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FIRE PREVENTION FILM SPOTS FOR TELEVISION. . . narrator influence on knowledge and attitude changes

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USDA FOREST SERVICE RESEARCH PAPER PSW- 94 /1973

ERRATUM

"Fire Prevention Film Spots for Television...narrator influence on knowledge and attitude changes," by Gene C. Bernardi (USDA Forest Service Research Paper PSW-94, 1973)

Page 1, 4th paragraph of text, line 4 as reads:

"KIEM, Yreka, California..."

Should read:

"KIEM, Eureka, California..."

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ACKNOWLEDGMENTS

The experiment involving California high school students was done with the cooperation of Dr. Richard S. Boyd, superintendent, Oroville Union High School District; principals of the Oroville, Prospect, and Las Plumas High Schools; and the teachers and students who participated. John McCloud produced the film spots. Richard L. Aronoff, University of California, Berkeley, wrote the computer programs used in analyzing the data.

The experiment in which film spots were televised on commercial channels in California and Oregon was done with the cooperation of Newton L. Steward, vice president, KIEM-TV3, Eureka, California; Russ Jamison, director of programming, KMED-TV, Medford, Oregon; and Richard Ernest, fire prevention officer, California Division of Forestry. Marilyn Wilkes, University of California, Berkeley, wrote the computer programs used in analyzing the data.

SUMMARY

Bernardi, Gene C.
1973. **Fire prevention film spots for television ... narrator influence on knowledge and attitude change.** Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif. 14 p. (USDA Forest Serv. Res. Paper PSW-94)
Oxford: 432.13: U659.148.
Retrieval Terms: fire prevention education; television research; attitude change; behavior change.

Three 60-second fire prevention television spots designed to reach high tire risk persons in the young adult population were evaluated by two experiments. The films differ only in the character of the narrator: Smokey in one, a Youth in a second, and a Ranger in a third. The hypothesis being tested was: learning and positive attitude change are more likely to occur among young people following a message communicated by a peer group member or idol than following one by an enforcement authority figure (Ranger) or a symbolic figure (Smokey Bear).

The films were more effective in the captive audience situation of Experiment 1 conducted with 170 Northern California high school students than under normal television viewing conditions in Experiment 2. In the classroom experiment, all three of the films were effective in teaching proper fire use practices.

The success, in Experiment 1, of *all* three films in teaching proper fire use practices, although not a confirmation of the study's hypothesis, justified conducting Experiment 2 as a test of the hypothesis under normal television usage.

Experiment 2 retested the Smokey and Youth versions under conditions of normal exposure by commercial TV channels. The Smokey film was shown by KIEM, Yreka, California, and the Youth version by KMED, Medford, Oregon. Interviews were conducted before and after the showings, in Arcata, California, which received only the Smokey film, in Yreka, which received only the Youth film, and in Red Bluff, California, the control community, where neither of the films could be viewed.

The Youth film, under conditions of normal television viewing, was more effective than the Smokey film. In Yreka, after the Youth film was seen, people felt more strongly that "Fire prevention rules and regulations should be more strictly enforced." In the Arcata area where the Smokey film was viewed, the reverse occurred: people felt less strongly about the enforcement of fire regulations. In the normal television viewing situation there were no other statistically significant changes in answers to the remaining attitude statements nor to the knowledge questions on how to prevent forest fires. However, in the communities where the experimental films were shown there was more change (although not statistically significant) to correct answers following the film showings than in the control community.

Because the films were specifically designed to reach the high fire risk segment of the population under 25 years of age, the effectiveness of the films with different age groups was compared. Age was round to have no significant relationship to the effectiveness of the films. The relationship of other characteristics of the viewing populations—relevance of fire prevention, income, sex, marital status, employment status—was also investigated to determine whether either film was significantly more effective with some groups than others. The Youth film was found to be more effective than the Smokey film in eliciting a stronger position on fire law enforcement among those who had had recent forest and wildland experience. Neither film was consistently more effective than the other with any other subgroup.

Results of the two experiments suggest that these TV spots, with young people portrayed, were more effective in teaching proper fire use practices in a classroom situation than they were in the normal viewing situation for which they were intended. And the Youth film was more effective under normal viewing conditions, than the Smokey film, in making the population studied more concerned about the enforcement of fire regulations.

A combination of techniques for effective fire prevention is suggested by the findings: Education in captive audience situations where high fire risk persons may be found, such as offices or factories, and attitude change through the use of mass media personages with whom members of the target audience can more readily identify than they do with Smokey.

The development of guidelines for effective fire prevention films for television has been a continuing research effort by the U.S. Forest Service. An earlier experiment (Bernardi 1970) compared the attitude-changing effectiveness of three films varying in "threat" content. For the survey sample as a whole, one film was no more effective than another in changing attitudes, but for that one-third of the subjects who had recently lived or worked in the wildlands, the "mild-threat" film was significantly more effective.

No human beings were portrayed in these first experimental films. This suggested an explanation for the failure of any of the films to affect significantly the attitudes of the majority who had not recently lived or worked in wildland areas: members of the audience had no one with whom they could identify.

The need for television spots effective with wildland visitors as well as wildland residents and workers, and the assumption that audience identification with human models would lead to attitude change and learning, inspired three new experimental fire prevention films. In these, the persons portrayed were intended to appeal to members of a particular target audience—those high fire risk persons identified as such in a survey of residents of Butte County, California (Folkman 1965). High wildland activity, together with poor fire prevention knowledge and attitude scores were the indicators for the target group. Members tended to be unmarried persons under 25 years of age with a limited amount of schooling for their age and a total family income in the low-to-medium range. They appeared to spend less time than average listening to the radio, but their TV watching was higher than average.

