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Persuasive Communication and Grade Level Effects on Behavioral Intentions within a Wilderness Education Program

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Abstract: In investigating the effects of persuasive communication sources and messages and student grade levels on low-impact camping behavioral intentions, the impact monster skit was utilized. This wilderness education program employs a quasi-experimental design (pre-test/post-test). First, third, and sixth grade students (*N*=574) were randomly assigned to treatments. There was a significant difference between pre-test and post-test scores in the short-term behavioral intentions of students following exposure to the program. When considering pre- and post-test scores, a wilderness hiker was more effective than a wilderness ranger as a positive message source, and third and sixth grade students' scores were significantly higher than first grade students' scores. Chi-square tests for 15 of 17 potential behaviors were significant and in the expected direction.

Many wilderness managers use educational programs to supplement wilderness management techniques in efforts to influence visitor behavior. Among the wilderness education efforts of land management agencies is the K–8 "Wilderness and Land Ethic Curriculum" distributed by the Arthur Carhart National Wilderness Training Center. The curriculum teaches appropriate land ethics and wilderness values. The impact monster program is one activity within the curriculum (Hendricks and Watson 1999).

Persuasive Communication

Persuasive communication is often used to influence the behavior of wilderness visitors (Roggenbuck 1992; Roggenbuck and Manfredo 1989). Two potential persuasive communication approaches available are the central and peripheral routes to persuasion (Roggenbuck and Manfredo, 1989). The conceptual basis for these routes was derived from the Elaboration Likelihood Model (Petty and Cacioppo, 1981, 1986). The central route to persuasion depends upon message recipients being motivated and able to process information (Petty and Cacioppo, 1981, 1986; Petty, McMichael, and Brannon, 1992). With the peripheral route, the message recipient may be unable to process the message content and thus little attention is paid to the actual message (Roggenbuck and Manfredo 1989).

Article author Bill Hendricks. Photo by Tobi Greene.

One means of distinguishing between the central and peripheral routes of persuasion is within the content of a message. In general, a message that emphasizes questions results in a higher level of central route processing than a message that relies on assertions (Petty et al. 1992). For example, asking an individual why dishes should not be washed in a stream may result in a higher degree of central route processing than telling the person that they should not wash dishes in a stream.

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Prior to and following the presentation of the program, each student was given a color illustration depicting six appropriate and 11 inappropriate low-impact camping behaviors.

The central route to persuasion is generally not recommended as an effective approach with children due to its information processing requirements. When children lack the ability to process the content of a message, peripheral route factors such as the expertise, attractiveness (Roggenbuck and Manfredo, 1989), likability, (Petty, Cacioppo, and Schumann, 1983) or credibility (Petty, Cacioppo, and Goldman 1981) of a source become consequential. Therefore, it is important to determine the appropriate source of a message in children's wilderness education programs.

Grade Level and Learning Development

A wilderness education program may be more effective at one grade level than another depending on learning and cognitive development of program participants. Sometimes a single program such as the impact monster is used for a variety of ages, including children and adults, yet it is unknown if wilderness educators adapt the program for the audience taking into consideration the cognitive development of the participants.

Behavioral Intentions

Wilderness behavior has been of interest to researchers for more than two decades. Although behavioral intentions or attribute choices have been investigated in a variety of environments (e.g. Beaulieu & Schreyer, 1984; McDonough, 1982; McLaughlin, Krumpe, & Paradice, 1982; Schreyer & Beaulieu, 1986) the selection of low impact behavioral intentions by children in a controlled setting has received little attention. Among the few studies that have been conducted, Dowell and McCool (1986) found that exposure to a minimum impact program improved knowledge, behavioral intentions, and skills of Boy Scouts. Furthermore, Tracy (1995) determined that fifth grade students exposed to the impact monster skit increased their knowledge of wilderness behavior.

Impact Monster Program

The impact monster skit, which was designed to teach low impact camping techniques (Hansen 1990), has been used extensively by wilderness rangers since its development in the late 1970s. Typically, an "impact monster" as the source of a negative message demonstrates inappropriate wilderness behavior and a "good guy" corrects the behavior. For example, the impact monster may litter, pollute a stream, harm wildlife, and destroy other wilderness resources. The good guy as the source of a positive message informs the impact monster of how less impact could be incurred and more suitable behavior is modeled (Hendricks and Watson 1999). Characters previously used to represent the impact monster have included a person in brightly colored clothing, a wilderness user, a trash-covered impact monster, a white-faced impact monster, and a "country western geek." The good guy role is often a ranger, wilderness user, audience peer, or junior ranger (Hendricks and Watson, 1999). Other roles are played by the audience, providing a hands-on learning experience (Tracy 1995). The skit is often adapted to specific wilderness areas or ecosystems and has been used for a variety of age groups and settings such as campfire programs, special events, schools, and agency training workshops (Hendricks and Watson 1999). Persuasive communication is an integral part of the impact monster program as it relies on message content and sources in efforts to influence wilderness visitor behavior.

