

Department of Psychology



NELSON
INSTITUTE FOR
Environmental Studies
UNIVERSITY OF WISCONSIN-MADISON

Who Grows a Natural Shoreline and Who Doesn't? Antecedents of Behavior on Wisconsin's Shorelands

Michael S. Amato

PhD Candidate

Psychology and Environment & Resources

UNIVERSITY OF WISCONSIN – MADISON


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1) Who grows natural shorelines?

2) Motivation and the perception of shoreline impact

How do people make decisions about their shore?

Many possible reasons for different choices

- Emphasis on common good vs. self-interest
 - *Schwartz (2007); Stern (2000)*
- Beliefs about rights of nature versus humans
 - *Leopold (1949)*
- Beliefs about fragility of nature
 - *Dunlap, Van Liere, Mertig, & Jones (2000)*
- Goals for their property
 - *Lindenberg & Steg (2007)*

How do people make decisions about their shore?

Step 1:

Measure individual differences in people's beliefs & goals that theories predict are related to shoreline maintenance.

Step 2:

Test which differences in beliefs & goals are related to actual shoreline maintenance behavior.



How do people make decisions about their shore?

Field Study Method

- Responses from 340 property owners
- 20 belief items, 11 goal items

Beliefs & Goals

The image shows a stack of survey questionnaires. The top questionnaire is clearly visible and contains the following items:

- 20. Nature is adaptable enough to cope with development around the lake.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 21. The lake is willing to support fish and wildlife in lakes and ponds changed by human activities.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 22. Property owners have a responsibility to prevent lake levels for future generations.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 23. Property owners have a responsibility to prevent the ponds and streams that flow from their property.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 24. A private owners for any lake management should be allowed to have it will affect property owners and their families.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 25. Use lake fishing for all Wisconsin, and should be available to everyone.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 26. It is important that any lake is left in a healthy state for future generations.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 27. It is important that any lake is left in a healthy state for future generations.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 28. I would be willing to consider installing the required buffer on my shoreline by planting ever-shrub, grasses, or trees.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 29. I would be willing to consider installing the required buffer on my shoreline by planting ever-shrub, grasses, or trees.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 30. I would be willing to consider installing the required buffer on my shoreline by planting ever-shrub, grasses, or trees.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 31. The type of plants and animals found in the lake depends on the amount of vegetation along the shoreline.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)
- 32. The amount of development along the shoreline influences the type of plants and animals found in the lake.
(strength designed: 1 2 3 4 5 6 7) (strength agreed)

Outcome Measure

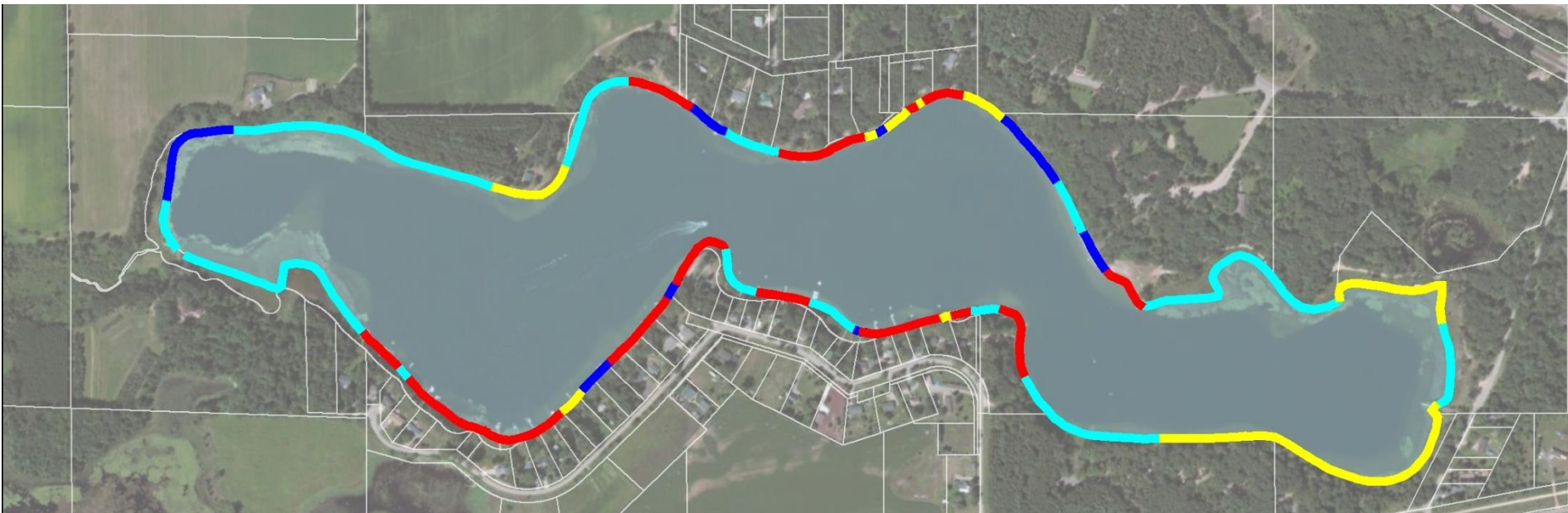
- Actual past behavior

How do people make decisions about their shore?