The three films showed a group of young people in a wildland recreation activity, and varied only in the person narrating. In one film this was a Forest Ranger; in the second, Smokey Bear; and in the third, a moderately "hip" youth, one with medium-length hair.

To reach the target audience with the films developed for this study, two approaches were used. In the first experiment, conducted in December 1970, a group of high school students viewed the three films as a school activity; before-and-after questionnaires were used to test their knowledge and attitude change and their reactions to the character of the narrator. In the second experiment, two of the three films were shown on two commercial TV channels, each having separate viewer coverage. Before and after the TV showings, in home interviews, community members were interviewed with questionnaires similar to those used with the students.

This paper reports on the relative effectiveness of the films in teaching fire prevention. The specific objective of the study was to test this hypothesis: Learning and positive attitude change (fire prevention knowledge and fire caution) are more likely to occur among young people of the lower socioeconomic group (undereducated lower-income youth) following a message communicated by a peer group member or idol (the Youth) than following one by an enforcement authority figure (Forest Ranger) or a symbolic figure (Smokey Bear). The hypothesis implies two agents of possible change—the message itself (constant) and the credibility of the message source, or narrator (varying). It was recognized that other elements in the films or in the viewing situation might need to be explored if the results showed positive knowledge or attitude changes not related to greater source credibility.

METHODS

To test the hypothesis, procedures in three areas had to be devised. It was necessary first to develop films that might appeal to the assumed audience; second, to choose the subjects and testing plan; and third, to devise the questionnaires.

Experimental Films

Development of three new 1-minute color television films to appeal to the target audience required some assumptions. For some of these, I drew upon a

number of published studies of appeal elements in mass-media materials. The assumption that the use of persons with whom the audience can presumably identify is valuable was borne out in a study by Blomgren and Scheuneman (1961). In illustrated leaflets featuring endorsement by a professional racing driver versus a "scare" approach, the former was significantly more effective. Mehling (1959) found that a photograph of a prestigious person accompanying a news story increased attitude change. Identification of viewers with like-sexed characters in films was explored by Maccoby and Wilson (1957), who found that boy viewers remember aggressive content, with the boy hero as agent, better than girls, whereas girls remember interactive content better than boys. Viewer identification with members of a social class aspired to was also noted. The importance of the way students perceive the prestige of the communicator was reported by Greenhill (1967); and Berscheid[1] found that lack of identification with the communicator's value system in a particular area resulted in change of opinions to a position opposing the communicator's. Kishler (1950), exploring audience attitudes toward the main character in a film, found positive changes occurred, but most differences were not statistically significant.

In establishing a basis of interests for the target audience, I assumed they shared the generally widespread taste of young people for rock music and the dress and hair styles generally associated with "hip" culture. A study of 16- and 17-year-old students explored differences between smokers and nonsmokers (Salber and Rochman 1964). Sixty percent of high school smokers were found to be low achievers, and two-thirds of the low achievers were smokers. Although we do not know the smoking habits of our high fire risk group, we do know that many are high-school dropouts. We may assume, therefore, that the personality differences of smokers are relevant to our target group. The study found that smokers, more than nonsmokers, own cars and go to dances. Cars and rock music were assumed to be useful elements for inclusion in the films. Poor adjustment in family relationships and with authority in general was also noted in boys who smoked. The investigators suggest that boys, at least, would not be likely to identify with a film personality representing a parental or authority figure.

[1]Berscheid, Ellen. *The effects of communicator-communicatee value similarity and dissimilarity upon opinion change.* 1965. (Unpublished Ph.D. thesis on file at Univ. of Minnesota, Minneapolis.).

Besides the lack of opportunity for viewer identification, an apparent weakness of our earlier set of experimental film spots was that they merely admonished the viewer to be careful with fire, but did not explain how. Therefore I decided that the new spots should inform their viewers of the proper way to build and put out a campfire and how to smoke safely while in the woods.

The three new television films devised differ only in the character of the narrator who advises the viewers on proper fire use practices. The film opens with young people arriving by sports car and motorcycle in a wooded area. Background rock music grows louder as the young people hike to a campsite. Scenes follow showing the young people and rock musicians assembled at the site. Then a closeup of the "narrator" who gives the fire prevention advice appears. As the narrator describes a proper fire use practice, a scene of the young people demonstrating the proper method is shown. The "Ranger" and "Smokey" narrations are identical, but the "Youth" narration incorporates the hip idiom in the first and last two paragraphs.

Ranger and Smokey Narration

Forests are for all of us to enjoy
And all of us can help protect them
By being *extra* careful.

Before you build a fire
Clear off a circle that's ten feet across
Right down to bare earth.

Make a ring of rocks
Or dig a hole at the center,
And then build a small fire inside.

If you have to smoke,
Sit down and do it in a cleared area,
And be sure all matches and cigarettes are dead out.

Before you leave, douse your fire
And stir the ashes until they are cold.

If we protect our forests now,
We can still enjoy them in the future.

Youth Narration

Yeah, people,
The woods are good for your head,
But be cool,
Do your thing the right way.

. . .

Before you split,
Douse your fire
And stir the ashes until they are cold.

The nature scene is far out–
Let's keep it that way for future trips.

