Journal of Leisure Research
1991, Vol. 23, No. 1, pp. 1–20

Articles

A Model For Assessing The Effects of Communication on Recreationists

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This study proposes a model of persuasion for evaluating informational techniques used in recreation management. The model focuses on the communication response process and factors which influence this process. Behavior change is proposed to be a function of message elaboration which is measured using three variables; number of thoughts generated, acquisition of new beliefs, and changes in old beliefs. Factors theorized to affect this process include amount of past knowledge regarding a message topic, direct experience related to the topic, personal involvement in the topic, role in social group, perception of source credibility and need for cognition. A study of the effects of brochures on wilderness users was used to test the model. On-site interviews and mailback questionnaires were used to obtain measures of these concepts. Results of path analysis provide support for the persuasion process proposed. Two factors, prior knowledge and source credibility, were found to have a direct effect on the persuasion process. Prior knowledge was influenced by, and mediated the effects of, direct experience and topic involvement. Explanations for a negative relationship between past knowledge and elaboration are offered. Managerial implications of these findings suggest the importance of recognizing the knowledge level of visitors for whom information is being developed.

KEYWORDS: *Persuasion, wilderness, behavior change, management.*

A major challenge to recreation managers is controlling the impacts of visitors while also facilitating quality recreation experiences. Because informational techniques, as opposed to direct management control, are relatively unobtrusive, they are considered highly desirable tools for meeting this challenge. Wilderness managers, for example, have repeatedly been encouraged to employ information and education methods (Hendee, Stankey, & Lucas, 1978; Lime, 1976; Lucas, 1982, 1983) and are reported to use these techniques quite frequently (Washburne & Cole, 1983).

Although there have been numerous calls for research, few studies are available to assist managers in developing, evaluating and refining com-

[1]This research was supported by funds provided by the Intermountain Research Station, Forest Service, U.S. Department of Agriculture.

munication techniques (Brown, McCool, & Manfredo, 1987). Much of the available research focuses on the efficacy of specific modes of communication. For example, research has found signs effective in increasing and redistributing roadstop use (Brown & Hunt, 1969), and brochures effective in redistributing backcountry use (Krumpe & Brown, 1982; Roggenbuck & Berrier, 1982), in reducing campground littering (Christensen & Clark, 1983; Oliver, Roggenbuck, & Watson, 1985) and in creating awareness of recreation being promoted (Baas, Manfredo, Lee, & Allen, 1989). Although these studies have offered valuable information in developing communication campaigns, their generalizability may be limited due to factors specific in the study, setting, and application investigated.

Several researchers have noted that persuasive communication studies might be enhanced if they adopted persuasion and attitude change theory from cognitive psychology (Cable, Knudson, Udd, & Stewart, 1987; Ham, 1983; Hammitt, 1984). The purpose of this study was to extend the application of cognitive models of behavior change by testing a model of communication effects in recreation settings.

Theoretical Background

The topic of persuasive communication has received a considerable amount of attention in the field of social psychology. A good deal of persuasion research was conducted between the 50's and 70's and evolved from the early work of Hovland (Hovland, Janis, & Kelly, 1953). The emphasis of this work was upon how factors related to message, source, medium, and recipient affected the persuasion process, which was viewed as a sequence of attention, comprehension, acceptance, yielding, and behavior change.

During the mid-70's, however, there was growing evidence of a need for theoretical refinement. In a summary of the persuasion literature, Himmelfarb and Eagly (1974) concluded that "after several decades of research there are few simple and direct empirical generalizations that can be made concerning how to change attitudes" (p. 594).

The trend of theoretical advancements in the 80's has been to place greater emphasis on the active cognitive processes induced by a persuasive appeal. This theoretical perspective is inherent in Petty and Cacioppo's *elaboration likelihood model of persuasion* (ELM), an approach which has received considerable attention (Petty & Cacioppo, 1981, 1986).

ELM suggests that lasting persuasive effects are the result of the cognitive process of elaboration. Elaboration refers to the extent of message relevant thinking which occurs when a persuasive appeal is received. Elaboration implies that a person a) attends to a message, (b) processes the message in light of relevant associations, images, and experience accessed from memory, and c) draws inferences and an overall evaluation about the merits of the conclusions drawn from a message (Petty & Cacioppo, 1986).

ELM suggests there are two routes to persuasion. The first, identified

as the peripheral route to persuasion, occurs when there is low elaboration. It occurs when people have low motivation and/or ability to actually process the message. Persuasion occurs, however, because people are influenced by cues tangential to the message itself (e.g., attractiveness of the message or message source). The peripheral route to persuasion results in temporary change in behavior.

