

Ellis N. Brandt Professor
Communication Arts and Sciences
Michigan State University

w/Anthony Dudo

Associate Professor
Moody College of Communication
The University of Texas at Austin



BURROUGHS
WELLCOME
FUND 

**Chan
Zuckerberg
Initiative** 
the David &
Lucile Packard
FOUNDATION

GORDON AND BETTY
MOORE
FOUNDATION


JOHN TEMPLETON
FOUNDATION

 THE
KAVLI
FOUNDATION

RITA ALLEN
FOUNDATION 

USDA

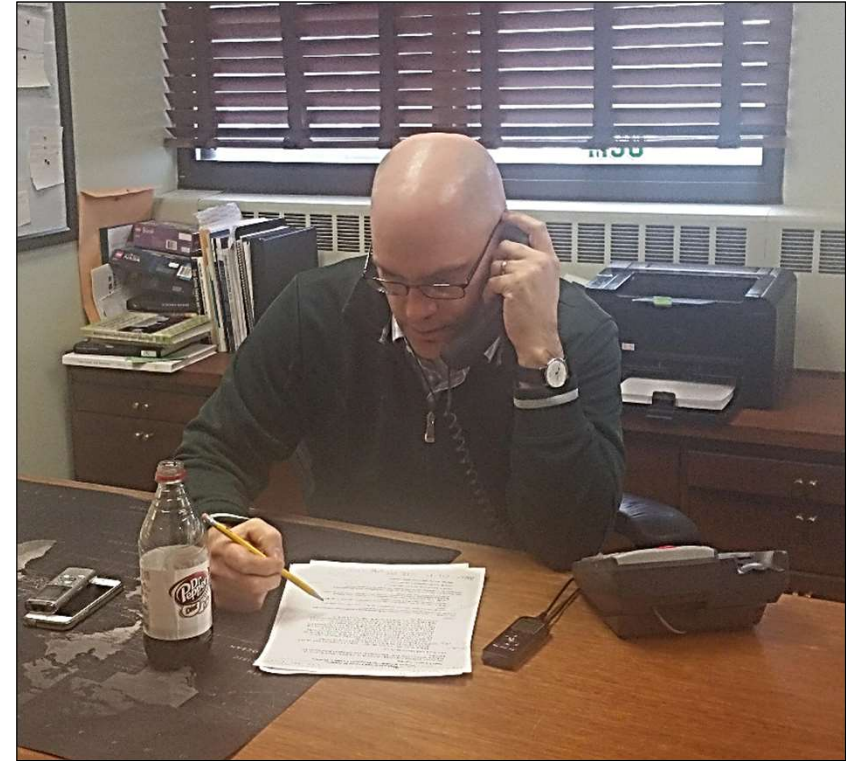

NIFA



This material is based upon
work supported by the National
Science Foundation (NSF, Grant
AISL 1421214-1421723. Any
opinions, findings, conclusions,
or recommendations expressed
in this material are those of the
authors and do not necessarily
reflect the views of the NSF.

Background

- Research on public's views about science and scientists
- Research to help science community communicate more effectively
 - Interviews with key actors
 - Surveys of scientists

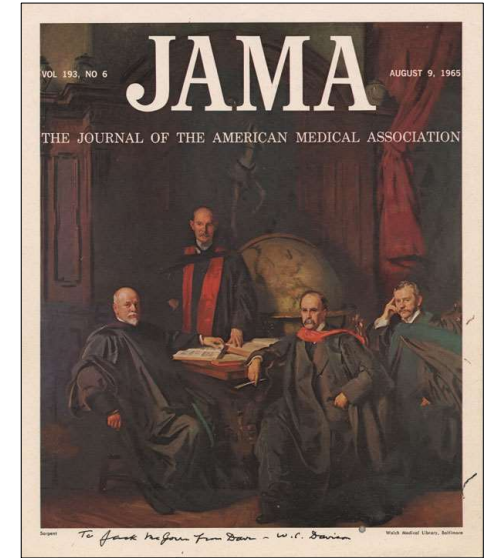


Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

A broad understanding of science communication (and a differentiation from science education)



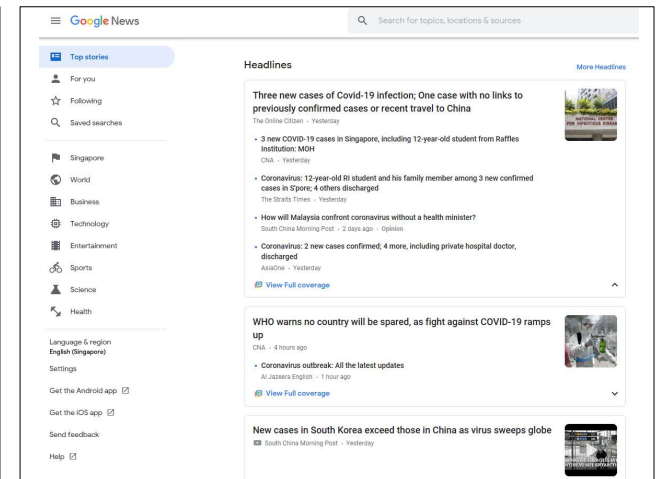
A broad understanding of science communication (and a differentiation from science education)



Stakeholders/Publics



Decision-makers



Mediated Audiences

Our old question: How can we
get more scientists to communicate?



Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

Understanding Scientists' Willingness to Engage


Scientists are willing to engage ...

John C. Besley¹, Anthony Dudo², Shupeí Yuan³, and Frank Lawrence¹

Mode	General Scientific Society			Biological Society I		Biological Society II		Chemistry Society			Geophysical Society		
	F2F	Media	Online	F2F	F2F	Online	F2F	Media	Online	F2F	Media	Online	
Engage willingness													
Not all willing (1)	3%	6%	19%	4%	2%	14%	3%	9%	15%	1%	3%	10%	
(2)	3%	5%	12%	3%	2%	7%	6%	7%	10%	2%	4%	8%	
(3)	3%	5%	8%	3%	2%	7%	3%	5%	9%	2%	4%	7%	
Neutral (4)	11%	16%	20%	13%	10%	19%	15%	26%	23%	8%	16%	19%	
(5)	17%	19%	14%	20%	17%	16%	17%	16%	14%	14%	17%	17%	
(6)	27%	23%	13%	24%	29%	16%	25%	19%	14%	29%	26%	17%	
Very willing (7)	36%	27%	15%	33%	39%	21%	31%	18%	15%	44%	32%	22%	

N = 4,073 (Ecological and geological society data not shown)

Understanding Scientists' Willingness to Engage

John C. Besley¹ , Anthony Dudo², Shupeí Yuan³,
and Frank Lawrence¹

... especially likely if scientists believe:

- It will be enjoyable (attitude)
- It will be effective (response efficacy)
- They have the time (behavioral control)



Current Question: How can we get scientists
(or other part-time science communicators)
to communicate more effectively?



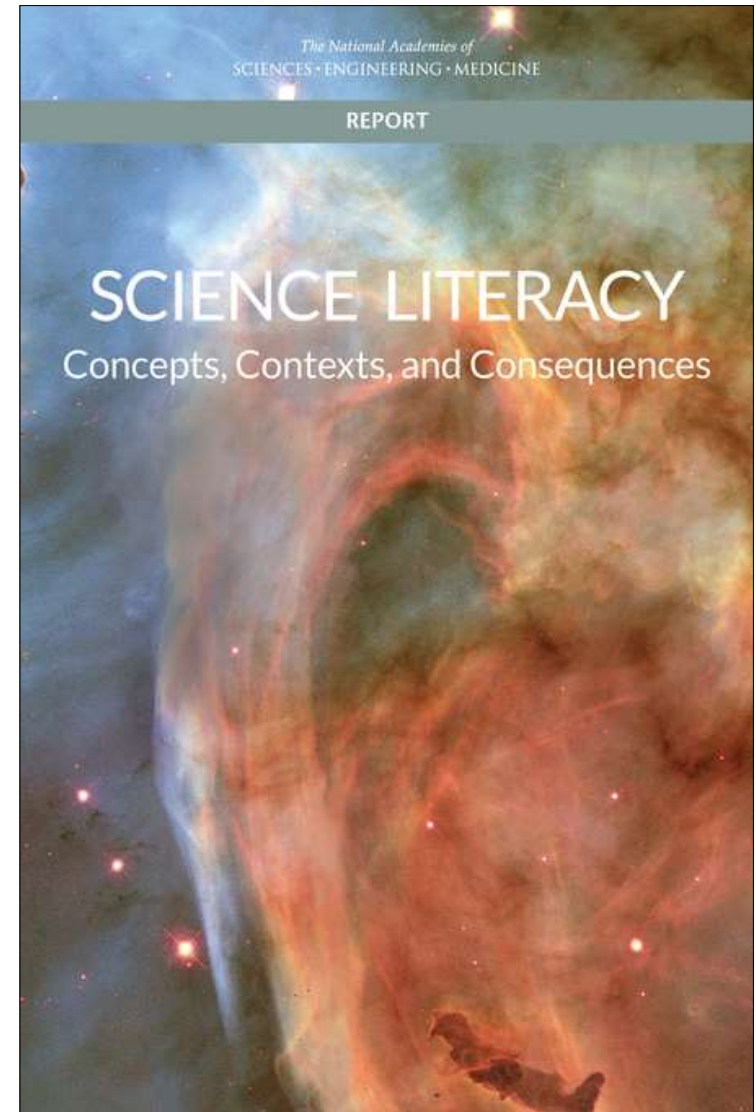
Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

