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RESEARCH ARTICLE

# Pre-trip expectations and post-trip satisfaction with marine tour interpretation in Hawaii: Applying the norm activation model

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**ABSTRACT**

This article examines environmental education by focusing on recreationist expectations for interpretation on marine tours, satisfaction with this interpretation and whether expectations were met, and how these perceptions correlate with components of the norm activation model. Recreationists surveyed before and after tours to Molokini, Hawaii ($n = 439$) had high pre-trip expectations for interpretation (e.g., about reefs, history), but satisfaction was lower and expectations for many recreationists were not met. Those who had their expectations met had higher problem awareness and ascribed more responsibility (i.e., norm activation) than those who did not, suggesting that interpretation is desired and may promote pro-environmental behavior.

**KEYWORDS**

expectations; interpretation; marine tourism; norm activation; satisfaction



## Introduction

Tourism is a primary industry in many regions of the world (Weaver, 2008). In Hawaii (USA), for example, tourism represents the largest source of private investment and employment generation (DBEDT, 2014). In recent years, the Hawaii tourism industry generated more than US $15 billion in economic contributions, accounting for 20% of the gross state product and total employment (DBEDT, 2014; HTA, 2014). Hawaii hosts approximately eight million visitors annually with 40% engaging in marine recreation (HTA, 2014). Scuba diving (200,000 annually) and snorkeling (three million annually) are particularly popular, but other recreation activities include swimming, surfing, fishing, jet skiing, and ocean kayaking (Friedlander et al., 2005; Needham, 2013). Hawaii's Marine Life Conservation Districts (MLCDs) are popular locations for some of these activities, and coral reefs in these protected areas are focal points for participants and resources of economic, sociocultural, and environmental importance to residents of Hawaii (Friedlander et al., 2005; Needham, 2010). This state's coral reefs, for example, generate more than US $800 million in recreation revenue and US $360 million in added value each year (Davidson, Hamnett, & Minato, 2003).

As the popularity of tourism and recreation in coastal and marine environments such as Hawaii's MLCDs continues to grow, developing strategies to mitigate adverse environmental (e.g., trampling reefs) and social (e.g., crowding) impacts is paramount to maintaining the integrity of natural resources, quality of experiences, and sustainability of economic benefits. Recreationist behaviors such as standing on coral, feeding fish, harassing marine life, or removing natural artifacts have direct impacts on the ecological and economic sustainability of marine sites (Weaver, 2008). In general, the majority of management strategies for addressing impacts involve regulatory (e.g., prohibit certain activities,

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close areas, limit visitor numbers) or physical techniques (e.g., placement and design of facilities, designate sacrifice sites; Manning, 2011). Education through the use of interpretation is also employed as a management strategy to reduce depreciative behavior and encourage voluntary behavior change while increasing enjoyment and understanding (Ham, 2013; Lück, 2015). Compared to regulations and physical site alternations, however, interpretation is typically used less effectively for managing popular marine sites partially because practitioners often lack understanding about user expectations for interpretation, satisfaction with this information, and how theoretical frameworks regarding learning and behavior change can help with improving education through the use of interpretation (Ballantyne & Packer, 2011; Lee, Jan, & Yang, 2013).

Understanding recreationist expectations and satisfaction with interpretive information, and the extent this information may influence decisions to engage in onsite sustainable behavior is essential for improving these educational programs that are integral to planning and management (Ham, 2013). Using interpretation and other education programs at marine sites such as Hanauma Bay, Hawaii's first MLCD, have mitigated some environmental degradation stemming from user behavior (Lankford, Inui, & Whittle, 2008; Orams, 1999). This bay was heavily impacted by overuse and depreciative recreationist behavior, but access restrictions and an intensive education program (e.g., mandatory orientation video) were implemented. These measures improved experiences and the ecological integrity of the site, and helped maintain some balance with the expanding needs of the tourism industry (Lankford et al., 2008).