Outcome Measure

➤ Actual past behavior

- Shoreline vegetation scores
- From county lakes assessment
- Range 0 – 11; high=good



How do people make decisions about their shore?

Two separate factor analyses

11 items about goals

Gain goals
Hedonic goals
Normative goals

20 items about beliefs

Resilience of nature
Rights and responsibilities of humans vs. nature
Place attachment
Relationship of property with identity
Self-transcendence (AKA altruism)
Personal efficacy for affecting the lake
Normative beliefs about others and agencies

How do people make decisions about their shore?

How important are each of the following considerations for you personally, when making decisions about how you maintain your yard and shoreline?

Results of Factor Analysis for **GOALS**

Goal factor 1: Appearance Goals

($\alpha = 0.75$)

example item:

Presenting a neatly groomed landscape that does not look messy.

Goal factor 2: Lake Health Goals

($\alpha = 0.73$)

example item:

How my decision will affect the overall health of the lake.

How do people make decisions about their shore?

How much do you agree or disagree?

Results of Factor Analysis for BELIEFS

Beliefs factor 1: Stewardship Beliefs ($\alpha = 0.74$)

example item:

Property owners have a responsibility to protect lake health for future generations.

Beliefs factor 2: Prescriptive Norm Beliefs ($\alpha = 0.69$)

example item:

My neighbors think it is important that I maintain a vegetated buffer on my shoreline.

How do people make decisions about their shore?

***Individual Differences
in the importance of:***

Appearance Goals
Lake Health Goals

***Individual Differences
in agreement with:***

Stewardship Beliefs
Prescriptive Norm Beliefs

- Linear Mixed Effects analysis
- Random intercepts for lake

***Individual differences
in shoreline behavior:***
shoreline vegetation scores
from lake assessments

How do people make decisions about their shore?

Property Owner
Beliefs and Goals

- Linear Mixed Effects analysis
- Random intercepts for lake

Physical Environment
Constraints:

total acreage; length of
shoreline frontage; land
value; improved value;
average slope

Local Norms:

average of neighbors'
vegetation scores; average of
neighbors' development scores

Individual differences
in shoreline behavior:
shoreline vegetation scores
from lake assessments

How do people make decisions about their shore?

Beliefs and Goals:

Beliefs about stewardship

Appearance Goals

Lake Health Goals

Physical Environment:

Parcel slope

Frontage length

Local Norms:

neighbors' vegetation scores

neighbors' development scores

$\beta = 0.29, [0.00, 0.56]$

$\beta = -0.24, [-0.46, -0.03]$

$\beta = -0.25, [-0.50, -0.10]$

$\beta = 0.32, [0.09, 0.55]$

$\beta = 0.29, [0.03, 0.54]$


$\beta = 1.09, [0.67, 1.50]$

$\beta = 0.93, [0.49, 1.37]$

shoreline
vegetation
scores

[95% Confidence Intervals]

How do people make decisions about their shore?

- ***The strongest predictor of shoreline vegetation was the vegetation on neighbors' shorelines***
 - ★ **Suggests focusing on areas with a mix of groomed and naturalized shorelines**
 - ★ **Suggests highlighting good examples**
 - Recognizing good stewards
 - Example setting on public lands
- 

How do people make decisions about their shore?

➤ *Individual differences in owner beliefs and goals explained a smaller, but reliable, amount of variance*

★ **Suggests possible themes for communication**

- Stewardship and responsibility to future generations
- Emphasizing compatibility of natural shoreline with tidy appearance

1) Who grows natural shorelines?

2) Motivation and the perception of shoreline impact

Theory of Motivated Cognition

Preference for a particular outcome can influence the selection of cognitive strategies for accessing, constructing, and evaluating beliefs.

– *Kunda, Z. (1990). The case for motivated reasoning. Psychological Bulletin, 108(3), 480-498.*

In other words: people see what they want to see.