The fundamental challenge of science communication

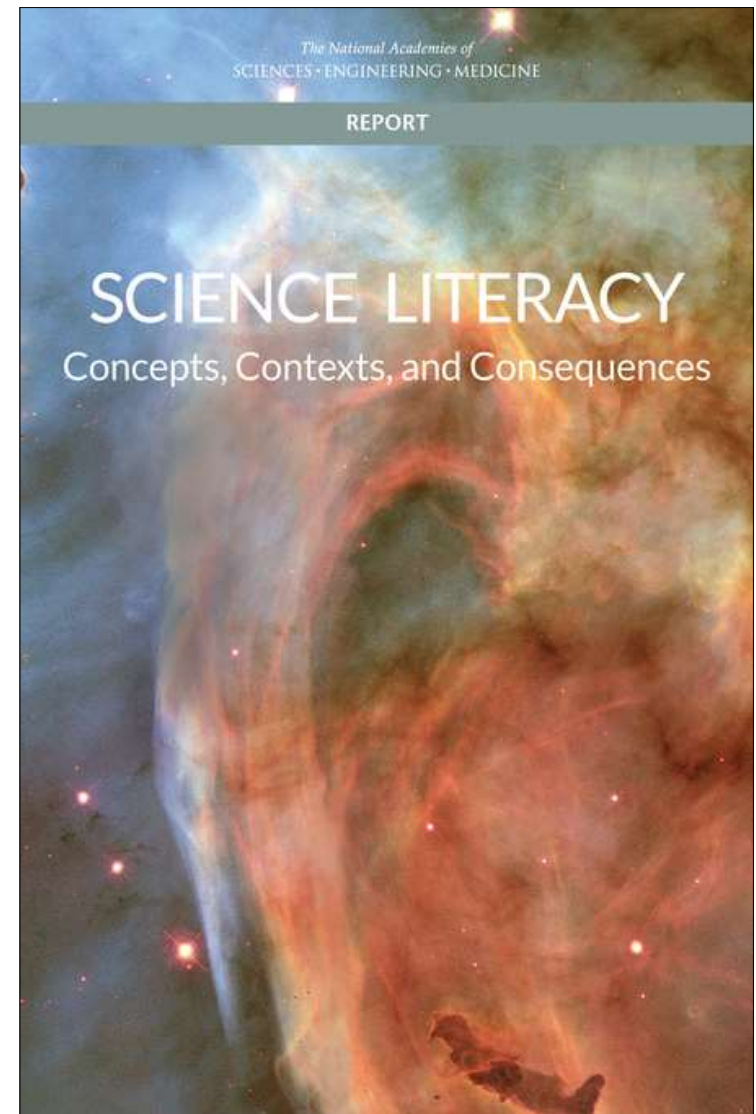
“Available research does not support the claim that increasing science literacy will lead to appreciably greater support for science ...”



Communication



**Translation, Distillation,
Explanation, etc.**



Current Question: How can we get scientists
(or other part-time science communicators)
to communicate more effectively?



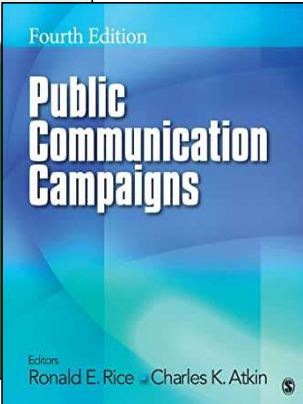
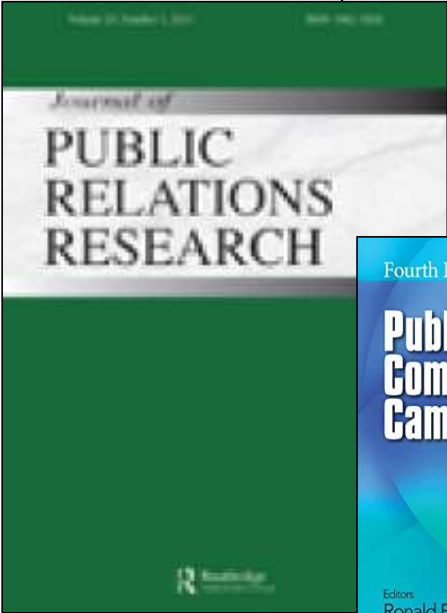
Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

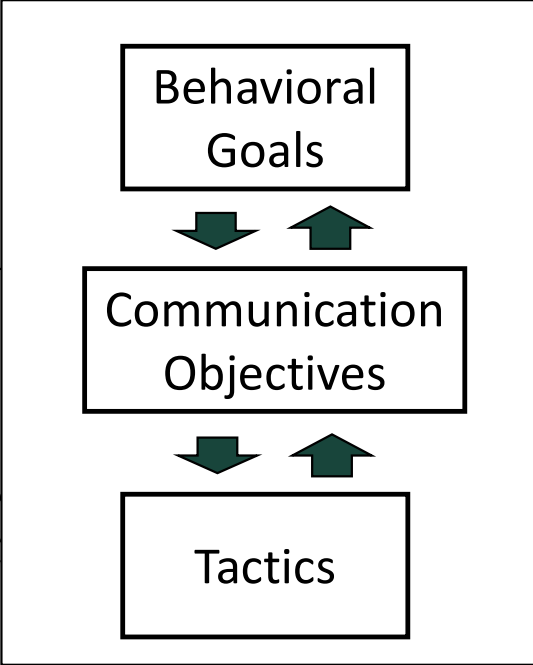
What do we mean by effective?

JOURNAL OF PUBLIC RELATIONS RESEARCH, 10(2), 103-135
Copyright © 1998, Lawrence Erlbaum Associates, Inc.



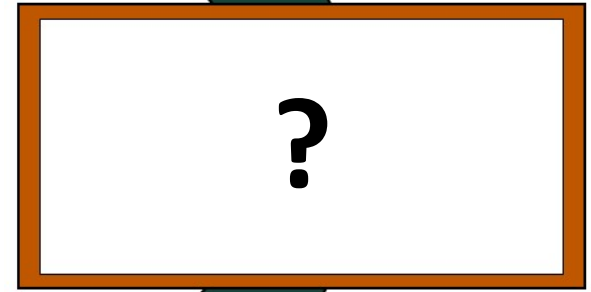
Demonstrating Effectiveness in Public Relations: Goals, Objectives, and Evaluation

Linda Childers Hon
Department of Public Relations
College of Journalism and Communications
University of Florida



What do we mean by behavioral goals?

What do you hope will happen from the time, money, and energy you put into communicating?



Would you be happy if you only ...

Randen Pederson, Bridge to Nowhere, via Flickr Creative Commons

What do we mean by behavioral goals?

What do you hope will happen from the time, money, and energy you put into communicating?