This article examines marine recreationist expectations for interpretation, satisfaction with this interpretation and whether expectations were met, and how these perceptions correlate with components of the norm activation model (NAM) to encourage pro-environmental behaviors (PEBs). PEBs involve efforts to consciously reduce human impacts on natural resources (Nordlund & Garvill, 2002). Understanding educational expectations of recreationists and the social psychology of their behaviors are foundational to developing successful interpretation and offering information for managers and tour operators attempting to mitigate impacts of tourism and recreation.



## Conceptual foundation

### *Satisfaction with interpretation*

One environmental education component of recreation experiences involves interpretation. Interpretation attempts to capture attention and convey information with the goal of educating people (Wearing & Neil, 2009). Interpretation exists in various forms, including signs, lectures, and brochures. Effective interpretation should go beyond conveying facts to revealing relationships and meanings, and is essential for achieving both entertainment and educational outcomes (Ham & Weiler, 2007; Weaver, 2008). These outcomes can be important for satisfying recreationists.

Recreation satisfaction involves positive feelings that an individual gains from engaging in activities, and is the degree that he or she is content with these experiences (Beard & Ragheb, 1980; Needham, Haider, & Rollins, 2016). One management goal is to provide experiences that satisfy participants (Manning, 2011). Hendee's (1974) "multiple satisfactions" approach suggests that recreation offers various experiences that provide many satisfactions. An individual's satisfaction is complex; he or she may be satisfied or dissatisfied with different aspects of the experience and setting. These multiple satisfactions involve the congruence between pre-trip expectations and post-trip outcomes (Manning, 2011). Expectations for interpretation, for example, range from shallow (e.g., need for exposure to basic information) to deep (e.g., need to understand relationships between ecological concepts and societal implications). In addition, some recreationists expect to receive interpretation during their experiences, whereas others do not desire any interpretation or only want to learn about certain attributes of the setting or experience (Lück, 2003, 2015). It is important to understand the extent that any pre-trip expectations are met because this can influence post-trip outcomes such as satisfaction (Ballantyne & Packer, 2011; Ham & Weiler, 2007; Weaver, 2008).

Goals of interpretation are not just to enhance experiences and increase satisfaction, but also to encourage behavior that minimizes negative impacts of visitation and inspires voluntary behavior

change (Ballantyne & Packer, 2013; Ham, 2013; Weaver, 2008). This voluntary aspect contrasts with the imposition of restrictive regulations and physical site alterations. Although many challenges can hinder the planning and implementation of effective interpretation programs (e.g., lack of trained personnel, diverse user characteristics, keeping people engaged; Orams, 1999), there is support for including these types of educational programs in recreation settings because they can increase knowledge and participation in site-specific PEBs (Jacobs & Harms, 2014; Orams, 1997; Tubb, 2003; Wiener, Needham, & Wilkinson, 2009).

### Norm activation model (NAM)

One model that has been successful in predicting participation in altruistic and environmentally friendly behaviors is the NAM (Schwartz, 1977). This model posits that engagement in PEBs or prosocial behaviors is activated by four situational concepts (Steg & de Groot, 2010). First, problem awareness is the extent that an individual is aware of the consequences of his or her actions. Second, ascription of responsibility involves feelings of responsibility for the consequences of these actions. Third, outcome efficacy is the individual's identification of effective solutions and perception of outcomes related to behavioral decisions. The final concept is the individual's ability to engage in the PEB or prosocial behavior. The NAM has been used for explaining behavioral intentions and PEBs such as recycling (Bratt, 1999; Hopper & Nielsen, 1991), reducing personal vehicle use (Nordlund & Garvill, 2003), and choosing travel modes (Hunecke, Blobaum, Matthies, & Hoger, 2001; Nordlund & Garvill, 2002).