Test Subjects and Film Showing

Experiment 1

The first phase of the testing was conducted with captive audiences: 170 high school students in Oroville, Butte County, California. Four treatment groups were set up, one to view each of the experimental films and a control group which viewed only an unrelated film. To secure an adequate number of subjects, the experiment was conducted four times, utilizing 12 different teachers' students at the several schools making up the Oroville Union High School District—Oroville, Prospect Continuation, and Las Plumas—providing a total of 170 students. Students in each classroom at a participating school were randomly assigned to four treatment groups. Later, for purposes of analysis, scores of all students who had viewed a particular film were grouped together, regardless of the school and day of their participation.

To simulate normal TV viewing conditions, each 1-minute fire prevention spot was spliced as a rider onto an 11-minute color film, "Life in the Sea," produced by Encyclopedia Britannica Films, Inc. The control group saw only this film.

Every effort was made to test the effectiveness of the films with the target audience for which they were designed: the high fire risk group identified in the Butte County survey (Folkman 1965). As described earlier, this group consisted largely of high school dropouts from lower or lower-middle income families. Those employed had only part time or intermittent jobs. They were mainly city or open-country nonfarm residents, and most had formerly lived in small towns.

To reach potential high school dropouts, the test group included as many Title I Classes (disadvantaged students qualified for special funding under the Elementary Secondary Education Act) as possible, and both the morning and afternoon sessions at the continuation high school. Our experimental audience closely resembled the high fire risk target group identified by the Butte County survey. Ninety-three percent of the students were single and had never been married. They were young, 97 percent being between 14 and 20 years of age. Of those who considered themselves in the labor force during the past year, 34 percent were employed just part time or part of the year, and another 14 percent were unemployed. Most of the students were from the small town of Oroville, and the next largest group were open country nonfarm residents. Three-fifths formerly lived in either a city or a small town.

Equal numbers of each sex made up the group identified by the Butte County survey as high fire risk. Three-fifths of the Oroville High School experimental group were boys, however.

Experiment 2

Significant results with the captive audience of students justified us in repeating the experiment under conditions of normal exposure from commercial TV channels. Two of the three films were retested in the fall of 1971 through stations KIEM-TV3 in Eureka, California, and KMED-TV in Medford, Oregon. Budget restrictions limited us to two of the original three films, and we chose the films using Smokey and the Youth.

To control as many variables as possible, it was necessary to choose test communities which not only do not receive each other's television signals, but also have fairly similar population characteristics. The three communities which came closest to meeting these two criteria were Arcata, Yreka, and Red Bluff. Each is a small northern California city of under 10,000 population: Arcata, 8,985; Yreka, 5,461; Red Bluff, 7,653 (U.S. Bureau of Census 1972). Each of these communities are in counties with a small minority group population: Arcata, Humboldt County, Negro 0.3 percent, Spanish surname 2.2 percent, Indian 2.5 percent; Yreka, Siskiyou County, Negro 2.2 percent, Spanish surname 4.1 percent, Indian 1.8 percent; Red Bluff, Tehama County, Negro 0.2 percent, Spanish surname 3.7 percent, Indian 0.7 percent (California Division of Fair Employment Practices 1964, 1965; California Division of Labor Statistics and Research 1965).

Income characteristics of the three communities are similar. In Arcata and Yreka, median income is about $10,000; in Red Bluff it is closer to $9,500. The proportions of the population with income below the poverty level in the three towns are 9.5, 7.1, and 8.2 percent, respectively.

Of course, no two communities are exactly alike, and there are some important differences here. Arcata is on the coast and adjacent to the relatively large city of Eureka, whereas Yreka and Red Bluff are inland and somewhat isolated from other towns. Also, Arcata has a college whereas the other towns do not.

The test community of Arcata received only the experimental Smokey film from KIEM, and Yreka received only the Youth film from KMED. Red Bluff, the third distinct viewing area, which receives neither of these channels, served as a control community.

Interviews preceded and followed a 1-week period (September 20-27, 1971) during which each spot was

shown several times daily. In an effort to reach a group comparable to the high fire risk group of the Butte County survey, the interviews were confined to a representative sample of households in districts having a relatively high proportion of low-rent and low-assessed housing according to the U.S. Census Bureau. (These criteria were used because the 1970 census income information had not yet been released.) A higher sampling rate was applied in districts with the greatest concentration of low-income housing. One or two sampling units in each community were urban and the remainder were rural or semirural.

We oversampled the youth-young adults; that is, if a household member was 14-24 years of age, we chose that person for interviews, rather than using the random selection method to determine the respondent, as we did in other households.

The sample consisted of 378 potential respondents; 123 in Arcata, 136 in Yreka, and 119 in Red Bluff. From this sample, interviews were conducted, before the film showings, with 82 percent, or 308 of the total potential respondents. Following the film showing, we interviewed 90 percent or 277, of those with whom we had a "before" interview.

The percentage of youth in our samples' low-income districts was low in Yreka and Red Bluff, 17 and 18 percent respectively, but almost one-third (32 percent) in Arcata, [2] apparently because of the college population there. Our special sampling techniques gave us a higher-than-random proportion of youth in our samples: in Yreka 39 percent of our initial interviews were with persons under 25; in Red Bluff, 35 percent, and in Arcata, 45 percent.

