



Overcoming barriers to invasive species prevention behaviors through values-framed outreach messages

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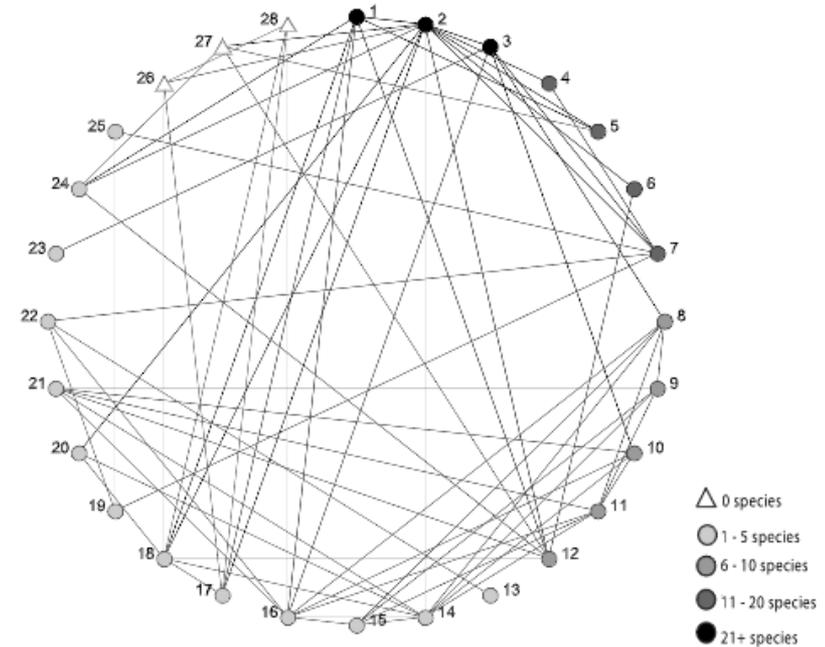


- The spread of aquatic invasive species (AIS) poses risks to social-ecological systems
- Recreational water users can inadvertently transport AIS between waterbodies
- Campaigns are ongoing to encourage boaters and anglers to take preventative measures
 - Recommended steps: Remove, Drain, Dry
 - Awareness of AIS has been increasing (Cole et al., 2016)





- **Risk of AIS spread in IL is still high (Cole et al., 2019)**
 - About 70% of respondents always took at least one recommended action
 - Only 38% of respondents always took every recommended action
 - Boaters & anglers travel between many different waterbodies
- **Are there ways we can modify our outreach messages to reach those who aren't taking action?**



“Potential spread” network, showing waterbodies visited by boaters who posed risk of AIS transport. Shading indicates # of established non-native species (Cole et al., 2019)



- **Individual values, defined as guiding principles in life, have been shown to influence behaviors related to AIS prevention (Golebie et al., 2021; Shin et al., 2022)**
 - Self-transcendent
 - Altruistic: Helping others, equality among people
 - Biospheric: appreciating and preserving nature
 - Self-enhancement
 - Egoistic: achieving goals, leadership, influencing others
- **Research is needed to determine how messages imbued with values may influence AIS related beliefs & behavior**



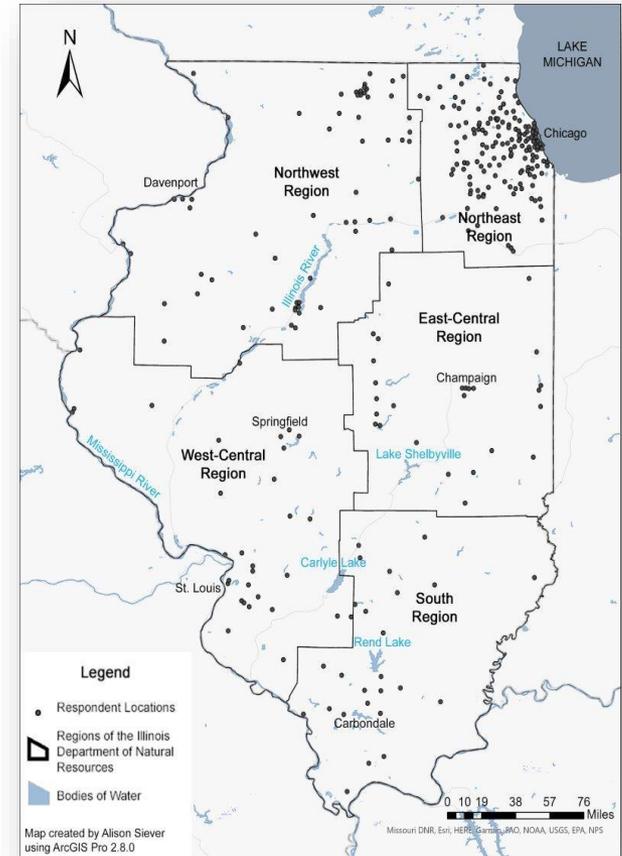
Assess the effectiveness of values-framed AIS outreach messaging