Although the NAM has been used for studying long-term, habitual PEBs and intentions (e.g., recycling, transportation mode choice, environmental activism), limited research has applied the model to short-term, temporary, or site-specific behaviors such as those associated with tourism and recreation experiences away from an individual's place of residence. Christensen, Needham, and Rowe (2009), for example, found that whale watchers with more past experience and stronger environmental values had more problem awareness associated with impacts on whales and their habitat. Related research has also found relationships between different foci of interpretation messages (i.e., problem awareness, ascription of responsibility, emotion) and conservation intentions of tourists (Jacobs & Harms, 2014). A few studies have also examined the continuity of PEBs and habits that individuals practice at home and on holiday (Dolnicar & Leisch, 2007; Solstrand & Gressnes, 2014). There were few relationships between the practice of long-term, habitual PEBs at places of residence and participation in PEBs on holiday in unfamiliar settings. In a related study, Mehmetoglu (2010) found that variables such as environmental concern and personal values were more strongly associated with decisions to engage in PEBs at home than on holiday. These studies suggest that long-term, habitual participation in PEBs may not automatically result in continuity of these behaviors in short-term, temporary, or site-specific situations.

Given this context, there is a need to assess the expectations and satisfaction associated with interpretation programs at marine recreation sites, and the extent these perceptions are related to components of the NAM that can influence PEBs. This article, therefore, addresses three research questions. First, what interpretive information do recreationists expect to learn on marine tours (i.e., pre-trip)? Second, how satisfied are these recreationists with what they learned from this interpretive information, and were their expectations met (i.e., post-trip)? Third, are those who were satisfied with this interpretation and received information that met or exceeded their learning expectations more aware of the consequences of their behavior (i.e., problem awareness) and do they ascribe more responsibility for their actions (i.e., ascription of responsibility)?

## Methods

### Study site

Molokini Shoal MLCD is an islet located south of the island of Maui, Hawaii, with clear waters, a unique crescent shape, and a semi-enclosed area of relatively calm sea. Molokini possesses 48,571 $m^2$ of coral reefs and more than 20 species of fish, including large marine life such as sharks and rays

(Friedlander et al., 2005). This MLCD is accessible only by boat (almost entirely with commercial tour operators) and its close proximity to Maui enables most recreationists to reach it within one hour. Molokini is one of Hawaii's most popular marine sites with approximately 400,000 snorkelers and scuba divers visiting annually, making it the second most visited MLCD in this state (Friedlander et al., 2005). More than 40 commercial tour boats have permits to operate here, ranging from smaller boats that are typically less than 30 feet in length and carry fewer than 15 passengers, to much larger boats of 50 feet or more in length carrying up to 150 passengers (Bell, Needham, & Szuster, 2011; Needham, Szuster, & Bell, 2011).

### Data collection

Data were obtained from pre-trip and post-trip questionnaires administered onsite to recreationists visiting Molokini on tour boats during both higher use (spring break March 2009) and lower use periods (late April 2009). To ensure a representative sample, questionnaires were administered to passengers on boats operating out of the three harbors from which boats depart for Molokini. Most tour boats operate from Maalaea harbor, where questionnaires were administered on two larger boats carrying mostly snorkelers and two smaller boats focusing mainly on scuba divers. Questionnaires were also administered on one smaller tour boat predominantly carrying scuba divers operating from Lahaina harbor, and one smaller boat carrying mostly scuba divers from Kihei boat ramp. These boats were chosen to provide a representative cross-section of the types of tour boats visiting Molokini.

Passengers were selected for sampling during 28 trips to the site. Passengers on larger boats were selected randomly by sampling every group or party and asking one person in each group or party with the most recent birthday to complete a questionnaire. Given the lower number of passengers on smaller boats, all passengers on these boats were asked to complete a questionnaire. Pre-trip questionnaires were completed on the dock prior to leaving for Molokini, and post-trip questionnaires were completed on the boats by the same individuals immediately following their visit. Matching pre-trip and post-trip questionnaires were completed by 439 recreationists (95% response rate). In total, 85% of respondents were on larger boats and 15% were on smaller boats, and this is relatively proportionate to the distribution of use at Molokini (Markrich, 2004).

