Editor’s Note:

This issue marks the end of my term as editor of the *Journal of Interpretation Research*. It was a privilege to serve the National Association for Interpretation in this capacity for the past four years. I want to thank all of the associate editors and manuscript reviewers for their excellent work. I also want to thank the authors who submitted manuscripts to *JIR* during my tenure as editor. A journal is only as good as the material submitted to it. Cem Basman at Southern Illinois University–Carbondale will be taking over editorship. I know Dr. Basman will do a great job. I urge you to support this journal with manuscript submissions and by encouraging subscriptions. Dr. Basman’s address and information about submissions is provided on the inside back cover. Thank you again for your support and for your dedication to the field of interpretation.

Respectfully,

*Ted T. Cable*

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REDUCING THEFT OF PETRIFIED WOOD AT PETRIFIED FOREST NATIONAL PARK

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Abstract:
The theft of petrified wood from Petrified Forest National Park is the park’s primary resource-protection problem. Several interventions to control theft currently exist in the park, yet an estimated 12 tons of wood disappear from the park each year. This study evaluated three interventions to reduce the theft of wood from the park. Tested interventions included a sign, a signed pledge, and a uniformed volunteer. A field experiment revealed that all three interventions significantly reduced theft of wood over control conditions. In addition, the interventions were not significantly different from each other in their effectiveness.

Keywords:
Depreciative behavior, vandalism, theft, behavior-change interventions, Petrified Forest National Park.

INTRODUCTION
Noncompliant visitor behavior is a significant problem facing natural-resource managers. In a 1994 survey of U.S. national park superintendents, 72% of survey participants reported that noncompliance with rules and regulations by visitors caused significant damage to park resources (Johnson & Vande Kamp, 1994). The annual cost of this damage was estimated in excess of $80 million. In addition, about two-thirds of all managers reported noncompliant behavior that damaged cultural or
historical sites or objects, or theft of paleontological or cultural objects. This kind of damage is not easily quantified. Once these resources are removed or destroyed, they are often not repairable or replaceable.

Included in the category of nonrepairable damage is the removal of petrified wood from Petrified Forest National Park in the southeastern United States. Petrified Forest National Park is located in northeast Arizona. Although the area did not become a national park until 1962, it has been protected since 1906, when Theodore Roosevelt set aside the area to protect “the mineralized remains of Mesozoic Forests” (U. S. Department of the Interior and National Park Service [USDI-NPS], 1992, p. 3). These Triassic fossils, over 200 million years old, clearly represent a nonrenewable resource that, once removed, is gone forever. According to the park’s General Management Plan (USDI-NPS), visitor removal of petrified wood is the park’s primary resource-protection problem. Managers consider visitors who take a small piece or two of petrified wood to be more devastating to the resource than commercial collectors. They estimate that individual visitors remove approximately 12 tons of petrified wood from the park each year (USDI-NPS).

Throughout the years, the park has implemented various methods designed to deter wood theft. All visitors entering the park at either of the entrance/exit points are informed by park rangers that removal of artifacts from the park is illegal. Signs prohibiting the collection of artifacts at the entrance/exit points are written in several languages. In addition, all visitors are exposed to signs throughout the park with various antitheft messages, ranging from the threat of punishments and/or sanctions to the need to save the resource for future generations.

These interventions are assumed to expose all visitors to antitheft messages. In addition, two visitor centers, one at each end of the park, contain a wide array of interventions and antitheft messages. More than 50% of visitors spend some time in one of these two visitor centers (Roggenbuck, Widner, & Stratton, 1997). Intervention techniques inside the visitor center include a display with returned petrified wood and letters from the guilt-ridden thieves, a video describing the history of the park and the need for protection, written material about the park and wood protection, and interpretive rangers who interact with visitors. Thus, techniques to prevent theft include appeals to the visitors’ conscience, threats to their pocketbooks (i.e., fines), a reminder of their responsibility to future generations, and an explanation of the scientific value of the resource.

Despite this myriad of interventions in place in the park, a study conducted in summer 1992 found an estimated 1.2% of visitors removed petrified wood from the park (Roggenbuck et al., 1997). With an estimated visitation of 900,000 persons per year, and assuming that the 1.2% who are thieves take only one piece of wood each, an estimated 9,600 pieces of wood disappear each year.

Given the nonrenewable nature of petrified wood, this loss of wood from the park each year is unacceptable. The primary purpose of the research reported here was to develop, implement, and test the effectiveness of various interpretive methods to deter the theft of petrified wood from the park. With respect to this general research goal, the following section briefly describes the literature on deprivative behavior in parks.
CONTROLLING DEPRECIATIVE BEHAVIOR IN PARKS

Considering the frequency and intensity of reported damage to parks as a result of deprecative behavior, it is surprising that so little empirical work has been done on methods for reducing these behaviors. Compounding the difficulty of developing effective interventions is the variable nature of the few studies that have been conducted and the inconsistency of the results obtained. For example, the studied behaviors include off-trail hiking, tree damage, picnic table carving, wildlife feeding, and littering. In addition, a myriad of interventions—including signs, petitions, uniformed officers, and brochures—have been tested on controlling deprecative behaviors. Studies often produce conflicting results, and due to variability introduced by testing different interventions on site-specific behaviors, arriving at generalizable conclusions that can help create effective behavioral interventions is difficult. The following is a brief review of some of the studies conducted in natural-resource areas to assess the effectiveness of strategies to reduce deprecative behavior.

Martin (1992) examined the effect of four interventions—three types of trailhead signs and a brochure—on the theft of pumice from Mount St. Helens National Volcanic Monument. He found that all four methods reduced the occurrence of theft. The most effective method, a sanction sign that threatened prosecution for removing pumice, reduced theft of pumice from approximately 12\% to less than 1\% of park visitors. Johnson and Swearingen (1992) reported that the most effective sign message to deter off-trail hiking was also a sanction message. In contrast, Clark, Hendee, and Burgess (1972) found threats of citations or fines ineffective in controlling littering.

Other research indicated that the type of sanction might make a difference in effectiveness. For example, Schwartzkopf (1984) tested various sign texts on their ability to reduce feeding ground squirrels in Crater Lake National Park. He found that a sign warning of negative consequences to visitors from feeding the squirrels was twice as effective as a sign that explained negative consequences of the behavior for the squirrels.

Oliver, Roggenbuck, and Watson (1985) demonstrated the effectiveness of a brochure on reducing deprecative behavior. However, they tested the brochure’s effectiveness on reducing campsite impacts and did not evaluate the effectiveness of a sanction sign, as did Martin (1992). Oliver et al. did, however, find increased effectiveness with personal delivery of the brochure. Martin did not test this method of delivery for his brochure.

Some studies have examined the effect of a uniformed presence on noncompliant behavior. In Swearingen and Johnson’s (1988) study, off-trail hiking was decreased by using various sign messages, including a sanction message, but the most effective method was the presence of a uniformed interpreter. Oliver et al. (1985), as discussed above, found personal delivery of information by a uniformed volunteer to be the most effective method of deterring tree damage and litter. In contrast, other studies have found little to no increase in effectiveness of interventions due to personal contact (Neilson, 1981; Roggenbuck & Berrier, 1982). Roggenbuck & Berrier, for example, reported wide variability in the effectiveness of rangers in influencing behavior and concluded that, if the group was inexperienced or had three to six group members, the ranger-plus-brochure intervention was more
effective than the brochure alone in influencing behavior. On the other hand, if the group arrived late in the day, the personal contact plus brochure was not more effective than the brochure alone. The authors speculated that this result was due to the lack of reasonable alternative camping spots given the late hour.

Theory-Based Interventions

A general conclusion from studies of interpretive interventions in parks is that only some interventions work for some individuals some of the time. Another, and perhaps more meaningful, way of examining behavior change research is to consider the particular theory being tested. Studies of visitor behavior have examined the issue through theories drawn from social psychology, psychology, and sociology, including norm theories (Gramann, Christensen, & Vander Stoep, 1992; Noe, Hull, & Wellman, 1982; Schwartz, 1970); attitude-based theories (Fishbein & Ajzen, 1975; Johnson & Swearingen, 1992; Vincent & Fazio, 1992); and moral-reasoning theories (Dustin, 1985; Kohlberg, Levine, & Hewer, 1983; Stratton, 1995). Shaping behavior, though, is a complex endeavor. For example, within attitude-based approaches to behavior change, such variables as motivations, strength of held attitudes, foreseeability of consequences, acceptance of responsibility for those consequences, and perceived freedom of choice are thought to determine the effectiveness of persuasion techniques (Eagly & Chaiken, 1993; Petty & Cacioppo, 1984; Swearingen & Johnson, 1988; Vincent & Fazio).

After reviewing deprecative behavior studies in parks, Vande Kamp, Johnson, and Swearingen (1994) recommended that, due to the complexities of controlling noncompliant behavior, a multipronged approach should be used. Others have also concluded that no single strategy will likely effectively control all deprecative behaviors in parks (Christensen & Dustin, 1989; Knopf & Dustin, 1992; Vande Kamp et al.). Johnson and Vande Kamp (1994) suggested that not only should multiple interventions be used but also “rather than adopting a single theoretical viewpoint, researchers should draw from as many theories as possible in searching for interventions to be tested” (p. A-4). In fact, Eagly & Chaiken (1993) concluded that “much greater breadth of theory can be achieved, particularly if investigators will allow themselves to take inspiration from a variety of domains of research” (p. 693). In other words, the effectiveness of a single intervention strategy should be increased by incorporating multiple behavior-influence techniques. For example, if norm appeals reach some people and attitude-change proposals can be used to influence others, a single intervention that includes both norm- and attitude-based approaches should be more effective overall than interventions based on any single approach.

Given the practical need of the research presented here to design effective interventions that stop or significantly reduce the theft of petrified wood, and the conflicting nature of the results of intervention-specific studies, using multiple theories to create each intervention seemed the logical choice to increase the potential applied effectiveness of the intervention. Two general questions became pertinent for the research presented here. First, what research and theories of human behavior can inform and improve interventions? Second, what interventions can be adopted in the park that are likely to be more effective than those that currently exist? With respect to these two questions, the following section provides a brief
review of the interventions tested in this study and some of the behavior-influence theories from which the interventions were developed.

**Tested Interventions**

**Uniformed Volunteer**

One intervention tested in this study was an on-site uniformed volunteer. Research investigating the effects of a uniformed presence on site has demonstrated it to be one of the more effective tested methods (Vande Kamp et al., 1994). Given budgetary constraints, however, it is often not practical to place a salaried ranger on site. As a result, we tested the effect of a uniformed volunteer on visitor behavior. The uniformed volunteer wore a National Park Service volunteer shirt and hat and carried binoculars and a radio. She looked and acted much like a roving park ranger or interpreter.

Several theories suggested testing a uniformed-volunteer intervention. The presence of a uniformed volunteer could invoke behavior change in a manner consistent with normative social-influence theory, which contends that behavior is influenced by the expectations of others (Eagly & Chaiken, 1993). Normative research suggests that a uniformed-volunteer intervention will be successful because it would serve to remind (prime) visitors of an existing norm regarding theft behavior (Eagly & Chaiken; Cialdini, 1993). For example, the intervention could activate the schema or personal norm that stealing petrified wood is wrong (Schwartz, 1970). The uniformed presence could also serve as a reminder for visitors’ held attitudes that “stealing” is bad (Eagly & Chaiken; Johnson & Vande Kamp, 1994; Petty & Cacioppo, 1984).

Applied behavior analysis and deterrence theories consider the uniformed presence to serve as a discriminative stimulus (Clark et al., 1972; Heberlein, 1971; Jason & Jung, 1984). For example, just as a police officer in the roadway median serves to remind us that if we break the speed limit we get a ticket, the uniformed volunteer on site likely acts to strengthen the belief that a particular behavior (i.e., stealing petrified wood) results in a particular consequence (i.e., getting a fine) (Geller, 1994; Vande Kamp et al., 1994).

**The Sign**

The second intervention tested was an interpretive sign (Figure 1). The sign was located next to the entry point of the only trail through the study site. On top of the sign were three photographs depicting the progressive loss of petrified wood from 1965 to 1995. The third photograph showed bare ground, and underneath the photo was a question mark indicating the uncertainty of how long the petrified wood would remain in the park. On the side of the sign was a mirror to help personalize the message by reflecting the reader’s image.

Several theories supported the design and placement of the sign. The entry-point location of the sign was suggested by research indicating that signs placed at or near the impact site are more effective than those farther from the site (Fishbein & Manfredo, 1992; Geller, 1994; Vincent & Fazio, 1992). Consistent with the theoretical multipronged approach, the sign incorporated attitude-behavior change theories, personal and injunctive normative theories, sanction messages, and ethical
appeals, all of which have been shown to impact behavior (Eagly & Chaiken, 1993; Friedland, Thibaut, & Walker, 1973; Schwartz, 1970).

Attitude research indicates that if interventions are to affect behavior through attitudes, the appropriate attitude must be primed and made applicable to the situation (Fishbein & Manfredo, 1992; Petty & Cacioppo, 1984; Vincent & Fazio, 1992). This literature prompted the inclusion of the photographs and much of the text. The photographs visually conveyed the message that stealing petrified wood is harming the resource, thus making the primed attitude regarding theft applicable to this situation. Once an attitude is primed, many variables determine whether it influences behavior. Two of these elements are acceptance of responsibility for consequences of the behavior and foreseeability of those consequences (Aronson, 1992; Cooper & Fazio, 1984; Eagly & Chaiken, 1993; Heider, 1958; Latane & Darley, 1975; Petty & Cacioppo, 1984). Subjects must be able to predict what will happen after a behavior and must be willing to accept responsibility for those consequences. The text was written to tell visitors what would happen if they took wood, and the photographs were included to visually convey the same message. The mirror was also used to reinforce the visitors’ responsibility for the consequences, thus helping to prevent the diffusion of responsibility.

Research on norms also supports the content of the text. Cialdini (1996) indicates that persuasive messages are more successful if injunctive and descriptive norms agree. Keeping with this theory, what we tell visitors to do, for example, “do not steal even one small piece” (injunctive norm), agrees with the descriptive norm of what we say others are doing, for example, “99% of all park visitors do not steal petrified wood” (descriptive norm).
Moral-reasoning theories prompted the inclusion of two sanction messages, one addressing preconventional moral reasoning and the other addressing higher levels of moral reasoning (Christensen & Dustin, 1989; Kohlberg et al., 1983). Kohlberg’s stages of moral development indicate that persuasive messages should be tailored to the stage of moral reasoning held by the target individual. For example, individuals in the preconventional stage of moral development will be more likely to change behavior in response to threats of punishment or promises of rewards than to ethical appeals. On the other hand, individuals in the postconventional stages of moral reasoning will tend to be more responsive to ethical appeals. Because individuals at the park could be in any stage of moral development, it followed from the overall goal of this research that we include as many stages as possible.