Motivation and the perception of shoreline impact

- **Self-serving evaluation of personal attributes**
(Sanitioso, Kunda & Fong, 1990)
- **Biased evaluation of risk information**
(Kunda, 1987)
- **Biased perception of the physical environment**
(Balcetis & Dunning, 2007)
- **In-group bias for moral judgments**
(Leidner & Castano, 2012)
- **In-group bias for attributions of global warming**
(Jang, 2012)

What are implications for behavior change by owners of impaired shoreline properties?



Motivation and the perception of shoreline impact



old behavior:
excessively groom
one's shoreline

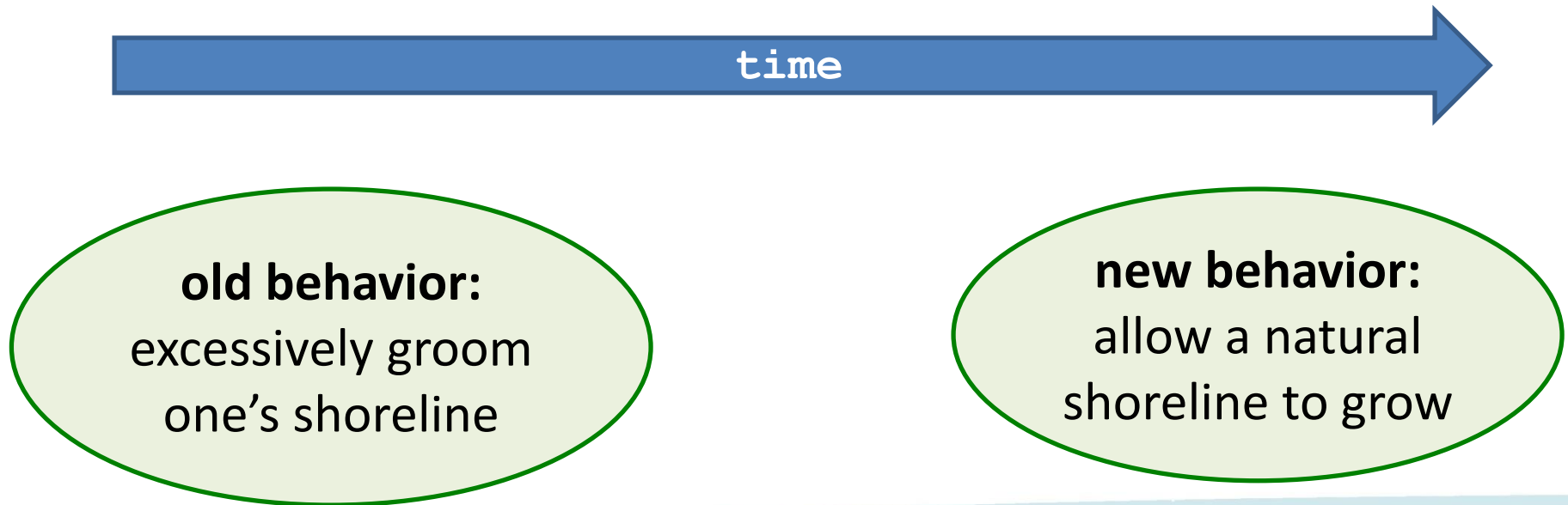
new behavior:
allow a natural
shoreline to grow