The second is the central route to persuasion. This involves high elaboration of a persuasive appeal which occurs because people are motivated and able to respond. Petty and Cacioppo theorize that lasting attitude change will occur via the central route to persuasion.

Our study tested whether the process described as the central route to persuasion explains variation in response to informational techniques used in recreation management. Our adaptation suggests that behavior change is the result of degree of elaboration (see Figure 1). Given the difficulties inherent in measuring the mental process of elaboration, our model makes inferences about elaboration as a result of the outcomes it would produce. In this regard, we identified three variables which are the result of elaboration; number of thoughts generated and recalled, changes in prior beliefs, and acquisition of new beliefs. Causally, we have proposed that the extent of message thought generation will determine acquisition of new beliefs and change in prior beliefs. These will, in turn, affect behavior.

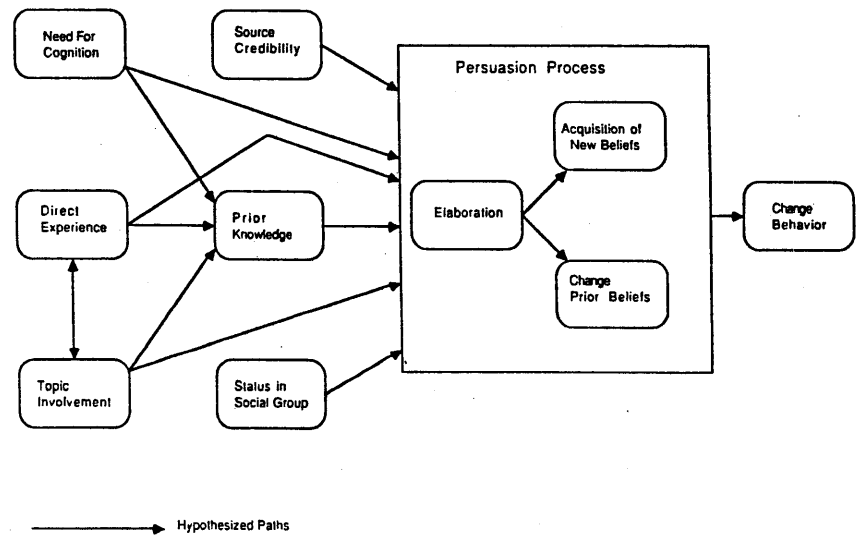

Figure 1. Hypothesized model for overall information packet

Factors which affect elaboration. The remainder of our model explores the effects of variables which are hypothesized to have a direct effect on the persuasion process. Six factors were examined in this study. These include prior knowledge, direct experience, topic involvement, need for cognition, perceived status in social group (e.g., group "leader" versus "follower"), and perceived source credibility.

The amount of *prior knowledge* held by an individual is viewed as a key component of a cognitive approach to persuasion (Bettman, 1986). Response to external environmental cues, like persuasive messages, is in large part dictated by how a person relates it to preexisting information. A major factor which influences this process is the amount of information available to an individual (Kisielius & Sternthal, 1984). Greater amounts of information held by an individual appear to affect the ease with which messages are processed (Johnson & Russo, 1984; Sujan, 1985) and is associated with greater attitude-behavior consistency (Davidson, Yantis, Norwood, & Montano, 1985), and greater resistance to attitude change (Wood, 1982). As noted by Lord, Ross and Lepper (1979), the more knowledge people have about an issue, the greater their ability to argue against messages counter to their initial position and the greater their ability to support an argument congruent with their initial position. Furthermore, researchers have noted a decelerating set-size effect in which pieces of information added to evaluation of an object become incrementally less important in influencing the overall attitude. As Davidson et al. (1985) note, "with each additional piece of information, the overall evaluative judgment increases, but the amount of increase decreases" (p. 1184). In addition to being resistant to attitude change, it has been suggested that those with greater prior knowledge are also less likely to search for new information (Reilly & Conver, 1983).

Preexisting information which has been obtained through *direct experience* appears to have a particularly important effect on how new information is processed. Research suggests that prior information obtained through direct experience (as opposed to indirect such as reading about an issue or being told about it) will result in higher attitude-behavior consistency (Fazio & Zanna, 1981; Sample & Warland, 1973) and will also result in attitudes held with greater certainty (Fazio, Powell, & Herr, 1983). Direct experience attitudes result in more favorable response to proattitudinal appeals and are more resistant to counter attitudinal appeals (Wu & Shaffer, 1987).

Research tends to confirm the importance of direct past recreation experience as a mediator of new information. Roggenbuck and Berrier (1982) found a brochure with personal contact more effective with inexperienced backpackers (versus experienced backpackers) as a means of redistributing backcountry use. Similarly, Krumpe and Brown (1982) found that backpackers in Yellowstone who used their informational brochure had less experience backpacking in Yellowstone National Park than those who did not use the brochure.