Policy support/acceptance
Research priority setting/framing
Trust (As willing to be vulnerable)
Individual behavior
(including career choice)



Buying/donating



Acting/behaving



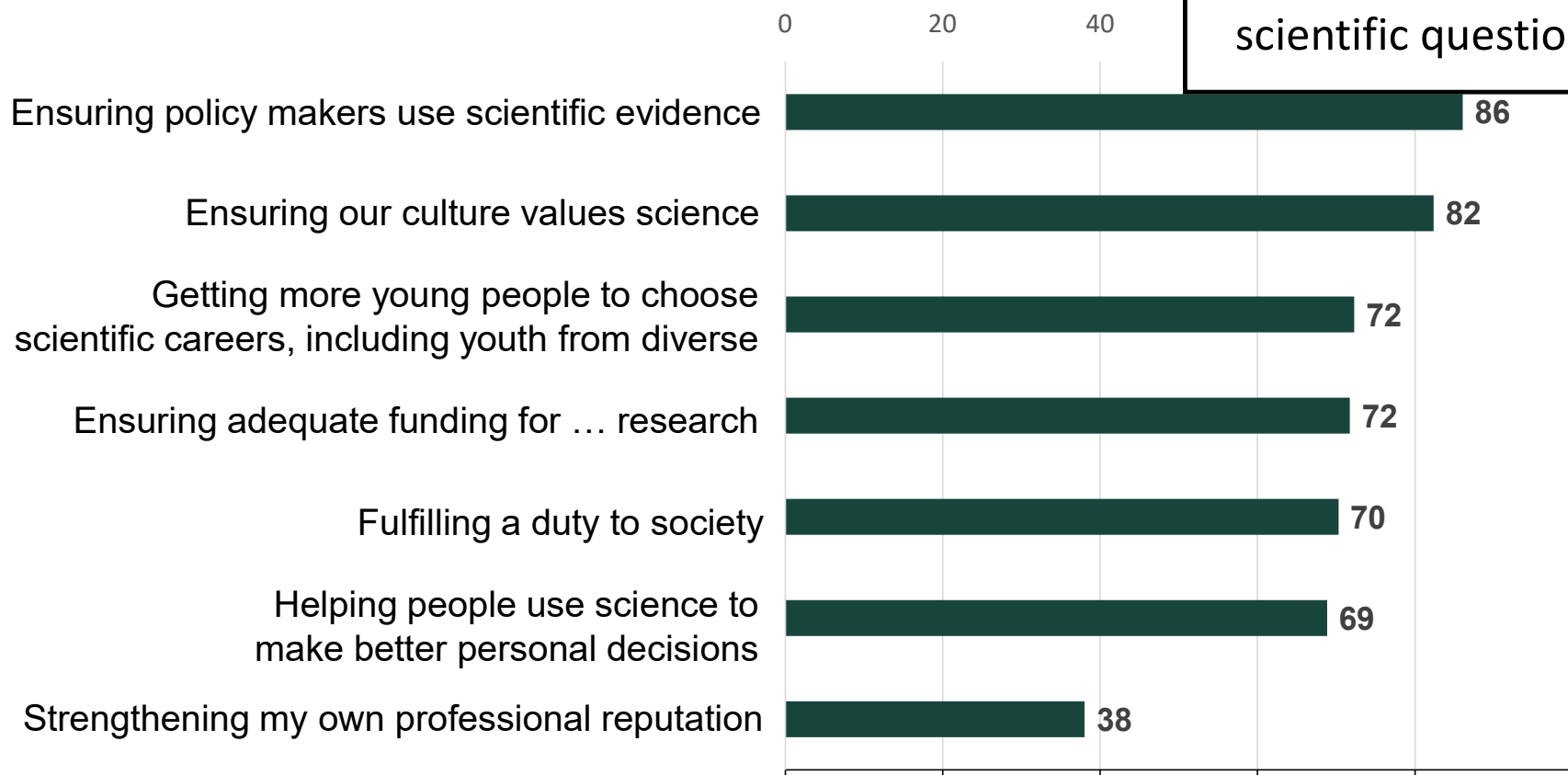
Supporting



Legitimacy/
Behavioral Trust

Scientists have goals ...

AAU Scholar Importance Ratings of Potential Engagement Goals



A missing goal:
“To ensure scientists ask the most important scientific questions.”

Fall 2018, 11% Response Rate, n =~516

What do we mean by tactics?

Behaviors
Messages
Tone/Intensity/Style
Channels
Sources

Who says (or does) what
to/with who in what way and
through what channel?

scienceandpublic.com ☆

De-Jargonizer
How accessible is your work, paste your article ... to analyze the amount of jargon in your writing.

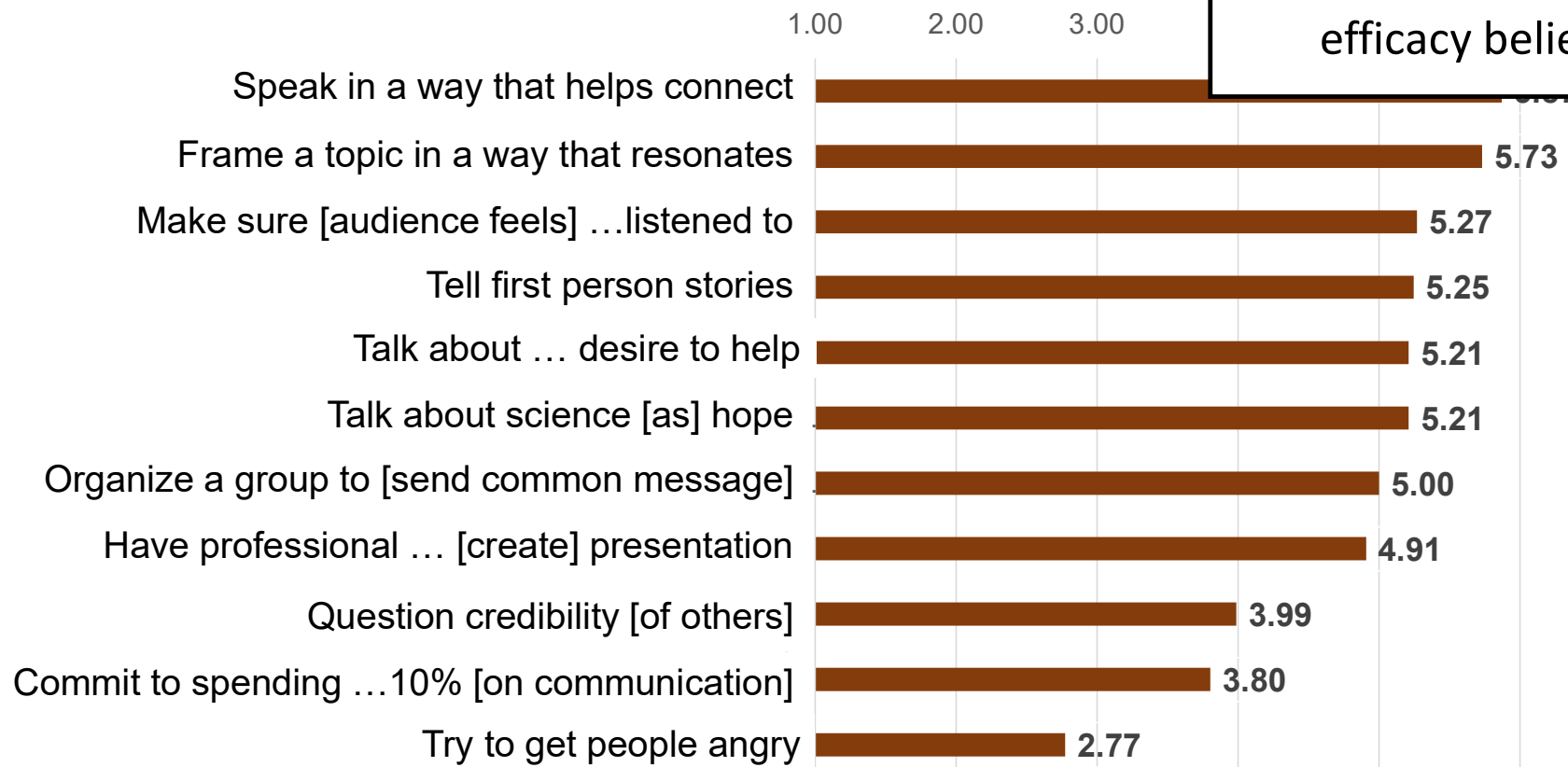
Start



Most training ...
Emphasis on
'translation,'
storytelling,
new social channels,
and fostering
dialogue (+ more)