Motivation and the perception of shoreline impact

Stages of Change Model

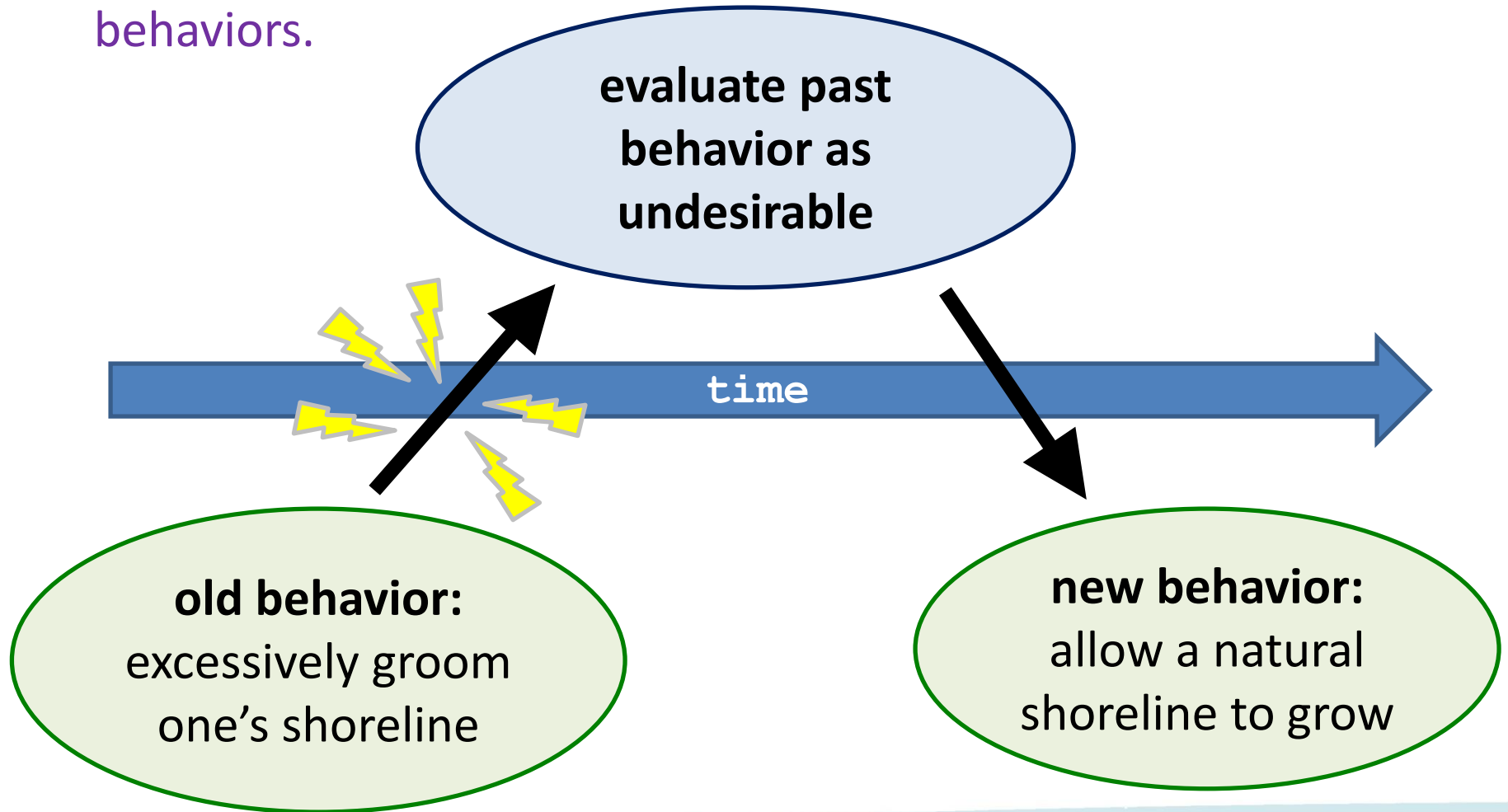
(DiClemente et al., 1991)