1. Compare participant evaluations of values-framed messages and their post-message beliefs about AIS and remove-drain-dry
2. Identify the effect of values-alignment on relationships among values, elaboration, and beliefs about AIS and remove-drain-dry





- **Message experiment embedded within online survey**
 - Conducted during summer 2021
 - Qualtrics panel of Illinois residents; eligible if they had gone fishing or participated in a recreational water activity (sailing, kayaking, boating, etc.) since 2018
 - Total number of participants = 507
- **Each participant was randomly assigned one of three experimental messages to evaluate**



Approximate location of internet survey participants (Golebie et al., 2021)



Steps for preventing aquatic invaders from spreading:

REMOVE

Remove plants, animals and mud from all equipment.

Many invaders spread by attaching to boats, trailers, and other equipment.

Plant fragments can create new populations and transport smaller invaders like zebra mussels.



Be aware!

It is illegal to travel on Illinois roadways with aquatic plants attached to your vehicle or trailer.



ZEBRA MUSSELS

DRAIN

Drain all water from your boat and gear.

Pull drain plugs and remove water from all equipment prior to leaving a water access.

Water should be drained from all water-containing equipment, such as portable bait containers, ballast tanks, motors, bilge tanks, livewells, and baitwells.

Be aware!

It is illegal to transport water-related equipment on Illinois roadways without first draining water.



DRY

Dry everything thoroughly with a towel.

Wiping down your boat, trailer, and other equipment not only leaves you with clean gear, but also removes all the invaders you can't see, such as zebra mussel larvae and fish diseases like VHS. If possible, let your gear remain dry for at least 5 days.

Be aware!

High pressure water removes and hot water kills aquatic invaders. If possible, spray your gear down with high pressure and/or hot water.



HYDRILLA



DON'T DUMP BAIT

Remember

Dispose of all unwanted bait and hitchhikers in the trash, and never release organisms caught from one waterbody into another.



SILVER CARP

These tips don't just apply to boaters and anglers! Other activities can easily spread invaders, such as:

JETSKIING WINDSURFING SAILING KAYAKING WATERFOWL HUNTING BODYBOARDING

PADDLEBOARDING CANOEING SHORE AND FLY FISHING SCUBA DIVING SURFING

Report new sightings!

If you suspect a new infestation of an invasive plant or animal, save a specimen and report it by visiting <http://www.usgs.gov/stopANS> or calling the Illinois Department of Natural Resources at 217-782-6302.



Experimental Design



Self-transcendence	Self-enhancement
<p data-bbox="253 394 807 429">PROTECT THE ENVIRONMENT</p> <p data-bbox="92 489 846 572">Aquatic invaders can dramatically change the ecosystem and harm native fish species.</p> <p data-bbox="92 665 813 701">By completing remove-drain-dry, you can...</p> <ul data-bbox="92 739 894 1186" style="list-style-type: none"><li data-bbox="92 739 788 822">•Protect the quality of habitats and natural environments<li data-bbox="92 861 846 943">•Preserve recreational opportunities for future generations<li data-bbox="92 982 894 1065">•Build a sense of community among anglers and water users<li data-bbox="92 1103 865 1186">•Ensure the economic benefits provided by the resource will continue to benefit the region	<p data-bbox="1039 394 1827 429">YOUR WATERWAYS ARE BEING IMPACTED</p> <p data-bbox="993 489 1823 615">Aquatic invaders can block access to waterbodies and prevent you from enjoying your favorite activities.</p> <p data-bbox="993 708 1713 743">By completing remove-drain-dry, you can...</p> <ul data-bbox="993 782 1866 1158" style="list-style-type: none"><li data-bbox="993 782 1827 818">• Protect the waterbodies that you value the most<li data-bbox="993 853 1798 936">• Ensure you'll be able to enjoy the resource for years to come<li data-bbox="993 972 1744 1055">• Know you have done the right thing to be a responsible angler or boater<li data-bbox="993 1090 1866 1158">• Influence other recreationists to take responsibility for the ecosystem