The Pledge

The third intervention tested was a signed pledge. When this intervention was in place, visitors were asked to voluntarily sign a pledge before entering the park. The pledge read, “I understand that petrified wood theft in the park is a problem. I agree not to take any wood from the park.” Pledges were given at both entry points into the park. All individuals in each vehicle entering the park were asked to sign the pledge. Visitors were told the signed pledges would be displayed in the visitor centers. Thus, visitors gave a freely written, public commitment.

This intervention was based primarily on consistency and commitment theories. According to Cialdini (1993), individuals have internal and external pressure to be consistent with commitments, especially if those commitments are made in public and in writing. Research has demonstrated that written commitments are powerful in promoting behavior consistent with the commitment (Bem, 1972; Freedman & Fraser, 1966; Iso-Ahola & Niblock, 1981; Jones & Harris, 1967). People tend to “live up to what they have written down” (Cialdini, 1993, p. 67).

In a study conducted by Iso-Ahola and Niblock (1981), a commitment was found to reduce litter in a campground by 52%. These results could be interpreted as a product of consistency and commitment pressures. However, demonstrating the interconnectedness of much of the world of theory, this result could also be interpreted as a product of norms. Iso-Ahola and Niblock noted an interesting twist to their results. The commitment, or signing a petition agreeing not to litter, was only effective in a cleaner campground. Cialdini (1996) might suggest that this was the result of a discrepancy between descriptive and injunctive norms. The injunctive norm that littering is unacceptable and wrong, emphasized through the petition, was undermined by the descriptive norm that everyone else was littering, evident in the littered campground. When the norms were in agreement, as in the cleaner campground, the intervention was successful.

Study Hypotheses

Based on past research, theories of behavior change, and goals of this research, two study hypotheses were tested. First, the three designed interventions would significantly reduce the theft rate over the control conditions. Second, because past research is largely inconclusive, the null hypothesis that the interventions would not
be significantly different from each other in their effectiveness in reducing theft was also tested.

**METHODS**

*Study Site and Population*

Petrified Forest National Park is a linear park located in northeast Arizona. Because a 27-mile road traverses the park, and visitors are able to stop in a variety of places where wood is accessible, monitoring wood theft and the effectiveness of any interventions throughout the park was not possible. As a result, one site was chosen to conduct this study.

Crystal Forest was selected for several reasons. First, Crystal Forest had large amounts of highly accessible petrified wood, allowing for theft to occur. Second, Crystal Forest received approximately 56% of all visitors to the park (Roggenbuck et al., 1997). The site also provided places for discreet observation, which was necessary for the study. Visitors to the study site during each sampling period in summer 1995 were observed. One existing National Park Service antitheft sign was located on the site throughout the entire study. It read, “Removal of petrified wood from the park is prohibited,” and was located near the entrance to the Crystal Forest site but not directly adjacent to the trail.

*Study Design*

The researchers conducted a field experiment to determine the effectiveness of each intervention in reducing theft of petrified wood. Each of the three interventions was tested for 10 randomly assigned days during summer 1995. A control condition, where no intervention was in place, was also tested for 10 randomly selected days. This resulted in 40 days of observation. Each observation day ran from 7 a.m. until 2:30 p.m., with a half-hour break at 11:30 a.m. for lunch. Observation stopped at 2:30 p.m. to prevent fatigue among on-site observers.

*Data Collection*

Data collection was conducted using on-site field observation of behavior. Because of the site's large size, on-site observation required that it be divided into two sections. Two observers worked each sampling day, with one observer randomly assigned to each section of the site. A third observer, the counter, worked each sampling day to monitor use levels on the site. This enabled an accurate estimate of the theft rate. In this paper, the number of thieves per total visitors to the site and the theft rate, calculated at the number of thieves per 100 visitors to the site, are reported.

The field crew had two primary directives for observing theft. First, all observers were to collect data in as unobtrusive a manner as possible. Observers dressed and acted like park visitors. Maintaining an unobtrusive presence was necessary to avoid bias. For example, a visitor who noticed a pair of binoculars following him would be unlikely to steal petrified wood.

The second requirement was that observers had to be certain that the person labeled as taking wood was indeed taking wood. Given the task of observing theft
and assessing the interventions’ effects on theft, this may seem an obvious requirement. It became clear in the field, however, that many people were good at stealing. Many times observers were almost positive a theft had occurred but did not actually see the wood go into a pocket, for example. This situation could result in judgment errors about who was or was not removing wood from the site. There was concern about the consistency or reliability of theft judgments across field observers.

To reduce variability in recorded thefts among observers, several precautionary measures were taken. First, a theft was carefully defined as an act that began with a visitor picking up petrified wood. If the visitor then placed the wood somewhere on himself/herself or in any personal possessions, it was counted as a theft. Observers were instructed to be certain where the wood was as it left the site (e.g., in the left hand or in the front right pocket). In addition, observers were trained for three days, during which cross-validation of theft observations among all observers was conducted. Finally, observers were stratified across all four observation conditions (i.e., the three interventions and the control) so that each observed an equal number of days for each condition.

RESULTS

To determine the effectiveness of the theft-reduction interventions, an analysis of variance (ANOVA) a priori contrast was conducted (McCall, 1970; Nie, 1975). The contrast tests the differences between specified means using a $t$ statistic. In this case, the difference between the control and the interventions was tested. A contrast was used in lieu of an overall ANOVA because it was predicted that the interventions would significantly lower the theft rate relative to the control condition. An overall ANOVA would simultaneously test for differences among the four means. However, this type of test is not appropriate because it averages the differences found between the four groups. For example, if a large difference exists between two means but the other means are not different, then output for the overall ANOVA may not show significance. In other words, an overall ANOVA may miss a significant relationship.

In addition, a contrast was used instead of individual $t$ tests because it is more powerful. It estimates within-group variability based on all groups in the analysis of variance, not just on the two groups involved in the comparison as in a simple $t$ test (McCall, 1970). Thus, to answer the primary question of whether the interventions were effective in lowering the theft rate, a contrast to compare all three interventions to the control was used.

Results of the contrast revealed that the interventions significantly lowered theft over the control condition at $p=.017$. In other words, the hypothesis that the interventions would significantly lower the theft rate below that of the control condition was accepted. Under the control condition, the theft rate was 2.1%. This rate of theft was significantly reduced to about 1.4% under the sign, the pledge, and the uniformed-volunteer interventions (Table 1).

Although the contrast tells us that there is a significant difference between the three interventions and the control, it does not tell us whether there is any significant unaccounted-for variance. Because the contrast simultaneously compares all
Table 1. Intervention effectiveness

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of sampling days</th>
<th>Number of visitors</th>
<th>Number of thieves</th>
<th>Mean theft rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10</td>
<td>5674</td>
<td>118</td>
<td>2.09</td>
</tr>
<tr>
<td>Uniformed volunteer</td>
<td>10</td>
<td>5439</td>
<td>74</td>
<td>1.38</td>
</tr>
<tr>
<td>Interpretive sign</td>
<td>10</td>
<td>5369</td>
<td>75</td>
<td>1.43</td>
</tr>
<tr>
<td>Signed pledge</td>
<td>10</td>
<td>5596</td>
<td>80</td>
<td>1.41</td>
</tr>
</tbody>
</table>

ANOVA contrast (control vs. interventions): significant difference at \( p = .017, t = 2.491, df = 36 \), standard error of the difference = 0.198. No residual group difference unaccounted for (i.e., no difference among interventions was found).

three interventions to the control, we might be missing a significant difference among the interventions themselves. In other words, is there any residual between-group variance? By examining the sums of squares and the mean squares of the two unaccounted-for degrees of freedom (the contrast accounted for one), it was determined that there was no remaining significant between-group variance unaccounted for by the original contrast (at \( F_{ob} = .00910, df(2,36) \), and \( F_{crit} = 2.86 \)). These results indicate that while each intervention reduced theft, the interventions themselves did not differ in effectiveness from each other. In other words, the null hypothesis is accepted.

DISCUSSION OF RESULTS
There are two primary findings of this study. The first indicates that each of the three interventions reduced wood theft. The second finding suggests that the effectiveness of each intervention did not vary significantly. The following sections briefly discuss each of these findings.

The Interventions Reduced Wood Theft
Given the existing low control level of theft of 2.1%, reducing the theft to 1.4% may not seem like much. However, given an estimated 900,000 visitors to the park each year, this reduction in theft equates to at least 6,000 pieces of wood not stolen each year. In addition, given the barrage of existing antitheft messages aimed at visitors, it is promising that the tested interventions reduced theft even further. To shed some light on why the interventions may have reduced theft, we turn to a brief discussion of each of the three interventions.

The sign. What is different about the tested sign from the existing sign on the site at Crystal Forest? Past research and theory suggests that the tested sign should be more effective for several reasons. The existing National Park Service sign contains one written message. In addition, the message is general (“...removal of petrified wood is prohibited”) and targets only those who may not know the norm or rule for behavior.
The interpretive sign tested in this research incorporated several theories of behavior change in addition to the norm message of the existing National Park Service sign. As indicated in the literature review, increasing the theoretical grounding of a single intervention, in this case a sign, should increase overall effectiveness. As with the existing sign, the tested sign contained a normative message, but it was also located at the entrance to the site and contained an attitude-change proposal, ethical appeals, and sanction messages, which would be expected to make it more effective (Aronson, 1992; Geller, 1994).

Research also shows that persuasive messages should be linked specifically to the target behavior (Ajzen, 1988; Eagly & Chaiken, 1993; Vande Kamp et al., 1994). The existing National Park Service sign states, “Removal of petrified wood is prohibited.” But why is it prohibited? Are small chips of wood included in the warning? What happens if wood is taken? The tested interpretive sign should have been more effective because it conveyed the specific behavior desired: “Do not steal even one small piece.” Second, text and visual photographs clearly communicated what would happen (“All of the wood would disappear in 15 years”) if the behavior was performed.

Lastly it is important that visitors not only be able to predict the consequences of an action but also accept responsibility for those consequences (Eagly & Chaiken, 1993; Latane & Darley, 1975; Petty & Cacioppo, 1984). By using the text, “Only you can protect the park treasures,” and the mirror, the tested sign attempted to convey to each visitor that he or she was responsible for the condition of the resource.

**The uniformed volunteer.** This study also found that the presence of a uniformed volunteer helped reduce theft of petrified wood. Research suggests that this intervention was successful because of the strong discriminative stimulus it provided (Geller, 1994; Vande Kamp et al., 1994). If we assume that most visitors to the park received the antitheft message at the gate, then the success of a uniformed officer was due to the strong behavioral cue provided by her presence. She was present on site throughout the period of the intervention, and she made herself visible by roving among visitors on the trail through the site. It is unclear whether the uniformed presence primed an existing norm regarding theft behavior or an attitude that “stealing” is bad. It could also be that her presence sent a preconventional sanction message, that is, “If you steal wood, you will get caught and fined.” Although this is a message visitors may be receiving at the gate, the proximal presence of the uniformed volunteer may inhibit the performance of the prohibited behavior.

**The pledge.** The effectiveness of the pledge intervention also provides some interesting insights. While the other two interventions occurred on the study site, the pledge was more removed in time and space from the study site. For example, some visitors entering the park on the north end may not have reached the study site for 3 or 4 hours. Much of the theory would suggest that, for this reason, the pledge would not be as effective as the on-site uniformed volunteer. However, no difference was found in effectiveness among the tested interventions. The pledge, though not proximal in nature, required visitors not to take wood anytime in the park. The findings of this study support the theory that freely written, public
commitments can be effective in promoting compliance with the commitment (Cialdini, 1993; Freedman & Fraser, 1966; Iso-Ahola & Niblock, 1981).

**Similarity in Effectiveness of the Interventions**

As already indicated, no difference was found between the tested interventions. This is the second major finding provided by this study. The use of multiple-theory pronged interventions, observer bias, or the population itself could all be reasons for this finding. For example, results suggest that a good interpretive sign can be as effective as an on-site uniformed volunteer. The incorporation of many theories of behavior change into the tested sign could be the reason for this finding.

Swearingen and Johnson (1988) found a uniformed officer to be more effective in deterring off-trail hiking than any sign text that they tested. However, examination of the texts they tested reveals each message conveyed only one primary persuasive message. For example, “Off-trail hikers may be fined” and “No hiking—meadow repairs” were two signs they tested. The tested sign in the research presented here may be as effective as a uniformed officer because it included many techniques shown to increase the effectiveness of persuasive messages. This result could also have been linked to the size of the study site and the subsequent inability of the uniformed volunteer to be seen by everyone at the same time. It could also be because she was not a gun-toting ranger. In any case, this finding is beneficial to managers who may not be able to place a uniformed presence on site but who, nevertheless, need to protect the resource.

Another possible reason for the similarity in effectiveness of the three interventions may have been observer bias. In other words, the observers knew an intervention was in place and may have expected to see less theft and, therefore, observed less theft. This explanation does not seem plausible, however, when considering the high variability of theft observations for each day between and within the interventions and the control. For example, during the control days, the number of observed thieves ranged from 5 to 22. When the pledge intervention was in place, the number of observed thieves ranged from 2 to 17.

Another possible explanation for the similar effectiveness of the interventions can be found in the population itself. It could be, as some have indicated, that a certain percentage of noncompliant visitor behavior may be malicious and impossible to change (Vande Kamp et al., 1994). If this is the case, then perhaps 1.4% is the lowest threshold of theft that can possibly be reached, and any well-designed intervention could lower theft only to this level.

**Management Implications**

The primary management implication from this study is that park managers might be able to achieve substantial reduction in theft using a variety of alternative methods. One method is the uniformed volunteer. The study’s uniformed volunteer significantly reduced theft. This is important information to managers, who, because of numerous constraints, may not be able to deploy a salaried uniformed presence on site. With damage to parks from noncompliant visitor behavior amounting to millions of dollars annually nationwide, this research provides effective and, more importantly, practical alternative solutions.
Another effective alternative suggested by this research is a theory-based, well-written, and well-designed interpretive sign. Because most parks have many existing signs, the implication that one more sign will make the difference may seem ludicrous. Nevertheless, it does appear from this research that a single sign incorporating multiple messages theoretically grounded in a range of behavior-change strategies can be as effective as a uniformed presence on the site. This is an exciting finding. Visitor motives for deviant behavior are numerous, and building a single message that targets as many of those various visitor populations as possible can maximize the message’s effectiveness.