In other characteristics of the high fire risk group, the youth in this study's three samples combined tended to be similar: 77 percent were unmarried; 52 percent had not finished high school; of the 46 percent not in the labor market most were students; another 39 percent were employed part time or part of the past year and 14 percent full time. Only 2 percent reported unemployment for the entire past year. Almost half of these youth reported their occupation in the household and service worker or laboring group. Another 7 percent were operatives, 12 percent clerical, and 23 percent, most of whom were students, either had never been employed or had had no steady or substantial job experience. Sixty-five percent had yearly family incomes under $10,000 per year. There were almost equal numbers of each sex (51 percent females). Most considered themselves city or small-town residents. Their TV-watching behavior and radio-listening behavior were similar to that of the total sample, with 48 percent watching TV 2 or more hours per day and 23 percent listening to radio 2 or more hours per day.

The total sample differed from the youth portion of it as follows: the proportions of single persons, students and persons employed only part time were smaller. Although the proportion reporting their occupation as household and service worker or laborer was smaller, over 70 percent of the total sample had incomes under $10,000 per year. In the total sample, there were more females than males, particularly in Red Bluff. Most of the total sample also considered themselves city or small town residents.

On some of the above characteristics, youth in the three study communities differed considerably. Partly because Arcata is a college town, there were more subjects with some college there than in Yreka and Red Bluff, where the majority had only some high school or less. Similarly, a greater proportion of the youth sampled in Yreka and Red Bluff were concentrated in the 14-20 age group; in Arcata they were 21-24. The proportion of those reporting their status as employed rather than student is also apparently related to age, more in Arcata having been employed part time or full time during the past year. In yearly family income, the Arcata sample's youth had the largest proportion with under $6,000 per year, Yreka the largest with over $10,000 per year, and Red Bluff a greater concentration in the income range between. Almost three-fifths of the youth were females in Arcata and Red Bluff, but 56 percent in Yreka were males. In Red Bluff, the control community, we found the most TV-prone youth, 71 percent watching 2 or more hours per day. In Arcata, only 30 percent watched that much, and 25 percent watched not at all or only once or twice per week. In Yreka, TV habits were similar to those of the total combined sample, with 49 percent watching 2 or more hours per day.

Questionnaires and Interviews

Experiment 1

In conducting the experiment special measures were taken to control the nonexperimental variables, such as preexisting differences between the participating classes. One possible difference may have been the influence of the teachers who read aloud the preliminary attitude-knowledge questionnaires to their intact classes. Any differences from this procedure were distributed, along with other differences, by the

[2]Data from Census Services Facility, University of California, Berkeley.

random assignment of students to the next day's four film groups, where the second questionnaire was given following the film showing. Theoretically, each of these four groups included equal numbers of students from each class.

Four assistants were used. Because the experiment was conducted four times, once at Oroville High, twice at Prospect (morning and afternoon), and once at Las Plumas, it was possible to assign each assistant to a different film treatment each time, thus neutralizing any special influence of the assistant on the results of the second questionnaire. This influence could have been considerable in that it was necessary, because of the low reading level of the students, for the assistant to read the standardized instructions, questions, and attitude statements aloud to the students as they completed the questionnaires.

The first, or preliminary, questionnaire measured attitude and knowledge, and identified demographic characteristics. The second, or final, questionnaire explored the viewer's recall and reactions to the fire prevention film, and repeated the attitude and knowledge items of the first questionnaire.

The preliminary questionnaire was designed to determine existing attitudes toward fire prevention and knowledge of proper fire practices, as demonstrated in the fire prevention spots. In Questionnaire I, Part I, Education, Community, and Environment 11 of the 53 items, pertained to fire prevention attitudes, and three to fire prevention knowledge; Part II, Background Information, contained seven items on demographic characteristics of respondents. The remaining items in Part I were intended to disguise the purpose of the questionnaire, and to interfere with recall of specific answers given to the fire prevention questions which were repeated in the second questionnaire.

A set of attitude statements in which there are five possible responses (strongly agree, agree, undecided, disagree, and strongly disagree) was used (Likert 1967). To avoid response set—a tendency to select the same response for all statements—about half of the fire prevention attitude statements were worded so that agreement denoted a favorable attitude, and the remainder so that disagreement denoted a favorable attitude. (The response most favorable to fire prevention was scored 5, and that least favorable was scored 1.)

Six of the 11 attitude statements were selected from the Butte County study (Folkman 1965, p. 30-32). The six questions chosen were among those that were differentiating; that is, participants in the Butte County study did not all respond to these questions in the same way. The wording was slightly altered in two of the six questions to avoid response set. Analysis of results of a pilot test (Bernardi 1970, p. 4) showed the following three attitude statements best differentiated between students with the most favorable "before" attitude and those with the least favorable "before" attitudes. These statements were in order of discriminating ability...

1. Fire prevention literature is a waste of taxpayer's money.
2. People should be required to obtain fire permits much on the same basis as driver's licenses.
3. Schools should not be permitted to use school time for instruction in forest fire prevention.

Questionnaire II consisted of three parts. In Part I, five questions covered recall of the fire prevention spot seen, and reactions to it, if any. Part II consisted of 29 scales evaluating the acceptability of message sources. Each scale consisted of a pair of adjectives judged to be antonyms, one at each end of a seven-point rating scale. Respondents were asked to rate the narrator (Smokey, Ranger, or Youth) in the fire prevention film viewed, on each scale. The dimensions probed by the scales were safety-qualification-dynamism, an index to source credibility (Berlo, Lemert, and Mertz 1969-70), and sociability and attraction. A receiver may be said to find a source credible if the receiver perceives the source as trustworthy (safety), expert (qualification), and bold (dynamism). Part III contained 21 questions on the respondent's wildland experience; these included a repeat of the 11 attitude and three knowledge questions in the preliminary questionnaire.