- **Message response**

- **Elaboration:** depth of thinking about the message (4 items)
- **Reactance:** feeling pressured by the message and rejecting it (4 items)
- **Perceived effectiveness** (6 items)

- **Beliefs**

- **Risk perceptions:** seriousness of threat of AIS to personal, social, and environmental entities (3 items each)
- **Self-efficacy:** confidence in ability to complete prevention steps (3 items)
- **Response-efficacy:** beliefs that prevention steps will make a difference (3 items)

- **Values**

- **Altruistic, biospheric, and egoistic** (3 items each)



Objective 1. Compare participant evaluations of values-framed messages and their post-message beliefs about AIS and remove-drain-dry

- ANOVA: Compare mean values of each variable across three treatment groups

Message evaluations

Elaboration
Reactance
Perceived effectiveness

Post-message beliefs

Risk perceptions
Personal
Social
Environmental
Self-efficacy
Response-efficacy



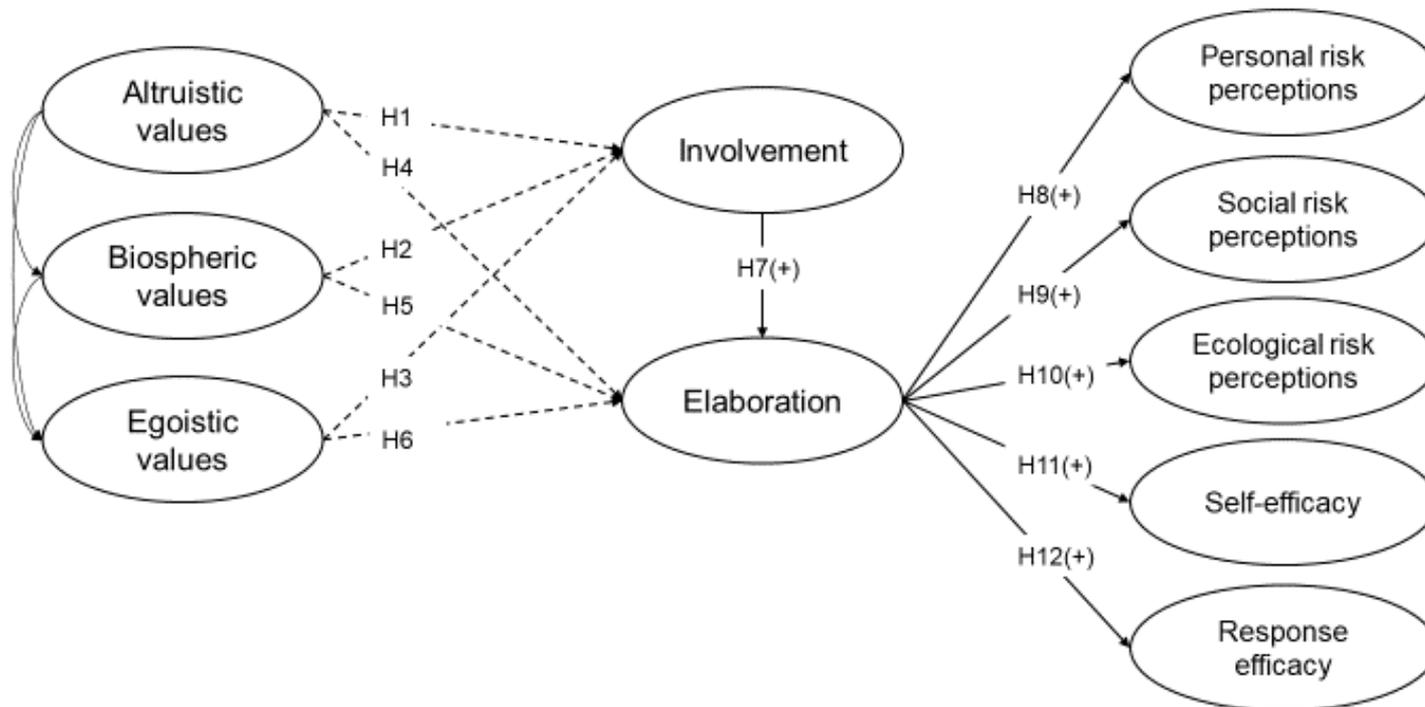
- **All three messages were perceived to be effective**
 - Moderate to high elaboration; low reactance
 - No significant differences across the three messages