In addition, an interpretive sign should be placed in proximal location to the opportunity to perform the targeted behavior. The inclusion of a visual message, in this case the photographs, should also increase a sign’s effectiveness. Just as visitors vary in their individual responsiveness to interventions, they also vary in their attentiveness to interventions. For example, some visitors only glance at a sign, whereas others carefully read every word. The inclusion of a visual message provides an antitheft message to those who only glance at the sign.

The signed pledge tested in this study also provided an effective alternative management tool. This intervention has promising potential for one primary reason. It was as effective as the proximal interventions even though it was given off site. Although the uniformed ranger and the sign were effective on site, they could not possibly have been effective in stopping the theft of petrified wood prior to visitor exposure to them. On the other hand, the pledge, because it was given at the entrance station, could potentially have been reducing theft not just at the study site but also throughout the entire park.

When long lines build up at the entrance station, the prospect of giving a signed pledge at the gate may not seem to be an appealing or practical intervention. However, an antitheft message is already being given to all visitors entering the park, and the substitution of the pledge as the antitheft message would add only seconds to the overall contact time. If the result is the protection of thousands of pieces of petrified wood each year, benefits appear to outweigh the costs of inconvenience to park staff and visitors.

It is also important that the pledge be given freely and that visitors know it will be made public. Informing visitors that the pledges will be displayed somewhere, such as a visitor center, makes the commitment a public one. In addition, visitors must be asked, not required, to sign the pledge. This voluntary commitment is apparently what produces the pressure for visitors to be consistent with the signed commitment, even when removed in time and space from where they signed the pledge. Training of contact personnel and practice in requesting a pledge should make it a practical and effective management alternative to reduce deprecative behaviors.

In summary, our research shows that managers can choose appropriate solutions, depending on the situation, without sacrificing effectiveness. Creating single-intervention techniques that incorporate a variety of theories should increase overall effectiveness. In other words, using theories of social influence, managers can construct effective site-specific and problem-specific interventions.
Research Implications
This study has two primary implications for further research, one involving the findings and the other surrounding the theoretical approach taken in this study. This study leads to many questions of a practical nature. Does the time elapsed between giving a commitment and the opportunity to display the relevant behavior affect consistency between the commitment and the behavior? For instance, will visitors who signed a pledge internalize the commitment, as the theory suggests, or is the pledge self-limiting in space, time, or both? Does a pledge to protect park resources in the Petrified Forest National Park transfer to other parks and other resources, or is it limited to the site where it was administered?

Another question related to the above issues involves the success of the pledge itself. Why, as an off-site intervention, was the pledge as successful as the on-site uniformed-volunteer intervention? Maybe the uniformed volunteer was not as effective because she was merely a volunteer with no obvious rule-enforcing abilities. It could also have been the product of her gender. The effectiveness of a male uniformed volunteer was not tested. In addition, the study site itself was large, and she may have stopped less theft because some people simply did not see her on the site.

The success of the tested interpretive sign also raised new questions. Was one message on the sign more effective than others, or was the success due to the combination of many theoretically grounded messages? This question might be answered by testing single-theory-based messages and comparing their effectiveness to a single sign that combines the same messages. The existing National Park Service sign on the study site contained only a preconventional sanction message, and the decreased theft rate found when the tested interpretive sign was in place suggests that combining several different theory-based messages in one sign increases effectiveness. However, increased effectiveness could also have been the result of an additional sign on the site. For example, research on repeated exposure to messages would suggest that the effectiveness may have increased not because of the particular message but simply because of the presence of another sign on the site.

Another question concerns whether theft would have decreased even further if all three interventions were given simultaneously. For example, if one intervention with differing message approaches was more effective than a single message, then perhaps several such multipronged interventions would have decreased theft even further. The results of testing all three interventions simultaneously might also suggest whether the interventions are reaching different people or whether the lower limit of effectiveness has been reached.

This issue leads to the second primary implication for researchers, that is, testing multiple-theory, or "shotgun," approaches in the field. There are several reasons for and implications from a shotgun approach. A primary reason is the need to arrive at practical, effective solutions to current management problems. Most in this field agree that there is no single solution to a problem. Some theoretically based messages work for some people, some of the time, in some situations. Combining many theories into a single intervention should increase its overall effectiveness, thus addressing the immediate needs of the manager. This research begins to confirm that multiple-theory-based messages are effective and practical in the field. As previously noted, however, it is important that the
approaches be compatible and not contradict each other in psychological appeal.

To build even stronger interventions, and to know how and why each one works, interventions must be broken down into component parts and those parts tested. For example, was the most effective message the norm message, or was it the preconventional sanction message? Were visitors attracted to the sign by its size, location, or the photographs? Questions such as these can be addressed by two primary methods. First, controlled lab experiments can be used to test some of the single-theory approaches and their differential effects on behavior. This kind of work has led to the incorporation of the various theoretically grounded messages in the first place, and it is through controlled lab experiments that refinements can be made.

The second research approach is suggested by the above discussion. If discoveries found in the lab are to be understood and tested in the field, there is a need to simultaneously conduct more qualitative in-depth research in the field. Understanding the processes that may be affecting visitor behavior could be gained from the visitors themselves. In this case, in-depth interviews from those who took wood and those who did not could lend more understanding to which theories may be impacting behavior and why. For example, asking visitors what they remember about the sign could suggest what messages may have been influencing them the most. Comparing the subjective responses of thieves and nonthieves could have implications for theory development. In this manner, we can combine deduction to create interventions from existing research and theory with induction from qualitative interviews to refine and develop new theories.

In summary, theoretical understanding of a problem is important and can stimulate solutions for applied problems. As Eagly & Chaiken (1993, p. 695) concluded, “Because of many uncertainties that researchers face in trying to apply existing theories, exploratory research in the applied setting is generally essential to problem solving in the environment.” This research demonstrates that we can use our knowledge of theory and of successful management to help build theoretically sound, practical, effective interventions.

REFERENCES


PERCEPTIONS OF A ZOOLOGICAL PARK:
A COMPARATIVE STUDY OF EDUCATORS
AND VISITORS

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Abstract:
Views of educators and visitors were compared in relation to public enjoyment of a zoological park. Factors studied were the primary motivation, social orientation, and educational strategies associated with zoo visitation. Analysis of variance was used to test for significant differences between groups for each dimension. Results indicated that zoo educators were fairly good at predicting visitors’ educational and recreational motives for attendance, but showed less consistency regarding their social orientation (i.e., intrinsic values were more important to educators). When evaluating the importance of educational strategies, only two out of eight items were similar with visitors. Although educators demonstrated a reasonable understanding of zoo visitors, they were encouraged to become more market-oriented to meet the public’s needs.

Keywords:
Zoos, education, visitors, motives.

INTRODUCTION
Based on attendance figures, zoological parks are unsurpassed as recreation destinations. Over 100 million people in North America and almost 600 million people worldwide visit zoos each year (Sunquist, 1995). Perhaps this is why zoos are regarded as the most important source of contact between humans and animals in modern society (Kellert, 1979). Despite keeping good attendance records, most zoos do not conduct social science research. Yet two of four purposes identified by the American Zoo and Aquarium Association (AZA) directly relate to visitors (education and recreation).

Traditionally zoos have emphasized the importance of recreation and aesthetics over education. Unsolicited information was thought to burden visitors if they

Note: Accepted December 1999. The author would like to thank Marlama Hodgkinson for data collection, Kathy Andereck for use of her motive items, and several anonymous reviewers for ways to improve the manuscript. This study was funded by Kansas State University.
only attended zoos for pleasure (Bendiner, 1981). Since then, numerous factors have caused zoos to shift from an entertainment agenda to one having more scientific and educational goals (Kellert, 1979). A few examples include designing naturalistic enclosures, initiating captive-breeding programs, conserving global habitats, and expanding educational services. Although much needed, some of these changes may be inconsistent with the desires of zoo visitors.

Zoos want to educate people about animals, though most visitors seem reluctant to pursue this type of information. Quite simply, education is not a primary motivator for attendance at zoos (Morgan & Hodgkinson, 1999; Andereck & Caldwell, 1994). Because most zoo visitors are recreationally oriented, they expect learning to occur in a casual and relaxed atmosphere. Rather than taking an informal approach to education, many zoos rely on a centralized and structured process. This response is partially justified on the basis of satisfying the educational requirements of school systems. Although the school “market” is important, it should not overshadow the majority of guests who visit zoos in their free time. Potentially the educational goals of zoos and the motives of visitors are inconsistent (White & Marcellini, 1986).

If visitor satisfaction is important to zoos, then educators can play a significant role in achieving this goal. Adopting a market-based educational philosophy would improve the relationship between zoos and their visitors. Educators could use periodic input from zoo visitors when developing or evaluating educational practices instead of relying strictly on professional judgment to make these decisions. No published study has compared the views of zoo educators with zoo visitors to determine their degree of similarity. Can zoo educators accurately predict the motivations and learning strategies of visitors attending a zoological park?

**Literature Review**

Numerous marketing-based studies can be found in the recreation literature, but few have been conducted with visitors at zoos, museums, or nature centers. However, the need for collecting “customer” information and facilitating “client” satisfaction in zoos and other places of informal learning has been expressed (Hewson, 1992; Blakely, 1981). For example, curators at the Milwaukee Public Museum knew more about exhibit content than about visitor preferences. In fact, museum guards were seen as more credible sources of information than the curators, presumably because of the guards’ close contact with audiences (Davison, 1989). Birney (1988b) asked children to identify several attributes of museum and zoo visitation, including: their purposes (to teach, promote fun, and conduct research); reasons for attendance (to learn, to see a variety of animals, to tell others about animals); and dislikes with these places (physical stress, boring topics/exhibits, and rules/time constraints). Children’s views, though infrequently measured, have some important managerial implications.

Public enjoyment of zoos is multifaceted, encompassing a wide range of motives for attendance. For example, Kellert (1979) found that zoos were used as places to educate children (36%); recreate with family and friends (26%); satisfy personal fascinations with animals (25%); and see beautiful animals (11%). Consistent with Kellert, researchers Wolf and Tymitz (1981) found that many visitors “loved” zoo animals and used these occasions for teaching their children about
nature. In addition, recreational use was important for some visitors. In a marketing-based study, Andereck and Caldwell (1994) segmented zoo visitors into the following motive clusters: an education/recreation group (56.3%); a recreation-oriented group (11.2%); an educational group (21.0%); and a recreation/photography group (11.5%). Lastly, Morgan and Hodgkinson (1999) examined motivations for zoo attendance and concluded that visitors had greater desire for recreation than education and preferred the social aspects over a self-directed experience.

In the recreation literature, motive-based studies were followed by those comparing the responses of managers with visitors to address marketing issues. Some research indicates that managers and recreationists have different perceptions about the same resource (Ibitayo & Virden, 1996; Twight & Catton, 1975; and Peterson, 1974). Other studies have looked at the ability of managers to predict certain aspects of leisure experiences. For example, managers could not accurately predict visitors’ recreational preferences in wilderness areas (Hendee & Harris, 1970; Peterson), developed campgrounds (Clark, Hendee, & Campbell, 1971), or national parks (Wellman, Dawson, & Roggenbuck, 1982). In fact, only one study demonstrated some consistency between the motives of outdoor recreationists and managerial perceptions of their experience (Rosenthal & Driver, 1983).

Fewer studies have compared educators with visitors in places of informal learning. One study found wide variations between the rankings of employees and visitors on several measures, including text readability, enjoyment, holding power, and ease of use associated with nine museum displays and exhibits (Bonner, 1989). Beer (1987) found that museum staff (a) overestimated the amount of time visitors spent at exhibits and (b) identified different goals for visitation than guests, but (c) correctly predicted that visitors would avoid reading labels and text. Mixed results were reported in a study comparing educators and visitors at a historical farm in Utah (Anderson & Blahna, 1996). Museum educators accurately predicted visitor demographics and behavior but misunderstood the motives and satisfaction associated with the visit. Anderson and Blahna (p. 34) concluded, “Since information on visitor motivations and satisfaction is not directly observable, no amount of informal visitor contact is likely to provide such data.” Shaw (1987) made a similar observation by stating that intuition and behavioral observations used to predict the underlying motivations of visitors could lead to many false conclusions. As Crompton (1979) noted, motivation is an important indicator of behavior but not the only determinant.

Because marketing-based studies conducted at places of informal learning are limited, few generalizations can be made. To some degree, this problem can be attributed to the uniqueness of visitors and locations. In addition, there is much inconsistency between the type, number, and wording of questions posed to visitors. Comparing visitors at different locations is difficult if they are not responding to similar questions. Generalizability of research findings should improve as more site-specific studies are conducted.

The purpose of this study was to determine whether public enjoyment of zoos (as defined by primary motivation and social orientation) and preferred learning strategies of visitors could be predicted by educators. Both samples were asked to complete an identical set of motive-based items to determine if the primary reason
for zoo attendance was based more on education (for learning) or recreation (for pleasure), and if visitors’ social orientation was more intrinsic (inwardly focused) or altruistic (to benefit others). Additionally both groups were asked to evaluate the importance of some common educational strategies used in zoos. To simplify this process and to address one methodological issue, the motive-based items and typology developed by Morgan and Hodgkinson (1999) were used in this study. The motive subscales had been previously tested for reliability using Cronbach’s alpha (coefficients ranged from 0.73 to 0.86), and the 2 x 2 matrix was useful in understanding why people visit zoos (see Figure 1).

METHODS

Study Site
Sunset Zoological Park (SZP), located in Manhattan, Kansas, was selected as the location to survey zoo visitors. This facility is a “small market” zoo that serves a resident population of approximately 50,000 people. The presence of a major university and a nearby military installation positively affects zoo visitation in terms of both number and diversity of guests. The zoo displays a collection of nearly 300 animals (about 100 species) on 150 acres. Despite some limitations, SZP has an impressive list of accomplishments, including accreditation by the American Zoological Association (AZA), participation in the Species Survival Plan, and formation of a Fauna Interest Group in conjunction with a zoo in Paraguay. The zoo education staff consists of a director, an assistant curator, and numerous docents. Educational approaches used at SZP are similar to those found in other zoos. These methods include signs/labels, wayside exhibits, live-animal presentations in the amphitheater, “touch” tables containing objects and/or artifacts, guided tours, and off-site programs.

![Figure 1. A typology of zoo visitation (from Morgan & Hodgkinson, 1999).](image-url)
Survey Design and Subjects

Nearly 100,000 visits are made to SZP each year. During the summer months of 1996, 620 visitors (aged 18 and older) were selected on a systematic random basis to participate in this study. The sampling plan was based on previous visitation records at SZP. Thirty blocks of time were selected that included a proportionate number of weekend/day and morning/afternoon guests. During these interview periods, a research assistant (stationed outside the gate) approached exiting visitors and asked every 10th one if he or she would like to participate in the study. Virtually everyone complied with the initial request. Consenting visitors received a postage-paid envelope containing a cover letter, questionnaire, ballpoint pen, and free zoo pass. Visitors did not complete the questionnaire on zoo property.