Experiment 2

The showing of film spots during the week of September 20, 1971, was preceded and followed by interviews with the population sample chosen. In order to control other potentially influencing variables, ideally, the two TV spots shown during the one-week period should each have been shown adjacent to the same programs and at the same time of day. This ideal could not be perfectly achieved, because the two cooperating stations are not on the same national network and because the spots were treated as public service announcements and were therefore in competition with paid commercials. Nevertheless, the two stations came close to meeting the ideal schedule which I suggested: Playing the spot three times daily, at noon, 3:00 p.m. and 8:00 p.m. Station KIEM varied slightly from this schedule for the Smokey spot on only three occasions in the entire week of showings; KMED played the Youth spot

around noon and 3:00 p.m. almost every day, but could not sacrifice the 8:00 p.m. prime time and instead played the spot between 10:00 and 11:15 p.m. The showings of our experimental spots were in addition to the regular fire prevention programming.

In each of the three communities a team of five interviewers and an interviewer-supervisor were hired. I trained the interviewing teams during the week of August 30, 1971. Interviewing began shortly thereafter with Schedule 1, the preliminary interview, and was concluded on Sunday, September 19, the day before the film spot showings began. No interviews were conducted during the week the spots were shown. Interviewing with Schedule II, the final interview, began on Monday, September 27, and was concluded by October 7.

Schedule I was essentially the same as Questionnaire I except that four filler items were eliminated. Also, the background information section was redesigned for interviewing and included more demographic information, such as occupation and income.

Schedule II, Part I, determined a respondent's wildland experience. Part II repeated the attitude and knowledge questions of Schedule I. Part III was considerably changed from Questionnaire I to fit the second experiment. It probed, first through recall-type questions, and then recognition-type questions, whether a respondent saw, or remembered seeing, the experimental spot. Part III also included both subjective and objective measures of response to the narrator, Smokey Bear in Arcata, and the Youth in Yreka. The objective measure was a much shortened and simplified version, better adapted to interviewing, of Part II, Questionnaire II. Fifteen adjectival pairs of antonyms made up a two-point scale; either the adjective or its antonym could be chosen to describe the narrator, but nothing in between. Part III also included questions on the TV-watching, radio-listening, and organizational behavior of the subject.

Interpretation of Scores

To test the hypotheses in both experiments as to attitude and knowledge changes and narrator effectiveness, scores on the relevant items as described above were compared.

Changes were studied on an individual-item basis. Whether a respondent underwent a positive attitude change toward fire prevention, or learned something about proper fire practices, was measured by determining the difference between his "before" and "after" scores on each item. Changes were also measured as differences between total attitude and between total knowledge scores and differences between summed scores on three differentiating attitude statements. Where scores on knowledge questions were compared the differences are called knowledge change scores and where scores on attitude statements were compared the differences are called attitude change scores.

The operational indicator of narrator credibility was the scoring of the antonyms bounding a seven-point scale in the first experiment, and making up a two-point scale in the second experiment. An average score of all the scores on the adjectival pair scales was used, but scores were also computed on a particular dimension such as credibility, attraction or sociability, using the applicable groups of adjectival pairs.

Scores were evaluated for statistical significance by the Kruskal-Wallis one-way analysis of variance test (Siegel 1956, p. 184-94). The Mann-Whitney U test for comparison of individual pairs of treatments was also used.

RESULTS

Knowledge and Attitude Change

Experiment 1

Significant gains in fire prevention knowledge were made by those students viewing any one of the three experimental fire prevention films. The gain was particularly noticeable in a comparison of the total knowledge scores on the three fire prevention practices questions *(table 1).* Almost all in the control group chose the same answers after seeing the unrelated film as they had before. The statistically significant difference in knowledge change scores ($P < 0.001$) occurred in completion of these statements: "The surest way to put out a campfire, assuming all these methods are available, is to ..." and "When building a campfire it is safest to ... " The difference in change scores in completion of the statement "It is safest to smoke in the woods while ... " was significant ($0.02 < P < 0.05$), but the probability of this difference occurring by chance was greater than that for the differences in scores on the other two statements.

Sizable percentages of each student group changed to the correct answers after they saw the film spot. In

Table 1–*Total knowledge change on three questions on fire prevention practices, among California high school students who viewed one of three experimental fire prevention films* [1]

Direction of change		Youth (n=40)	Smokey (n=48)	Ranger (n=46)	Control (n=36)
		Percent[2,3]			
	+3	7	21	2	0
To correct:	+2	28	19	24	0
	+1	35	33	37	22
No change	0	28	27	30	75
To incorrect	-1	3	0	7	3

[1] A total knowledge change score is the difference between the total scores received, before and after seeing a film, on the three questions testing knowledge of fire prevention practices.

[2] Differences between treatments and control were significant by Kruskal-Wallis test on ungrouped scores: This yielded an H = 29.34, which with df = 3 shows P <0.00001.

[3] Columns may not add to 100 percent because of rounding.

the Youth, Smokey, and Ranger viewing groups, 53, 48, and 39 percent respectively changed their answers to the correct one on the surest way to put out a campfire. On the safest way to build a campfire, 28, 45, and 41 percent respectively changed to the correct answer. On both these questions, 92 percent of the control group chose the same answer, correct or incorrect, they had chosen before seeing the unrelated film. Comparing the total knowledge scores, we find that 70, 73, and 63 percent respectively of the Youth, Smokey, and Ranger groups changed from one to three of their answers to correct ones following the film. In the control group the total knowledge score changed in a positive direction for only 22 percent of the students, and then by only one point.