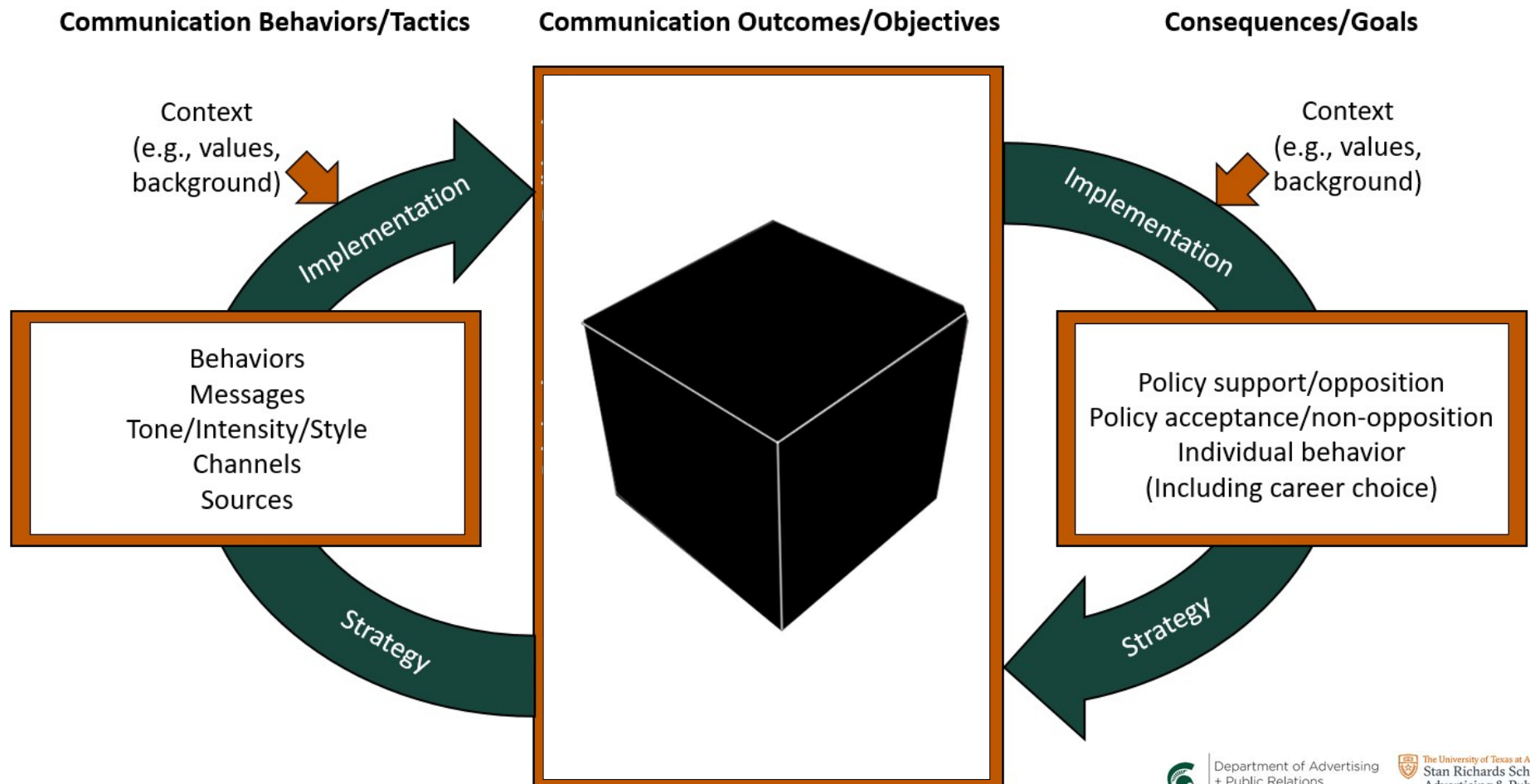
Scientists are open to many potential tactics

AAU Scholar Willingness to Prioritize Various Communication Tactics
(1 = Strongly disagree, 7 = Strongly agree)

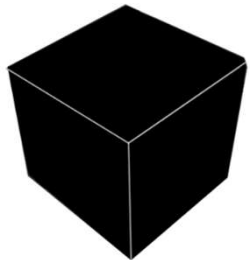


Statistical predictors include ethicality, normative beliefs, and efficacy beliefs

What about communication objectives?



The central role of communication objectives ...



Communication effects researchers study the ‘outcome’ of communication (i.e., tactics) and the impact of these outcomes on behaviors (goals)



Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY

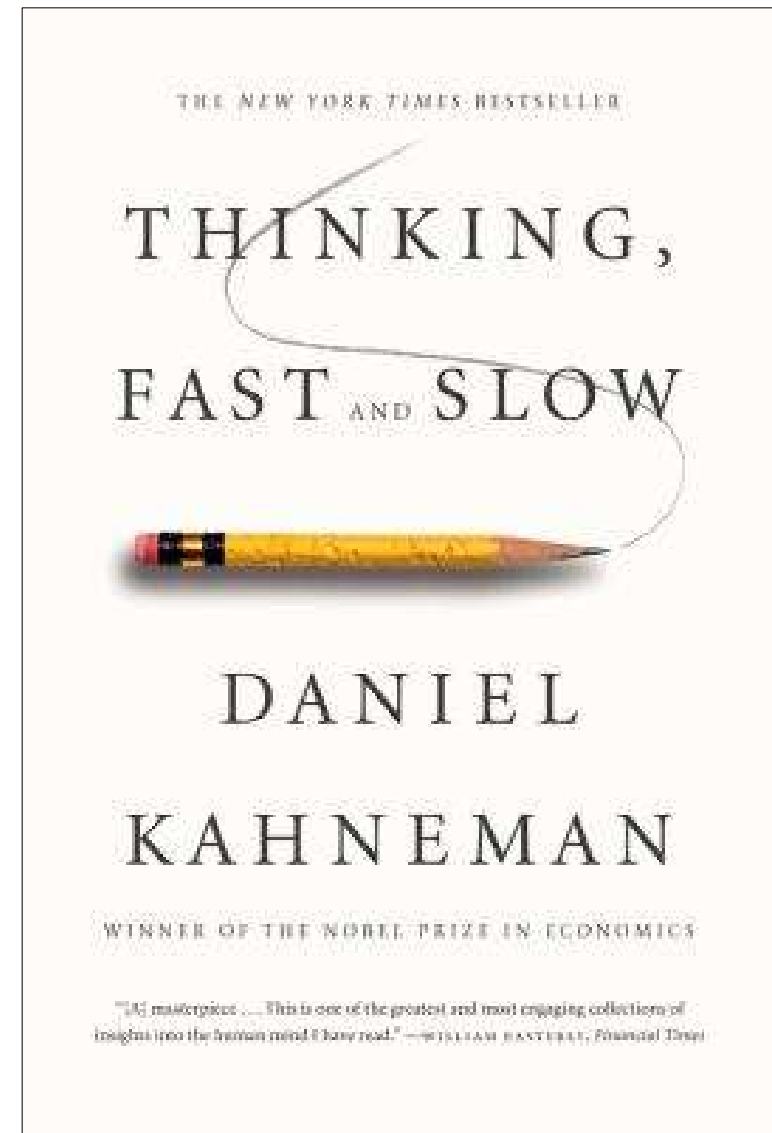
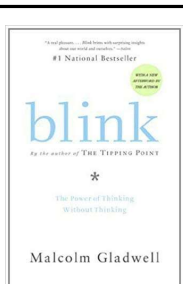


The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

How do we think communication works?

Many communication effects occur quickly and automatically (system 1) but some are also the result of slower but deeper amounts of cognitive engagement (system 2)

Also know as ...
Systematic
processing
Central route
processing.
See also ...



How do we think slow communication works?



Paul Sableman, Dripping via Flickr Creative Commons

Over time, efforts to foster deeper engagement with science and scientists should result in long-term, cumulative changes to all communication participants evaluative beliefs