	<u>Pooled sample</u>	<u>ANOVA results</u>	
	M (SD)	F	P
<u>Message evaluations</u>			
Elaboration	3.79 (0.68)	.299	.742
Perceived effectiveness	4.12 (0.67)	.220	.803
Reactance	2.63 (0.87)	.019	.981
<u>Post-message beliefs</u>			
Risk perceptions			
Personal	3.32 (0.94)	.443	.642
Social	3.32 (0.94)	.519	.595
Environmental	3.56 (0.79)	1.179	.308
Self-efficacy	4.12 (0.75)	1.195	.304
Response efficacy	4.35 (0.66)	1.000	.369



Objective 2: Identify the effect of values-alignment on relationships among values, elaboration, and beliefs about AIS and remove-drain-dry

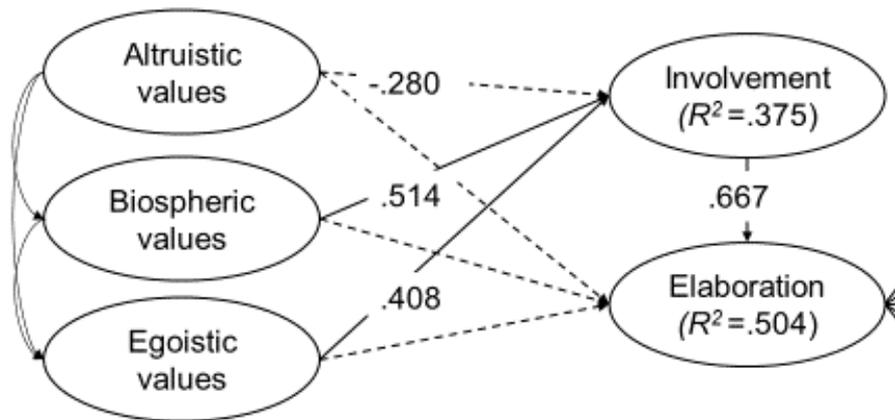
- *Structural equation modeling* used to assess relationships and draw comparisons



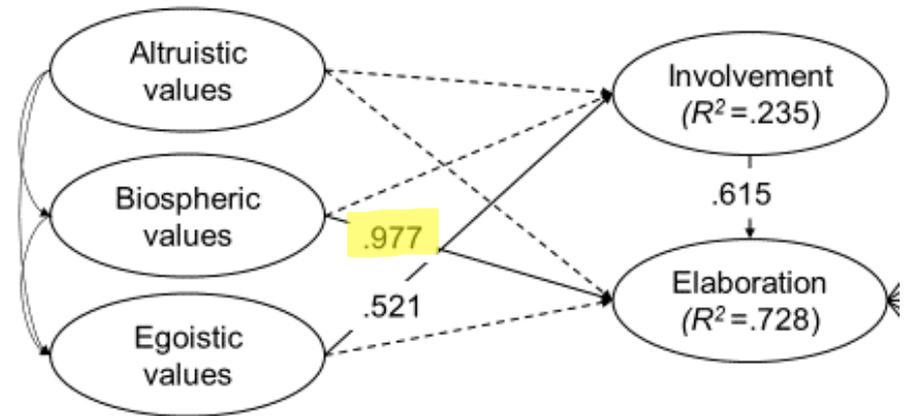


- Relationships between values and elaboration (i.e., depth of thinking about the message) differed across treatment groups
 - Biospheric values predicted elaboration only for the self-transcendent treatment group
 - Values did not predict elaboration in control or self-enhancement groups

