Visitor Survey Responses to Framed Climate Changed Messaging, Survey Validity Test

National Network for Ocean and Climate Change Interpretation (NNOCCI)

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EXECUTIVE SUMMARY

This study assessed visitor outcomes from attending presentations by members of the National Network for Ocean Climate Change Interpretation [NNOCCI] community of practice at four test aquariums and two control site aquariums where climate change interpretation is delivered by professional environmental educators who have not received NNOCCI training. Four unique self-complete surveys were developed, each collecting comparable demographic data and then each uniquely querying: obligations to act on climate change information for people, animals or the ocean; confidence that actions will result in improved conditions for various target entities; feelings of distress and emotional reaction to the topic, feelings of national ability to respond, and feelings about the resilience of oceans; and the motivating impact of the talk to promote social action or engagement with others on the topic. Results demonstrate that NNOCCI trained presenters were more likely to solicit responses that are positive, although some produced greater feelings of concern and anxiety, these feelings were accompanied by increase feelings of hopefulness about the ability of Americans to respond to the problem. Across all constructs, these distinctions were apparent. These results suggest that the NNOCCI strategy shows promise for increased positive outcomes once the program is

fully deployed. The evaluators recommend that additional data be collected to allow for statistical analysis of results and to further validate and clarify constructs within the instruments in order to support final production of a monitoring tool that can assess individual presenter, institutional and regional variation that may influence program design.

OVERVIEW

Validity Testing Self-complete Visitor Surveys

NewKnowledge.org created a comprehensive evaluation plan including front end and formative to support the project team, and to aid in the development of a summative evaluation for the implementation phase of the project following completion of the planning grant. This evaluation addresses results of visitor surveys that assess the impact of presentations delivered by members of the National Network for Ocean Climate Change Interpretation (NNOCCI) Community of Practice. In particular, it assesses whether the presentations by those trained to use Strategic Framing techniques had impact on visitor perceptions of climate change science and the degree of concern they felt about the issue. The validity test was conducted to determine reliability of a four-instrument self-complete survey strategy and compared to traditional messaging at two aquariums with staff that have not completed the training (control).

METHODOLOGY

Participants

All participants were over age 18 and had seen a presentation about ocean and climate change. Participants were visitors to six zoos and aquariums; the Aquarium of the Pacific, Mystic Aquarium, New England Aquarium, New York Aquarium, St Louis Zoo, and Utah's Hogle Zoo. Presenters from the Aquarium of the Pacific, New England Aquarium, St. Louis Zoo and Utah's Hogle Zoo represent those who completed the NNOCCI training programs or those in their institution who received secondary training (experimental group) and compared with results from visitors who witnessed presentations at the Mystic Aquarium and New York Aquarium (control group).

All surveys used a pre-approved consent form and, by their willingness to complete and return the survey, stated that they read and accepted the terms of the form. A total of 600 responses were included in this validity study.

Survey Instrument

Four different surveys were distributed to audiences of ocean and climate change interpretation presentations (Appendix A). The four surveys were designated by color to eliminate any suggestion that they were hierarchical. Data entry was managed by staff at the participating zoos, by NewKnowledge staff or data entry contractors, through an online Qualtrics data entry URL not accessible to the public.

All four versions of the survey asked the visitor what they learned from the presentation, general demographics, the frequency of attendance at zoos or aquarium and how many people were in their visiting group.

Each of the four versions of the survey then pursued different questions:

Green: Obligations to act on climate change information for people, animals or the ocean

Pink: Confidence that actions will result in improved conditions for various target entities

Purple: Feelings of distress and emotional reaction to the topic, feelings of national ability to respond, and feelings about the resilience of oceans

Yellow: Motivating impact of the talk to promote social action or engagement with others on the topic.

Survey Analysis

Results were exported from the Qualtrics software for analysis using Excel 14.2.3. Results were analyzed to identify dominant trends, to confirm validity of the various components as stable questions, as summated scales, and to assess whether distinctions in responses could be attributed to the presentation delivered by NNOCCI trained versus untrained professional environmental educators.