To survey zoo educators, a list of accredited zoos in North America was obtained from the AZA. Because this number was relatively small (n=148), no random-sampling technique was used. Instead, a cover letter and questionnaire were mailed to each education curator. A modified version of the Total Design Method was used for studying both groups (Dillman, 1978).

Questionnaire Design

The survey completed by educators and visitors included 26 motive-based statements: intrinsic education (4 items), intrinsic recreation (9 items), altruistic education (4 items), and altruistic recreation (9 items). Respondents evaluated each item independently, using a range from low to high importance (coded 1–5, respectively). Because the items were unbalanced with respect to the education, recreation, intrinsic, and altruistic dimensions, it was possible for a response bias to develop. To address this potential problem, similar items were not clustered. Despite some overlap in meanings, attempts were made to clarify the terms recreation and education (either learning-based or not). Furthermore, respondents were prompted by phrases such as for myself or to benefit others in my group to help explain the intrinsic/altruistic dimension.

Additionally, the importance of eight learning strategies in zoo settings were compared: reading signs and labels, listening to talks by the staff, watching audiovisual presentations, participating with interactive displays, viewing live animals, watching staff handle live animals, touching live animals, and viewing animals in natural habitat enclosures. The rating scale was similar to the motive items, with scoring possibilities ranging from 1 (low importance) to 5 (high importance). Distinctions between intrinsic and altruistic orientations were not made in this section.

Zoo visitors were asked to evaluate the importance of motives and learning strategies, whereas educators were told to predict the responses of “typical” zoo visitors. For zoo educators, hypothetical visitors were used as a reference since they had no prior knowledge of SZP or its guests. It was assumed that SZP visitors represented a reasonable cross section of people attending zoos nationwide.

Results

Of the 620 questionnaires distributed to SZP visitors, 447 were completed and returned. This yielded a response rate of 72.1%. Zoo educators returned 79.7% of their questionnaires (118 out of 148). No follow-ups were made on nonrespondents.
Assuming a limited response bias, random-sampling error, and a reasonable degree of homogeneity in the sample, these response rates were good because they exceeded the 65% level set by Dolsen and Machliss (1991).

Summer visitors to SZP were characterized in the following manner (see Table 1 for a complete profile). Overall, attendees were familiar with the zoo (approximately 2/3 had visited previously, averaging over 7 visits). Most visitors were Kansans (83.2%), although 26 states were represented in the sample. Nearly half (45.1%) of the respondents made a spontaneous decision to visit the zoo, with the choice being made largely by themselves (42.5%) or their spouse (16.8%). Only 13.6% of zoo visits were initiated by children. Over 3/4 of visitors were part of a family group: a couple with children (35.1%), a multigenerational family (23.7%), or a single adult with children (18.3%). The average group size was about 4 people ($M=4.1$), and males were slightly underrepresented in the travel party ($M=1.8$). Typically visitors spent about 2 hours at the zoo ($M=113.7$ minutes). As a source of zoo information, communication by word of mouth (53.9%) was more important to visitors than a brochure/pamphlet (12.3%) or a highway sign/billboard (11.6%).

Several demographic questions were posed to zoo educators. Results indicated they are a very homogeneous group, best described as: experienced ($M=8$ years and 8 months); educated (8 doctoral degrees, 9 education specialists, 55 master’s degrees, 116 bachelor’s degrees; categories are not mutually exclusive); female (72%); and Caucasian (95.7%). Educators are not representative of the visitor population at zoos.

In this study, analysis of variance (ANOVA) was used to test for significant differences between the two samples (the alpha level was set at 0.05). See Table 2 for the summary statistics and reliability scores of the motive subscales. Results indicated that zoo educators accurately predicted the composite scores of visitors, including both educational and recreational motives. Although zoo educators evaluated these factors slightly higher than visitors, statistically the means were considered equal. Zoo educators only predicted half of the social orientation component correctly, however. The altruistic scores were similar, but the intrinsic scores were significantly different ($F=5.79; 1 df; P=0.0165$). Zoo educators thought intrinsic values were more important than what visitors considered ($M=3.31$ vs. $M=3.14$, respectively). In other words, zoo educators believed that visitors were more self-directed on their recreational and educational motives than what they actually were.

Further testing of the typology yielded two more differences between zoo educators and visitors on the motive subscales: Cell 1 ($F=4.85; 1 df; P=0.0280$) and Cell 4 ($4.45; 1 df; P=0.0350$). When compared with visitors, zoo educators overestimated the value of intrinsic education ($M=2.98$ vs. $M=2.75$) and underestimated the importance of altruistic recreation ($M=3.66$ vs. $M=3.79$). These results show a tendency for educators to evaluate the zoo experience as more intrinsically appealing than what most visitors believe. Statistically comparing Cells 2 and 3 yielded no significant differences.

In relation to individual scale items, zoo educators correctly identified 15 out of 26 visitor motives (a 57.6% success rate). Zoo educators predicted higher on 6 motives and lower on 5 as compared with visitors (generally those coincided with intrinsic values). Of the 11 inconsistent items, 8 were unique (3 shared a common element with another motive).
Table 1. A visitor profile from Sunset Zoological Park

<table>
<thead>
<tr>
<th>Place of origin (N=447)</th>
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<tbody>
<tr>
<td>372 (83.2%) Kansas</td>
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</tr>
<tr>
<td>061 (13.6%) Other (26 states</td>
<td></td>
</tr>
<tr>
<td>listed)</td>
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<tr>
<td>014 (03.1%) Missing data</td>
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<table>
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<tr>
<th>Repeat visitor (N=447)</th>
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<tbody>
<tr>
<td>134 (30.0%) No</td>
<td></td>
</tr>
<tr>
<td>308 (68.9%) Yes (N=416; M=7.2;</td>
<td></td>
</tr>
<tr>
<td>SD=12.8 visits)</td>
<td></td>
</tr>
<tr>
<td>005 (01.1%) Missing data</td>
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</table>

<table>
<thead>
<tr>
<th>Decision to visit (N=447)</th>
<th></th>
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<tbody>
<tr>
<td>202 (45.2%) Spontaneous</td>
<td></td>
</tr>
<tr>
<td>234 (52.4%) Planned</td>
<td></td>
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<tr>
<td>011 (02.5%) Missing data</td>
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<table>
<thead>
<tr>
<th>Initiated visit (N=447)</th>
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<tbody>
<tr>
<td>190 (42.5%) Myself</td>
<td></td>
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<tr>
<td>075 (16.8%) Spouse</td>
<td></td>
</tr>
<tr>
<td>061 (13.7%) Children</td>
<td></td>
</tr>
<tr>
<td>049 (11.0%) Other relatives</td>
<td></td>
</tr>
<tr>
<td>023 (05.2%) Friends</td>
<td></td>
</tr>
<tr>
<td>049 (11.0%) Missing data</td>
<td></td>
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<table>
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<tr>
<th>Travel party description (N=447)</th>
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<tbody>
<tr>
<td>157 (35.1%) Couple with children</td>
<td></td>
</tr>
<tr>
<td>106 (23.7%) Multigenerational</td>
<td></td>
</tr>
<tr>
<td>family</td>
<td></td>
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<tr>
<td>082 (18.3%) Single adult with</td>
<td></td>
</tr>
<tr>
<td>children</td>
<td></td>
</tr>
<tr>
<td>052 (11.6%) Couple without</td>
<td></td>
</tr>
<tr>
<td>children</td>
<td></td>
</tr>
<tr>
<td>015 (03.4%) Other</td>
<td></td>
</tr>
<tr>
<td>013 (02.9%) Two or more unrelated</td>
<td></td>
</tr>
<tr>
<td>families</td>
<td></td>
</tr>
<tr>
<td>012 (02.7%) Group of friends</td>
<td></td>
</tr>
<tr>
<td>003 (00.7%) Alone</td>
<td></td>
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<tr>
<td>007 (01.6%) Missing data</td>
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<table>
<thead>
<tr>
<th>Travel party size</th>
<th></th>
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<tbody>
<tr>
<td>N=441; M=4.1 overall; SD=3.0</td>
<td></td>
</tr>
<tr>
<td>N=436; M=1.8 males; SD=1.5</td>
<td></td>
</tr>
<tr>
<td>N=437; M=2.3 females; SD=1.9</td>
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<table>
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<tr>
<th>Time spent</th>
<th></th>
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<tbody>
<tr>
<td>N=441; M=113.7 minutes; SD=36.2</td>
<td></td>
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<table>
<thead>
<tr>
<th>Information source (N=447)</th>
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<tbody>
<tr>
<td>241 (53.9%) Word of mouth</td>
<td></td>
</tr>
<tr>
<td>055 (12.3%) Brochure/pamphlet</td>
<td></td>
</tr>
<tr>
<td>052 (11.6%) Highway sign/billboard</td>
<td></td>
</tr>
<tr>
<td>022 (04.9%) Newspaper ad/article</td>
<td></td>
</tr>
<tr>
<td>021 (04.7%) Radio ad/program</td>
<td></td>
</tr>
<tr>
<td>001 (00.2%) Magazine ad/story</td>
<td></td>
</tr>
<tr>
<td>055 (12.3%) Missing data</td>
<td></td>
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</table>

N = sample size
SD = standard deviation
M = mean
When comparing the responses associated with learning strategies, zoo educators were mostly inconsistent with visitor preferences (only 2 of 8 methods were similar). Zoo educators and visitors agreed on the importance of “reading educational signs/labels” and “viewing animals in natural habitat enclosures.” Of the 6 remaining strategies, zoo educators overestimated the value of “listening to informative talks,” “viewing,” and “touching live animals” while underestimating the importance of “listening to audiovisuuals,” “participating with interactives,” and “watching staff handle live animals.” See Table 3 for more information.

**Discussion of Results**

Some compromises must be made when conducting research on managers and visitors. In a typical study, the responses of a few managers are compared against many visitors. Statistical comparisons are difficult because of unequal sample sizes. As a result, few of these studies are reported in the literature. In this case, sample size was not a problem. In order to gain sufficient power, however, educators from other zoos were included in the analysis. This represents a potential problem because non-SZP educators had no experience with the location being studied. Generalizability of these results is therefore limited by the degree that SZP is representative of other zoos and their visitors. It appears that SZP visitors and those attending the North Carolina Zoological Park were fairly similar (Andereck & Caldwell, 1994). At both zoos, over 80% of attendees were in-state visitors. The most common travel party, a couple with children, was 35.1% at SZP and 38% at the North Carolina zoo. Furthermore, visitors at both zoos evaluated the importance of recreation higher than education.

This study focused on the ability of zoo educators to predict the motivations of visitors attending a zoological park. Based on results from previous studies, it was anticipated that managers would perform poorly on this task. For example, Anderson and Blahna (1996) reported that neither length of service nor level of contact made a difference in the ability of managers to predict the motives and satisfaction of visitors at a living-history farm. This study, however, showed that zoo educators were reasonably good at predicting visitor motivations (3 out of 4 composite scores, 2 out of 4 subscales, and 15 out of 26 scale items). This is impressive considering that zoo educators (save one) had no knowledge of or exposure to SZP visitors.

Perhaps the consistency of response was due to an intuitive knowledge that zoo educators have of the visiting public, regardless of location. Maybe the “average” zoo visitor (in terms of motivation) exists after all. An alternative explanation could be that the items used in this survey did not discriminate between educators and visitors. Of course, both groups could not evaluate context-specific questions about SZP.

One difference between the two groups showed up in the intrinsic scores, especially as related to education. There was a tendency for zoo educators to evaluate intrinsic education as more important than visitors did (M=2.98 vs. M=2.75, respectively). In fact, intrinsic education was the lowest cell mean reported by zoo visitors. Perhaps this result is unique to SZP, though it could be a case of “wishful thinking” on the part of zoo educators. Consistent with this reasoning is the fact that educators devalued altruistic recreation when compared to visitors (M=3.66
Comparative Study of Zoo Educators and Visitors

Educators know that recreational use of zoos is widespread but may be reluctant to admit its importance.

For example, visitors rated the importance of walking for exercise (including both intrinsic and altruistic purposes) significantly higher than educators did. Based on these results and anecdotal evidence, aerobic walking is popular at zoos (despite being viewed as an inappropriate use by most educators). Educators can respond to this dilemma by doing nothing, discouraging it, or trying to incorporate learning as a part of aerobic walking.

Educators performed better when predicting visitor motives for zoo attendance than when evaluating the importance of some learning strategies (only a 25% success rate). As previously mentioned, these results could be a function of SZP and not generalizable to visitors attending other sites. Perhaps educators were thinking about younger audiences, rather than adults, when completing this portion of the survey.

Another explanation for this inconsistency is the value that zoo visitors place on education. Despite the relatively high scores on specific learning strategies, adult visitors tended to be more passive in their educational interests compared to what zoo educators believed they would be. Evidence of this trend is seen by significantly lower scores on “listening to informative talks,” “viewing live animals,” and “touching live animals.” Even the high rating of “watching staff handle live animals” is consistent with the idea of passive involvement. Because visitors considered altruistic education to be more important than intrinsic education, it should not be surprising that adults would rather watch zoo staff handle live animals than actually touch them ($M=4.07$ and $M=3.85$, respectively). When presented with the opportunity to touch zoo animals, most adults will act accordingly. This type of modeling behavior might be viewed as “compulsory,” however, if children are present.

Implications for Zoo Education

Practically every visitor experiences some form of learning during a trip to the zoo, whether it be cognitive, affective, or behavioral in nature (Wolf & Tymitz, 1981). Yet researchers find it difficult to quantify the zoo experience in terms of educational gains. This type of information represents the kind of learning either not valued by experts or not easily expressed by visitors (Birney, 1986). The general public has limited knowledge about environmental issues, and the potential for education is great. Perhaps zoos are better suited for providing “generic” educational benefits such as environmental awareness and resource stewardship rather than conveying specific information about animals (Roggenbuck, Loomis, & Dagostino, 1990).