The level of *topic involvement,* also identified in the literature as personal relevance, is theorized to have a significant effect on the amount of behavior change that occurs as a result of persuasive communication. People receive hundreds of messages per day (Assael, 1984) and devote thought to very few of them. Petty and Cacioppo (1981) have suggested that involvement will be an important determinant of whether messages are processed. Empirical findings support the relationship between personal relevance of a topic and message elaboration. For example, high personal relevance of an issue has been related to high recall of messages (Leippe & Elkin, 1987), message relevant thinking (Chaiken, 1980), stronger counter-arguments with weak messages (Petty & Cacioppo, 1979), and stronger attitude-behavior consistency (Petty, Cacioppo, & Heesacker, 1981).

Need for cognition refers to a personality trait which reflects a desire to structure relevant situations in meaningful, integrated ways and to understand and make reasonable the experiential world (Cohen, 1957). Cacioppo and Petty (1982) have suggested that one's need for cognition may be an important variable in understanding response to communication. Although recent studies have found little direct relationship between need for cognition and attention given to an ad (Mackenzie, 1986) or between need for cognition and tourist information seeking (Manfredo, 1989), Cacioppo, Petty, and Morris (1983) have conducted lab studies which indicate need for cognition can be an important determinant of elaboration. These researchers suggest that when levels of personal involvement (or relevance) are similar, those with higher levels of need for cognition should be more active in message elaboration.

The impact of *status in social group* has particular applied importance. Kirchler and Davis (1986) found that high status individuals within a group showed less tendency to exhibit behavior change when presented with a persuasive argument than those persons representing a more subordinate role. This finding has important implications when one considers group dynamics. For example, if persuasive appeals affect only the beliefs and attitudes of subordinate group members but group leaders are making decisions for the entire group and are having an influence on group followers, the desired behavior changes may not occur.

Overall, there is agreement that the more credible a communicator (*source credibility*), the more persuasive he/she will be, particularly in situations where low processing of information occurs (Cooper & Croyle, 1984). One point is interesting to note; although early work on this influence examined source credibility as an objective component of the persuasion situation (i.e. a source characteristic), others have suggested that it is the attributions people make about the communicator (an attitude held by the recipient) which determine crediblity (Eagly, Chaiken, & Wood, 1981). This work suggests it is important to examine people's perception of source credibility since people might vary in their assessment of a communicator.

Inherent in our model are several hypotheses which were tested in

this study:

H1: Subjects' perception of behavior change resulting from persuasive communication will be directly affected by the acquisition of new beliefs and changes in prior beliefs.

H2: Amount of message relevant thoughts generated as a result of the persuasive communication will have a direct effect on acquisition of new beliefs and changes in prior beliefs. Acquisition of new beliefs will also have a direct affect on changes in prior beliefs.

H3: The extent to which the recipient generates message relevant thoughts will be directly affected by the level of prior knowledge, direct experience, topic involvement, need for cognition, status in social group, and source credibility.

H4: The extent of change in prior beliefs and the extent to which new beliefs are acquired will be directly affected by the level of prior knowledge, direct experience, topic involvement, need for cognition, status in social group, and source credibility.

H5: Topic involvement, direct experience, and need for cognition will have a direct influence on the amount of prior knowledge possessed by the recipient.

H6: There will be a direct two-way relationship between the level of topic involvement and the amount of direct experience possessed by the recipient.

Methodology

Study Setting

This study was conducted at the Boundary Waters Canoe Area Wilderness (BWCAW) in cooperation with the United States Forest Service. The BWCAW is located in the Superior National Forest in northern Minnesota and is one of the most popular wilderness areas in the United States. In 1987 it received approximately 1.25 million visitor days of use.

Informational Treatment

As part of an overall management strategy that included limited entry permits and enforcement, the Forest Service implemented a communications program in an effort to influence visitors' use in the area. The primary means by which information was delivered was a packet delivered to those who obtained permits via a mail-in request. The packet included 6 pamphlets: a) "Safety First", describing boating safety and first aid issues, b) "Camping with Bears", describing tips to prevent trouble with bears, c) "Natural Fires in the Wilderness", explaining the Forest Service's policy on prescribed fires, 3) "Wilderness Challenge", promoting minimum impact wilderness use, e) "Group Size", explaining the BWCAW's rule concerning the maximum allowable size of a group, and f) "Gain While You Give", promoting opportunities available for volunteering to spend time in the BWCAW helping to preserve the area.