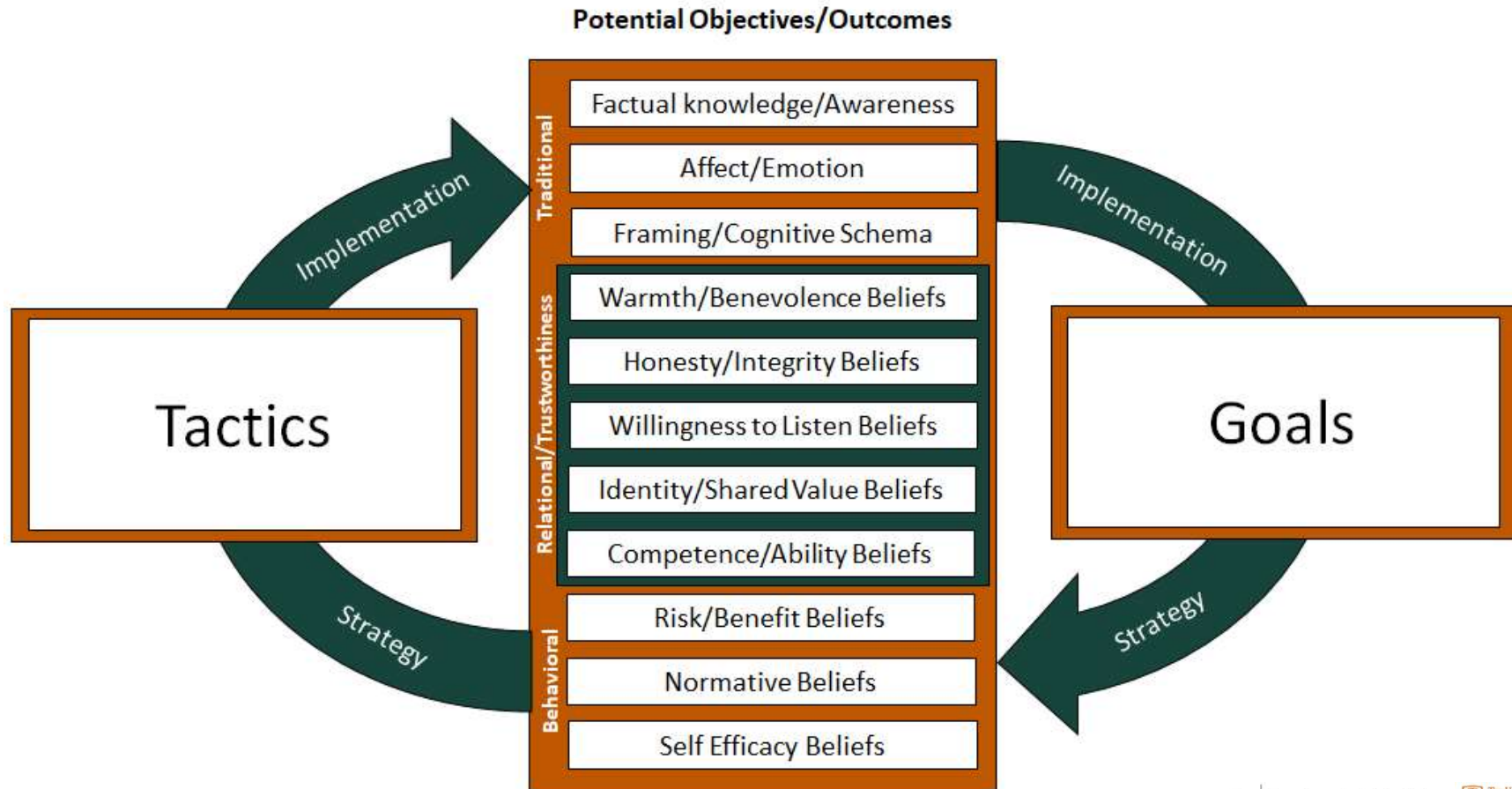
$$A_o = \sum_{i=1}^n b_i e_i$$

Attitudes are the sum of available beliefs (b) and the evaluation (e) of those beliefs

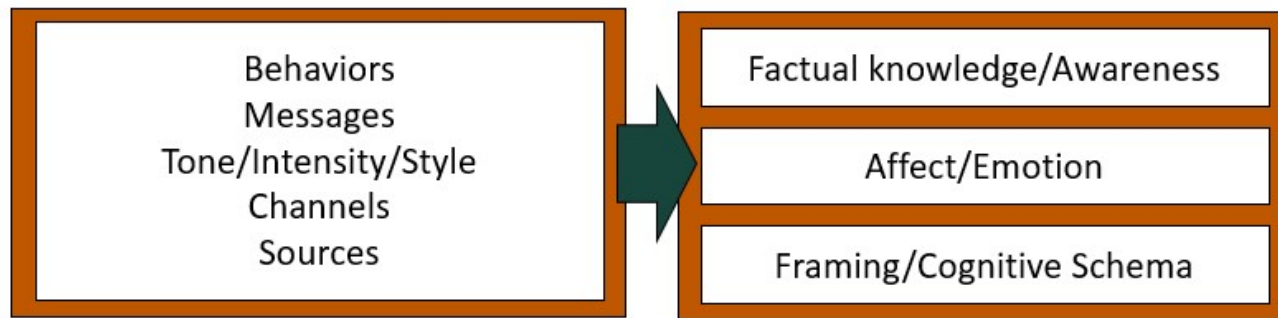


Several different types of 'beliefs' (and feelings and frames) can result from communication

What do we mean objectives (and strategy)



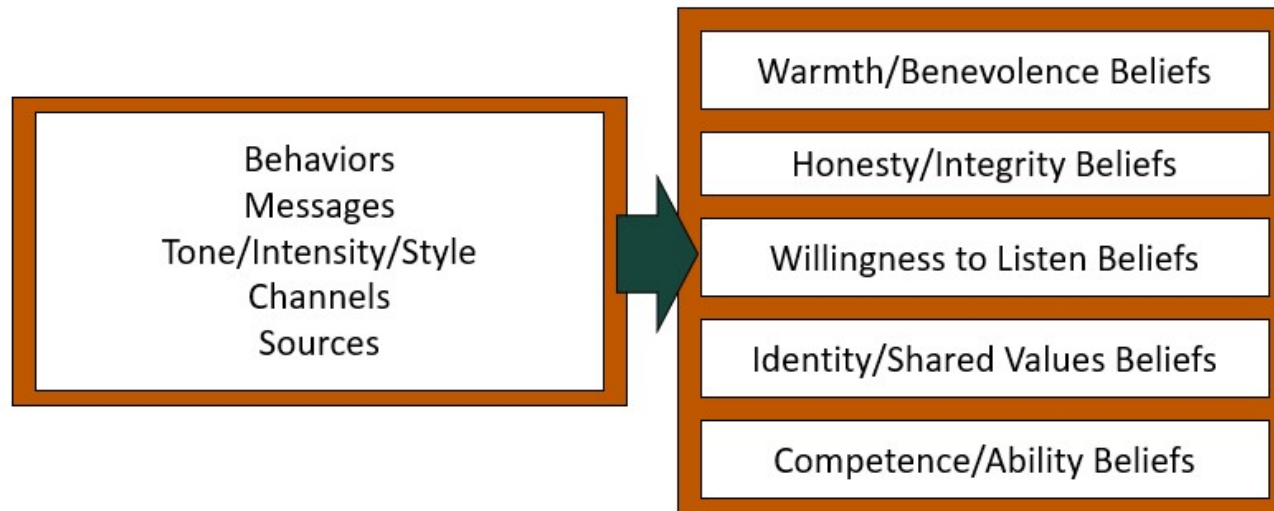
Traditional objectives...



Imagine you wanted to
write stories that affect ...

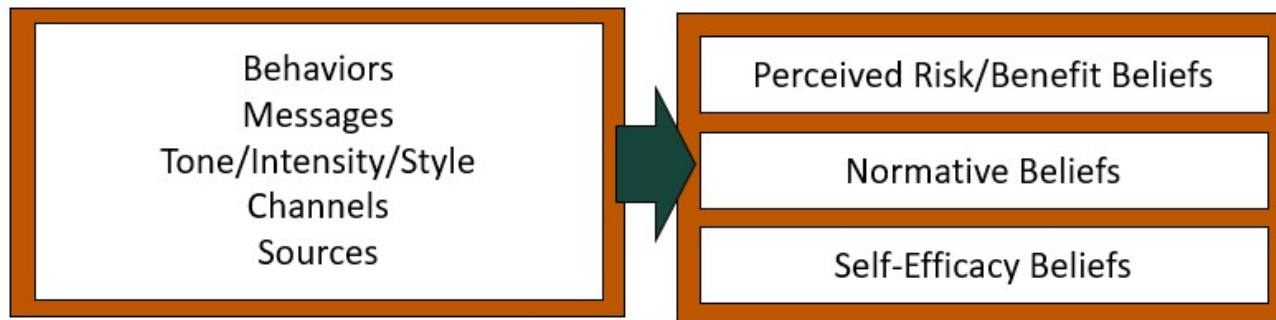


Trust/Relational Objectives...



Imagine you wanted to
write stories that affect ...

Behavior Change Objectives...