Although education is a motivator for zoo visitation, children might benefit more than adults. Parents often use zoo visits to educate their children about animals, but do not seem to be as interested in the information themselves. The significance of “teaching others” in zoo settings has been noted by several researchers (Morgan & Hodgkinson, 1999; Andereck & Caldwell, 1994; Wolf & Tymitz, 1981; and Kellert, 1979). Therefore zoo educators should present information through the broadest range of channels or risk missing the preferred learning styles of visitors (including children).
Table 2. Summary statistics of motive subscale items (educators vs. visitors)

<table>
<thead>
<tr>
<th>Subscale items</th>
<th>Zoo visitors</th>
<th></th>
<th>Zoo educators</th>
<th></th>
<th>F value</th>
<th>F probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic education (Cell 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn about animals in general</td>
<td>2.70</td>
<td>1.33</td>
<td>3.14</td>
<td>0.90</td>
<td>10.96</td>
<td>0.0010</td>
</tr>
<tr>
<td>Learn about a specific animal(s)</td>
<td>2.40</td>
<td>1.34</td>
<td>2.70</td>
<td>0.86</td>
<td>5.09</td>
<td>0.0245</td>
</tr>
<tr>
<td>Learn about endangered species</td>
<td>2.78</td>
<td>1.38</td>
<td>3.03</td>
<td>0.90</td>
<td>3.22</td>
<td>0.0733</td>
</tr>
<tr>
<td>Benefit myself (educationally)</td>
<td>3.16</td>
<td>1.02</td>
<td>3.08</td>
<td>0.89</td>
<td>0.40</td>
<td>0.5297</td>
</tr>
<tr>
<td>Summary (reliability = 0.76)</td>
<td>2.75</td>
<td>1.02</td>
<td>2.98</td>
<td>0.69</td>
<td>4.85</td>
<td>0.0280</td>
</tr>
<tr>
<td>Altruistic education (Cell 3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn about animals in general</td>
<td>3.73</td>
<td>1.28</td>
<td>3.59</td>
<td>0.83</td>
<td>1.14</td>
<td>0.2864</td>
</tr>
<tr>
<td>Learn about a specific animal(s)</td>
<td>3.00</td>
<td>1.48</td>
<td>2.91</td>
<td>0.98</td>
<td>0.39</td>
<td>0.5333</td>
</tr>
<tr>
<td>Learn about endangered species</td>
<td>3.03</td>
<td>1.45</td>
<td>3.26</td>
<td>0.93</td>
<td>2.72</td>
<td>0.0995</td>
</tr>
<tr>
<td>Benefit others (educationally)</td>
<td>3.69</td>
<td>1.28</td>
<td>3.57</td>
<td>0.97</td>
<td>0.87</td>
<td>0.3504</td>
</tr>
<tr>
<td>Summary (reliability = 0.76)</td>
<td>3.36</td>
<td>1.05</td>
<td>3.32</td>
<td>0.74</td>
<td>0.12</td>
<td>0.7340</td>
</tr>
<tr>
<td>Composite education score (E)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary (reliability = 0.86)</td>
<td>3.04</td>
<td>0.97</td>
<td>3.15</td>
<td>0.66</td>
<td>1.30</td>
<td>0.2460</td>
</tr>
<tr>
<td>Intrinsic recreation (Cell 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photograph nature</td>
<td>1.59</td>
<td>1.10</td>
<td>2.21</td>
<td>0.89</td>
<td>31.81</td>
<td>0.0000</td>
</tr>
<tr>
<td>Spend some quality time by myself</td>
<td>1.56</td>
<td>1.15</td>
<td>2.64</td>
<td>1.11</td>
<td>82.01</td>
<td>0.0000</td>
</tr>
<tr>
<td>Get away from regular routine</td>
<td>3.91</td>
<td>1.26</td>
<td>3.79</td>
<td>0.91</td>
<td>1.02</td>
<td>0.3126</td>
</tr>
<tr>
<td>Be outdoors in nature</td>
<td>4.09</td>
<td>1.13</td>
<td>4.02</td>
<td>0.79</td>
<td>0.49</td>
<td>0.4825</td>
</tr>
<tr>
<td>Have fun, recreate</td>
<td>4.69</td>
<td>0.66</td>
<td>4.82</td>
<td>0.38</td>
<td>4.59</td>
<td>0.0326</td>
</tr>
<tr>
<td>Relax and unwind</td>
<td>4.38</td>
<td>0.97</td>
<td>4.25</td>
<td>0.79</td>
<td>1.60</td>
<td>0.2069</td>
</tr>
<tr>
<td>Something different in free time</td>
<td>4.18</td>
<td>1.13</td>
<td>4.16</td>
<td>0.78</td>
<td>0.06</td>
<td>0.8064</td>
</tr>
<tr>
<td>Walk since it would be good to do</td>
<td>3.35</td>
<td>1.37</td>
<td>2.64</td>
<td>1.01</td>
<td>28.08</td>
<td>0.0000</td>
</tr>
<tr>
<td>Get out/explore a new area</td>
<td>2.35</td>
<td>1.46</td>
<td>2.58</td>
<td>1.01</td>
<td>2.45</td>
<td>0.1178</td>
</tr>
<tr>
<td>Summary (reliability = 0.73)</td>
<td>3.33</td>
<td>0.64</td>
<td>3.46</td>
<td>0.47</td>
<td>3.76</td>
<td>0.5300</td>
</tr>
<tr>
<td>Altruistic recreation (Cell 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photograph nature</td>
<td>1.57</td>
<td>1.10</td>
<td>1.82</td>
<td>0.82</td>
<td>5.31</td>
<td>0.0216</td>
</tr>
<tr>
<td>Spend some quality time with others</td>
<td>4.66</td>
<td>0.79</td>
<td>4.48</td>
<td>0.65</td>
<td>5.29</td>
<td>0.0218</td>
</tr>
<tr>
<td>Educational methods</td>
<td>Zoo visitors</td>
<td>Zoo educators</td>
<td>F value</td>
<td>F probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>---------</td>
<td>---------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading educational signs/labels</td>
<td>4.20</td>
<td>4.06</td>
<td>2.35</td>
<td>0.1261</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening to informative talks</td>
<td>3.75</td>
<td>4.44</td>
<td>42.67</td>
<td>0.0000&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening to audiovisuals</td>
<td>3.30</td>
<td>2.87</td>
<td>13.27</td>
<td>0.0003&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating with interactives</td>
<td>4.02</td>
<td>3.63</td>
<td>15.27</td>
<td>0.0001&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing live animals</td>
<td>4.76</td>
<td>4.86</td>
<td>4.18</td>
<td>0.0413&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watching staff handle live animals</td>
<td>4.07</td>
<td>3.83</td>
<td>5.22</td>
<td>0.0227&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touching live animals myself</td>
<td>3.85</td>
<td>4.27</td>
<td>11.22</td>
<td>0.0009&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viewing animals in natural habitat</td>
<td>4.57</td>
<td>4.63</td>
<td>0.65</td>
<td>0.4190</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Significant at the 0.01 alpha level.
<sup>b</sup>Significant at the 0.05 alpha level.
Zoo educators should not rely on traditional methods such as signs, wildlife observation, and guided tours to get their messages across to contemporary visitors. Although widely used, these techniques do not always produce desirable results. The time spent reading labels is only a few seconds (Bendiner, 1981), and mere exposure to wildlife in zoological settings is insufficient to cause positive changes in knowledge or attitudes (De White & Jacobson, 1994). Presumably the effectiveness of observation is related to the frequency and duration of exposure, especially if the animal is disliked (Litvak, 1969). In fact, mere exposure can have detrimental effects on peoples’ attitudes toward animals if they are displayed in artificial, rather than naturalistic, conditions (Rhoads & Goldsworth, 1979). Yet maximizing the “naturalness” of animal enclosures can lead to frustration if visitors are unable to see the animals on display (Serrell, 1981). If field trips are highly structured and educationally oriented, then student learning can occur (De White & Jacobson; Marshdoyle, Bowman, & Mullins, 1982). The numerous distractions at outdoor locations can actually interfere with the learning process, however (Falk, Martin, & Balling, 1978).

These factors might explain why some zoos are combining elements of aesthetics, interdisciplinary learning, recreational enjoyment, participation, and family togetherness for a holistic experience (Brody, 1981). Sometimes this can be achieved through the physical design of exhibits and displays. For example, the Cleveland Metroparks Zoo in Ohio has created a rain forest environment for visitors to “immerse” themselves in a discovery-learning process via multisensory stimulation (Mindick, 1994). Visitors to the hummingbird aviary at the Arizona–Sonora Desert Museum in Tucson stayed longer and appeared to be learning more because of the layout (Larris, 1995). The Tulsa Zoo in Oklahoma uses cultural exhibits and programs (interdisciplinary education) to teach visitors about the social basis of environmental issues (Rippey, 1990). Active, rather than passive, learning is becoming more common at zoos. The National Zoo in Washington, D.C., features an informal-learning facility called HERPLab, where families can investigate factual information about reptiles and amphibians through using activity boxes (White & Marcellini, 1986). Birney (1988a) found that 45% of visitors at the Brookfield Zoo in Chicago who used a participatory exhibit on bird wing movement were able to replicate the pattern, as compared with only 4% who did not.

Despite showing some predictive success, zoo educators probably need to do a better job of understanding their visitors. Because zoos cannot “force” people to learn information, Blakely (1981, p. 3) suggested they should “tell our visitors what they want to know.” Furthermore, Blakely said, “The information we want to give may not be what they want to receive.” This position should be addressed if zoos wish to increase visitor satisfaction. Ultimately society will judge zoos on the basis of providing mutual benefits for animals and people (Bendiner, 1981). Although education is important, it should be viewed as only one of many benefits sought by zoo visitors. Maximizing public enjoyment of zoological parks will require a comprehensive effort to understand the needs of visitors. Successful implementation of a marketing campaign should yield not only increased satisfaction but also greater political and financial support for zoos.
REFERENCES


DETERMINING SOCIAL SCIENCE RESEARCH NEEDS IN INTERPRETATION: A CASE STUDY

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Abstract:
The objective of this paper is to report and analyze the results of two nominal group sessions that sought to determine the social science research needs and priorities of the Harpers Ferry Center (HFC), a unit in the National Park Service (NPS) dedicated to the creation of interpretive media, as perceived by HFC personnel and individual NPS site interpretive personnel, respectively. The Nominal Group Technique, or NGT (Delbecq & Van de Ven, 1971), is a collective decision-making technique that has been used widely within recreation research to determine and prioritize concerns of practitioners, including research agenda items (Ewert, 1990). This study indicates that those involved in different aspects of interpretation have different perspectives on social science needs. Not only do such groups need to understand each other’s perspectives and contributions better, but this study also suggests that their collaboration is critical to the crafting of well-rounded social science research agendas in interpretation.

Keywords:
Social science research, Nominal Group Technique, interpretation, National Park Service, communication, media.

INTRODUCTION
Over the past 30 years, the social sciences (anthropology, archeology, economics, geography, psychology, political science, and sociology) have informed a wide range of research issues in park and recreation planning and management, including so-
social carrying capacity (e.g., Burch, 1984), participant motivation (e.g., Mills, 1985), and visitor behavior (e.g., Pearce, 1988). As this literature has grown, so has the commitment of park and recreation agencies to conduct their own social science programs. The use of information resulting from social science research by individual agencies has yielded many benefits for those agencies, including the reduction of costs (Machlis & Harvey, 1993) and the production of useful insight for decision making and strategic planning (Ewert, 1990). A research agenda that is developed with the input of all interested parties can help unify an agency and provide direction for the future. Research by individual agencies, in turn, contributes to the growing literature, shedding light on the social science needs of the field at large.

The application of social science to the planning and management of interpretation has recently received increased attention (e.g., Cialdini, 1996; Ham & Krumpe, 1996; Loomis, 1996). Because exhibits, signs, films, and other interpretive media are the major vehicles by which parks communicate with visitors, continued social science research on interpretation is a critical area for the future of park and recreation management. As interpretive media are sometimes produced for recreation agencies by outside companies or consultants, social science research on interpretive media is needed by planners, producers, administrators, and interpreters alike.

The National Park Service (NPS), an agency heavily involved in interpretation, has a history of conducting social science research. The Visitor Services Project, begun in 1982, represents a committed effort on the part of the NPS to employ the social sciences in understanding the park experience. The NPS also uses a social science research plan that identifies and prioritizes the social science research needs of the entire agency (Machlis, 1996). In 1996, the NPS determined that a social science research plan was also needed for the Harpers Ferry Center (HFC), the office responsible for the planning, design, and production of interpretive media for all units of the National Park System. Located in Harpers Ferry, West Virginia, the HFC is one of the world’s leading units in interpretive media design and production. In the face of rapid changes in available technology, and their subsequent impact on public expectations and use, a solid plan for social science research was deemed an important management tool for the HFC. In 1997, this plan was developed for the center (Machlis & Silverman, 1997).

In developing this plan, input regarding social science research needs and priorities was sought from HFC staff members, who are the producers of interpretive media, as well as staff members of various NPS sites, who are essentially the clients of HFC. These two groups of employees are among the most important professionals involved in the operation of interpretive services for the entire agency. To solicit such input, a nominal group session was held with a representative group of HFC staff and NPS interpretive site personnel, respectively. The results

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*Elaborate on the benefits of social science research in the context of park management, emphasizing the role of interpretive media in communication.*

*Elizabeth Barrie is the recipient of the 1998 Canon National Parks Science Scholar fellowship for research in the social sciences. Her dissertation will focus on understanding meaningful interpretive experiences.*
yielded similarities as well as differences in the perspectives of the two groups.

The purpose of this paper is to report and analyze the results of these two nominal group sessions, which sought to determine the social science research needs and priorities of the HFC, as perceived by HFC personnel and individual NPS site interpretive personnel, respectively. This case is viewed as an illustrative example of an agency considering its social science needs. What questions are foremost in the minds of personnel involved in one of the nation’s leading interpretive agencies? What can be learned from considering the similarities and differences in perspectives expressed by two different groups within the same agency? The implications of this case study for future practice and research in interpretation will be discussed.

**Method**

**Participants**

Representatives of two key groups involved with the functions of the HFC were selected for participation in this study: HFC personnel and individual NPS site interpretive personnel. In both cases, participants were recruited from those attending systemwide annual training programs at the HFC in November 1996 and March 1997, respectively. The HFC sample consisted of 17 employees of the center, representing a range of levels of responsibility within the unit. The site interpretive personnel sample consisted of 15 interpretive personnel from different sites within the NPS, reflecting a diversity of geographic locations. One important difference must be noted between the two groups. Participants in the HFC personnel group knew each other and shared a history of working together, whereas most participants from the interpretive site personnel group did not know each other or share such history. This difference may have been a factor in the study results.