### Analysis variables

Expectations for interpretation were measured in the pre-trip questionnaire by asking if respondents disagreed or agreed with five statements—on this trip to Molokini, I expect to learn about: (1) underwater marine species (e.g., fish, larger marine life), (2) coral reefs, (3) nature, (4) history of the area, and (5) native Hawaiian culture. Satisfaction with interpretation was measured in the post-trip questionnaire by asking the same respondents if they disagreed or agreed they were satisfied that they actually learned about each of these characteristics on their tour. Consistent with widely accepted principles of survey methodology (e.g., Dillman, Smyth, & Christian, 2014; Vaske, 2008), expectations and satisfaction were measured on 5-point bipolar scales of 1 "strongly disagree" to 5 "strongly agree" (3 "neither" midpoint).[1]

Seven variables measured problem awareness: (1) feeding marine life could harm them; (2) I could harm marine life (e.g., fish, coral, turtles) by touching them; (3) I have increased my awareness of the marine environment; (4) my behaviors can cause problems in the marine environment; (5) humans have impacts on the marine environment; (6) I have expanded my world view; and (7) my daily actions affect the marine environment. Four variables measured ascription of responsibility: (1) it is my responsibility to help protect the marine environment; (2) I can do more to help the marine environment; (3) I can contribute (e.g., donate, volunteer) to help improve the marine environment; and (4) I should be responsible for helping to teach others about the marine environment. Consistent with past studies (e.g., Christensen et al., 2009), these variables were also measured on 5-point bipolar scales of 1 "strongly disagree" to 5 "strongly agree" (3 "neither" midpoint). Variables were analyzed using

chi-square ($\chi^2$) tests, independent samples *t*-tests, paired samples *t*-tests, Cronbach alpha reliability, and effect size statistics (phi $\phi$, Cramer's *V*, Cohen's *d*; Cohen, 1988; Vaske, 2008).

## Results

In total, 52% of respondents were female and 48% were male. The smaller boats had significantly more males (61%), whereas the larger boats had slightly more females (57%), $\chi^2 = 9.61$, $p = .002$. The phi ($\phi$) effect size, however, was only .15. Using guidelines from Cohen (1988) and Vaske (2008) for interpreting effect sizes, the magnitude of this difference can be characterized as "small" or "minimal," respectively. The average age among respondents was 40 years old and there was no significant difference between those on larger ($M = 40.8$) and smaller boats ($M = 38.9$), $t = 1.23$, $p = .218$. Most respondents (81%) were visiting Molokini for the first time and only 19% were repeat visitors, but the smaller boats had more repeat visitors (41%) than the larger boats (15%), $\chi^2 = 33.18$, $p < .001$, $\phi = .23$. These findings are consistent with other studies examining visitors to the area (Friedlander et al., 2005; HTA, 2014; Markrich, 2004), suggesting that respondents are generally representative of visitors at the area.

More than 70% of respondents agreed they expected to learn about each of the five characteristics, with highest expectations for learning about underwater marine species (92%) and lowest for learning about Hawaiian culture (71%; Table 1). Those on larger boats had significantly higher expectations than those on smaller boats, $\chi^2 = 6.91$ to 28.38, $p = .009$ to $<.001$. The phi ($\phi$) effect sizes ranged from .11 to .21, suggesting the strength of these differences between larger and smaller boats was "small" to "medium" (Cohen, 1988) or "minimal" to "typical" (Vaske, 2008).

Over 70% of respondents agreed they were satisfied with the interpretation about marine species (85%), nature (76%), and coral reefs (72%), but satisfaction was lower for learning about history (63%) and Hawaiian culture (42%; Table 1). Those on smaller boats had lower satisfaction than those on larger boats, and this was significant for four of the five characteristics, $\chi^2 = 4.80$ to 58.01, $p = .029$ to $<.001$. Satisfaction with learning about history (33%) and Hawaiian culture (11%) was much lower on smaller boats than larger boats (73%, 51%). Effect sizes were "small" or "minimal" for nature and reefs ($\phi = .11, .16$), but "medium" to "large" or "typical" to "substantial" for history and culture ($\phi = .35$; Cohen, 1988; Vaske, 2008).