Prerequisite to behavior change – coming to view past behavior as undesirable

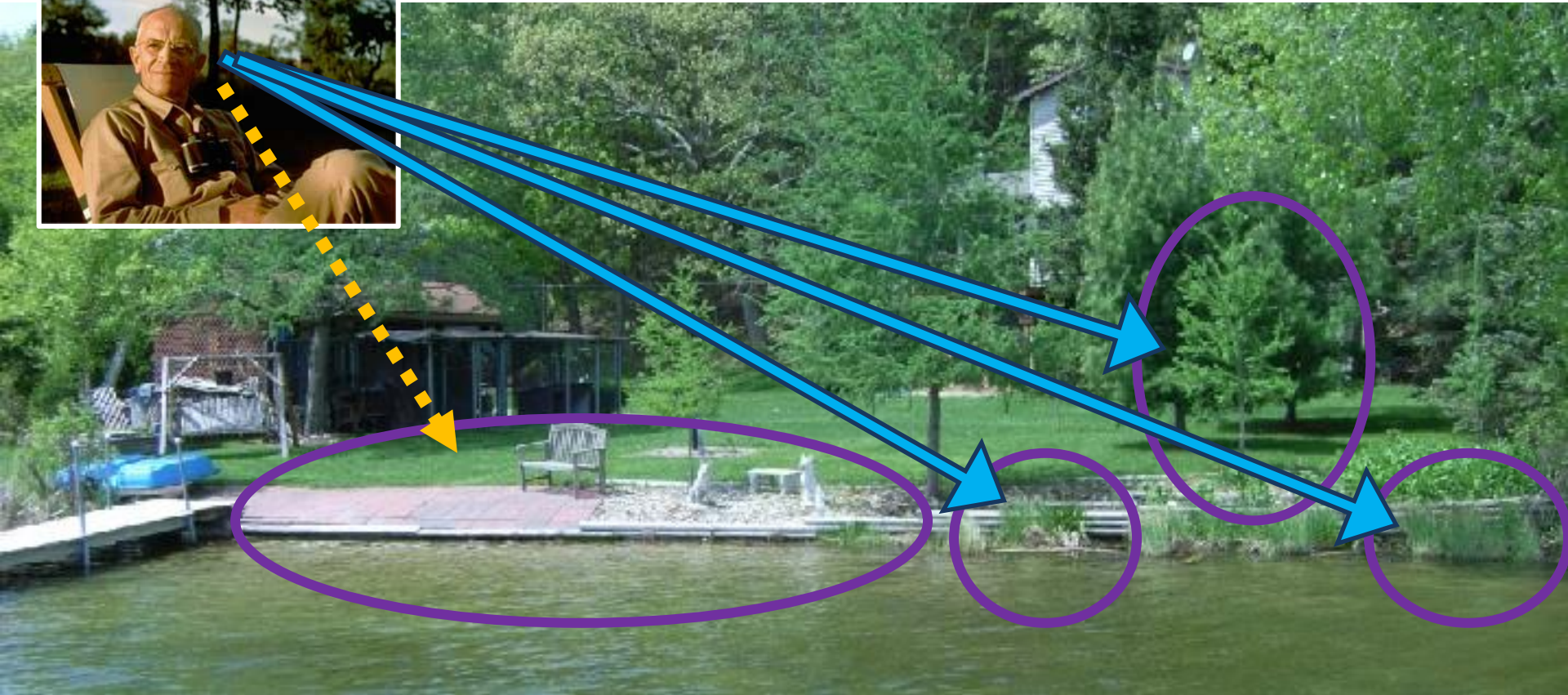


Motivation and the perception of shoreline impact

People are motivated to avoid negative conclusions about past behaviors.



Motivation and the perception of shoreline impact



Motivation and the perception of shoreline impact

Field Study:



- Central Wisconsin
- 71 property owners
(59% response rate)



- Rated photos of shorelines on 4 measures:
natural beauty, water quality, habitat, usability
- **8 photos:** 1 photo of their own shoreline
+7 photos of other participants' shorelines

Motivation and the perception of shoreline impact

natural beauty, water quality, habitat, usability

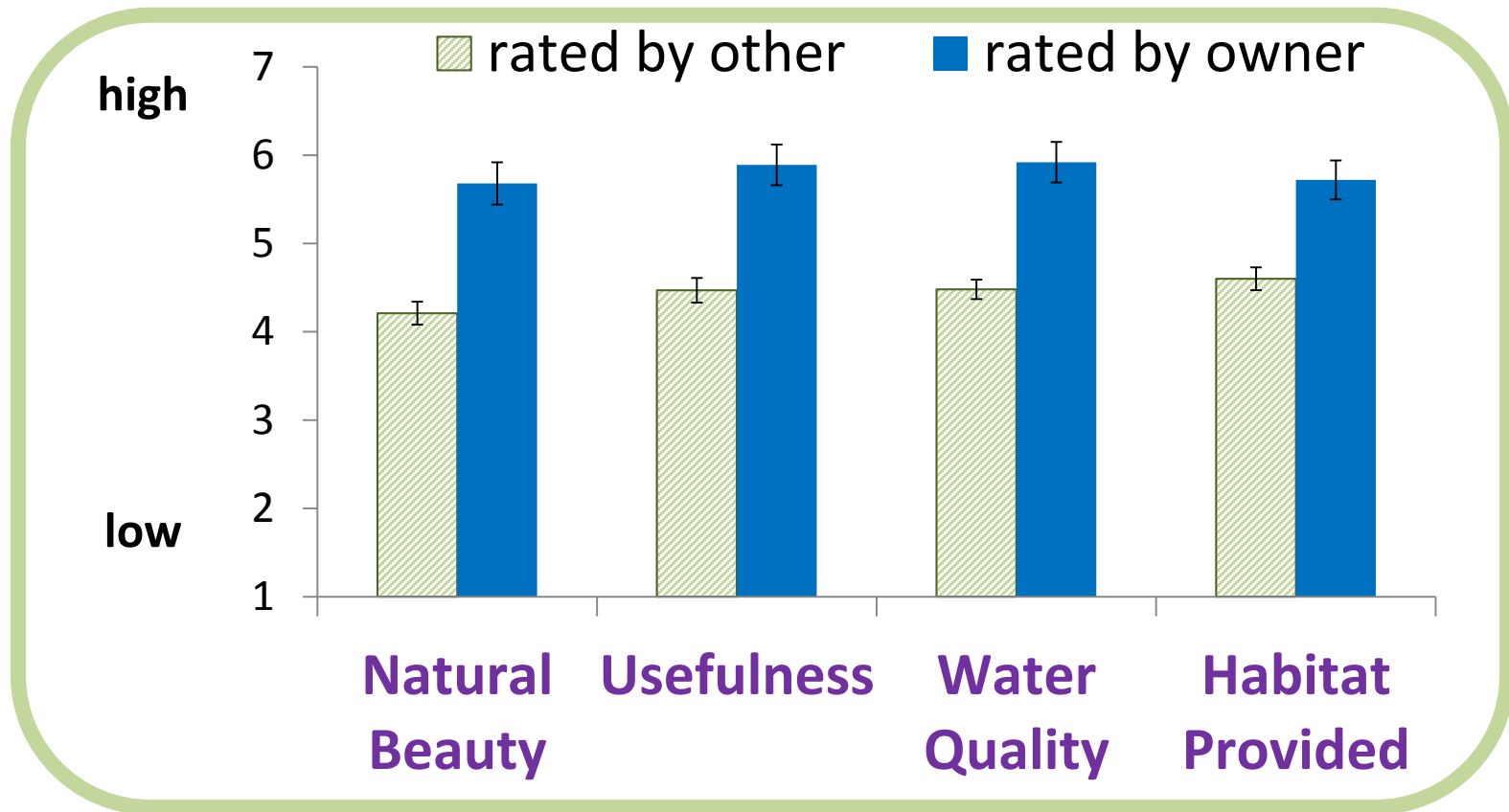
1 photo of their own shoreline
+7 photos of other participants' shorelines