**The Nominal Group Technique**

The Nominal Group Technique, or NGT (Delbecq & Vande Ven, 1971), is a collective decision-making technique that has been widely used within recreation research to determine and prioritize concerns of practitioners, including research agenda items. Lankford and DeGraaf (1992) used the NGT with individuals in morale, welfare, and recreation agencies to prioritize organizational issues. Little, Lankford, DeGraaf, and Tashiro (1995) successfully used the NGT to identify current and future issues and trends in the field of therapeutic recreation. Loovis and Melograno (1993) relied on the NGT to identify issues impacting the implementation of mandated programs in physical education. And Ewert (1990) identified the NGT as an appropriate procedure for developing research agendas in recreation agencies.

The NGT involves reading a problem statement to participants, after which they silently record their ideas on paper. All of the generated ideas are then presented to the participants, and the process of prioritizing the ideas begins. The specific procedures for prioritizing in this study are outlined below. “Among the real advantages of using a technique such as the NGT is that the agency gets a ‘better’ pool of options from which to choose” (Ewert, 1990, p. 7). In this study,
two nominal groups were conducted in order to identify and prioritize social science research questions considered important for the HFC.

The Process
Both nominal groups were conducted at the NPS Mather Training Center, Harpers Ferry, West Virginia. Each group was run during a systemwide NPS training program that gathered personnel together for professional development. The HFC employee nominal group was held in November 1996, and the NPS interpretive personnel nominal group was held in March 1997. The workshop protocol, followed exactly by both groups, consisted of three consecutive steps, which lasted a total of 3 hours.

Step One: After being given a brief definition of the social sciences, participants were led through three worksheets by a moderator. On the first worksheet, each participant was asked, “For the Harpers Ferry Center to more effectively accomplish its mission and responsibilities, what are the most important social science research questions that must be answered?” Each participant wrote a list of questions and then presented their questions to the group. All responses were written on flip charts. Questions were presented one at a time until all questions had been shared and recorded.

Step Two: Using a second worksheet, participants were instructed to “choose the five questions you believe are most important” from the total list of questions written on the flip charts. The moderator tallied these results and indicated the research questions that were chosen most often.

Step Three: Using a final worksheet, participants were instructed, “From the final list, please give each question a share of 100 points. The more important you think the question is, the more points it should receive.” Results were then tallied, and a final list of top research questions—with total scores and rank as determined by the group—was derived.

Analysis: Content analysis of each list was followed by a thematic analysis of each list. The content and themes of the lists were compared and contrasted in the tradition of the constant comparison of dissimilar groups (Hardesty, 1986; Strauss, 1987).

Results
HFC Employee Results
The social science research questions identified by HFC employees are presented in Table 1. The dominant theme of the list generated by HFC employees relates to the role and influence of the interpretive media product in the interpretive experience. Most of the questions (Questions 1, 3, 4, 5, 6, and 7) are concerned with HFC products and services. In particular, Questions 1, 4, 6, and 7 ask how HFC products do or do not act upon or influence visitors. For example, the highest ranked question (Question 1) asks if “HFC products provoke continued learning and/or behavioral change among visitors,” whereas other questions assume the media’s power to “reach HFC customers” (Question 4), to “communicate interpretive messages” (Question 6), and to “reach populations not yet reached” (Question 7).
Table 1. Social science research questions generated by HFC personnel

<table>
<thead>
<tr>
<th>Rank</th>
<th>Question</th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do Harpers Ferry Center (HFC) products provoke continued learning and/or behavioral change among visitors?</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>What is the demographic profile of National Park Service (NPS) visitors?</td>
<td>265</td>
</tr>
<tr>
<td>3</td>
<td>To what degree do NPS managers know what HFC products and services are available to them, and how to access them?</td>
<td>260</td>
</tr>
<tr>
<td>4</td>
<td>What are the most effective media to reach HFC customers?</td>
<td>250</td>
</tr>
<tr>
<td>5</td>
<td>What do NPS managers want from HFC, and what is most important to them?</td>
<td>245</td>
</tr>
<tr>
<td>6</td>
<td>Are some media more effective than others in communicating interpretive messages?</td>
<td>210</td>
</tr>
<tr>
<td>7</td>
<td>Which media are most appropriate for reaching populations not yet reached?</td>
<td>145</td>
</tr>
</tbody>
</table>

aData originally presented in Machlis & Silverman, 1997, p. 59.

bThe points represent the total number of points HFC personnel awarded the question, an indication of how important the question was to the participants.

NPS Interpretive Personnel Results

The social science research questions identified by individual NPS site interpretive personnel are listed in Table 2. The dominant theme of the list generated by NPS interpretive personnel relates to the role and influence of the visitor in the interpretive experience. All questions are primarily concerned with visitors. In particular, Questions 1, 2, 3, 4, 6, and 7 ask about feelings, motivations, and values that visitors possess, and their impact on the park experience. For example, the highest ranked question (Question 1) acknowledges that visitors’ feelings, in this case visitor hostility about controversial issues, plays a role in visitors’ experiences. Other questions acknowledge the existence and influence of a “range of visitor motivations” (Question 2), the “meanings and values of national parks held by the public” (Question 3), the “feeling from their experiences in national parks” (Question 4), feeling or not feeling “invited to our parks” (Question 6), and the “values and expectations” of young adults (Question 7).

Comparison of HFC Employees and NPS Interpretive Personnel

The two lists of research questions that emerged from the nominal group sessions indicate both similarities and differences in social science research priorities between interpretive media producers (i.e., HFC employees) and their clients (individual site interpretive personnel). These similarities and differences carry important implications for social science research within the NPS as well as for social science research in the fields of interpretation and park and recreation management at large.
Two themes emerged as common to the groups. Both raised the point of needing to understand how to reach populations or groups of potential visitors not yet reached. Although this was the highest ranked question for the site interpretive personnel, it was the lowest ranked question for the interpretive media producers.

Both groups also identified the need to understand each other better. In particular, the producers indicated a desire to understand how much their clients (site interpretive personnel) know about HFC products and services, how to access HFC, what these clients want, and what they value (Questions 3 and 5). The site interpretive personnel expressed a desire to better understand the HFC’s design process, particularly as it relates to the site interpretive personnel’s ultimate clients, the park visitors (Questions 2 and 5).

Despite these similarities, the social science research questions generated by the two groups reflected fundamentally different emphases. Overall the producers’ list of research questions reflected the theme of the impact or effectiveness of the interpretive media in communicating with or reaching visitors (Questions 1, 4, 6, and 7), whereas the site interpretive personnel’s list reflected a theme of understanding the diverse attitudes, motivations, meanings, values, and feelings of visitors (Questions 3, 4, 6, and 7). While the interpretive media producers focused on the role and influence of the media product, the site interpretive personnel focused on the role and influence of the visitor.

### Table 2. Social science research questions generated by NPS interpretive personnel\(^a\)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Question</th>
<th>Total points(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What can we do to better reach hostile audiences (for example, given controversial issues like acid rain)?</td>
<td>255</td>
</tr>
<tr>
<td>2</td>
<td>How does HFC design products to bring messages to the widest range of visitor motivations?</td>
<td>245</td>
</tr>
<tr>
<td>3</td>
<td>How can we better understand the meanings and values of National Parks held by the public?</td>
<td>230</td>
</tr>
<tr>
<td>4</td>
<td>Do visitors get a standardized, cookie-cutter (&quot;McDonald’s&quot;) feeling from their experiences in National Parks? Is that good or bad?</td>
<td>210</td>
</tr>
<tr>
<td>5</td>
<td>How can HFC gain balanced input from audience, clients, and resource personnel to design more successful visitor experiences?</td>
<td>195</td>
</tr>
<tr>
<td>6</td>
<td>What visitor groups do not feel invited to our parks?</td>
<td>175</td>
</tr>
<tr>
<td>7</td>
<td>What values and expectations do young adults perceive in parks and resources?</td>
<td>150</td>
</tr>
<tr>
<td>8</td>
<td>What is the impact of user fees on the type of visitor?</td>
<td>135</td>
</tr>
</tbody>
</table>

\(^a\)Data originally presented in Machlis & Silverman, 1997, pp. 59–60.

\(^b\)The points represent the total number of points HFC personnel awarded the question, an indication of how important the question was to the participants.
IMPLICATIONS

While various theories of people’s experience with media have tended to ascribe power and influence either to the medium or to the audience (Halloran, 1970), more recent perspectives posit that meaning is a product of the interaction of both media and audience (Hall, 1980; Iser, 1978). In their model of the visitor experience, Falk and Dierking (1992) also suggest that interpretation is an interactive process involving three contexts: the physical (such as interpretive media), the personal (such as visitors’ attitudes, motivations, and feelings), and the social (such as with whom one visits). This study suggests that interpretive media producers and individual site interpretive personnel are focused on two different components of the interpretive process.

This difference in focus suggests that interpretive media producers and interpreters in the NPS need to communicate their perspectives to each other. For HFC personnel and site interpretive personnel to effectively work together as a team, they each need to understand the needs, concerns, and priorities of both groups.

The results of these nominal groups also suggest that there is a continuing need for inclusive collaboration in the development of social science research agendas within agencies, as well as in the development of interpretation theory. The participants in these nominal groups seemed to be ascribing to outdated theories of communication that placed power either in the medium (which the interpretive media producers’ questions suggested) or in the audience (which the individual site interpreters’ questions suggested). Collaborative and inclusive development of social science research agendas, as well as theories of interpretation, may assist all parties involved in understanding and enhancing the truly interactive nature of the interpretive experience.

This case study is instructive to all agencies involved in interpretation. Those responsible for different aspects of interpretation (e.g., planning, production, delivery, visitor contact) may well adhere to different theoretical perspectives and maintain different priorities. Examining and communicating about such similarities, differences, and approaches are important ongoing exercises for the effective management of interpretation.

RECOMMENDATIONS

From these implications, three recommendations can be made. First, to improve communication between representatives of differing perspectives (in this case, HFC personnel and NPS site interpretive personnel), it would be useful to conduct a communication audit. A communication audit is one way to measure the effectiveness of communication with an agency. Audits involve such methods as surveys, interviews, and communication diaries to measure employees’ perceptions of how well information is being communicated to them. Audits conducted in other park agencies (e.g., Ward, Farley, & Bluman, 1986) have resulted in improved communication among employees. A communication audit including all those NPS individuals involved with interpretation may reveal gaps in the communication process that could then be corrected and improved.

Second, it would be useful for HFC, as an organization that produces interpr-
tive material, to review its approach to Quality Function Deployment (QFD). QFD is “a group of techniques for planning and communicating that coordinates the activities within an organization” (Ross, 1995, p. 161). QFD involves the formation of interfunctional teams (e.g., managers, designers, engineers) that focus on the development of a product (i.e., an interpretive display) that meets the quality standards of all parties involved in the interpretive process. Although not addressed in this study, interfunctional teams can and, in this case, should include visitors to ensure that a product meets expectations. “The basic premise is that products [i.e., interpretive materials] should be designed to reflect the desires and tastes of customers” (Ross, 1995, p. 161). By adopting a QFD approach to interpretive development, the gap that exists between HFC personnel and interpretive site personnel could be bridged while both groups work together to produce a quality product.

The final recommendation relates to the development of interpretation theory. Any interpretation theory must consider the perspectives of all of the groups involved in the interpretive experience. A grounded theory stays close to the data from which it was developed. A grounded theory triangulated by data source could include the perspectives of interpretive media producers, interpreters, and visitors in order to develop a theory that would capture the interactive nature of the interpretive experience.

**Conclusion**

As Ewert (1990) has noted, “Research is an integral part of a park and recreation organization: it is how every agency gaols information regarding how it should use its resources or what problems are being encountered” (p. 1). The current study has shown that departments within a large agency can have fundamentally different perspectives on the interpretive research needs of an organization. Because research serves such an important role in an agency, there is much to be gained from developing a cohesive and inclusive interpretive research agenda. The process of developing such an agenda would provide a forum for discussion and would enable the various departments and perspectives within a park and recreation organization to collectively determine the direction of future interpretive research, which would in turn influence the future management of the agency. Edginton, Madrigal, Lankford, & Wheeler (1990) have asserted that “goals influence the way resources are directed to shape the organization’s current and future desired state of affairs” (p. 71). An agenda that details the interpretive research goals of an agency and which has been developed with the input of all departments within the agency can serve as a team-building tool, which can focus and unify the interpretive efforts of the entire agency. The recommendations presented for doing so may be useful to a variety of interpretive agencies and facilities.

This study also reveals a number of critical questions about interpretation worthy of in-depth research. In this case, a modest, qualitative approach effectively uncovered issues of concern that can be addressed with more elaborate qualitative or quantitative designs. Although the research priorities of a particular agency may be specific to that agency, the questions—and their answers—are of great significance to the evolving profession of interpretation and to the growing body of knowledge in our field.
REFERENCES


COMMENTARY

MIXED METHODS IN VISITOR STUDIES RESEARCH

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Abstract:
In visitor studies, there has been some debate about the use of qualitative versus quantitative research methods. Many evaluators understand the advantages and disadvantages of both methods, but deciding on the most appropriate method can still be problematic. This article summarizes the tenets of both qualitative and quantitative methods and provides examples of visitor studies for each. It also reviews several research studies that have successfully used mixed methods to evaluate visitors.

Keywords:
Research methodology, qualitative methods, quantitative methods, mixed methods, visitor studies.

INTRODUCTION
When conducting visitor research, deciding which method or methods to use is often difficult. Time, money, and available staff are typical logistical considerations. In addition, the purpose of the study figures predominantly into the decision, as do considerations about maximizing both reliability and validity. This paper briefly discusses the considerations of employing a variety of qualitative and quantitative methods and provides some rationale for why researchers might incorporate a combination of both in visitor studies research.

Note: Accepted December 1999.
QUALITATIVE AND QUANTITATIVE METHODS

Social scientists have not always agreed on which are the best methods for visitor research (Firestone, 1987). Some researchers believe that quantitative methods are best. For example, quantitative methods are typically the best choice for capturing large amounts of information and for instances where application to other similar situations is paramount. Others believe just the opposite—that qualitative methods are best. Qualitative methods are highly appropriate for capturing in-depth information, for maximizing internal validity, or for capturing broad ideas that might later guide quantitative instrument development or more specific detailed research.

For many years, some researchers have felt obligated to choose between the two methods. Recently, however, there has been a greater acceptance of using both methods in a single research project (e.g., Rossman & Wilson, 1994). This has occurred, for example, in education research (Eisner, 1998) and policy research (Rossman & Wilson). In fact, many years ago Campbell and Fiske (1959) warned against using a “mono-method,” or singular approach, to research. These authors suggested that when using only one method to examine a phenomenon of interest, the likelihood of the method driving the differences is greater than when using more than one method.