Sampling

The time frame for on-site sampling was July 23 to September 12, 1988. The specific sites used in data collection were arranged in cooperation with U.S.F.S. personnel. A random sample of time clusters were sampled from interviewing each day. Time clusters were 10 a.m.-1 p.m., 1 p.m.-4 p.m., and 4 p.m.-7 p.m. The sampling was designed so that all groups exiting or entering during a sampled time were included in the study. To avoid the possibility of group leaders dominating our sample, we attempted to obtain interviews from at least two members of every group. Interviewers sampled 104 time clusters and collected data on 51 different days.

Data Collection

Data for this study were collected using two instruments, a) an on-site interview and b) a mail questionnaire.

The purpose of the on-site interview was to obtain measures of the effects of the information packet and to obtain names and addresses for the mail questionnaire sample. Subjects were approached as they were taking out or entering. Interviewers identified themselves as members of a research team who, in cooperation with the Forest Service, were conducting a user study at the area. Subjects were asked to participate in the study; however, if they refused, were asked to excuse the interruption and left alone. Interviews were conducted in a conversational mode with interviewers asking questions and recording responses. Subjects were not shown the on-site interview form.

The on-site interview was used to collect data concerning people's elaboration of the information packet (i.e. number of thoughts generated, changes in prior beliefs, acquisition of new beliefs), and changed behaviors. The approach taken in measurement was to use a variation of the "thought listing" procedure which is commonly used in tests of ELM (Petty & Cacioppo, 1986). During this procedure, subjects are asked to record thoughts which occur to them as they are responding to a persuasive message. Adopting this approach, subjects were shown the information packet and asked if they recalled receiving it. Only those recalling the packet were retained in this study. After indicating their recall, a hierarchy of questions was asked to determine the level of thought generation, new information, changing of old ideas and changing of behavior which occurred for each pamphlet. Answers to these questions were elicited from the subject without allowing them to reread any portion of the pamphlets.

To measure thought generation, subjects were asked "What specific ideas do you remember thinking about as a result of reading these brochures?". Answers to these questions were recorded on a scale of 1 to 5: 1—no mentions, 2—mention of one thought, 3—mention of two different thoughts, 4—three different thoughts, and 5—four or more different thoughts. A thought was defined as a topically distinct statement derived from the information packet. The interviewer then asked the subject if any

information in the pamphlet was new to him or her. Response was recorded on a scale of 1 to 4; 1—no mention of new information, 2—one mention of new information, 3—two mentions of new information, and 4—three or more mentions of new information. The subject was then asked if the information changed any of his/her existing ideas concerning any of the topics. Responses were rated on a scale of 1—no mention of change, 2—one mention of change, 3—two mentions of change, 4—three mentions of change, and 5—four or more mentions of change.

This study is limited because we were unable to make objective assessments of behavior changes and instead used measures of intended and reported measures of change. Conclusions by Manfredo and Shelby (1989) suggest that intended and self reports of behavior are similar to the extent that self report serves as the filter or mediator of past observable behavior just as intention serves to mediate future behavior. To measure reported and intended behavior change, the subject was asked if the information had or will have any effect on their behavior while in the BWCAW. This variable was measured on a scale of one through four, with four representing the highest level of behavior change.

One concern in this study was to avoid rater bias which might arise during interviews. Three steps were taken to minimize this effect. First, the interview was structured so that specific questions would be asked and instructions given to aid in classifying responses. Second, in-depth training was conducted prior to field data collection. Third, a field testing of the interview was conducted for 3 days during which the interviewers worked in a group conducting interviews; one interviewer would conduct the interview while others would listen and independently make their ratings, after which they compared, discussed and refined the rating technique.

Interviews generally took only 10 to 15 minutes. At the conclusion of this aspect of the interview, subjects were asked if they would be willing to fill out a longer questionnaire which would be sent to them later in the mail. Names and addresses of those agreeing to participate were recorded.

The mail questionnaire obtained information about factors which might influence the persuasion process (See Table 1 for the mail question-

TABLE 1
Items Used to Measure Factors Influencing Elaboration.