Questions were structured using Likert-type five point scales: strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. Responses were converted to a 1 to 5, with 1 representing strongly disagree and 5 representing strongly agree. The purple survey scales assessing both stress and hope are reported directly rather than as reverse scales since these constructs represent different orientations that can be held simultaneously.

RESULTS

About the Visitors

The six institutions distributed surveys to visitors after viewing presentations on ocean and climate change. At each facility between 33 and 166 surveys were collected (see Table 1).

Table 1. Participation by institution.

Facility	Group Type	*n*
Aquarium of the Pacific	Test	51
Mystic Aquarium	Control	100
New England Aquarium	Test	166
New York Aquarium	Control	109
Saint Louis Zoo	Test	33
Utah's Hogle Zoo	Test	141

N= 600

In all facilities, females were more likely to respond than males, with females filling out between 58.4% and 80.6% with percentage varying by institution. There was no significant difference between the ratio of men and women in the control and test groups. We note that women are also more likely to initiate visits to zoos and aquariums and are more likely to respond as *facilitators* who seek to optimize the experience for others (Falk, Heimlich, & Bronnenkant, 2008)

The average age of participants from all the facilities was 39.7 years (n = 574). There was no difference in average age between the control group (M = 39.9, n = 202) and the test group (M = 39.53, n = 373). The average person completing surveys was accompanied by approximately 3.89 people with 3 as the median, while the control aquariums averaged 3.18 per group (n = 205, SD = 1.81, Mode = 3). The variation in these responses could be accounted for by a few respondents in the test cases who were members of large groups ranging from 20 to 83 people.

Over 60% of both the control group visitors (69.4%) and the test group visitors (61.3%) indicated they have at least completed a college degree. Visitors attending either the control institutions or the test institutions did not see themselves at the political extremes.

Table 2. Political orientation of survey takers*

On political matters I consider myself to be...	Control	Test
Progressive/Very liberal	10%	13%
Liberal	26%	21%
Moderate	35%	37%
Conservative	22%	20%
Very conservative	5%	5%
Libertarian	2%	3%
Total	194	372

N=566

*Note. 34 participants did not respond

Visitation between the control and test group facilities were different from one another mainly in the *first time visiting* category, but in both groups more than a third of the surveyed visitors attend at least once a year (Table 3).

Table 3. Visitation frequency of survey participants

Visit Frequency	Control	Test
First time visiting	31%	23%
Not since I was a child	6%	7%
Not for many years	8%	9%
Once every few years	13%	16%
Once per year	9%	10%
Twice per year	10%	7%
Three plus times a year	24%	27%
Total	209	375

Demographic data suggested that the sample was representative of typical aquarium visitors which tend to skew slightly toward adult female and with on average, slightly higher education than the average American.

In addition to prompting visitors to share demographic information, all surveys asked visitors to rate on a 4 point scale whether or not they had learned anything new, where 1 indicated *no* and 4 indicated *yes, a lot*. Most visitors (89.4%) indicated that they had at least learned *a little* during presentations regardless of the institution they attended (n = 526). About 85% of visitor respondents in the control aquariums reported having learned at least *a little* and 91%

of the visitor participants who attended presentations at the test institutions reported learning at least *a little*.

Of the four different surveys types, responses were collected as follows: 161 yellow, 152 green, 150 pink and 137 purple surveys were collected.

Green Survey Takers

Only 15 of the 152 green survey respondents indicated that they did not learn anything new at the presentation they attended, 12 people did not respond to this question.

Two questions asked participants to rate their agreement with six statements on a 1 to 5 scale from *Strongly Disagree* to *Strongly Agree*. Most participants from the control group agreed or strongly agreed with the statements: *because of [the] presentation; [they felt] an obligation to the children in [their] life* (*M*= 4.23) and *[they felt] an obligation to ocean animals to promote policies that improve the health of oceans*(*M*= 4.28). While the test group was slightly less likely to claim they felt an obligation to the children in their life to promote policies to improve ocean health (*M*= 4.08) and slightly more inclined to do so for ocean animals (*M*= 4.1).