Paired comparisons between pre-trip expectations and post-trip satisfaction showed that for both larger and smaller boats, satisfaction was lower than expectations (Table 2). Many respondents on smaller boats, for example, agreed they expected to learn about Hawaiian culture ($M = 3.48$), but disagreed they were satisfied with what they actually learned about Hawaiian culture on their tour ($M = 2.40$). These differences between expectations and satisfaction were significant for nine of the 10 comparisons, $t$(paired) = 2.90 to 9.45, $p = .004$ to $<.001$. Most of the Cohen's *d* effect sizes ($d = .19$ to .92) suggested these differences between expectations and satisfaction were "medium" to "large" (Cohen, 1988) or "typical" to "substantial" (Vaske, 2008).

**Table 1.** Pre-trip expectations and post-trip satisfaction for larger and smaller boats.

| | Larger Boats | Smaller Boats | Total | $\chi^2$ | *p* | $\phi$ |
|---|---|---|---|---|---|---|
| Pre-trip expectations[1] | | | | | | |
| Underwater marine species | 94 | 83 | 92 | 10.86 | .001 | .14 |
| Coral reefs | 91 | 77 | 89 | 14.40 | <.001 | .16 |
| Nature | 90 | 80 | 88 | 6.91 | .009 | .11 |
| History of the area | 87 | 65 | 83 | 26.16 | <.001 | .21 |
| Native Hawaiian culture | 75 | 49 | 71 | 28.38 | <.001 | .21 |
| Post-trip satisfaction[2] | | | | | | |
| Underwater marine species | 86 | 81 | 85 | 1.24 | .265 | .06 |
| Nature | 80 | 64 | 76 | 10.07 | .002 | .16 |
| Coral reefs | 75 | 63 | 72 | 4.80 | .029 | .11 |
| History of the area | 73 | 33 | 63 | 48.99 | <.001 | .35 |
| Native Hawaiian culture | 51 | 11 | 42 | 58.01 | <.001 | .35 |

[1]Cell entries are percent agreeing they expected to learn about each characteristic.
[2]Cell entries are percent agreeing they were satisfied they learned about each characteristic.

**Table 2.** Paired comparisons between pre-trip expectations and post-trip satisfaction.[1]

| | Pre-trip expectations | Post-trip satisfaction | Paired *t* | *p* | Cohen's *d* |
|---|---|---|---|---|---|
| Larger boats | | | | | |
| Underwater marine species | 4.16 | 4.01 | 3.74 | <.001 | .25 |
| Coral reefs | 4.10 | 3.84 | 5.42 | <.001 | .38 |
| Nature | 4.08 | 3.96 | 2.90 | .004 | .19 |
| History of the area | 4.00 | 3.78 | 4.27 | <.001 | .30 |
| Native Hawaiian culture | 3.84 | 3.38 | 8.00 | <.001 | .53 |
| Smaller boats | | | | | |
| Underwater marine species | 4.05 | 3.91 | 1.45 | .150 | .19 |
| Coral reefs | 3.98 | 3.57 | 4.12 | <.001 | .49 |
| Nature | 4.02 | 3.62 | 3.83 | <.001 | .52 |
| History of the area | 3.74 | 2.98 | 6.13 | <.001 | .79 |
| Native Hawaiian culture | 3.48 | 2.40 | 9.45 | <.001 | .92 |

[1]Cell entries are means from 1 "strongly disagree" to 5 "strongly agree."



For the problem awareness questions, respondents were most likely to agree that feeding and touching marine life are harmful (Table 3). For ascription of responsibility, respondents were most likely to agree it is their responsibility to protect marine environments. Measurement reliability of these concepts was examined with Cronbach alpha coefficients. Reliability is the consistency of responses to multiple variables intended to measure a broader concept (Vaske, 2008). Reliability coefficients were .90 (larger boats) and .89 (smaller boats) for problem awareness, and .92 (larger boats) and .91 (smaller boats) for ascription of responsibility. Deletion of any variable did not improve reliability. An alpha greater than .65 indicates that variables are measuring the same concept and justifies combining them into an index (Vaske, 2008). On average, indices for problem awareness ($M = 3.83$) and ascription of responsibility ($M = 3.74$) were significantly higher on larger boats than smaller boats ($M = 3.45, 3.23$), $t = 4.84$ to 5.31, $p < .001$ (Table 4). The point-biserial correlation effect sizes ($r_{pb} = .23, .25$) revealed these differences were "medium" (Cohen, 1988) or "typical" (Vaske, 2008).