Motivation and the perception of shoreline impact

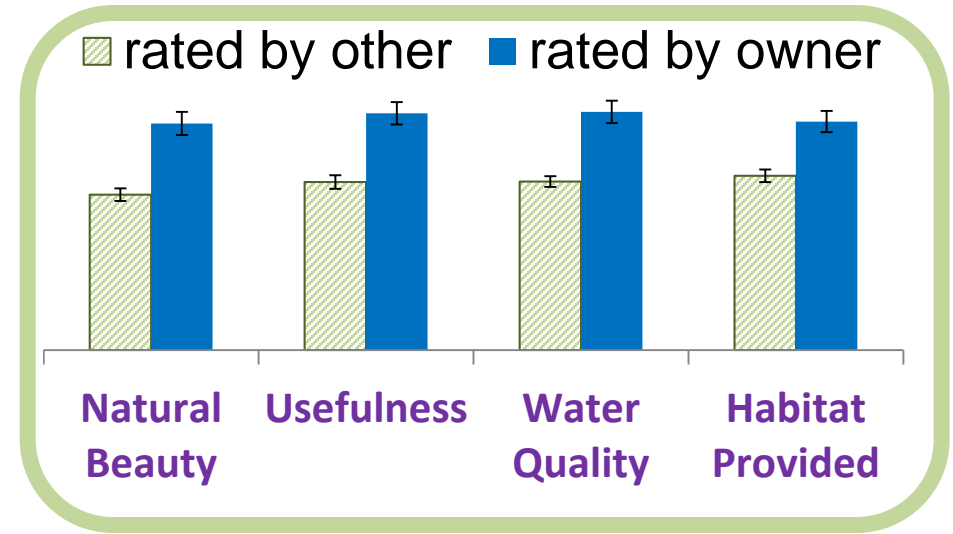
Study result:

- Owners underestimate their own shoreline's impact



error bars show 95% confidence intervals

Motivation and the perception of shoreline impact



Implications:

- Suggests individuals are motivated to underestimate environmental risk to protect self view
- Owners are unlikely to improve their shoreline if they don't perceive a problem.

Motivation and the perception of shoreline impact

Motivations for underestimating environmental risk

- ✓ Protect self
- ? Protect in-group

Laboratory Study:

- *Two groups of undergrad pps read a fictional news story about proposed shoreline development on campus*
- *Judged the environmental impact*