Control message

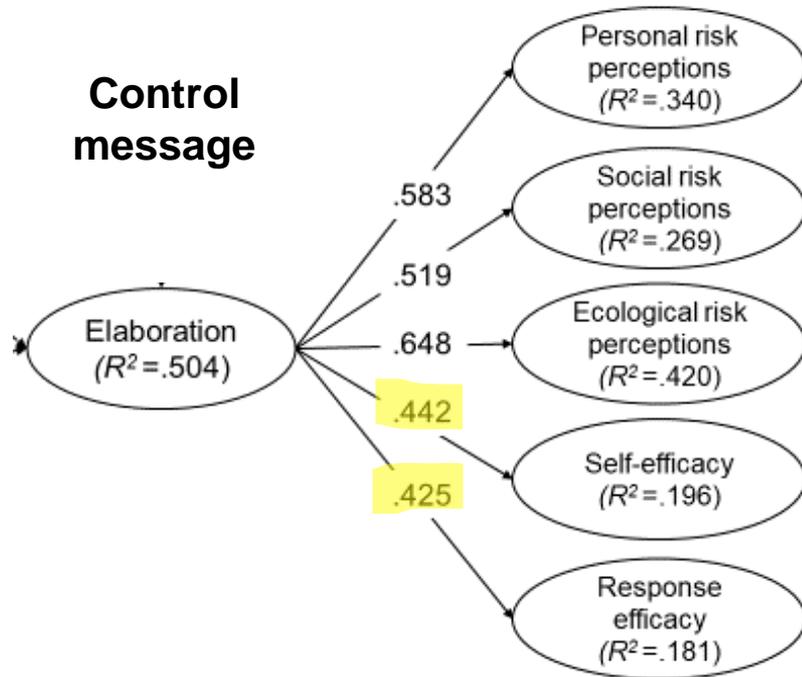


Self-transcendent message

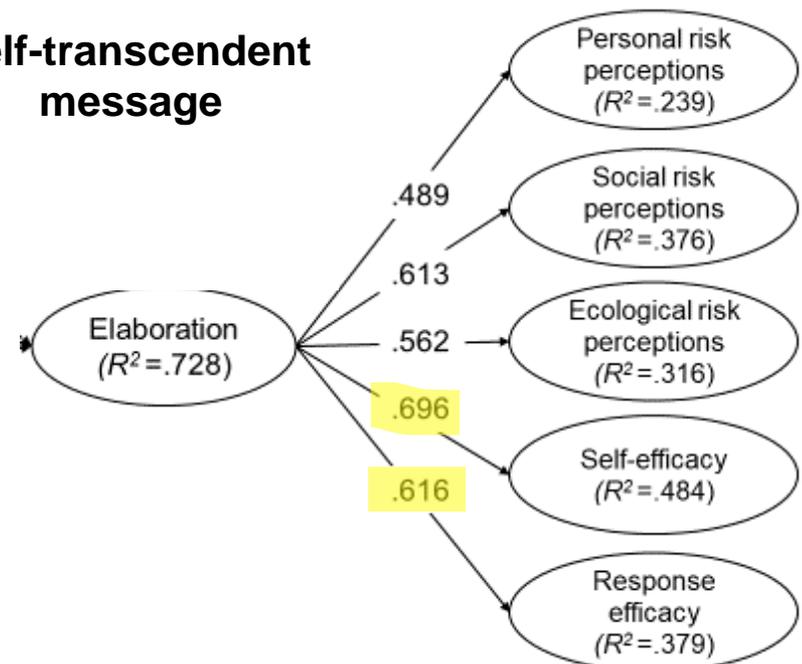




- Relationships between elaboration and beliefs were strong for all treatment groups
 - Elaboration had a stronger influence on self- and response-efficacy in the self-transcendent message



Self-transcendent message





- **All tested messages were evaluated favorably**
 - Overall, the Be a Hero campaign is well-received
 - The modifications to add values-framing did not evoke negative responses (e.g., reactance) among participants
- **Biospheric values strongly predicted elaboration for the self-transcendent message**
 - Biospheric values tend to be high among recreational water users
 - Biospheric framing may result in a stronger message than egoistic or altruistic framing for environmental issues (Hansla, 2011)



- **Strong relationship between elaboration and beliefs (risk perceptions & efficacy) across all messages**
 - Importance of designing messages that recreational water users want to engage with
- **Message framing to align with values** shows great promise as an area for future research
 - Different ways of conveying each type of value
 - Drawing on multiple types of values within the same message





Project Team

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Thanks for your attention

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