For both larger and smaller boats, recreationists who received interpretation that met or exceeded their expectations (i.e., satisfaction same or greater than expectations) for learning each of the five characteristics were more aware of their consequences and ascribed more responsibility for their actions compared to those whose expectations were not met (i.e., satisfaction lower than expectations; Table 5). These differences in awareness and responsibility between those whose expectations were met or

**Table 3.** Reliability of variables measuring problem awareness and ascription of responsibility.[1]

| | Mean (*M*)[2] | Item total correlation | Alpha if item deleted | Cronbach alpha |
|---|---|---|---|---|
| Problem awareness | | | | .90, .89 |
| Feeding marine life could harm them | 4.18, 3.56 | .55, .73 | .90, .87 | |
| I could harm marine life by touching them | 4.06, 3.82 | .75, .67 | .88, .88 | |
| I have increased my awareness of the marine environment | 3.91, 3.62 | .66, .61 | .89, .88 | |
| My behaviors can cause problems in the marine environment | 3.76, 3.35 | .76, .74 | .88, .87 | |
| Humans have impacts on the marine environment | 3.74, 3.31 | .82, .73 | .87, .87 | |
| I have expanded my worldview | 3.58, 3.35 | .69, .65 | .89, .88 | |
| My daily actions affect the marine environment | 3.56, 3.12 | .75, .67 | .88, .88 | |
| Ascription of responsibility | | | | .92, .91 |
| It is my responsibility to help protect the marine environment | 3.90, 3.52 | .82, .78 | .89, .89 | |
| I can do more to help the marine environment | 3.74, 3.19 | .78, .82 | .90, .88 | |
| I can contribute to help improve the marine environment | 3.69, 2.97 | .80, .75 | .90, .90 | |
| I should be responsible for helping to teach others about the marine environment | 3.64, 3.23 | .84, .86 | .88, .87 | |

[1]First numbers = larger boats, second numbers = smaller boats.
[2]Cell entries are means from 1 "strongly disagree" to 5 "strongly agree."

**Table 4.** Problem awareness and ascription of responsibility for larger and smaller boats.[1]

| | Larger boats | Smaller boats | *t* | *p* | $r_{pb}$ |
|---|---|---|---|---|---|
| Problem awareness | 3.83 | 3.45 | 4.84 | <.001 | .23 |
| Ascription of responsibility | 3.74 | 3.23 | 5.31 | <.001 | .25 |

[1]Cell entries are means on composite scales of 1 "strongly disagree" to 5 "strongly agree."

exceeded and those whose expectations were not met were statistically significant in all cases for larger boats, and the effect sizes were "medium" to "large" (Cohen, 1988) or "typical" to "substantial" (Vaske, 2008), $t = 3.65$ to 6.27, $p < .001$, $r_{pb} = .21$ to .34. Although this pattern was identical for smaller boats, the differences were significant in half of the cases.

## Discussion

These findings showed that most recreationists participating in these marine tours expected they would receive interpretive information and learn about history, culture, and marine ecosystems. This result is consistent with research showing that many recreationists and tourists both desire and are amendable to learning about social and ecological attributes (Ham, 2013; Lück, 2015; Weaver, 2008). Despite these high expectations, however, satisfaction was lower and expectations for many respondents were not met. Satisfaction was highest with interpretation about ecological attributes (e.g., marine species, reefs) and lowest for social issues (e.g., history, culture). These results are similar to recent research by Lück (2015) who found that satisfaction with the content of marine tour interpretation often does not match the desires of recreationists who would have liked to receive more information. In addition, findings support Hendee's (1974) "multiple satisfactions" approach that recreationists can be satisfied or