Motivation and the perception of shoreline impact

University of Wisconsin

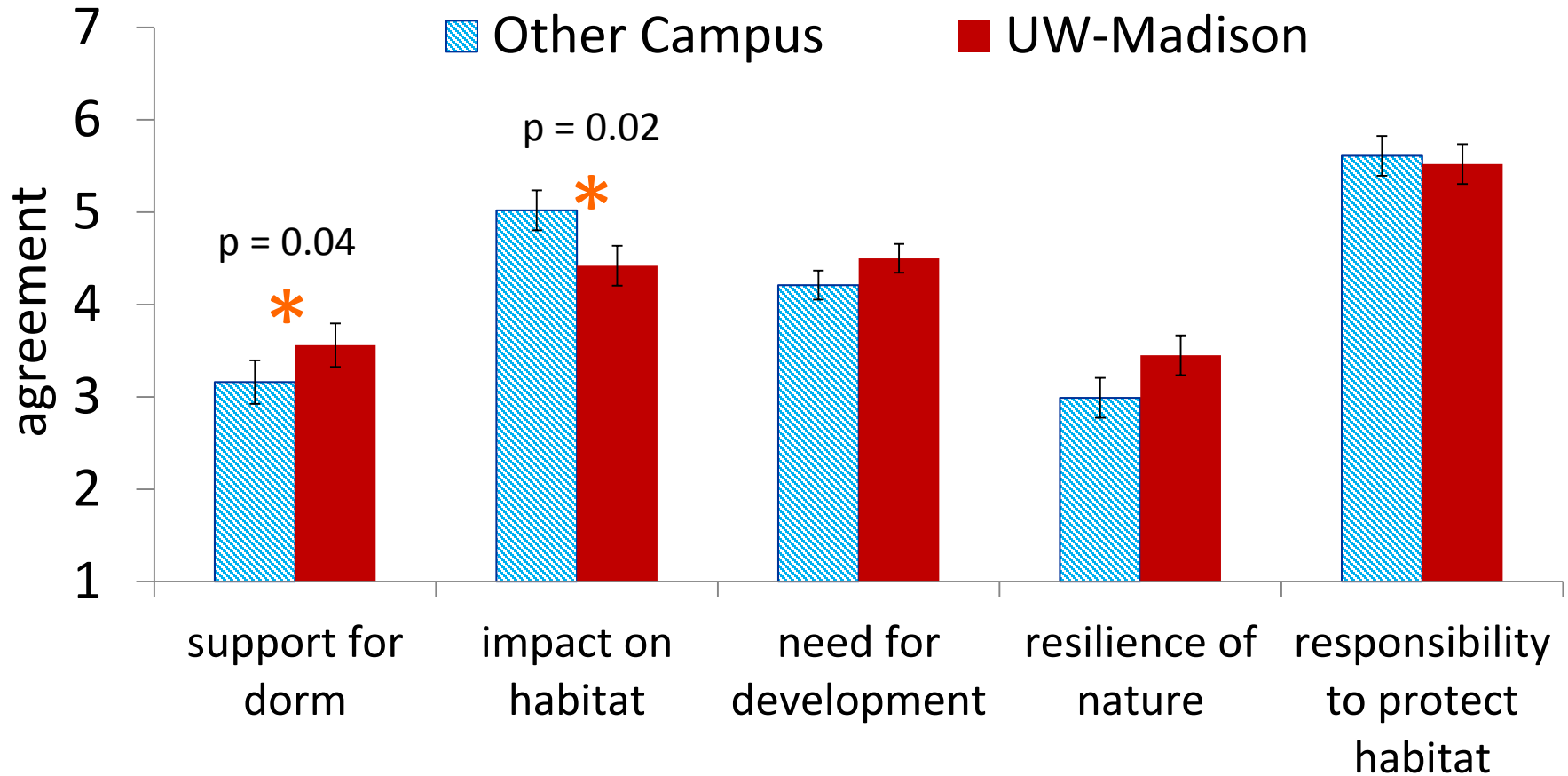
vs.

Ohio State, Univ. Michigan,
Univ. Texas, Univ. Florida

MADISON, WI - Campus officials from the **University of Wisconsin** will meet with concerned students and members of the public Thursday night, to discuss details of a proposed new dorm building. The construction project has drawn criticism from **Wisconsin** environmental groups. They claim it will destroy sensitive shoreline habitat that native animals and plants rely on. They also claim it will lower water quality by adding pollution and excess nutrients to waterways near the **Madison** campus. The administration says that there is a need to build additional student housing. The administration also says that the new building will be on a relatively small part of the shore, and will have only a minimal environmental impact on overall water quality near the **University of Wisconsin** campus.



Motivation and the perception of shoreline impact



n = 103

Error bars show 95% confidence intervals

Conclusions & Implications

Conclusions & Implications

- Motivation to protect self can cause biased perception of environmental risk
 - ❖ Evidence from photo ratings study
 - ❖ Evidence from campus development experiment
- Inaccurate information about risk may be a barrier to behavior change
 - Uncertainty & ambiguity increase bias, reduce perceived risk
 - ★ **Suggests communication containing specific, locally accurate information about environmental impact**

Conclusions & Implications

- The strongest predictor of shoreline vegetation was the vegetation on neighbors' shorelines
- ★ **Suggests focusing on areas with a mix of groomed and naturalized shorelines**
- ★ **Suggests highlighting good examples**
 - Recognizing good stewards
 - Example setting on public lands

Conclusions & Implications

- Individual differences in owner beliefs and goals explained a smaller, but reliable, amount of variance
- ★ **Suggests possible themes for communication**
 - Stewardship and responsibility to future generations
 - Emphasizing compatibility of natural shoreline with tidy appearance

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3) Motivated cognition as a barrier to cooperation.