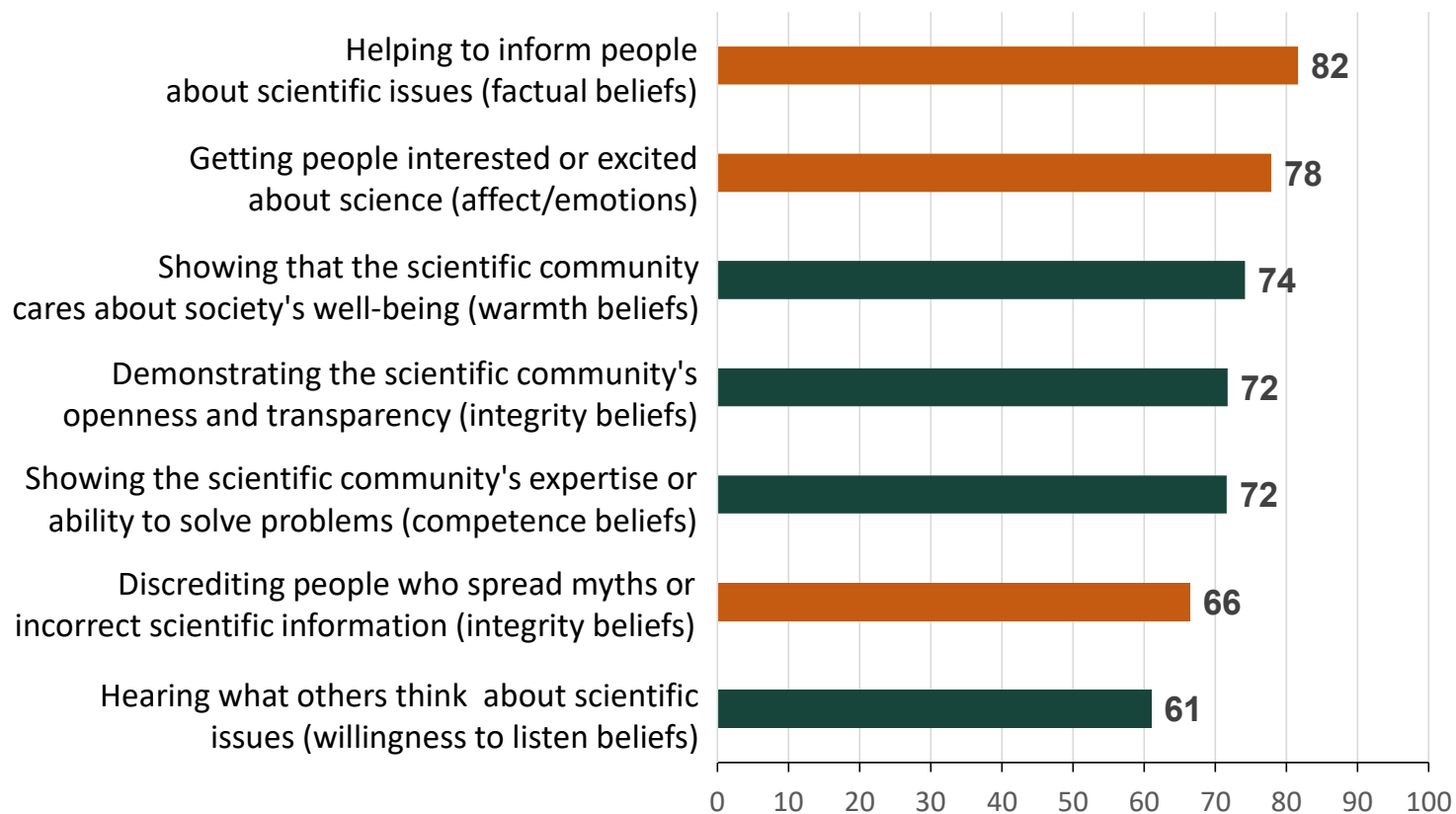
Imagine you wanted to
write stories that affect ...



Researchers are willing to prioritize a range of objectives

(but they haven't thought
much about most)

AAU Scholar Prioritization of Potential Communication Objectives (Range 0-100)



Fall 2018, 11% Response Rate, n ≈ 516

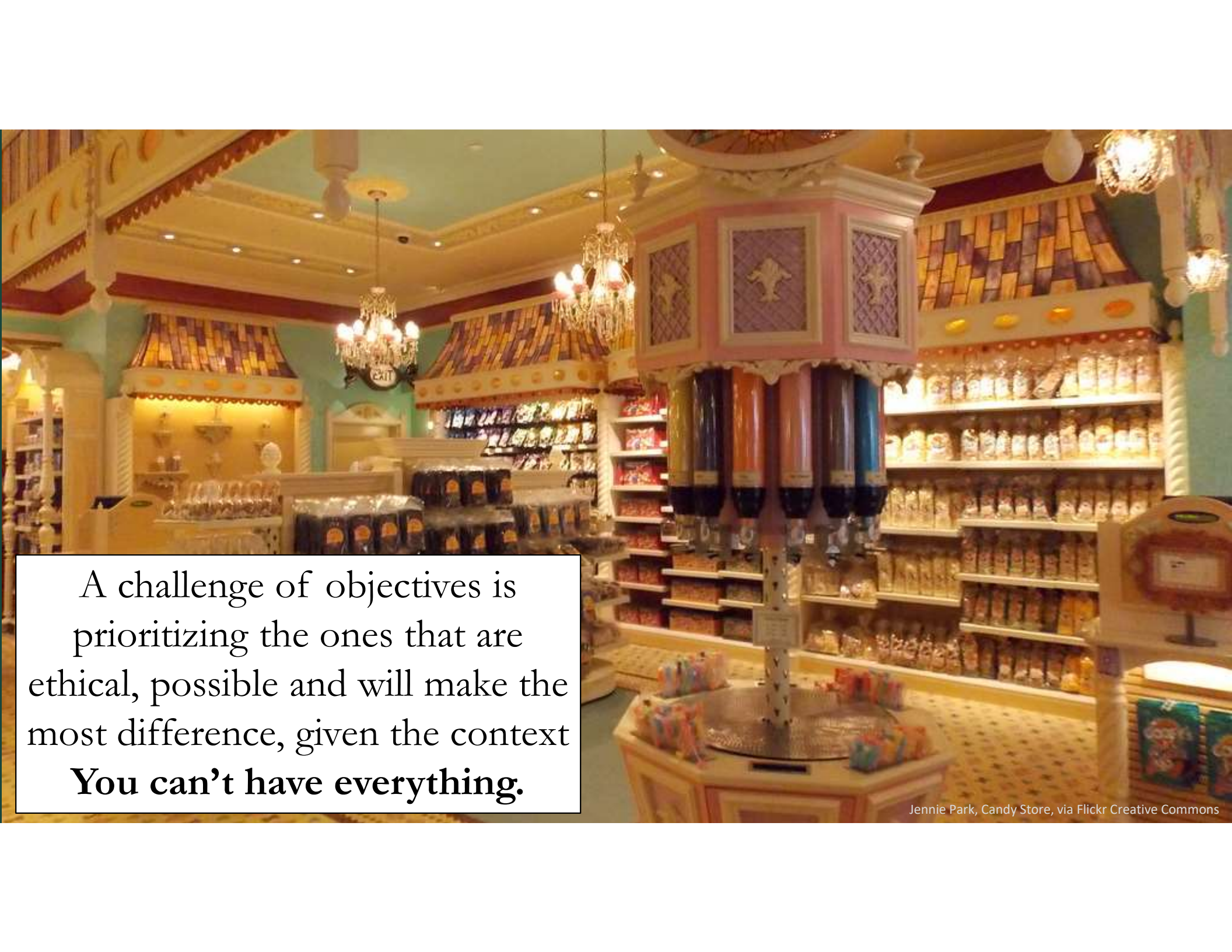
See also ... Besley, J. C., Dudo, A., & Yuan, S. (2018).
... *Public Understanding of Science*, 27(6), 708-730; Dudo,
A., & Besley, J. C. (2016). ... *PLoS ONE*, 11(2).



Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication

A photograph of a candy store interior. The store is brightly lit with ornate, multi-tiered chandeliers. Shelves are filled with various candies, including bags of chocolates and boxes of sweets. A central display features a large, multi-colored candy dispenser with several dispensing tubes. The store has a classic, decorative aesthetic with patterned awnings over the shelves and a patterned carpet. An 'EXIT' sign is visible on a chandelier in the background.

A challenge of objectives is prioritizing the ones that are ethical, possible and will make the most difference, given the context
You can't have everything.

Objectives and Evaluation?