Multimethod approaches, more than anything, allow a researcher to see whether the same results occur. If, for example, open-ended and multiple-choice questions yield the same results, then convergent validity exists. If, on the other hand, the same questions yield different results, it is possible that the nature and method of questioning may be influencing the results or that the method is not the most appropriate one for capturing the phenomenon of interest. This helps explain why two researchers can study the same topic and come up with different, and perhaps even opposite, conclusions.

Over time, researcher attitudes about the mutually exclusive nature of qualitative and quantitative methods have changed (Green, Caracelli, & Graham, 1989). Researchers increasingly view research methods as a toolbox from which to select the most appropriate tool or tools for the research question at hand. Depending on the specific purpose of the research and the available resources, different methods can be selected to accomplish a variety of tasks. Quantitative methods, for example, are associated with terms such as probability sampling, hypothesis testing, descriptive and inferential statistics, measurement scales, measures of central tendency, deductive analysis, and so forth. Quantitative methods are useful for summarizing large amounts of data, measuring specific relationships between variables, maximizing generalization of results, and so forth (McMillan & Schumacher, 1989). On the other hand, qualitative methods are associated with terms such as naturalistic inquiry, emergent design, purposeful sampling, content analysis, inductive analysis, triangulation, and so forth. Qualitative methods are useful for describing complex social phenomena, explaining the meaning of certain events or situations, maximizing validity, inferring relationships within a social context, and so forth (McMillan & Schumacher).

Tashakkori and Teddlie (1998) summarize the various roles of these two research methods as follows:
Quantitative Visitor Studies

In quantitative research, the typical underlying intent is to experimentally manipulate one or more (independent) variables while holding constant one or more (dependent) variables to see whether changing or modifying independent variables will influence any of the dependent variables. Prior to experimental manipulation, specific hypotheses are proposed regarding the relationship between the variables. Data are then collected, typically in numerical form, so that statistical analysis of that data can be performed. The careful and strategic analysis of data reveals any statistically significant differences in the relationships between the variables.

Within the field of visitor studies, application of these methods might include:

- Using multiple-choice test questions to test visitor knowledge before and after visiting an exhibit
- Determining visitor satisfaction with museum exhibits using a 5- or 7-point Likert scale
- Having visitors rank preferences for parts of an exhibit and then comparing their preferences on any number of variables (e.g., age, gender, museum visitation)
- Observing and calculating percentages of stops or holding time at interactive versus noninteractive exhibits, or both

As Tashakkori and Teddlie (1998) state, quantitative researchers attempt to be value-free, or as objective as is humanly possible. Asking questions in the same manner to every person, or sticking to a strict data collection procedure, helps reduce the influence of the experimenter on how a visitor might answer questions or perform tasks. Quantitative researchers practice unobtrusive observation because if a person knew he or she were being followed, he or she might modify his or her behavior. People often act differently if they know they are the focus of attention.

In visitor studies this means that, when interviewing or observing visitors, everyone involved in data collection should use the same methods and techniques. Often, if different people are collecting data, a meeting would be arranged to discuss topics such as participant selection, interview protocol, or observation methods. Sometimes these instructions are printed out and given to each member of the data collection team so that expectations are clear. The main goal here is to be systematic in the collection and analysis of data so that only the effects of the manipulation will affect the outcome.
In quantitative research, deductive logic is important. Quantitative researchers develop hypotheses to guide data collection and analysis. For example, if a quantitative researcher were conducting a study in an art museum about the usefulness of having trained docents to interpret specific exhibits, he or she might hypothesize that having a docent present would increase time spent in front of the specific exhibits. In employing deductive logic, research is purposeful, and data are collected accordingly.

In quantitative research, the researcher is simply a collector of data or information and not a participant in the data collection process. Minimizing the influence of the researcher is a top priority in quantitative research. Therefore, in an interview, a researcher’s comments or opinions are not part of the data collection process. For example, when interviewing people about their visit, it might be tempting to have a side conversation, especially if an interviewer found out that the interviewees were from the same town or had a job that was interesting to them. The assumption is, however, that these comments might influence, directly or indirectly, how the interviewee might respond. A positive feeling from that conversation might cause more positive comments in latter parts of the interview. In quantitative research, if these sorts of outside influences are not controlled, there is no way to clearly tell whether it is the manipulation or the treatment that is driving the results of the study.

**Qualitative Visitor Studies**

In qualitative research, data collection techniques can be quite different from those used in quantitative research. While numerical information is important for quantitative research, qualitative research stresses the importance of narrative types of data collection. Hypothesis testing and statistical analysis are seldom done with qualitative data. Rather, data are captured using open-ended formats such as group discussion, open-ended interviews, and observation, and conclusions about the data are drawn from a content analysis or logical synthesis of the data.

Application of these methods within the realm of visitor studies might include:

- Using focus groups to determine knowledge gain or satisfaction with museum exhibit
- Conducting in-depth interviews about perceptions of an exhibit topic or theme
- A case study of experiences of museum visitors and staff during a blockbuster exhibit
- Observing visitors' usage of and involvement with various interactive exhibits

Value always plays a role in qualitative research. Qualitative researchers believe that being objective and value-free is impossible and that the researcher’s attitudes and beliefs will always influence the topics chosen for research as well as the data collection and analysis process. Therefore it is accepted that research will always be affected by the values the researcher holds.
For example, if a qualitative researcher wanted to examine the role of educational programs on students’ attitudes toward an institution, he or she might use in-depth interviews as an assessment tool. As a qualitative researcher, he or she would see his or her purpose as interacting with the students in such a way that would reveal the phenomenon at hand—the students’ attitudes. Because the qualitative researcher believes it impossible not to influence the respondent, he or she would not be overly concerned with any influence that might occur.

Inductive reasoning is the predominant logic in qualitative research. There are typically no predetermined hypotheses to be tested. For example, if a researcher decided to study the role of humor in museums, visitor interviews might include a discussion about how humor is used in museum exhibits. If, during data collection, underlying themes not previously discussed emerge, the researcher might change the questions asked to follow and develop those particular themes. While quantitative researchers do not deviate from the predetermined data collection procedures, qualitative researchers are free to follow whichever themes will best reveal the phenomenon of interest.

Furthermore, in qualitative research the researcher is an essential part of the data collection process, and participants are sometimes referred to as co-researchers. Between the researcher and participant, data and ideas are discovered and developed during the process. Rather than remaining objective and removed, the researcher works with the participant(s) in examining the variable(s) of interest. As a result of this influence, it is impossible to determine a cause-and-effect relationship between variables.

**Mixed-Method Visitor Studies**

In mixed-method research, both quantitative and qualitative methods are used for data collection. Therefore, in combining the two types of research, researchers benefit from the advantages of each. Quantitative and qualitative methods can be used either simultaneously (at the same time) or sequentially (first one, then the other). Also, a researcher might select a research design that emphasizes one method over the other. Determining the best mixing of quantitative and qualitative research is usually determined by both the phenomenon being investigated and by the preferences of the researcher.

In mixed-method research, the previously mentioned roles of value, logic, and the researcher are a combination of the qualitative and quantitative methodologies. Value is accepted as an influence in mixed-method research, though it is not a major consideration in the research design. Logic tends to be both inductive and deductive. And the researcher makes some attempt to minimize his or her influence, though complete objectivity is assumed to be unobtainable.

Application of mixed-method research within visitor studies might include:

- Comparing answers on what visitors liked, using forced-choice and open-ended questions, to see if researcher conclusions from the two are similar (convergent validity)
• Using focus groups to generate a list of visitor concerns about museum services and then following up with visitors ranking the list of concerns

• Having visitors fill out a survey and then, based on their answers, conducting semistructured interviews for more in-depth information on their responses

• Conducting extensive interviews, but having visitors fill out a short demographic survey at the end for comparison purposes

The following section contains examples of studies conducted using various forms of mixed-method design to yield valuable information about visitors.

In a study by Birjulin and Saunders (1998), researchers integrated both qualitative and quantitative methods, which yielded somewhat different results. Open-ended interviews and a forced-choice quantitative format were used simultaneously to examine which topics people would like to see in an exhibit under development. Although they noted that the topic of indigenous cultures was included regardless of which of the two methods was used, this topic was rated much higher in a forced-choice format. The main implication of this study is that somewhat different conclusions would have been reached if only one method had been used. Using more than one method provided multiple perspectives on a phenomenon of interest, contributing valuable information to any resulting decision process.

In a study conducted by Brown (1999), first qualitative and then quantitative methods were used to address the issue of visitor satisfaction at Colonial Williamsburg. The first step used open-ended interviews to understand what visitors considered to be a satisfying visitor experience. Then, using those responses, the researcher constructed a forced-choice survey that was used to evaluate visitor satisfaction with various aspects of Colonial Williamsburg. The open-ended interviews determined which questions were included on the survey. The quantitative data were recorded in successive months as part of an ongoing effort to track visitor satisfaction. It made sense to use more open-ended methods first to determine what was a satisfying experience and then to test how Colonial Williamsburg was meeting those expectations with a more structured, testable method.

In an evaluation study conducted in Colorado of two watchable-wildlife kiosks, Waltz (1999) tested the difference between two question formats for soliciting visitor responses to knowledge questions about watchable-wildlife interpretation. He compared visitor responses using a forced-choice format (multiple-choice) and an open-ended format. Using these two formats, he found a significant difference in the way knowledge was reported by visitors. Visitors responding to the open-ended questions had significantly lower knowledge scores on the five items tested than those visitors responding to the forced-choice questions. This comparison of quantitative and qualitative question formats has implications for the way researchers ask knowledge questions in museums and nature centers.

Finally, in a study by Davis-Grohusky (2000), researchers used a mixed-method approach for understanding youth preferences about interpretive exhibits in nature centers. Researchers combined a quantitative exhibit evaluation form, individual qualitative reflections, and qualitative group discussions. No predetermined hypotheses were tested. Over the course of 8 weeks, all three methodologies were
used simultaneously to capture and better understand preferences of youth who visited and evaluated, with the researcher, more than 100 exhibits at eight separate interpretive facilities. Ultimately the results rendered a useful set of 14 interpretive principles for youth. Each methodology made a unique contribution to the elicitation of these youth preferences.

CONCLUSION

The purpose of this paper was to provide some background and perspective on the issues of using multiple methods in social science research, specifically in the field of visitor studies. One often hears about qualitative and quantitative studies. The terms are used somewhat loosely and often with an unclear idea of exactly what constitutes each method. Based on previous research and commentary, especially by McMillan and Schumacher (1989) and Tashakkori and Teddlie (1998), it is hoped that the distinction between qualitative and quantitative research and how they might be used is better understood.

In a field such as visitor studies, it is common to have professionals with different backgrounds who emphasize different methodological approaches. Although this makes for an interesting mix of researchers, it may also lead to disagreement about which methods are most useful to the discipline. Ultimately no single method is necessarily the “correct” one. All options should be explored before determining which method or methods to use. Many researchers are beginning to realize that the approach and/or methodology decision is not so much which method but rather which combination of methods is the most appropriate given the situation. As Campbell and Fiske (1959) remind us, multiple methods often provide a better variable measurement than any single method.

The museum visit lends itself well to qualitative research because reducing a museum visit to numbers can fail to capture some of the essence of the visitor experience. Interviews, observation, and focus groups add a facet to visitor studies research by allowing a more personal look into what visitors think about or experience during their visit. However, there is still a need for statistical testing of hypotheses and quantitative methods. These methods provide the statistical support and description that is often useful for generalizing to other situations. Because quantitative research emphasizes large sample sizes and objectivity, this method provides some confidence that the results found are due to the experimental manipulation and not to extraneous factors. Each method offers different, yet useful, contributions to visitor studies research. A great deal can be gained by combining both qualitative and quantitative approaches.

REFERENCES


FACTORS LIMITING MINORITY PARTICIPATION IN INTERPRETIVE PROGRAMMING: A CASE STUDY

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INTRODUCTION
Assessing the needs, desires, and perceived barriers of ethnic and racial minority populations has been a challenge to the interpretive community since 1962, when the Outdoor Recreation Resources Review Commission (ORRRC) reported recreational use of wildland areas to be primarily a white phenomenon. This project involved separate focus groups of children and adults within African American, Caucasian, and Hispanic populations, as well as the adult American Indian population, in Fort Worth, Texas. Focus groups were chosen because some minority populations are reluctant to participate in surveys, and focus groups allow in-depth discussion of cultural values, beliefs, attitudes, and expectations. Objectives were to assess outdoor activity preferences, interpretive programming preferences, and perceived barriers to participation at the Fort Worth Nature Center. Outdoor activity preferences were studied to ascertain the most effective ways to deliver the center’s programs to different audiences. All groups were informed that the focus groups were being conducted for the Fort Worth Nature Center.

Note: Accepted December 1999.
METHODOLOGY

Seven adult groups and six children’s groups were asked questions concerning preferred outdoor recreation activities, interpretive programs, and barriers to participating in wildland-related activities. Discussions were recorded on audiocassette and transcribed verbatim. Participant comments were then categorized, and each category was rated for importance in a group-to-group validation process. Ordinal validation is essential to reduce researcher bias and ensure a high level of objectivity in focus group data collection.

For the group-to-group validation, each category received three separate ratings. The first rating was the number of focus groups (#G) by age and ethnic subgroup in which a category arose. For the second rating, the proportion of group members in thirds (#P) who participated in discussion of that category was rated 1 to 3. The third rating was the level of energy or enthusiasm (e/e) with which a category was discussed, scaled 1 (low) to 3 (high). Scores were totaled (#G + #P + e/e = Total Score), and the categories were ranked in importance by score.

YOUTH RESULTS

The types of outdoor activities most important for all three subgroups of youth were “athletics/sports/games.” African Americans added “dancing/listening to music.” Additional important types of outdoor activities for Caucasian youth were “horseback riding,” “swimming/watersports,” “bike riding,” and “hiking/backpacking,” whereas Hispanic youth added “partying” and “dancing/listening to music” as important activity types.

“Wildlife” was the most important interpretive program topic for all three youth subgroups. Hispanic youth were equally interested in “athletics” programs.

Barriers to visiting the nature center for African American youth were dominated by fears of natural elements. “Fear of snakes/snakebites” was the most important barrier for them. Nine separate fears were discussed by the African American youth, including snakes, wildlife other than snakes, spiders and insects, allergic reactions to something, water and canoe trips, getting lost in the woods, inappropriate fear (e.g., tigers), and general, unspecified fear. After fear of snakes, concern that the nature center would be “boring/unappealing” also scored high for African American youth.

For Caucasian youth, “too far/lack of transportation” was the highest scoring barrier. “Mosquitoes” and concern that the nature center would be “boring/unappealing” were also important. “Lack of awareness/knowledge of the nature center” was the most important barrier for Hispanic youth. “Too far/lack of transportation” also scored high with Hispanic youth.