Factors and Items	Reliability Coefficient	Mean Score	Standard Deviation
Prior Knowledge[1]	.9366	1.97	0.77
1. . . . the location of campsites at the BWCAW.		2.21	1.33
2. . . . aspects about safety in the BWCAW.		1.90	1.02
3. . . . the best time of year to go to avoid crowds.		2.18	1.22
4. . . . the best time of year to go to experience the best fishing.		3.03	1.40
5. . . . the most functional clothing to bring.		1.55	0.77

TABLE 1 (Continued)

Factors and Items	Reliability Coefficient	Mean Score	Standard Deviation
6. . . . the type of gear necessary for your trip.		1.50	0.81
7. . . . dealing with bears.		2.00	1.03
8. obtaining a permit to use the BWCAW.		2.07	1.34
9. . . . using the BWCAW without disturbing the natural environment.		1.55	0.81
10. . . . using the BWCAW without disturbing others.		1.55	0.81
11. . . . the location of entry points into the BWCAW.		2.22	1.27
12. . . . use of fishing gear.		2.40	1.34
13. . . . rules and regulations for the BWCAW.		2.03	1.14
14. . . . types of wildlife in the BWCAW.		2.05	0.91
15. . . . surviving successfully in a wilderness setting.		1.77	0.85
16. . . . use of campfires in a way that does not damage the environment.		1.57	0.80
Role in Party Decisions (Status in Party)[2]	.7212	2.09	0.84
1. On that trip, other members of the party tended to look to me concerning proper camping, canoeing or other wilderness use techniques.		2.01	1.10
2. On that trip, other members of the party sometimes looked to me for leadership in making decisions.		1.93	0.98
*3. I generally followed the lead of other members of the party in deciding where to go and what to do.		2.33	1.03
Visitor Use Experience (Direct Experience)	N/A	4.62	5.19
1. How many times have you visited the BWCAW in the past 5 years.		4.62	5.19
Personal Involvement with the Boundary Waters Canoe Area (Topic Involvement)	.8115	1.77	0.54
1. I think of the BWCAW as my second home.		2.83	1.20
2. When I need to get away from it all, I come to the BWCAW.		2.21	1.13
3. It bothers me when other people use the BWCAW in a way that disturbs the environment.		1.13	0.38
4. I take pride in the BWCAW.		1.22	0.50
5. I identify with the BWCAW more than other areas.		1.99	1.03
6. The BWCAW is a traditional area for my friends and family to meet.		2.95	1.35
7. I feel everything possible should be done to maintain the BWCAW as a wild and natural place for recreation.		1.07	0.32

TABLE 1 (Continued)

Factors and Items	Reliability Coefficient	Mean Score	Standard Deviation
8. The BWCAW is an important wilderness area for my friends and family.		1.72	1.02
9. I see the BWCAW as an irreplaceable wilderness resource.		1.09	0.36
10. Recreation in an area like the BWCAW is an important part of my life.		1.48	0.75
Need for Cognition	.7614	2.08	0.54
1. I really enjoy a task that involves coming up with new solutions to problems.		1.69	0.68
*2. I prefer just to let things happen rather than try to understand why they turned out that way.		1.87	0.92
3. I like tasks that require little thought once I have learned them.		2.25	1.05
*4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.		1.73	0.83
*5. I don't like the responsibility of handling a situation that requires a lot of thinking.		1.65	0.78
6. I prefer my life to be full of puzzles that I must solve.		2.60	1.04
*7. It is enough for me that something gets the job done, I don't care how or why it works.		1.94	0.86
8. I find little satisfaction in deliberating long and hard for hours.		2.53	1.06
9. I would prefer complex to simple problems.		2.55	1.00
Source Credibility	.6738	1.39	0.36
1. The rules and regulations set by the U.S. Forest Service are important in maintaing the BWCAW.		1.25	0.50
2. When talking to a U.S. Forest Service official, I pay attention to what he/she has to say.		1.55	0.70
3. I respect the authority of U.S. Forest Service officials.		1.38	0.61

[1]Responses to knowledge questions were prefaced by the statement "Before receiving your permit to use the BWCAW, how knowledgeable did you feel about . ." and responses were obtained on the scale; 5 = Highly Knowledgeable, 4 = Moderately Knowledgeable, 3 = Somewhat Knowledgeable, 2 = Slightly Knowledgeable, 1 = Not at All Knowledgeable.
[2]Responses to all items except the knowledge items were obtained on a scale ranging from 1 = Strongly Agree, 2 = Moderately Agree, 3 = Neither Agree or Disagree, 4 = Moderately Disagree, 5 = Strongly Disagree.
*Scoring was reversed on this item.

naire items). Direct experience of the user was measured by asking subjects how many trips they had taken to the BWCAW in the past 5 years. Prior knowledge was measured using a bank of 16 items which were developed to reflect the user's knowledge in content areas related to the brochure and their overall knowledge of the BWCAW. Instructions asked subjects to rate their level of knowledge prior to receiving the information package. responses to items were obtained on a scale with the ratings of "not at all knowledgeable", "slightly knowledgeable", "somewhat knowledgeable", "moderately knowledgeable", or "highly knowledgeable". Self reports of past knowledge, which are used frequently in consumer psychology, must be viewed as one's attitude toward their knowledge (Brucks, 1985). This is a subjective assessment and may not be accurate representations of more objective measures of knowledge.