Self-serving bias of personal attributes

(Sanitioso, Kunda & Fong, 1990)

- PPs manipulated to believe introversion or extroversion desirable
- Selectively searched autobiographical memories for evidence

Biased evaluation of risk information

(Kunda, 1987)

- PPs read about a new study linking caffeine to a disease afflicting women
- Coffee-drinking women were more skeptical of the article than men
- Sought to decrease perceived risk of their behavior

In-group bias for judgments

(Leidner & Castano, 2012)

- American pps read about Iraqi prisoner abuse by U.S. or Australian troops
- Judged the American soldiers' actions more moral, using different criteria

3) Motivated cognition as a barrier to cooperation.

In-group bias for attributions of global warming

(Jang, 2012)

- American pps read about China's or U.S.'s greenhouse gas emissions
- Asked if global warming due to human activities vs. natural cycles
- Judged lower human responsibility after reading about U.S.



Construct	Item Text	rho
support for dorm	<p>The dorm should be built.</p> <hr/> <p>The new dorm should only be built if it does not harm shoreline habitat or water quality.</p>	0.59
impact on lake health	<p>If the dorm is built, the loss of shoreline habitat will probably not be very serious.</p> <hr/> <p>If the dorm is built, it will harm animals and plant populations that need shoreline habitat.</p>	0.49
need for development	<p>The need for student housing justifies possible loss of habitat.</p> <hr/> <p>The university needs new buildings to continue to grow.</p>	0.58
resilience of nature	<p>Plants and animals are adaptable enough to cope with development of shoreline habitat.</p> <hr/> <p>Shoreline habitat is fragile, and easily harmed by human development.</p>	0.71
responsibility to protect habitat	<p>Property owners have a responsibility to protect the plants and animals that live in aquatic ecosystems.</p> <hr/> <p>The university is not responsible for the wellbeing of wild plants and animals.</p>	0.63



5) Beliefs and goals related to shoreline behavior

11 Goal Items. *How important are each of the following considerations for you personally, when making decisions about how you maintain your yard and shoreline?*

(not at all important) 1 2 3 4 5 6 7 (very important)

gain

Cost of the different options, in time and money.

Impact of the decision on the resale value of my property.

Fear of enforcement related to zoning regulations for shoreland properties.

hedonic

How the decision will affect my ability to enjoy my property and the activities I like.

How the decision will impact my ability to enjoy the lake.

How much I will like the visual look of an option I am considering.

normative

How well my property will fit in with surrounding properties.

Presenting a neatly groomed landscape that does not look messy.

How my decision will affect the overall health of the lake.

How the decision will affect fish and wildlife habitat.

Following county zoning regulations for shoreland properties.



5) Beliefs and goals related to shoreline behavior

21 Belief Items. *How much do you agree or disagree?*

(strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

Human development should only be allowed if it does not harm the lake.

Nature is adaptable enough to cope with development around the lake.

The types of plants and animals in the lake depends on the amount of vegetation along the shore.

Plants and animals have as much right to the lake as humans do.

Property owners have the right to modify their shoreline the way they see fit.

Property owners have a responsibility to protect lake health for future generations.

Property owners have a responsibility to protect the plants and animals that live in the lake.

I am more concerned about the lake my property is on than I am about other lakes.

I feel a special attachment to my lake.

Taking good care of my shoreline is important to me.

The way someone manages their property reflects what sort of person they are.



5) Beliefs and goals related to shoreline behavior

21 Belief Items. *How much do you agree or disagree?*

(strongly disagree) 1 2 3 4 5 6 7 (strongly agree)

Lake management decisions should prioritize the needs of property owners and their families.

Our lakes should be available to everyone.

If I decided to improve my shoreline's buffer, I would know what to do.

The amount of vegetation on my shoreline is not something I have a lot of control over.

My neighbors and I discuss the importance of protecting our lake.

My neighbors think it is important that I maintain a vegetated buffer on my shoreline.

The Department of Natural Resources (DNR) thinks it is important that I maintain a vegetated buffer on my shoreline.

The lake association thinks it is important that I maintain a vegetated buffer on my shoreline.

I'm aware of the resource concerns and recommendations in the management plan for my lake.



3) Two models of shoreline behavior.

Theory of Planned Behavior

(Ajzen, 1985)