**Table 5.** Problem awareness and ascription of responsibility between those whose expectations were met or exceeded versus those whose expectations were not met.[1]

| | Met or exceeded expectations | Did not meet expectations | *t* | *p* | $r_{pb}$ |
|---|---|---|---|---|---|
| Larger boats | | | | | |
| Problem awareness | | | | | |
| Underwater marine species | 3.96 | 3.43 | 6.27 | <.001 | .34 |
| Coral reefs | 3.97 | 3.53 | 5.62 | <.001 | .31 |
| Nature | 3.96 | 3.45 | 6.05 | <.001 | .33 |
| History of the area | 3.94 | 3.58 | 3.94 | <.001 | .25 |
| Native Hawaiian culture | 3.99 | 3.62 | 4.99 | <.001 | .28 |
| Ascription of responsibility | | | | | |
| Underwater marine species | 3.88 | 3.32 | 4.52 | <.001 | .29 |
| Coral reefs | 3.91 | 3.36 | 5.06 | <.001 | .31 |
| Nature | 3.87 | 3.34 | 4.43 | <.001 | .27 |
| History of the area | 3.86 | 3.47 | 3.65 | <.001 | .21 |
| Native Hawaiian culture | 3.92 | 3.50 | 4.41 | <.001 | .25 |
| Smaller boats | | | | | |
| Problem awareness | | | | | |
| Underwater marine species | 3.53 | 3.22 | 1.81 | .074 | .18 |
| Coral reefs | 3.66 | 3.12 | 3.41 | <.001 | .34 |
| Nature | 3.59 | 3.25 | 2.23 | .029 | .22 |
| History of the area | 3.65 | 3.32 | 2.07 | .041 | .21 |
| Native Hawaiian culture | 3.53 | 3.41 | 0.71 | .482 | .07 |
| Ascription of responsibility | | | | | |
| Underwater marine species | 3.29 | 3.07 | 1.03 | .307 | .10 |
| Coral reefs | 3.39 | 2.97 | 2.27 | .025 | .23 |
| Nature | 3.33 | 3.09 | 1.13 | .262 | .13 |
| History of the area | 3.49 | 3.04 | 2.42 | .017 | .24 |
| Native Hawaiian culture | 3.32 | 3.18 | 0.69 | .493 | .07 |

[1]Cell entries are means for problem awareness and ascription of responsibility on composite scales of 1 "strongly disagree" to 5 "strongly agree."

dissatisfied with different aspects of the experience and setting. Results are also consistent with Wiener et al. (2009) who found that most marine tour operators in Hawaii focus almost exclusively on safety and ecological issues in their interpretation while giving little attention to sociocultural issues. Given the measurable level of post-trip dissatisfaction in comparison to pre-trip expectations, interpretation appears to be under-utilized at Molokini. Tour operators should increase client exposure to interpretive information, especially about local history and culture, because participants expect this information and satisfaction will likely increase if expectations are met (Needham et al., 2016). A unique strategy could be employed through the use of native Hawaiian guides or having history and culture as underlying or unifying themes for interpretation.

Expectations for learning, satisfaction with interpretive information, and both problem awareness and ascription of responsibility were higher on larger boats that mostly cater to snorkelers compared to smaller boats predominantly carrying scuba divers. It is possible these results could be influenced by past visitation to Molokini given that larger boats had fewer repeat visitors compared to smaller boats. However, there were no differences in expectations, satisfaction, awareness, and responsibility between first time and repeat visitors on both larger and smaller boats.[2] Although speculative, the results may be explained by the fact that interpretive information on some of the smaller boats tends to be dominated by safety briefings related to scuba diving rather than much about biophysical and cultural attributes of the site (Wiener et al., 2009). In addition, some of the smaller boats are less suited to communication with passengers because they are more exposed to external conditions (e.g., weather, wind, waves, related noise), do not have speaker systems, and only have a captain and dive master rather than any dedicated interpretation staff. Although scuba diving involves risks and safety precautions, the comparatively minimal environmental and cultural interpretative experiences could lead to more depreciative behaviors and lack of appreciation for the historical and cultural importance of dive sites. Research is needed to examine these differences among interpretation programs offered on the larger and smaller boats to understand other possible reasons influencing differences in findings among boats.