The status of the user in the social group was measured using three items which addressed aspects of party status. Subjects were asked whether or not they followed the lead of others and the level to which other members of the party looked to them for leadership. Responses were measured on a 5-point scale including "strongly agree", "moderately agree", "neither agree nor disagree", "moderately disagree", and "strongly disagree".

Topic involvement was measured by asking subjects 10 questions concerning their personal involvement and feelings toward the BWCAW as a recreation and wilderness area. Issues such as the importance of the BWCAW to one's family and friends, the importance of maintaining the BWCAW as a wilderness area, and personal feelings toward the BWCAW were measured on a 5-point scale ranging from "strongly agree" to "strongly disagree".

Need for cognition measured the user's desire in solving problems or puzzles and, in general, their tendency to engage in activities that challenge their thinking abilities. These items were sampled from a 45-item scale published by Cacioppo and Petty (1982) and were measured using a 5-point scale ranging from "strongly agree" through "strongly disagree". A reduced number of items was used to ease burden on respondents.

Source credibility was measured by asking three questions concerning the user's attitude toward the Forest Service officials and the regulations they have established for the BWCAW. This section was also measured using a 5-point "strongly agree" to "strongly disagree" scale.

The initial administration of the mail questionnaire was done in the month of September. Two weeks after the first mailing, subjects were sent a postcard reminder if they had yet to respond. Those not responding after the first mailing and the postcard follow-up were sent another questionnaire and reminder to complete the survey.

Analysis.

Cluster analyses of individual variables were performed to create overall indices (one for each variable) of factors measured in the mail ques-

tionnaire. Variables for prior knowledge, direct experience, topic involvement, need for cognition, status in social group, and source credibility were all obtained in this manner. Table 1 is a listing of the created indices (with individual questionnaire items making up the index) and its reliability coefficient which was computed prior to use of the indices.

Using the indices as measures of the variables in our model, path analysis was performed and used in tests of hypotheses. Path analysis was used because it allowed tests of a causal model and has been used in previous studies of attitude-behavior relationships (Bagozzi, 1981; Bentler & Speckart, 1979).

Results

A total of 413 users, 76% of all those contacted at the BWCAW, recalled receiving the information packet from the Forest Service prior to taking their trip. Of these, 368 were interviewed and responded with the mail questionnaire representing an 89% response rate.

Descriptive Statistics

Twenty seven percent of our sample who recalled the information indicated they devoted no thought to the information packet. Among those recalling the brochures, 30% mentioned one, 11% mentioned two, 18% mentioned three, and 14% mentioned four or more thoughts that were generated as a result of examining the information packet.

Most of the users indicated that they received no new information from the information packet (71%). Nineteen percent mentioned one new idea as a result of reading the information packet, 8% mentioned two, and 2% mentioned three or more new ideas.

Fifty nine percent of those who recalled the packet indicated that the information packet did not change any of their old ideas regarding wilderness use and the BWCAW. Thirty seven percent indicated change in one, 2% indicated change in two, and 2% indicated change in three beliefs due to the information packet.

Finally, a high majority (89%) of the users who recalled the packet indicated that their behavior was not changed due to the information in the packet. Eight percent indicated they intended to or actually did change one type, 2% indicated two types, and 1% indicated three or more types of behaviors.

The Model

Figure 2 presents the results of path analysis. Only significant paths are shown with the standardized beta indicating the magnitude of effects. Path analysis showed that the model predicted overall behavior change with an R squared of .42.

Results support the communication process proposed in the model.

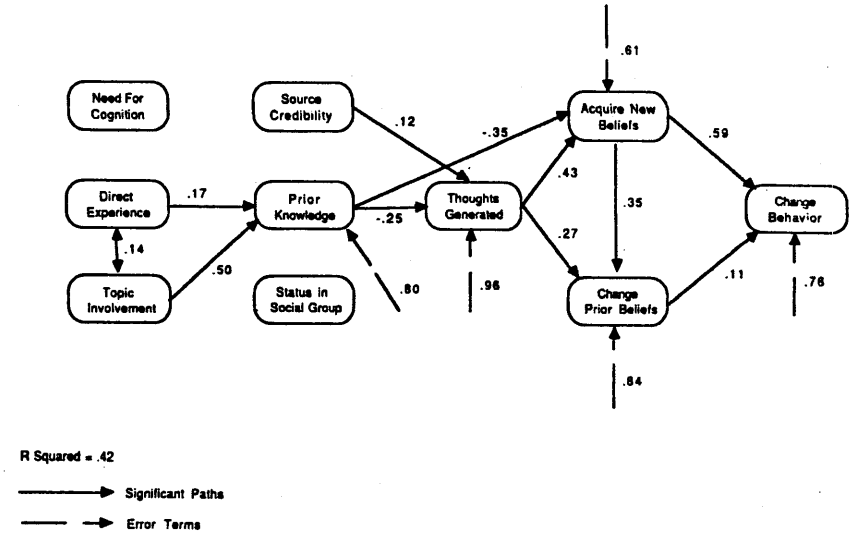

Figure 2. Persuasion model containing significant paths for overall information packet

