

Comparing the Effectiveness of Interpretive and Sanction Messages for Influencing Wilderness Visitors' Intended Behavior

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Abstract: A laboratory experiment was designed to compare the effectiveness of sanction and interpretive written messages for influencing wilderness visitors' intended behavior. Questionnaires were presented to 237 people assigned to one of three treatments (control, sanction, or interpretation). Each viewed a series of slides of a hypothetical wilderness outing. Sanction and interpretation groups viewed signs containing messages interspersed in the slides; the control group viewed no such messages. Participants responded to written scenarios and indicated the likelihood that they would perform certain behaviors. In three of the four scenarios the interpretation message was as effective as the sanction message at eliciting intentions to perform desired behaviors and not to perform undesired behaviors; both were more effective than no message. In the fourth scenario, the interpretation message was more effective at eliciting the desired response than the sanction message, which was in turn more effective than no message.



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Introduction

Many land management agencies in the United States use interpretation to help accomplish resource management objectives. Interpretation is described by Knudson et al. (1995) as a method of communicating the significance or meaning of something in a way that instills understanding and appreciation. Interpretive communication may be personal (e.g. on-site naturalists) or impersonal (e.g. signs, brochures, or exhibits), and may use images, analogies, metaphors, or stories to explain the significance of natural resources or cultural events, or to present the rationale behind management policies or regulations.

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Agencies commonly rely on plea and sanction messages to promulgate regulations. A sanction, as used here, is defined as threatening a penalty (usually a fine) for behaviors considered inappropriate by the managing agency. Commonly used sanctions are, in certain situations, effective for visitor management. Gramann et al. (1995) found that participants reported stronger intentions to obey a rule if they were aware of the sanction for violating that rule. Johnson and Swearingen (1992) reduced off-trail hiking by 75% with a threatened sanction sign at Mount Rainier National Park. Of the signs they tested, the sanction message was the most effective. Martin (1992) reduced pumice collection at Mount St. Helens National Volcanic Monument by 97% with a simple sanction sign.

Providing the reasons for a regulation is almost always more effective than simply stating the rule (Ham 1992). Interpretive messages can explain the rationale behind management regulations and the necessity for them without threatening a penalty for noncompliance. Interpretation can protect the resource by increasing the visitor's awareness of its value, of behavior that degrades the resource, and of damage that occurs with improper actions (Dame 1985). Vander Stoep and Gramann (1987) evaluated the effectiveness of written interpretive messages at the Shiloh National Military Park in reducing damage by youth to cultural resources such as cannons, statues, and monuments. They found that even the most basic design of the three tested was effective in reducing depreciative behavior.

Oliver et al. (1985) found a brochure successful at reducing littering and tree damage impacts at campsites. The brochure contained sketches and verbal messages explaining to visitors which behaviors were destructive, the