Research Questions

This study attempted to answer the following research questions:

1. Does the source of the impact monster skit "positive message" influence behavioral intentions to adopt appropriate wilderness behavior?
2. Does the source of the impact monster skit "negative message" influence behavioral intentions to adopt appropriate wilderness behavior?
3. Does content format (telling versus asking) influence behavioral intentions to adopt appropriate wilderness behavior?
4. Does grade level (first, third, and sixth) influence behavioral intentions to adopt appropriate wilderness behavior?

Methods

The study was a quasi-experimental design employing a repeated measures analysis of variance. The factors were (a) three grade levels (first, third, and sixth) to indicate the ability to process information; (b) two levels of a positive message source who presented appropriate low-impact techniques (wilderness ranger or wilderness hiker); (c) a negative message source with two levels who presented inappropriate techniques (a "cool" impact monster dressed in brightly colored clothing or an impact monster dressed as a traditional wilderness hiker);

and (d) two versions of the program message content (one with an emphasis on asserting behaviors and the other with questioning as the predominant format).

Short-term behavioral intentions were measured prior to and following presentation of the impact monster skit by having each subject view a wilderness setting illustration. The illustration was adapted, with artist permission, from a 1994 National Geographic, Wilderness System publication.

Study subjects consisted of 574 students in 24 first, third, and sixth grade classes from elementary schools located in communities on the California central coast adjacent to the Los Padres National Forest. Schools were selected based on their willingness to participate in the study. The schools were contacted because they were similar in demographics and student composition. Nearly all subjects spoke English as a first language. The schools were located in communities ranging in population from 405 to 6,600 residents. There were 200 (34.8%) first graders, 202 (35.2%) third graders, and 172 (30.0%) sixth graders in the study. Classes in each grade level were randomly assigned to treatments.

Procedures

Scripts for two versions of the impact monster were written based on skits typically used by wilderness educators. One script was written in an "asking" message format, whereas the second script was a "telling" format, thus creating two levels of persuasive messages requiring different levels of processing capabilities. For example, in the introduction of the "telling" version the students were told what they would not find in a wilderness. In the "asking" version they were asked, "What are some things you would not find in a wilderness?" Similarly, at the conclusion of the skit during the "telling" version the students were told how impacts could be prevented. In the "asking" version they were asked, "How can impacts be prevented?" The same props, roles, and low impact examples were used for each version. Trained research assistants presented the program. The research assistants maintained the same roles for each skit. The program was presented to each class individually during spring 1996.

"Asking" message format. Photo by Pam Hamp.

Prior to and following the presentation of the program, each student was given a color illustration depicting six appropriate and 11 inappropriate low-impact camping behaviors. Students were asked to circle those activities they would do the next time they went camping in a wilderness setting. Inappropriate behaviors were coded negative one and appropriate behaviors were coded positive one. Aggregate pre-test and post-test scores for the 17 potential behaviors present in the illustration were computed for each subject. Thus, scores could range from negative 11 for a student who selected the 11 inappropriate behaviors and no appropriate behaviors to positive six for a student who selected the six appropriate behaviors and no inappropriate behaviors.

Results

There were 302 boys (52.6%) and 270 girls (47.0%) who participated in the study (gender was not provided for two students). Roles in the skit (frog, tree, rocks, flower, sign, and snake) were played by 192 randomly selected students (33.4%). An analysis was conducted for the full repeated measures model and for each of the potential behavioral intentions. Significant differences between pre-test and post-test scores were present for levels of all factors (see Table 1). The full model indicated a statistically significant difference between pre-test and post-test scores (see Table 2). Interaction effects were present for positive message source hiker/ranger by pre-test/post-test and grade by pre-test/post-test scores.

In addition to the full model analysis, chi square tests were conducted for each of the 17 behaviors that were coded as dichotomous variables (selected and not selected) (see Table 3). The chi-square was significant and in the expected direction for all behaviors except hiking on a trail and using a tent away from a lake. Hiking on a trail changed in the expected direction, but using a tent away from a lake did not.

Conclusions

Regardless of the factor levels presented, the skit in all cases made a difference in pre-test and post-test scores. Thus, for short-term behavioral intentions, knowledge of appropriate behavior was improved by exposure to the skit.