Behavior change was directly affected by acquisition of new beliefs (b = .59) and the extent that prior beliefs were changed (b = .11). New beliefs also directly affected the extent that prior beliefs were changed (b = .35). Thought generation affected behavior change indirectly by affecting new information (b = .43) and changing prior beliefs (b = .27). Hypotheses 1 and 2, which addressed these processes, were both accepted.

Two factors hypothesized to affect the communication process were found significant. First, a significant path was found from prior knowledge to message elaboration (b = −.25) and acquisition of new beliefs (b = −.35). Second, source credibility had a weak but significant effect on thought generation (b = .12). None of the other factors directly affected the persuasion process. Consequently, hypotheses 3 and 4 can be only partially accepted as prior knowledge affected thought generation and acquisition of new beliefs, however did not affect changing of old beliefs. Also, while source credibility affected thought generation, topic involvement, direct experience, status in group, and need for cognition were not directly related to the elaboration variables.

Hypothesis 5 was also only partially accepted. As hypothesized, prior knowledge was directly affected by the level of topic involvement (b = .50) and direct experience (b = .17). However, need for cognition had no effect on prior knowledge. The hypothesized two-way relationship between direct

experience and topic involvement (H6) was also found to be significant (b = .14).

Error terms were moderately large reflecting the effects of measurement error and effects which are unaccounted for. Errors were .76 for changed behavior, .61 for acquisition of new beliefs, .84 for changing in prior beliefs, .96 for thoughts generated and .80 for prior knowledge. This indicates a need for future research which improves the specification of this model and refines the measures used for testing it.

Discussion

The primary purpose of this study was to proposed and test a model which explained the effects of informational techniques used in recreation management. The model was proposed for situations where recipients of information are expected to engage in thoughtful analysis of information presented. Adapting concepts introduced in psychology, our model suggested that persuasive information distributed by recreation managers will influence behavior to the extent that recreationists elaborate on the message. The model operationalized elaboration by the outcomes it would produce; thoughts generated, changes in old beliefs and addition of new beliefs. Results support this view of the communication process.

It should be noted that the information packet at the BWCAW changed at least one belief for 41% of those who recalled receiving it. However, this variable had only a weak effect on behavior change. It seems likely that the prior beliefs which were affected dealt with more general topics which were not highly related to behaviors one might exhibit in the wilderness. Conversely, 29% of those who recalled the packet acquired at least one new belief and this variable had a strong effect on behavior change. Perhaps new beliefs were related to specific conditions in the BWCAW which would require a behavioral response. In support of this explanation, we found that prior knowledge, a variable which dealt largely with knowledge specifically about the BWCAW, had a strong effect on thoughts generated and acquisition of new beliefs, but had no effect on change in old beliefs. Overall, these results suggest that the information packet used at the BWCAW is effective in influencing the behavior of less knowledgeable users and does so by generating thought and introducing new beliefs.

Our findings regarding the effects of prior knowledge on the persuasion process are consistent with Williams and Huffman (1986). These researchers found that hikers in Rocky Mountain National Park who had high experience with that area were less responsive to an informational brochure designed to influence their trail choice. Similarly, Krumpe and Brown (1982) and Roggenbuck and Berrier (1982) determined that recreationists with less experience were more influenced by the communication strategies they tested. In a broader context, the study also offers support for the concept of experience use history introduced by Schreyer and others (Schreyer & Lime, 1984; Schreyer, Lime & Williams, 1984).

These researchers suggest that varying levels of experience yield different amounts of information available to the individuals. This plays an important role in determining how they evaluate an experience.

Several explanations may be likely for why more knowledgeable users did not devote as much thought to the informational brochures. One, users with more knowledge may perceive less utility for information provided by managers and therefore spend little time attending to it. If existing knowledge has been adequate during previous trips, users may not perceive a need for new information or users may simply feel confident in possessing adequate knowledge to fulfill their recreational goals. Another explanation is that those with high knowledge may process the information more quickly and, given its familiarity, devote less thought to it. These users may focus on key symbols or terms which activate knowledge in memory. With an awareness of this knowledge in memory, users might assume they possess the information in the persuasive appeal. Consequently, they devote less thought to the messages and there are few effects as a result. A third explanation may be that those more experienced are affected by message repetition. Cacioppo and Petty (1979) propose a two staged model of message repetition effects where, in the first stage, people are given increased opportunity to evaluate information and there are increased persuasion effects, however, at higher levels of repetition there is boredom or reactance toward the message which reduces persuasion effects. If highly knowledgeable users receive information on a high repeat basis over a number of use seasons, there might be less effects due to repetition of information.