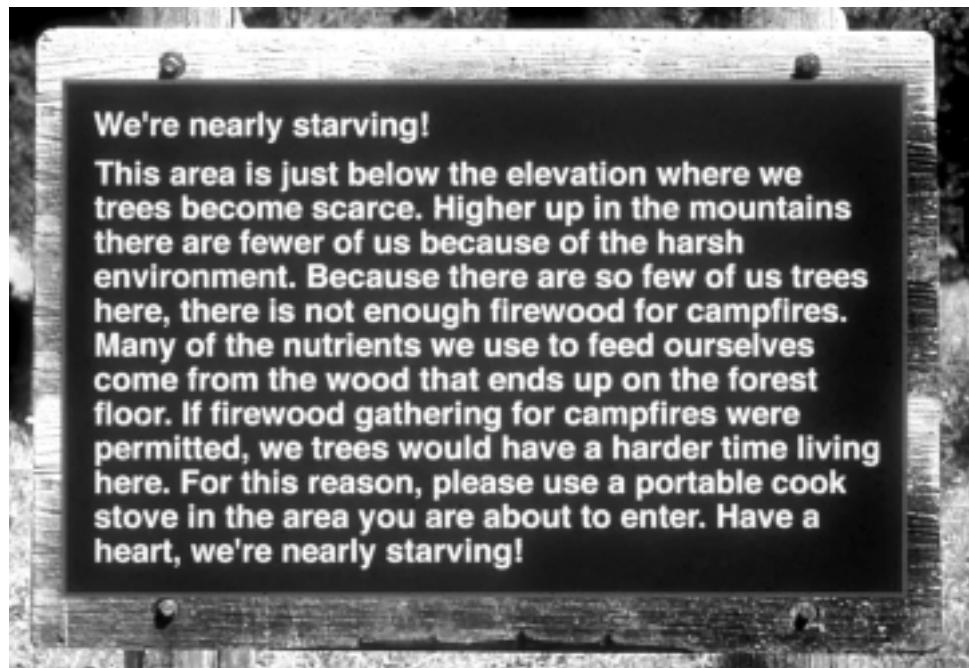


Figure 1—Campfire interpretation sign seen by subjects in slide presentation.

effects of these behaviors, the costs of rehabilitating damaged campsites, and ways that visitors could help protect the campground and camping experience. The brochure-only treatment reduced the percentage of camping groups that damaged one or more trees from 39% to 20%, and reduced the percentage of groups leaving litter from 82% to 67%.

Gramann et al. (1995) exposed participants to what they called an "awareness of consequences" (AC) message, which included the reason for the rule and the negative consequences to the resource or other visitors of not obeying the rule, but no mention of a sanction. They found that AC participants were significantly more likely to indicate that they would obey the rule than participants who did not receive this message.

Widner and Roggenbuck (2000) tested the effectiveness of three interventions designed to reduce theft of petrified wood at Petrified Forest National Park. They found that there was no significant difference in effectiveness among a signed pledge, an on-site ranger, and "a theory-based,

well-written, and well-designed interpretive sign." The interpretive sign was as effective as the on-site ranger at a fraction of the cost. The interpretive message reduced resource degradation significantly over the previous sign that simply read "Removal of petrified wood is prohibited."

Although not universally agreed on (McAvoy and Dustin 1983; Schindler and Shelby 1993), the idea that indirect or nonregulatory management is preferred to direct or regulatory management of wilderness visitors is nevertheless widely accepted (McCool and Christensen 1996). One of the problems with using the threat of sanctions in wilderness is that they likely decrease the visitor's sense of behavioral freedom, an outcome long accepted as important to most wilderness visitors. As effective as sanctions can be, wilderness experiences may be diminished by threatened sanctions. Interpretive messages may be more appropriate in situations where the threat of a sanction is either not warranted or otherwise considered contrary to the desired experience. This study examined the effectiveness



Figure 2—Campfire sanction sign seen by subjects in slide presentation.

of interpretive messages as an alternative to sanction messages for wilderness visitor management.

Methods

Questionnaires were completed by a total of 237 participants randomly assigned to one of three treatments: control (no message), sanction message, or interpretive message. The participants were college students from upper division and graduate classes in natural resources and other classes. A total of 12 presentations occurred (four for each treatment type) averaging about 20 participants each, at two universities, one in a rural setting and one in an urban area.

All participants viewed slides of a hypothetical wilderness outing. To the control groups the researcher presented 17 slides with images they would encounter on a typical wilderness trip. For example, the first slide was of a trailhead; then a trail starting up a mountain; then a group of backpackers; then a scenic

view; then a campsite, and so on. The sanction and interpretation participants viewed four additional slides of messages on signs, interspersed in the series of slides (sanction participants viewed sanction messages; interpretation participants viewed interpretive messages).

After viewing the slides, all participants completed a written questionnaire. Four scenarios were presented in the questionnaire. The scenarios correlated to the topic of the sanction or interpretive messages in the slide presentations (firewood collection, human waste disposal, cultural artifacts, and food scraps disposal).

All participants responded to the four scenarios by indicating, on a scale from 0% to 100%, the likelihood that they would perform each of three different behaviors in response to that scenario. One of these behaviors was the desirable or preferable behavior (from the manager's perspective); the others were incorrect or less desirable behaviors.