Looking across all the responses, the majority of participants either agreed or strongly agreed with feeling that they have an obligation to the children in their lives (M= 3.89, n =152) and feeling that they have an obligation to ocean animals (M = 3.97, n = 147) to do different things about climate change. However it should be noted that the lowest scores of agreement were to feeling they have an obligation *to avoid eating fish and seafood that deplete ocean resources* for the children in their lives (M = 3.58, n =151) and to the animals in their lives (M= 3.76, n = 147). When looking at the difference between how visitors at the control institutions responded to this question after seeing a presentation ($M_{childre\ n}$ =3.73; $M_{ocean\ animals}$= 3.95) and the test institution visitors ($M_{childre\ n}$ =3.53, $M_{ocean\ animals}$ = 3.67), one notices that the control group seems to have slightly more agreement with the statements than the test group, although the difference were not statistically significant.

Pink Survey Takers

One-hundred and fifty visitors responded to the pink survey. When asked if they learned anything new, 11 people said *no* while the remainder claimed some learning outcomes (n =133).

Participants were asked to rate their agreement with ten statements concerning their confidence in those actions improving the health of the oceans. Similar to the *green* surveys, respondents believe that *promoting policies that improve the health of oceans …* will be the most significant factor to make changes in the ocean's health (M = 4.19, n = 149). There was no significant difference between the control (M = 4.27, n = 37) and the test group (M = 4.26, n = 93).

After viewing the presentation, participants also felt more confident that *seeking out more information about how [to live life] in a way that is friendlier to the environment* will also improve ocean health ($M_{control}$ = 4.30, n = 37; M_{test} = 4.11, n = 93). Visitors also feel confident that if they *[tell] others about changes in [the] plane* ($M_{control}$ = 3.97, n = 37; M_{test} = 4.12, n = 93) and *encourage others to seek out more information about how they can live their life in a way that is friendlier to the environment* ($M_{control}$ = 4.11, n = 37; M_{test} = 4.00, n = 93) will also improve ocean health.

When it came to eating fish and other seafood, people in the test group were slightly more confident from the presentation than the control group that avoiding certain ocean sourced foods themselves ($M_{control}$ = 3.70, n = 37; M_{test} = 3.86, n = 93) and by others ($M_{control}$ = 3.51, n = 37; M_{test} = 3.68, n = 93) would improve ocean health, suggesting that decreasing seafood consumption as a climate change mitigation strategy was understood.

Purple Survey Takers

Although 137 *purple* surveys were input into the data system, these surveys were least likely to contain complete data, with only 119 providing full data for all questions. Again most visitors indicated they had learned at least a little new information from the presentation and only 16 individuals said they did not learn anything new (n =120).

The *purple* survey asked questions about participants' feelings about ocean and climate change. These questions were asked on a different scale system. When asked *to what extent do you feel distressed about the following . . .* the choices given were on a four point scale, with *Definitely not distressed* (1), *do not feel distressed* (2), *feel distressed* (3) and *definitely distressed* (4). Participants were least distressed by *the impact of changes to the climate on people* ($M_{control}$= 3.04, M_{test}= 3.00) than they were about the impact of climate change on animals and oceans ($M_{control}$= 3.19; M_{test}= 3.23). In this distressing category visitors were most distressed about the impact of climate change on oceans ($M_{control}$= 3.38; M_{test}= 3.29).

Visitors were also asked to express how *uneasy, anxious, hopeful* and *optimistic* they were about their *feelings about Americans' ability to address harmful changes to the planet*. Visitors were asked to rate these emotions as *definitely do not feel this, do not*

feel this, feel this and *definitely feel this*. Statistically these were expressed from values one through four. The mean responses were generally neutral with the control group indicating 0.13 more *uneasy* than the test group and 0.11 more *anxious* than the test group. The test group was more *hopeful* and more *optimistic* than the control group. than the control group (see Table 4). These results suggest that Strategic Framing did lead to both reduction in sense of anxiousness or uneasiness, but also improved perceptions of hope and optimism.

Table 4. Visitor feelings about Americans' abilities to address harmful changes to the planet

Extent visitors feel . . .	Control	Test
Uneasy	2.81	2.64
Anxious	2.69	2.58
Hopeful	2.73	2.89
Optimistic	2.58	2.76

Visitors who witnessed test group presentations felt slightly less *bored* by climate change information than control group participants. Additionally the test institution visitors felt slightly more *engaged* than the control institution visitors, approaching significance with t (122)= 1.89, p = .06. Additionally test institution visitors seemed to feel more *appropriately challenged* by climate change information than did the control institution visitors. There was not an apparent difference between how *overwhelmed* visitors felt by climate change information (see Table 5).