Comparison of the experimental fire prevention film groups by pairs showed no one film to be significantly more effective than either of the others in teaching these proper campfire practices.

In attitude items, no statistically significant differences in change scores occurred among the four film groups, as shown in scores on single attitude statements, total scores on all 11 statements, or a summed score of the three differentiating statements. The tendency in all four groups, however, was for the total fire prevention attitude change score to shift to a weaker or less favorable position *(table 2)*. This effect may have been due to the testing situation or instrument itself. A probable explanation is that the respondents did not react as strongly to an attitude statement when confronted with it for a second time. This tendency was slightly reversed, except in the control group, for the summed change scores on the three discriminating attitude statements.

Experiment 2

The significant fire prevention knowledge gains by the students justified the effort to determine whether the experimental film spots would retain their effectiveness under conditions of normal use.

Sample projections indicate that close to one-third of the Yreka population studied, and more than one-fourth of the Arcata population studied, saw the film. In Arcata, 20 percent definitely recalled seeing or recognized a description of the Smokey spot; 8 percent were not sure whether or not they had seen it. In Yreka, 24 percent definitely saw the Youth spot, 8 percent were not sure.

Regardless of whether or not they recalled seeing the film spots, those in the communities where the films were shown had a greater tendency to change to the correct answers on the fire use practices questions than did those in the control community *(table 3)*. The differences, however, were not statistically significant.

The Smokey and Youth films significantly differed in their effectiveness in changing attitude on only one out of 11 attitude statements: "Fire prevention rules and regulations should be more strictly enforced." The Kruskal-Wallis test showed $0.001 < P < 0.003$. (Where there are 11 items the probability of a chance difference this large is less than 0.033.) This significant difference in the effectiveness of the two films holds, even when those who recalled seeing a spot and those who did not are considered separately. In the Yreka area, where the Youth film was shown, attitudes became more positive toward this statement after the showings. In the Arcata area where the Smokey film was shown, the opposite occurred; after

Table 2–*Total attitude change on eleven attitude statements, among California high school students who viewed one of three experimental fire prevention films.*

Direction of attitude change	Youth (n=40)	Smokey (n=48)	Ranger (n=46)	Control (n=36)
	Percent[1]			
Stronger	32	37	39	36
No change	13	8	4	8
Weaker	53	52	52	50
No answer	3	2	4	6

[1] Columns may not add to 100 percent because of rounding.

Table 3–*Total knowledge change score on three questions on fire prevention practices, among respondents in three California communities who viewed one of three televised film spots.*[1]

Direction of change	Yreka (Youth) n=114	Arcata (Smokey) n=97	Red Bluff (Control) n=97
	Percent[2,3]		
To correct	31	28	21
No change	49	51	59
To incorrect	20	22	21

[1] A total knowledge change score is the differences between the total scores received, before and after seeing a film, on the three questions testing knowledge of fire prevention practices.

[2] Differences between treatments and control were not significant by Kruskal-Wallis test on ungrouped scores. This yielded an H = 2.23 which with df = 2 shows $0.30 < P < 0.50$.

[3] Columns may not add to 100 percent because of rounding.

the showing, people were inclined to feel less strongly than they had previously about the enforcement of fire prevention regulations. [3] The differences from the control results in Red Bluff [4] where over two thirds of the respondents showed no attitude change in the Schedule II interview, were significant. The percentages, for those who recalled seeing the spot, were Youth: stronger 28 percent, weaker 7 percent; Smokey: stronger 9 percent, weaker 27 percent. For those who did not recall seeing the spot, percentages were Youth: 22 and 19 percent, Smokey: 8 and 31 percent. The control group as a whole showed changes to stronger, 8 percent and to weaker, 15 percent. Thus, of those control subjects who did change, most moved to a more negative position, but this tendency was not as great as in the Arcata (Smokey) area. No statistically significant differences in attitude change occurred on 10 other attitude statements, when compared singly, or when summed scores on all 11 attitude statements, or on the three discriminating statements were compared.

Because the films were designed to reach the high fire risk segment of the population under 25 years of age, the effectiveness of the films with different age groups was compared. Age was found to have no significant relation to the effectiveness of the films. Comparisons were made for 19 other characteristics, including 12 that were socio-economic, five that indicated relevance of fire prevention to respondents, and two that described the respondents' residential environment. Preliminary tests (Kruskal-Wallis) showed that the attitude changes from the three experimental treatments differed significantly according to subgroups determined by marital status, family size, current employment status, and relevance of fire prevention. When individual pairs of film treatments are compared, (Mann-Whitney U test) for such differences, however, the pattern of response is inconsistent. (For example, the Smokey film may be more effective with married persons than with the widowed, divorced, and separated in changing an attitude in a positive direction on one statement, and the Youth film more effective with the married in improving their attitude on another statement.) For only a few subgroups did attitudes improve after the Smokey film was shown; in most, attitudes were weakened. Grouping according to the relevance of forest fire prevention produced some interesting results, however.

Criteria used to determine whether or not forest fire prevention was relevant to viewers were these questions: Did they visit forest or wildlands in the past year? Or work or visit there in the past 3 weeks? Did they live or work in forest or wildlands, or visit there 11 or more times in the last year? The Youth film was more effective than the Smokey film *(table 4)* in changing the attitude of those who had had recent forest and wildland experience, by all four criteria, to a stronger position on the statement "Fire prevention rules and regulations should be more strictly enforced." With several criteria, however, the effect of the Youth film was not significantly different from that in the control community. That is, the significant difference between the Smokey and Youth film was, with these criteria, due to the extent of the negative effect of the Smokey film rather than to the positive effect of the Youth film.