Results

The order of the message slides was rotated among the four groups in each treatment. An analysis of differences in behavioral intention scores (the dependent measure) among the groups within each treatment revealed that order of message slides was insignificant, with only six statistically significant differences (Tukey's HSD, $p < 0.05$) out of 216 possible pairwise comparisons (3 responses/scenario x 4 scenarios x 3 treatments x 6 pairwise comparisons/treatment).

An examination of differences across the three treatments on each of the 12 intended behavior responses (4 scenarios x 3 responses each) revealed 4 of the 12 intended behavior responses showed no significant difference across the three treatments. Eight responses showed a significant difference between at least two of the three treatments (Table 1). For all eight of these responses, the control group (no message) differed significantly from both the interpretation and sanction message treatments. In only one instance was there a significant difference between the sanction and interpretation message treatments. In that case, the interpretation message was significantly more effective than the sanction message (i.e., it elicited a higher probability of participants intending to perform the desired behavior).

Looking just at the undesired behaviors, each of the four scenarios had at least one response (and in scenarios 3 and 4, both responses), for which *any* message (sanction or interpretive) decreased the likelihood that a person would perform that incorrect behavior. Looking just at the desired behaviors, for two of the scenarios (firewood collection and food scraps), *any* message (sanction or interpretive) increased the likelihood that a person would perform the desired behavior. In summary, for

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all four of the scenarios, the interpretive message was at least as effective as the sanction message, and in one scenario (firewood collection), the interpretive message was more effective than the sanction message.

Finally, participants' scores for the four desired behaviors were summed, as were their scores for the eight undesired behaviors. This allowed us to examine the effect of the three treatments on composite desired and undesired intended behaviors. This analysis mediates the effects that the individual scenarios might have, because certain scenarios may be more

realistic or more compelling than others. For the desired behaviors, any message (sanction or interpretive) was significantly more effective than no message at increasing the probability of participants performing the desired behavior. For the undesired behaviors, any message (sanction or interpretive) was significantly more effective than no message at decreasing the probability of participants performing the undesired behavior. For both the desired and undesired intended behaviors, the interpretive and sanction messages were equally effective (i.e., there was no significant difference).

Discussion

These results are consistent with the findings of Gramann et al. (1995); participants exposed to an interpretive or "awareness of consequences" (AC) message were more likely to indicate that they would obey the rule (or perform the desired behavior) than participants not given any message. Gramann et al. found that sanction messages were somewhat more effective than AC messages at increasing the intentions to obey the rules, but this study found interpretive messages to be as effective as sanction messages. The explanation may lie in the subtle

Table 1—Mean Scores for Intended Behavior Responses to Scenarios with Scores on a 0–100 Scale Representing the Probability of Subject Performing a Behavior. Scenario Responses that Represent the Desired Behavior for Each Scenario are Labeled.

Intended Behavior Responses to the Scenarios	Control Group	Sanction Treatment	Interpretation Treatment	F ratio
HUMAN WASTE DISPOSAL				
1/1	24 ^a	12 ^b	14 ^b	4.46*
1/2 (desired behavior)	76 ^a	78 ^a	81 ^a	0.74
1/3	32 ^a	23 ^a	23 ^a	2.02
CULTURAL ARTIFACT REMOVAL				
2/1 (desired behavior)	70 ^a	73 ^a	79 ^a	2.06
2/2	25 ^a	17 ^b	9 ^b	6.96**
2/3	40 ^a	32 ^a	28 ^a	2.57
CAMPFIRE APPROPRIATENESS				
3/1	51 ^a	37 ^b	26 ^b	8.94**
3/2	62 ^a	50 ^b	42 ^b	5.91**
3/3 (desired behavior)	49 ^a	62 ^b	77 ^c	12.93**
FOOD SCRAP DISPOSAL				
4/1 (desired behavior)	47 ^a	65 ^b	67 ^b	6.88**
4/2	42 ^a	25 ^b	24 ^b	7.85**
4/3	48 ^a	28 ^b	21 ^b	13.46**
^{a,b,c} mean values with different superscripts are significantly different based on Tukey's Honestly Significant Difference test at $\alpha = .05$. *F ratio significant at $\alpha = .05$. **F ratio significant at $\alpha = .01$				

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difference between AC messages and “interpretive” messages. Equally plausible is that differences may simply be an artifact of the different populations and/or the different scenarios and intended behaviors studied.