Table 5. Visitor feelings on climate change interpretation

Extent visitors feel . . .	Control	Test
Bored	1.77	1.55
Engaged	2.81	3.05
Overwhelmed	2.38	2.42
Appropriately challenged	2.42	2.85

When asked about their view of the *impact of climate change on the ocean* the average test institution visitor indicated that they believe the ocean is between *ephemeral* (2) and *precariously balanced* (3) (M= 2.61). Visitors to the control institutions indicated that they feel the ocean is more ephemeral (M= 2.85).

Yellow Survey Takers

The *yellow* survey focused on if visitors after viewing a climate change presentation attended intended to take any kind of action and if they believe they are capable of helping others take action (see Appendix). When asked if they had learned anything new, 14 of the 135 respondents for that question said they had not, while the rest reported some learning outcomes.

In both the control and test groups visitors tend to agree with the statements that they *[intend] to promote policies to improve the health of oceans* ($M_{control}$= 3.90; M_{test}= 3.96) and that they can *help people who are important in [their lives] promote policies to improve the health of oceans* ($M_{control}$= 4.07; M_{test}= 4.01).

Although mean scores for agreement with the statements about intending to avoid eating fish and seafood were lower than the other scores the test group rated these statements with slightly more agreement than the control group. However when the statement was altered slightly to include a facet of helping people who are important in their lives the test group mean was lower than the control group (Table 6).

Table 6. Fish and seafood avoidance

	Control	Test
Intent to avoid eating fish & seafood	3.48	3.64
Intent to discuss how others should avoid eating fish and seafood	3.45	3.54
Help others by not eating seafood	3.79	3.68
Help others by discussing how they can avoid seafood	3.72	3.65

DISCUSSION

Overall, the data suggested that there was moderate variation in outcomes between the control and the test groups, but these differences were not statistically significant. Statistical means for visitors in the test versus those in the control groups indicated a greater positive impact from presentations on public audiences appears to be related to those who participated in NNOCCI training. These results seemed especially evident in the survey module that assessed negative emotions about climate change (e.g., anxiety) and the related more positive ratings of emotional state regarding potential solutions (e.g., hopefulness). While these results were not statistically significant, this could be attributed to the low sample size in this validity test. These results do suggest that training increased staff skill with messaging about climate change in a

manner that resulted in higher levels of comprehension and investment in the solution. It is also important to note, that there was great variety to the responses offered by each of the two groups, suggesting variation rather than any particular bias related to an institution or visitor type at an institution.

Given the early phase of the project where most trained presenters are only starting to engage with Strategic Framing, these results are not surprising but do suggest that continued attention to the emotional structure of messaging will likely continue to increase over time. We note that the two control sites used for this study are also concerned with climate change as a presentation topic and are using other techniques that may also promote positive outcomes.

These results suggest that the surveys themselves are stable, capable of gathering representative data from participating institutions, and can demonstrate variation that can be tied directly back to messaging techniques, even though institutional variation may exist within the presentations.

Given that this study attempted to validate a set of questions about climate change, the results need to be interpreted carefully. The survey items developed for this project produced results in the expected direction for the test group and therefore reveal promise for their future use in studies about climate change perceptions, beliefs and the impact of more directed conservation interpretation strategies. It is expected that with larger sample sizes, further refinement of these instruments, and careful selection of a larger group of study sites, these results will be strengthened.

CONCLUSION

These results demonstrate that the NNOCCI project has the potential to significantly influence visitors experience with climate change messages and will likely increase the self-efficacy of visitors as social change agents if the community of practice continues to adhere to the messaging structure and techniques. Further analysis of the current data and analysis of additional data from a much larger cohort of presenters and institutions will help inform how the trained presenters change over time, whether individual presenters are more successful with their framing messaging than others within their institution, and whether regional issues contribute to increased understanding, concern and feelings of hopefulness that Americans can collaborate to solve the environmental problems related to climate change.

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