The Youth film was also effective with those to whom forest fire prevention is less relevant because of their lack of recent wildland experience. But the Youth film's effectiveness did not hold for all criteria of nonrelevance, sometimes changing a subject's opinion in a positive direction on one attitude statement, sometimes on another, and sometimes not at all. In fact, the Smokey film's attitude-changing capacity was greater with this group to whom forest fire prevention is not relevant, because they do not go to the wildlands, than it was with any other subgroup.

[3] The Mann Whitney U test showed for Smokey vs. Youth, U 5503 or z = 3.26 and P of $z \geq 3.26 < 0.0007$.

[4] The Mann-Whitney U test showed for Smokey vs. Control, U = 4288, z = 2.03, P of $z \geq 2.03 = 0.02$; Youth vs. Control, U = 3889, z = 1.61, P of $z \geq 1.61 = 0.05$.

Opinion of Narrator

Experiment 1

On only one of the dimensions for evaluating message sources—attractiveness—was there a statistically significant difference in the opinion scores of the high school students viewing the fire prevention spots *(table 5)*. The adjectival pairs making up this dimension were: attractive—repulsive, one of us—one of them, stuffed shirt—regular guy, and plastic—real. Whereas the Youth and the Ranger were rated high on the attractiveness dimension (average scores 4-6) by 45 and 50 percent, respectively, of their viewers, Smokey was rated low on this dimension (average scores 0-3) by 63 percent of his viewers. There were no statistically significant differences on the sociability dimension; nor were there on the source credibility dimension or on a total opinion score figured on all 29 scales.

Table 5—*Scores on attractiveness of message narrator in television film spots viewed by California high school students who viewed one of three experimental fire prevention films*[1]

Attractiveness score	Youth (n=40)	Smokey (n=48)	Ranger (n=46)
	Percent [3]		
Positive (4-6)	45	15	50
Intermediate (3.1-3.9)	25	19	15
Negative (0-3)	25	63	28
No answer	5	4	7

[1] Differences between treatments were significant by Kruskal-Wallis test on ungrouped scores: This yielded an H = 13.69 which with df = 2 shows $0.001 < P < 0.01$.
[2] Based on ratings of adjectival pairs: attractive–repulsive; one of us–one of them; stuffed shirt–regular guy; plastic–real.
[3] Columns may not add to 100 percent because of rounding.

Table 4—*Change in attitude shown toward enforcement of fire prevention regulations among respondents in three California communities after seeing one of three televised film spots, by type of narrator and relevancy of films to respondents' experience* [1]

Narrator in film viewed, and relevancy [2]	Change in respondent's attitude after seeing fire prevention film		
	Stronger	No change	Weaker
	Percent		
Youth:			
Relevant (n=41)	32	51	17
Not relevant (n=61)	18	67	15
Smokey:			
Relevant (n=52)	6	65	29
Not relevant (n=34)	12	53	35
Control:			
Relevant (n=28)	11	71	18
Not relevant (n=58)	9	78	14

[1] Mann-Whitney U test calculated with ungrouped scores showed:

Relevant

Youth vs. Smokey: U = 754, z = 2.60, P of $z \geq 2.60 = .005$

Youth vs. Control: U = 483, z = 1.25, P of $z \geq 1.25 = .106$

Smokey vs. Control: U = 620, z = 1.17, P of $z \geq 1.17 = .121$

Not relevant

Youth vs. Smokey: U = 796, z = 2.16, P of $z \geq 2.16 = .015$

Youth vs. Control: U = 1632, z = .92, P of $z \geq .92 = .179$

Smokey vs. Control: U = 817, z = 1.66, P of $z \geq 1.66 = .049$

[2] Relevancy determined by answer to question: Have you worked in or visited in any forest or other wildland areas in the past three weeks?

Results on the subjective reaction items showed that most respondents in each of the groups which viewed a film spot (73 percent—Youth, 85 percent–Smokey, 87 percent—Ranger) thought it was somewhat interesting or very interesting. Most also thought that the scenes portrayed were generally pleasant or very pleasant (93 percent—Youth, 87 percent—Smokey, 85 percent—Ranger).

Forty-eight percent of both the Youth and Smokey film viewers, and 43 percent of the Ranger film viewers, reported they were either informed or fascinated, or both. The balance were indifferent, annoyed, or confused.

A majority (54 percent—Ranger, 56 percent–Smokey, 58 percent—Youth) when asked what they thought the main point of the film was, answered, "to show how to prevent forest fires." Another 35 to 37 percent either did not know the main point or replied that it was "outdoor recreation." The rest either did not remember, did not answer, or said the main point was to advertise "cigarettes," "soft drinks," or "motorcycles."

Experiment 2

No significant difference between the two viewing communities was noted in the respondents' opinions of the narrator. This was true of opinion scores based on the complete set of adjective scales as well as on either of the two single dimensions, attractiveness and credibility. The latter dimension, in this experiment,

was composed of 14 of the adjective scales recommended by Berlo, Lemert, and Mertz (1969-70, p. 574) and the former only on the one scale, attractive —repulsive.

The absolute numbers in the samples of those who recalled seeing the spots are too small to make subgroup comparisons of credibility or opinion of narrator meaningful.

According to subjective reactions of those who saw a film, the Youth film was somewhat more impressive than the Smokey film. In Yreka 88½ percent said the Youth film was very interesting or somewhat interesting, and the rest said it was not very interesting. In Arcata 57 percent said the Smokey film was very or somewhat interesting and 43 percent said it was not very or not at all interesting.