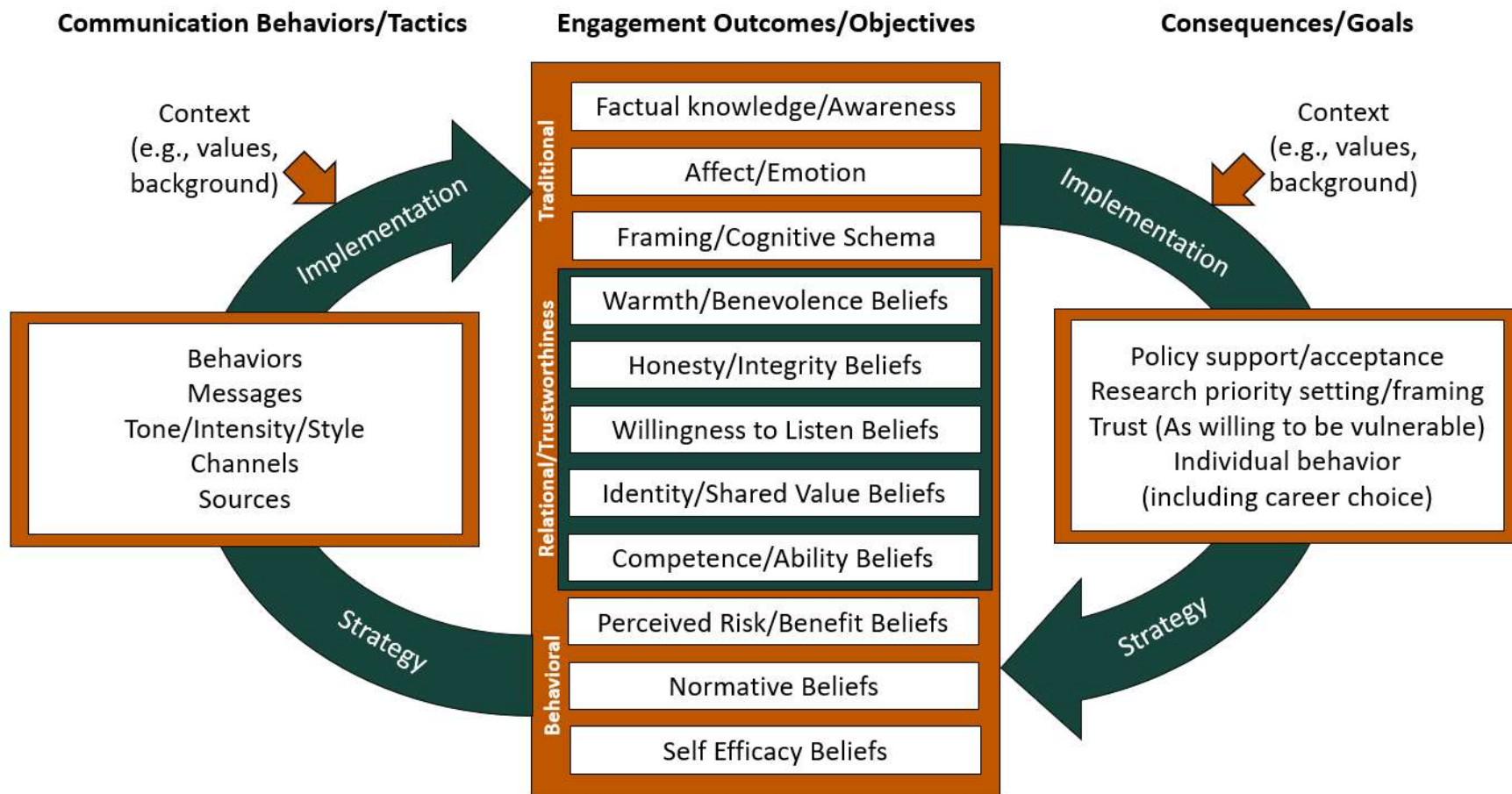
Clear objectives
enable evaluation

Participant Survey

Thank you for coming to today's event. Before you go, we'd like to hear from you about a few things ...

First, how would you rate the overall event?	Poor <input type="radio"/>	Fair <input type="radio"/>	Good <input type="radio"/>	Very Good <input type="radio"/>	Excellent <input type="radio"/>
Prior to this event, how much did you know about the topic[s] of the event?	Nothing at all <input type="radio"/>	Only a little <input type="radio"/>	A moderate amount <input type="radio"/>	A lot <input type="radio"/>	A great deal <input type="radio"/>
How much, if anything, did you learn from the event that you participated in?	Nothing at all <input type="radio"/>	Only a little <input type="radio"/>	A moderate amount <input type="radio"/>	A lot <input type="radio"/>	A great deal <input type="radio"/>
How interesting or uninteresting did you find the event?	Very uninteresting <input type="radio"/>	Somewhat uninteresting <input type="radio"/>	Neither interesting nor uninteresting <input type="radio"/>	Somewhat interesting <input type="radio"/>	Very interesting <input type="radio"/>
And thinking specifically about the main scientist you heard from ...					
How much did they seem to care or not care about helping others?	Hardly care at all <input type="radio"/>	Mostly don't care <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Care a fair amount <input type="radio"/>	Care a great deal <input type="radio"/>
How sincere or insincere did they seem?	Very insincere <input type="radio"/>	Somewhat insincere <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat sincere <input type="radio"/>	Very sincere <input type="radio"/>
How open-minded or closed-minded did they seem?	Very closed-minded <input type="radio"/>	Somewhat closed-minded <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat open-minded <input type="radio"/>	Very open-minded <input type="radio"/>
How willing or unwilling did they seem to consider others' point of view?	Very unwilling <input type="radio"/>	Somewhat unwilling <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat willing <input type="radio"/>	Very willing <input type="radio"/>
How competent or incompetent did they seem?	Very incompetent <input type="radio"/>	Somewhat incompetent <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat competent <input type="radio"/>	Very competent <input type="radio"/>
How intelligent or unintelligent did they seem?	Very unintelligent <input type="radio"/>	Somewhat unintelligent <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat intelligent <input type="radio"/>	Very intelligent <input type="radio"/>
How informed or uninformed did they seem?	Very uninformed <input type="radio"/>	Somewhat uninformed <input type="radio"/>	Couldn't Tell/ Neither <input type="radio"/>	Somewhat informed <input type="radio"/>	Very informed <input type="radio"/>

Discussion?



BURROUGHS
WELLCOME
FUND

Chan
Zuckerberg
Initiative
the David &
Lucile Packard
FOUNDATION

GORDON AND BETTY
MOORE
FOUNDATION

JOHN TEMPLETON
FOUNDATION

THE
KAVLI
FOUNDATION

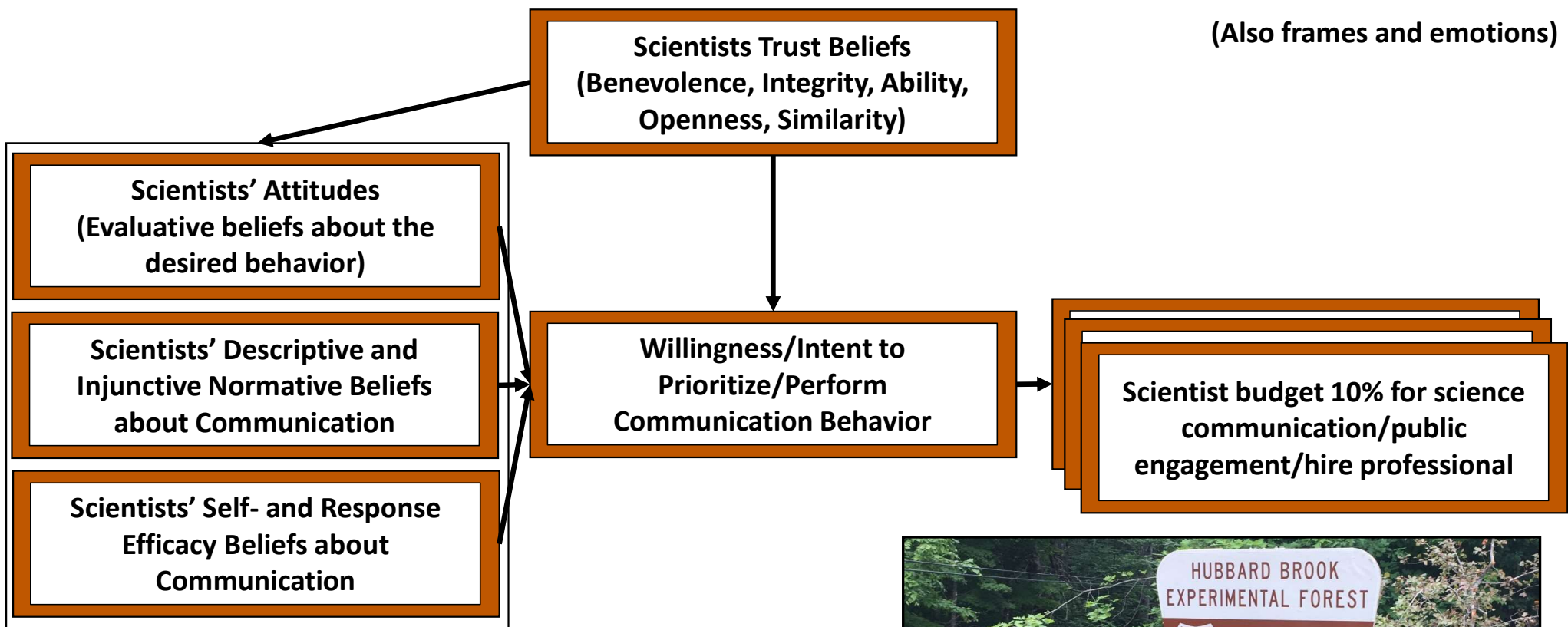
RITA ALLEN
FOUNDATION

USDA

NIFA



This material is based upon work supported by the National Science Foundation (NSF, Grant AISL 1421214-1421723. Any opinions, findings, conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the NSF.