Results indicated that the hiker is a greater influence on behavioral intentions than the ranger as a source of a positive message. There is little difference between the influence of the cool monster and traditional hiker monster as a negative message source. At a statistical significance level of $p<.054$, mean scores for

Table 1—Factor Mean Scores

Factor	Pretest	SD	Posttest	SD	Mean Difference
Positive Message Source					
Wilderness Hiker	- 0.30	2.51	3.21	2.43	3.51*
Wilderness Ranger	0.65	2.74	3.35	2.66	2.69*
Negative Message Source					
Cool Monster	0.17	2.68	3.35	2.58	3.18*
Hiker Monster	0.15	2.65	3.19	2.50	3.04*
Message Content					
Telling	- 0.18	2.74	3.21	2.75	3.39*
Asking	0.48	2.55	3.33	2.34	2.85*
Grade					
First	- 0.56	2.32	1.93	2.71	2.49*
Third	0.68	2.67	3.87	2.07	3.19*
Sixth	0.39	2.85	4.15	2.19	3.76*
Total Sample	0.16	2.66	3.28	2.54	3.12*

Note. Paired sample t-tests for each pair of pretest and posttest factors *$p < .001$.

Tabel 2—Analysis of Variances for Factors and Pre-test/Post-test

Source	df	SS	MS	F
Within Subjects Effects				
Pre/Post Test	1	1961.13	1961.13	507.02**
Positive Message Hiker/Ranger x Pre/Post Test	1	55.42	55.42	14.33**
Negative Message Impact Monster x Pre/Post Test	1	.89	.89	.23
Message Content x Pre/Post Test	1	14.39	14.39	3.72
Grade x Pre/Post Test	2	82.58	41.29	10.67**
Within Group Error	551	2131.43	3.87	

Note. **$p < .001$. Using simple deviation contrasts for grade level significant differences were present between first and third grade ($p < .019$), and between first and sixth grade ($p < .001$).

all three grade levels are higher with the telling message than with the asking message, indicating that peripheral messages may be more effective than central route messages within the skit. There is a significant difference between grade level pre-test and post-test scores. Third and sixth grade levels influence behavioral intentions more than first grade.

The collection of pre-test data contributes meaningful information for analysis, yet some caution is advised in interpretation of the results. For the message source and message content factors, classes that began with inferior pre-test scores resulted in a greater mean difference between pre- and post-test scores. The classes with greater pre-test scores also had greater post-test scores, but the difference was less than those with the lower scores prior to exposure to the skit.

Educational Implications

Although the skit appears to be effective for third and sixth grade students, the appropriateness for first grade students is questionable. There are significant differences between first grade pre- and post-test scores; yet, following the skit less than two appropriate behaviors were identified by this group as behavioral intentions.

With the relatively low p value attained and the practical results that behavioral intentions are greater for all grade levels with a telling message, attention should be given to the skit format. When writing scripts the audience's ability to process information should be considered. For this study, extensive use of prewritten questions was employed to systematically differentiate the telling versus asking skit. The abundance of questions may be beyond the processing capabilities of even the sixth grade students. Further research needs to be pursued regarding this variable before definitive solutions may be offered.

Theoretical Implications

As mentioned previously, at a statistical significance level of $p<.054$, greater mean score differences occur with the telling format of the skit for all three grade levels. This indicates that the message (telling) requiring less cognitive abilities and information processing is potentially the more influential. These results support Roggenbuck and Manfredo's (1989) suggestion that wilderness education programs for children should not employ complex information processing techniques.

Credibility and source attractiveness are key components of peripheral route message sources (Petty and Cacioppo, 1981, 1986; Petty, McMichael, and Brannon, 1992). If limited central route processing is occurring, the importance of actors in the skit becomes magnified. For example, did the students consider the hiker to be a more credible source than the ranger? Expertise is another source variable that comes into play here. In this case, is attractiveness more important than expertise or was the ranger considered less of an expert? Perloff (1993) discussed similarity as an alternative source to attractiveness, expertise, and credibility. Attractive, credible, expert, and

Tabel 3—Low Impact Camping Behavior Selection

Behavior	Pretest Selection	Posttest Selection
	Percent	
Inappropriate Behavior		
Banana Peel on Rock	9.8	4.0*
Carve Initials in Tree	23.9	7.3*
Cut Limb on Tree	29.8	7.3*
Wash Dishes in Lake	48.1	13.2*
Build a Large Fire	69.5	17.1*
Horse Tied Next to Lake	39.5	26.5*
Flowers in Jar	30.8	7.9*
Nail in Tree	25.6	6.1*
Hike off Trail	35.2	14.6*
Pick Flower	24.9	5.7*
Listen to Radio	42.5	17.4*
Appropriate Behavior		
Wash Dishes Away from Lake	56.8	73.9*
Hike on Trail	75.8	79.6
Use of Trail Sign	48.6	58.9*
Smell Flower	58.0	76.7*
Use a Stove	59.9	79.1*
Tent Away from Lake	87.1	83.3

Note. A McNemar test for related dichotomous variables was used to conduct a chi-square analysis. *p <.0001.

similar sources may have differing influences on behavioral intentions of participants in the program.

Refinements based on sound theory can potentially improve the effectiveness of the impact monster program. Nevertheless, the results of this research and Tracy's (1995) study provide evidence that current versions of the skit may influence short-term behavioral intentions, and the program should remain a tool for promoting appropriate wilderness behavior. **IJW**

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