Ninety-six percent of the Youth film viewers found the scenes portrayed pleasant and 4 percent found them very unpleasant. Eighty-nine percent of the Smokey film viewers found the scenes portrayed pleasant or very pleasant and 11 percent found them unpleasant.

Of the Youth film viewers 83 percent found the Youth agreeable and the balance found him *very* agreeable. All the Smokey film viewers found him only agreeable.

DISCUSSION

The 60-second fire prevention television spots tested in this study were designed for use on commercial channels, where they would be received by the public at their discretion, ordinarily in the home. The captive audience evaluation with students was merely a stepping stone to the field evaluation of these fire prevention spots.

The spots were more effective in teaching proper fire use practices when shown to the captive audience. None of the films improved attitudes in this use, but the Youth film did, apparently, have a limited effect on attitude when shown to the public.

In the showings to students, Experiment 1, no one of the fire prevention films was significantly more effective than another, but all three were significantly effective in teaching the viewers how to build and how to put out a campfire. These results, and the absence of significant differences between viewers' evaluations of the narrator, except as to attractiveness, suggest that the narrator did not affect the reception of the total film. This conclusion is borne out by the viewers' subjective reactions, which vary little from film to film.

The important thing we found in the first experiment was that youngsters in a classroom situation did learn proper fire use practices from the explicit directions and demonstrations in these films. But this did not happen for the reason hypothesized: that the identification potential of the Youth film would render it more effective with "undereducated" young people than the Smokey or Ranger film. The findings of the first experiment did not show that the improved learning was from identification with, greater credibility of, or even greater attractiveness of a peer group member rather than an authority figure or symbolic figure.

The hypothesis being disproved, we can only guess at the reasons for all three films' success in the classroom experiment. For example, identification with the young people arriving by car and motorcycle and interest in the rock music and general party atmosphere portrayed in each of the films may have overwhelmed the change in only one variable, the character of the narrator. On the basis of Experiment 2, however, carried out under conditions of normal television viewing, this conjecture does not hold up. Here no teaching effect was observed, but the Youth film was effective, though to a limited extent, in changing attitude in a positive direction, whereas the Smokey film weakened attitudes. Again, we must guess at the reasons for the significantly greater attitude-change effectiveness of the Youth film, for there were no significant differences between the two films on the hypothesized factor, credibility or opinion of narrator.

If we look for an explanation in environmental factors in the communities, two of the most obvious relevant variables are forest fires and the effect of other fire prevention programming during the test period.

According to the National Forest offices, a major forest fire, or one reported as major, took place in the surrounding area of each of the communities during the study.

On September 18, 1971, just as the Schedule I interviews were being completed and 2 days before the spot showings began, a major fire, the "Red Fir Fire," started in the Klamath National Forest near Yreka. This fire was contained on September 19. Also on September 18, the "Lamb" fire started in the Six Rivers National Forest near Arcata. Because of its potential this fire was reported in the news as a major

fire. Under aggressive air attack, however, it was contained the same day at 241 acres. The largest fire occurred in the Mendocino National Forest near Paskenta outside Red Bluff, our control community. This fire started on September 13, about midway in the interview period preceding the spot showings and was not contained until September 18. It burned 1,500 acres.

Thus, the fire situations in the test communities of Yreka and Arcata were very similar during the study period and are not likely to explain any differential effect in attitude change. If the fire situation was influential, the expected improvement would have been not in Yreka, but in Red Bluff, where the fire was largest and of greatest duration.

Other fire prevention programming, as indicated by the schedules of other fire prevention spots played during the test week, was apparently not a factor. Station KIEM, which played the Smokey Spot, had a much heavier schedule of regular fire prevention spots, especially the first part of the week, than did KMED. This is probably a fairly good indication of the fire prevention spot dosage in these communities because only a few channels are received in each. Since TV coverage of fire prevention seemed to be heavier in the Eureka–Arcata area than in Yreka, assuming a positive correlation between dosage and improved attitude, we would expect the reverse of the effects that actually occurred. Therefore, we cannot attribute the improved attitude in the Yreka area to the amount of TV spot fire prevention coverage.

Although our hypothesis that the Youth film would be more effective was confirmed in the second experiment, this was not because it was more effective with the youth under 25 years of age for which it was designed. It was just as effective with one age group as another in changing attitude toward a stronger interest in the enforcement of fire regulations.

The Youth film, irrespective of the wildland experience criterion used, was more effective than the Smokey film in changing the attitude of those who had had recent forest and wildland experience to a stronger position on the statement, "Fire prevention rules and regulations should be more strictly enforced." With several criteria, however, this effectiveness is only apparent; the changes did not differ significantly from the changes that occurred in the control community. In other words, the significant difference between the Youth and Smokey films was due more to the latter "turning off" those with wildland experience, than to the former "turning them on." By the relevance-of-fire-prevention criterion, the Smokey film was effective in changing attitudes in a positive direction, in a few instances, but only with those who had *not* had wildland experience, that is, only with those to whom fire prevention had least relevance.

Perhaps the most important group to reach with our fire prevention messages is those who visit, live, or work in the wildlands. In the experiment using films with varying degrees of threat (Bernardi 1970), we found that the "mild threat" film was especially effective with those who had lived or worked in wildlands in the past year. Although the field experiment reported here has ruled out Smokey as an effective message source in the normal viewing situation for *both* this group and visitors to wildlands, it has added very little to our knowledge about what *will* reach those to whom fire prevention is relevant.

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