The effect of source credibility suggests that the more positive a recreationist's perception of the Forest Service, the more likely they were to devote thought to the informational brochures. It is interesting to note that although source credibility has been identified as an important effect in peripheral processing (Petty & Cacioppo, 1986), in this study source credibility mediated thoughtful analysis of messages. If peripheral processing were operating, we would have expected to find a direct effect of source credibility on behavior change.

Among the other variables we hypothesized to affect the communication process, it seems plausible that the effects of topic involvement and direct experience are mediated by the broader concept of prior knowledge. They both contribute to one's overall knowledge but have little direct effect on acceptance of persuasive appeals.

Status in social group was also not significant and it seems possible that the effects of this variable are more related to knowledge than actual group status. Perhaps people are perceived as leaders because of their knowledge, therefore, knowledge is the cause of status effects. In support of this explanation, we found a correlation of .26 ($p \leq .001$) between status in group and prior knowledge.

With regards to the topic of "need for cognition", this study joins others which have found little relationship between this concept and the persuasion process (MacKenzie, 1986; Manfredo, 1989).

Managerial Implications

From an applied perspective, it must be concluded that the information packet examined in this study had only a modest effect on changing beliefs and affecting behavior. The behavioral effects, estimated at 11% of those recalling the information packet, are lower than findings in studies which used brochures in redistributing one-fourth to one-third of backcountry recreationists (Krumpe & Brown, 1982; Roggenbuck & Berrier, 1982). These findings are more similar to those from tests regarding the effectiveness of tourism brochures (Baas et al., 1989) and to findings more generally available in mass communications research (Mendelsohn, 1973).

This study reinforces past suggestions regarding the importance of managers knowing the experience and knowledge level of the group for which information is targeted. If the group has little knowledge of the area they are visiting, and/or the experiences in which they will be participating, informational approaches may be useful in developing new beliefs and affecting behavior. If managers are attempting to introduce new information to experienced users, more care needs to be taken in developing informational devices. One strategy in accomplishing this would be to avoid the appearance of repetition of previously used materials and to highlight information not distributed in previous years. Another strategy might be to make separate informational devices, one for experienced and one for inexperienced users.

Noting that changes in prior beliefs were weakly related to behavior change, we would recommend that, prior to developing communication devices, managers carefully identify the specific behaviors that they would like to change and the beliefs which are related to these behaviors (See Ajzen and Fishbein (1980) for a more complete discussion of procedures). Using this approach, there will be a greater likelihood that when beliefs shift, behavioral changes will follow.

Future Research

Although we generally found support for the approach proposed in this study, it must be considered exploratory. There were several methodological concerns which should be addressed in future research. A prominent concern is with the use of self reports of behavior change. Although prior studies have shown good prediction of actual behavior from self reports (Manfredo & Shelby 1989), other studies have shown that people may be poor judges of whether or not they have been affected by a treatment (Nisbitt & Wilson, 1977). Future studies should use observed behaviors in tests of this model. Similarly, self reports of prior knowledge taken after treatments may not be reliable and, in the future, should be measured at several points in time before, during, and after the persuasive treatment. Furthermore, future research would contribute to greater understanding of the communication process, and have more managerial relevance, if it

were topic specific (i.e. focus on topics such as problems with bears, wilderness fire, low impact camping) and identified the apriori and post communication treatment beliefs related to the topic.

Another suggestion for future research would be to test a model component which would address the valence or utility of information to its recipients. This will assist in understanding the effects of prior knowledge on the persuasion process and is consistent with contemporary theories of persuasion (e.g., Ajzen & Fishbein, 1980; Kiselius & Sternthal, 1984; Petty & Cacioppo, 1981).

In conclusion, although communication strategies have potential problems (e.g., Heberlein, 1973), managers frequently make use of them and they continue to be valuable management tools. Research can be quite useful to managers in improving communication strategies, particularly given guidance from recent advancements in persuasion theory (Chaiken & Stangor, 1987; Cooper & Croyle, 1984). We suggest that by focusing on the communication process and factors affecting the process, trends in effectiveness of communication strategies will become more apparent.

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Received August 16, 1989
Revision accepted April 1, 1990