In this study, the firewood collection interpretive message was the only one that was more effective than its corresponding sanction message. It is possible that this scenario was more realistic or more compelling; it may have resonated more with participants than the other scenarios, or the interpretive message itself may have made the difference.

The dependent measure in this study was purposely limited to behavioral intention in response to an immediate scenario. Though speculative, exposing wilderness visitors to interpretive messages may have other effects, perhaps even more likely and/or more beneficial than influencing a behavioral intention on an immediate scenario. For example, Christensen and Dustin (1989) suggested that interpretive messages tailored to levels of moral development could ultimately increase a visitor's ethical understanding of his or her responsibility toward resources. Also, exposure to interpretive rather than sanction messages may affect how visitors perceive the managing agency. Might wilderness visitors exposed to interpretive messages view the managing agency more favorably than those exposed to sanction messages?

This study presented interpretive signs in the wilderness, viewed by participants as they proceeded on a hypothetical wilderness outing. This raises the question of whether interpretive signs are appropriate in designated wilderness. Nothing in the Wilderness Act appears to preclude interpretation. National Park Service (NPS) Director's Order 41 on Wilderness Preservation and Management (NPS 1999) states that guided interpretive walks may be conducted in wilderness so long as they are in accordance with day use limits prescribed in the park's Wilderness Management Plan. If interpretive walks are permissible in designated wilderness, perhaps interpretive signs are not inappropriate. However, the NPS (2001) Management Policies also state (section 6.3.10.4) that “Signs detract from the wilderness character of an area and make the imprint of man and management more noticeable. Only those signs necessary for visitor safety or to protect wilderness resources, such as those identifying routes and distances, will be permitted.” To the extent that the purpose of the interpretive sign is to protect wilderness resources, it may be appropriate. However, perhaps such signs are more appropriate at wilderness portals, rather than inside wilderness boundaries.

Would interpretive signs at trailheads be effective? McCool and Cole (2000) examined visitors' attention to low-impact messages placed on

wilderness trailhead bulletin boards and found that only 64% of visitors stopped at the bulletin board, and only 70% of those stopping attended to the messages placed there. For those visitors who did attend to the messages, there was a significant positive relationship between average attention time per message and message comprehension, and between message comprehension and knowledge.

Visitors who stopped at wilderness trailheads to look at low-impact messages with various appeals (the appeals encouraged visitors to stop and read the messages) attended to those messages for an average of 52 seconds (Cole 1998). Including an appeal increased attention time by 88% over a previous study (Cole et al. 1997) with no such appeal. Cole (1998) noted that deciding *whether* to pay attention to a message appears to be different from deciding how *much* attention to give to a message, and listed several attention-gaining techniques. Although not tested in this research, we suggest that presenting information in an interpretive fashion (made interesting and relevant) may increase the likelihood of gaining and holding visitors' attention to messages.

The ways that people respond to messages are complex, influenced by a great many variables. This study examined one such variable, the interpretive versus sanction nature of the message itself. The interpretive messages were as effective as the sanction messages. This is significant because interpretive messages may be more “wilderness experience appropriate” than sanction messages for managing wilderness visitors. This study did not test actual (observed or self-reported) wilderness visitor behavior. But if one accepts the premise that interpretive signs are more appropriate for wilderness than signs that threaten sanctions,

then the results of this experiment suggest a next step of conducting a field experiment similar to that of Cole (1998). Observation or visitor self-reports of behavior could be used to compare the effectiveness of interpretive signs with that of sanction and/or other traditional minimum-impact messages at gaining behavioral compliance with managers' low impact recommendations. ❧

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