“Strategic Science Communication as Planned Behavior ...”

Building on: Fishbein, M., & Ajzen, I. (2010). *Predicting and Changing Behavior: The Reasoned Action Approach*. New York: Psychology Press.

Montano, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K. Glanz (Ed.), *Health behavior: Theory, research and practice (5th ed.)*. Hoboken, NJ: Wiley-Blackwell.



An example of why objectives/goals matter ...

(and my most frequent science communication conversation)

How should we think about the following statement:

“We want to decrease misunderstandings about _____?”

Why do you want to decrease misunderstandings? What do you think will happen if you succeed?

(The goal questions)

What types of misunderstandings? Cause/effect? Risks/benefits? Efficacy? Norms? The people involved?

(The objectives questions)

Why frame in terms of *mis*understandings? What might you want people to believe and feel about the issues and people involved?

Interviews with science communication trainers ...

2014 (n=24) and 2017 (n=33)

scienceandpublic.com ☆

De-Jargonizer

How accessible is your work, paste your article ... to analyze the amount of jargon in your writing.

Start

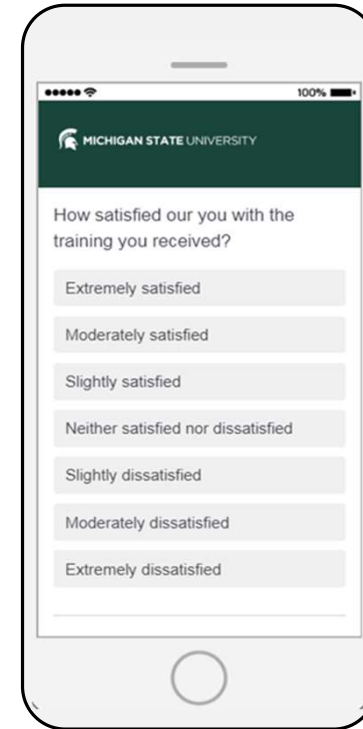
Expertise on tactics of 'translation,' dialogue, and storytelling

Little use of social science research

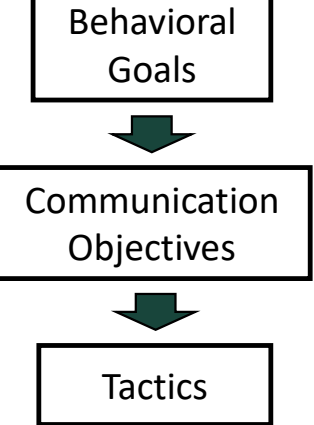


Little sharing of best practices (i.e., silos)

Silo, Wolfgang: Flickr Creative Commons



Limited depth of evaluation efforts



Limited focus on teaching of strategy

Besley, J. C., Dudo, A., Yuan, S., & AbiGhannam, N. (2016). ... *Science Communication*, 38(3), 356-381.

MEREDITH WILLSON'S

THE MUSIC MAN

A thing I worry about:

Is it okay to emphasize a range of beliefs, feelings, and frames (assuming I am always telling the truth, as best I can and am open to changing my own views)?

(A musical about a con man)



What about two-way dialogue?

Scientists beliefs, feelings, frames, and goals should sometimes change as a result of engagement efforts?

<https://www.nifi.org/en/about>

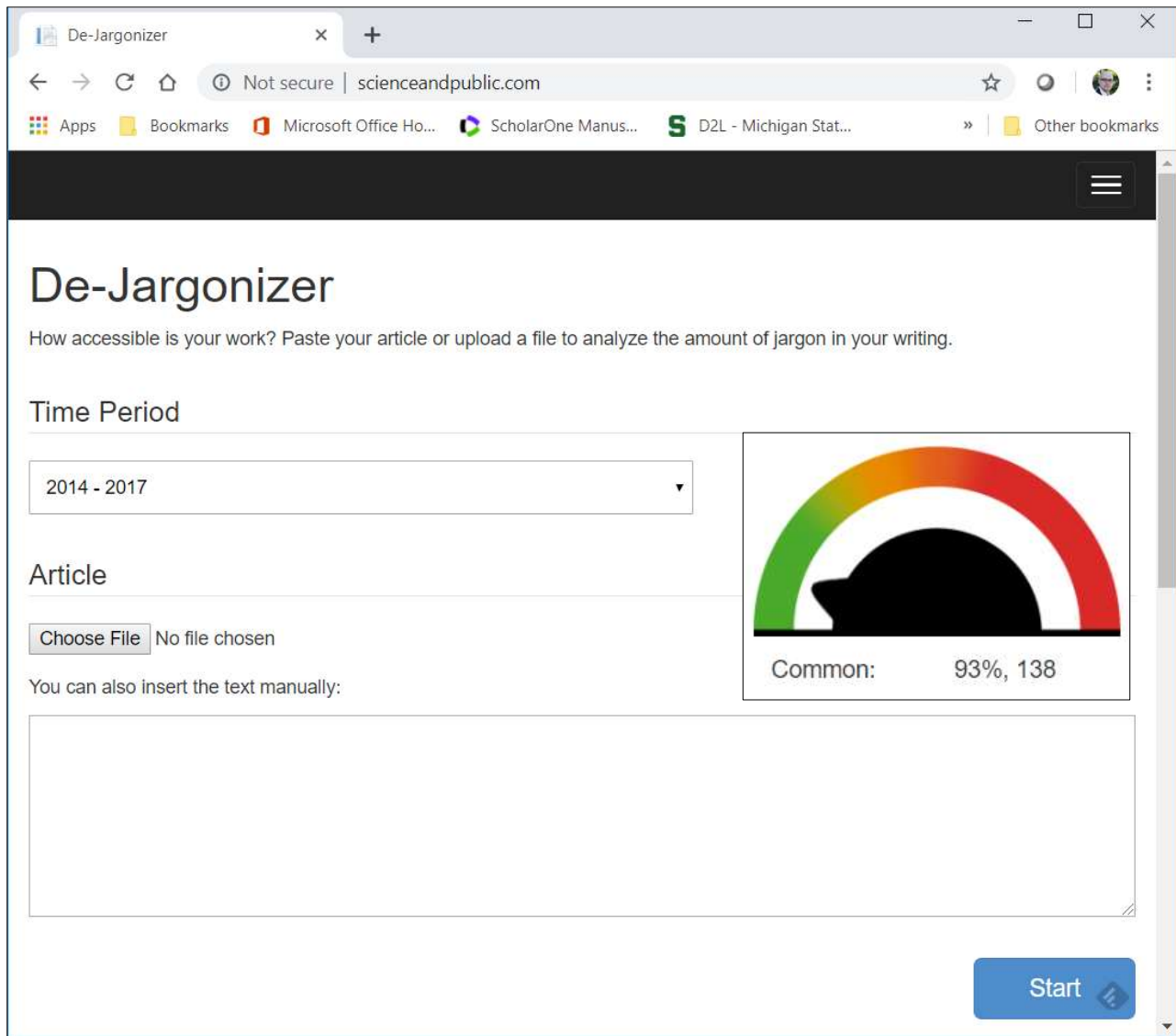


Traditional	Factual knowledge/Awareness
	Interest/Affect/Emotion
	Cognitive schema/Framing
Relational	Warmth/Benevolence Beliefs
	Honesty/Integrity Beliefs
	Willingness to Listen Beliefs
	Identity/Shared Value Beliefs
	Competence/Ability Beliefs
Behavioral	Perceived Risk/Benefit Beliefs
	Normative Beliefs
	Response/Self Efficacy Beliefs

Two great things about objectives: Part II, Clarity

Why does
jargon matter?

HIDDEN SLIDE



The screenshot shows a web browser window with the URL `scienceandpublic.com`. The page title is "De-Jargonizer". Below the title, there is a subtitle: "How accessible is your work? Paste your article or upload a file to analyze the amount of jargon in your writing." The "Time Period" section has a dropdown menu set to "2014 - 2017". The "Article" section has a "Choose File" button and the text "No file chosen". Below this, there is a text input area with the prompt "You can also insert the text manually:". On the right side, there is a graphic of a rainbow with a black silhouette of a person's head and shoulders in front of it. Below the graphic, the text reads "Common: 93%, 138". At the bottom right, there is a blue "Start" button.

Behavioral Goals

- Outcome of many factors
- Chosen based on priorities



Communication objectives

- Beliefs, feelings, frames (+salience)
- Direct effect of communication
- Chosen based on goals/context



vs. Cognitive processes (motivated reasoning, biased processing), SES, personality, traits, ideology/values, etc.



Department of Advertising
+ Public Relations
MICHIGAN STATE UNIVERSITY



The University of Texas at Austin
Stan Richards School of
Advertising & Public Relations
Moody College of Communication