ADULT RESULTS

The highest scoring outdoor activity types discussed by African American adults were “sports/athletics” and “boating.” Several African American adults reported enjoying “nothing” or just “hangin’/chillin’” outdoors.

“Walking/hiking,” “camping,” and “canoeing” were the most important outdoor activities for American Indian adults. “Sports/athletics” and “walking/hiking”
scored highest for Caucasian adults, whereas “playing with children” and “walking/hiking” received highest validation scores for Hispanic adults.

Activities that traditionally take place in wildland areas—such as camping, hiking, visiting parks, picnicking, viewing scenery, and whitewater rafting—were discussed more often and scored higher with Caucasian and American Indian adults than with African American and Hispanic adults.

Programs that could be delivered to their neighborhood, such as “outreach” and “neighborhood clean-up/restoration,” scored highest for African Americans.

American Indian adults were more energetic in discussion of programs than other subgroups. “History/geography unique to the area,” “night programs,” “American Indian culture/history,” “wildlife,” “children’s programs,” “climbing wall/ropes course/rappelling,” and “canoeing” were the most important interpretive program topics to American Indians.

“Wildlife” was the highest scoring program topic for Caucasian adults, whereas Hispanics scored “children’s programs” and “plant life” highest.

There was a marked difference in program interests between African American adults and Hispanic adults in gardening and plant communities. Hispanic groups discussed a desire for these programs in great detail, but they were omitted in African American focus groups.

For African American adults, the most important barrier to visiting the nature center was “fear of discrimination/police harassment” in surrounding rural communities. This is evidently not specific to the Fort Worth Nature Center. In the Wallace and Witter (1990) focus-group study of black adults in St. Louis, Missouri, fear of racial intimidation was expressed as a reason for their lack of interest in wildland-related recreation. Survey participants expressed fears of random violence as well as the belief that it was not safe for them to visit wildland parks and nature centers because they were not in the majority there.

“Crowds of people” was the only important barrier for American Indians. For Caucasian and Hispanic adults, the most important barrier was “lack of awareness/knowledge” of the nature center.

CONCLUSIONS
This study illustrates that outdoor recreation and interpretive programming needs differ among various ethnic and racial groups. It provides insights into the spectrum of opportunities that a culturally diverse public might desire from an outdoor facility. Concerns about natural elements and racial discrimination may be overwhelming barriers to many African Americans. More research is necessary to determine causes of these concerns and how to counteract them. Facility managers should consider outreach programs for minority neighborhoods and personal invitations to the minority public to allow them to feel welcome and comfortable in an unfamiliar setting.

In future years, the U. S. population will contain larger minority components. Interpreters need to ask themselves what potential cultural or ethnic boundaries exist, perceived or real, that prevent programs from being equally accessible and desirable. Do existing programs and personnel foster intercultural boundary maintenance, or do they encourage diversity?
ENVIRONMENTAL ATTITUDES, KNOWLEDGE, AND BEHAVIORS OF MISSOURI 6TH- AND 12TH-GRADE STUDENTS

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INTRODUCTION

Conservation agencies and environmental organizations have developed a wide variety of educational programs and materials for students, formal and nonformal educators, and the general public. To determine whether the time and effort in preparing and training for programs and in preparing and distributing materials are worthwhile, and to know whether the materials have had the desired effect on knowledge and attitudes, it is necessary to conduct various evaluations. Many believe that if environmental education is supposed to increase general knowledge about the environment and to encourage people to participate in more pro-environmental behaviors, then assessment of knowledge and attitudes is crucial to the identification of effective materials and techniques.
THE MISSOURI STUDY

The Missouri Department of Conservation (MDC) has developed a variety of materials for preschool, elementary, and secondary students. MDC materials are well suited to teach conservation because they use forests, fisheries, and wildlife as main topics and cover ecological principles. Wildlife and forests are good ways to aid student learning about conservation and the environment, in both knowledge and attitude change. Wildlife excites people and piques their interest, and a previous study showed that students relate nature to trees. In addition to EE materials and interpretive programs, magazines and TV programs are devoting more time and space to environmental topics and may be major exposures to wildlife information. Therefore it would be difficult to determine if changes in students’ attitudes and knowledge are due strictly to an organization’s materials, programs, television, or a combination of these.

Sixth- and 12th-grade students provided ideal ages for this evaluation. Research on attitudes and values shows that the ages 10 to 13 are the most important times to acquire knowledge and understanding about the environment. In addition, MDC’s OTIS program is designed for grades 1–6 and is extensively used across the state. Twelfth-grade students are at an ending point in their education and are also at the beginning of their adult lives. It is important to assess these students’ attitudes and knowledge as they leave the public school system. This study is intended to be a baseline study that can be followed up every five to six years.

The objective of this 1995–98 study, funded by MDC, was to determine environmental knowledge, attitude, and behavior levels of Missouri 6th- and 12th-graders to provide information on areas that need to be addressed in additional materials and programs and whether related behaviors influence knowledge and attitudes.

The MDC Conservation Education Guidelines, a previous Missouri study (Capps, 1940), and the Children’s Attitudes Toward the Environment Scale (Musser & Malikus, 1994) were used as guides for development of the questions. The questionnaire was divided into five sections: (1) factual knowledge (multiple-choice); (2) conceptual knowledge (true/false); (3) attitudes (Likert scale responses from 1 to 5, with 5 being the most positive toward the environment); (4) action/belief (answers were rated from 1 to 4, with 4 being the most positive response); and (5) personal questions regarding the individual’s involvement in nature and conservation activities.

Schools were randomly chosen from the nine MDC Regional Planning Districts. One urban school and up to five rural schools were selected from each district.

Percentages of correct responses were calculated for the factual and conceptual knowledge sections. The number correct for the factual and conceptual knowledge questions was also calculated for each student. Mean responses were calculated on the attitude and action/belief sections. Principle component analysis was conducted on all personal information. Principle components selected were then regressed against total factual and conceptual knowledge scores and against overall mean scores of the attitude and action/belief sections. This was to determine whether any relationship existed between personal information and knowledge or attitudes.

RESULTS

In general, knowledge was moderate. Most 6th- and 12th-graders knew what the
term *endangered* meant and about forest functions. The knowledge of the terms *conservation* and *biodiversity* was very low. This was surprising considering these terms are widely used today. Students did, however, understand the concept of biodiversity as shown in the conceptual knowledge section. Students in both age groups did not understand the energy transfer in a food chain.

In general, aquatic-related knowledge was moderate to high, but knowledge of wetland functions was very low. Surprisingly, attitudes toward the protection of wetlands were high. Students felt that wetlands were important and that they should be protected even though they may not have known why wetlands were important.

Overall, attitude scores were higher than knowledge scores. Other studies have found that participation in an environmental program led to a greater increase in attitudes than in knowledge (Leeming et al., 1997). Students in this study felt that humans do have a responsibility to protect the environment even if it adds costs or inconvenience. Other studies have also found that children are concerned about the environment (Musser & Malkus, 1994).

Less than half of all students surveyed had gone hunting. A greater number of students had gone fishing at some time. MDC has active aquatic education and urban fishing programs, which may have influenced this result.

With the large percentage of participants who have fished, it may not be surprising that fishing had the biggest influence on the variance in knowledge and attitudes. A recent study in Germany found that participation in short-term outdoor-education activities increased knowledge and attitude scores of participants (Bogner, 1998).

**Conclusion**

Studies like this can provide valuable information to agencies as well as nonformal and formal educators about the knowledge, attitudes, and behaviors of today’s youth. Such studies can also provide insight into educational successes and needs. This study showed that there were weaknesses in the knowledge level of 6th- and 12th-grade students, especially in the area of biodiversity, wetlands, and prairies. Participants in this study felt a responsibility for the environment, though adequate knowledge needed to protect the environment may not have been present. This study also supports the idea that personal outdoor experiences can have an influence on knowledge and attitudes toward the environment.

**References**


BOOK REVIEW

Contemporary Issues in Heritage and Environmental Interpretation
Edited by David Uzzell and Roy Ballantyne
London: The Stationery Office

Just as our world is changing, so is the practice of interpretation and our understanding of it. Thanks to editors David Uzzell and Roy Ballantyne, Contemporary Issues in Heritage and Environmental Interpretation compels us to face the magnitude and meaning of such change. Through a smorgasbord of 14 essays, this book addresses “the major theoretical issues impinging upon the interpretation of heritage and environmental places, events, and artefacts in the new millennium” (p. 1). Intended for practitioners, students, and academic researchers, Contemporary Issues challenges all readers to consider “the ‘why’ as well as the ‘how’” (p. 1) of interpretation. Offering much theoretical food for thought, this collection admirably argues for, and clearly illustrates the critical importance of, continued theory development in our field.

With contributions by authors from England, Australia, and the United States, the book presents a range of global issues and cutting-edge examples. Like a good smorgasbord, this book yields a full plate. While savoring the bites, I only wish the excellent management would have come around more often to answer some questions and to share their motivation and reflections.

In Chapter 1, Ballantyne describes the book’s outline, consisting of five major topics: “theoretical issues in interpretation,” “environmental issues in interpretation,” “issues involving interpreting a sense of place,” “emotive issues and contested heritage in interpretation,” and “design and evaluation issues in interpretation.” Between two and four chapters are devoted to each topic, and each chapter contains one essay.

Ironically, the editors leave a few important “why” questions unanswered in Chapter 1. Although the five topics are undeniably important to the contemporary practice of interpretation, the editors never clearly articulate why the book is focused on these particular issues. It would also be helpful to know why these particular contributors have been included.

On a organizational note, Chapter 1 is the only place where the book’s outline of five topics is made clear. Rather than dividing the book into five sections, each of the fourteen essays remains its own chapter. The absence of sections or a recurring framework makes the book somewhat dense. Nonetheless, the order of the chapters works well, and the content is worthwhile.

The “theoretical issues in interpretation”—Chapters 2, 3, 4, and 5—raise a number of distinct concerns, yet all share insights into the fundamental relationship of interpretation, people, and power. In Chapter 2, David Uzzell contends that the

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power of interpretation to bring about change is only as strong as its theoretical and research-based foundations. In Chapter 3, David Lowenthal asks to whom does heritage belong and suggests how sharing power is worth the challenges it presents to those involved. In a prime example of the need for interpretation “equity,” Briavel Holcomb in Chapter 4 examines gender imbalance in heritage interpretation. And in Chapter 5, Lynn D. Dierking reminds us of the extraordinary power of the visitor, for whom interpretation is a social experience and personal meaning is often what matters most. Chapters 6 and 7 directly address “environmental issues in interpretation.” Can interpretation help citizens address environmental goals and practices? While Ballantyne examines the role of interpretation in environmental education, and Kevin Markwell and Betty Weiler explain the rapid rise of ecotourism, both answer yes to the question of using interpretation to help prepare a sustainable future. Interestingly both advocate partnerships among professionals with compatible goals: interpreters and environmental educators or interpreters and ecotourism operators.

Chapters 8 and 9 deal with “issues involving interpreting a sense of place.” Gregory Ashworth presents the essential idea that heritage interpretation includes a spatial dimension and examines it in the case of a “European” heritage. In a unique view, Brian Goodey looks at “urban sites” and advocates how interpretation can play a role in the future use of space and buildings. Both authors make clear that places hold deep meaning for people.

Chapters 10 and 11 do a particularly fine job of illustrating “emotive issues and contested heritage in interpretation.” In the poignantly titled essay, “Heritage That Hurts,” Uzzell and Ballantyne discuss the growing prevalence of and need for “hot interpretation,” interpretation that emphasizes and works with, rather than against, affect and emotion. In a moving case study, Marija Anteric examines the challenges of cultural interpretation in the former Yugoslavia—hot interpretation, indeed.

Chapters 12, 13, and 14 constitute the final topic, “design and evaluation issues in interpretation.” Together these essays end the book with the critical reminder that evaluation and research are absolutely essential for the theory and practice of interpretation. Although much useful information is shared, all three of these essays disappoint by their omission of relevant and important references, such as the work of Marilyn Hood, Stephen Bitgood, Ross Loomis, and Minda Borun. Readers familiar with the extensive literature on visitor studies may notice some gaps here.

Together these essays offer a variety of issues, challenges, dilemmas, and future directions for interpretation. What conclusions can be drawn from contemplating this book as a whole? What themes and ideas emerge across topics? In what critical ways does interpretation of heritage and of the environment interweave? I wish the editors would have offered more reflection on this body of work in the form of an overall concluding discussion to help synthesize the rich array of information presented. Even so, this is a fascinating and provocative book worth studying, discussing, rereading, and debating with others.

Reviewed by Lois H. Silverman, Ph.D., Department of Recreation and Park Administration, Indiana University, Bloomington, IN 47405.
APPENDIX:
SUBMISSION GUIDELINES
FOR AUTHORS

The purposes of the Journal of Interpretation Research (JIR) are to communicate original empirical research dealing with heritage interpretation and to provide a forum for scholarly discourse about issues facing the profession of interpretation. JIR is published by the National Association for Interpretation, the preeminent professional association representing the heritage interpretation profession.

In recognition of how difficult it is for interpreters to keep up with the growing and diverse body of relevant literature, JIR will publish reviews of recent books, professional meetings and workshops, government publications, and original literature reviews and bibliographies dealing with heritage interpretation. Additionally, JIR will publish thought pieces that exhibit excellence and offer original or relevant philosophical discourse on the state of heritage interpretation. Review articles and thought pieces are reviewed internally by the JIR editorial staff.

JIR also includes a “Research Brief” section. This section will accept reports of ongoing interpretation research. It will also provide an outlet for summaries of research studies with limited scope. Much heritage interpretation research consists of small “in-house” program evaluations and basic visitor studies. The purpose of this section is to communicate current research activities and allow readers to identify colleagues with similar interests.

JIR takes a broad view of the field of heritage interpretation and publishes manuscripts from a wide range of academic disciplines. The primary criterion for deeming a manuscript appropriate for publication is whether it offers new insights for interpreters or those who study interpretation.

MANUSCRIPT SUBMISSION GUIDELINES

JIR is published in accordance with American Psychological Association (APA) style for sociological research. Authors are encouraged to refer to the Publication Manual of the American Psychological Association (4th ed.) for all style questions.

All manuscripts will be reviewed anonymously by a JIR Associate Editor and by at least two other reviewers. Based on the nature of the manuscript, special efforts will be made to identify well-qualified Associate Editors and reviewers to evaluate the manuscripts. From the recommendations of the Associate Editor, the Editor will make the final decision of the manuscript’s disposition and communicate this information to the author.

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• Margins should be 1” on all sides.
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All other questions should be directed to:

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