These differences, however, suggest that at least from the customer perspective, larger boat operators are doing a better job at interpretation than those operating smaller boats. Regardless, results suggest there is room for improvement on all boats, so the amount and type of interpretive information should be augmented to improve understanding of local history and culture, harmful human behaviors onsite, PEBs that participants could employ when visiting the site, and potential post-trip conservation actions. Given that up to 1,000 or more people visit Molokini each day, managers should consider mandating a naturalist guide component to the site visit and implementing an institutionalized program providing a more standardized high-quality educational experience for recreationists on all boats.

Findings also showed that recreationists who received interpretive information that met or exceeded their expectations were not only more satisfied, but also more aware of their consequences and ascribed more responsibility for their actions than those whose expectations were not met. In addition, respondents were most likely to agree that feeding and touching marine life is harmful, and it is their responsibility to protect marine environments. These findings suggest that expectations and satisfaction associated with interpretation on these tour boats are correlated with both problem awareness and ascription of responsibility, which are two important components of the NAM (Schwartz, 1977; Steg & de Groot, 2010). Research has shown that components of the NAM, such as problem awareness and ascription of responsibility, can influence long-term, habitual participation in PEBs (e.g., recycling, reducing personal vehicle use; Bratt, 1999; Nordlund & Garvill, 2002, 2003). Findings presented here, however, extend this body of research by suggesting that components of the NAM can also apply to the short term, temporary, and site-specific situations common in tourism and recreation.

These results are also consistent with research indicating that interpretation can be effective at influencing perceptions, such as problem awareness and ascription of responsibility, that may eventually promote some PEBs (Ballantyne & Packer, 2011; Christensen et al., 2009; Jacobs & Harms, 2014; Orams, 1997). These findings linking interpretation to these components of the NAM subsequently provide justification for improving interpretation and other educational programs (Ham, 2013; Wiener et al., 2009). Implementing a formal interpretation program as a management strategy at Molokini,

therefore, may be effective for encouraging PEBs. Research is needed to understand the types of educational messages and content most effective in promoting PEBs so managers and operators can design effective programs.

This study measured respondent expectations and satisfaction associated with interpretation in a marine environment, and how these perceptions correlate with components of the NAM (problem awareness, ascription of responsibility). These self-reported perceptions, however, may not represent actual learning, increased awareness, or changes in behavior. Experiments and longitudinal or panel observation studies are needed to measure actual changes in individuals over time. Furthermore, this study focused on problem awareness and ascription of responsibility, and was not designed to examine all four situational concepts within the NAM. Research is needed to examine the extent that findings extend to the two other concepts (outcome efficacy, ability to engage in PEBs). In addition, respondents may have reacted to some of the statements measuring awareness and responsibility (e.g., it is my responsibility to help protect the marine environment) because of social pressures to conform to a desired condition. This social desirability bias (Fisher, 1993) may have caused some respondents to ascribe slightly higher awareness and responsibility simply to convey a favorable image and avoid any possible embarrassment. Potential biases such as these have been a longstanding issue when examining social psychological theories and models such as the NAM (Bratt, 1999; Lee et al., 2013; Schwartz, 1977), and more research is needed to determine the extent they exist. Finally, results are limited to one popular marine site in Hawaii and may not generalize to all other recreation areas. The applicability of findings to other sites, therefore, remains a topic for further investigation.



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## Notes

1. Some researchers have advocated for providing an additional "do not know" or "no opinion" option, but recent research suggests this may be redundant because the majority of midpoint responses (e.g., "neither") infer no opinion rather than opinion neutrality (Sturgis, Roberts, & Smith, 2014).
2. Ancillary analyses showed no statistical differences in expectations, satisfaction, awareness, and responsibility between first time and repeat visitors to Molokini on both smaller ($t = .01$ to $.77$, $p = .441$ to $.993$, $r_{pb} = .01$ to $.08$) and larger ($t = .06$ to $1.67$, $p = .096$ to $.949$, $r_{pb} = .01$ to $.09$) boats.

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