



Effect of Color on Recall in Fire Prevention Signing

WILLIAM S. FOLKMAN

ABSTRACT: An exploratory experiment, designed to determine the effect of color on recall in fire prevention signing, was conducted on the San Bernardino National Forest. Background color of usual black on light yellow fire prevention signs was changed to bright, high intensity orange. The change may have affected impact, but did not improve recall. Frequency of exposure to fire prevention signs influenced the number of signs reported observed.

The interaction of many forces produces varying reactions to the use of color. The new-car buyer lingers over a fire engine-red convertible before settling for a conservative grey sedan. A meat market increases its sales by changing the lighting that had been giving its products an unappealing blu-

ish appearance. Color pulls one way and a host of other factors pull another. Sometimes color wins and sometimes it loses.

Research and experience in the use of color are beginning to explain what color can and cannot do. What is the relevance of color in fire prevention signing? Does color make a difference in impact and recall, visibility and legibility? Do the differences warrant the extra cost?

An exploratory experiment, designed to determine the effect of color on recall, was conducted at Barton Flats, San Bernardino National Forest in southern California during the weekends of October 5-6 and 12-13, 1963. The procedure was simple. Two signs were prepared, duplicating the regular 44- by 17-inch fire prevention sign format, except for the substitution of a bright, high intensity (but not fluorescent) orange color for the usual light yellow background. The texts of the two signs were: "HELP PREVENT FIRES," and "AMERICA NEEDS PRODUCTIVE FORESTS." To control for differences in wording, day of the week, etc., the two signs were put up on alternate days and the order reversed for the second weekend; i. e., the sign "America Needs Productive Forests" was displayed on Saturday, October 5, and Sunday, October 13. The sign "Help Prevent Fires" was put up on Sunday, October 6, and Saturday, October 12. The signs were thumbtacked over the faces of regular existing fire prevention signs.

Although the experiment was conducted after the usual summer season, the regular signing program was in effect, and the fire danger was considered high. Traffic counts taken at the Mill Creek Ranger Station were:

	<u>Vehicles</u>
Saturday, October 5	931
Sunday, October 6	241
Saturday, October 12	3,168
Sunday, October 13	343

Of these vehicles, an estimated 10 percent turned off before reaching Barton Flats.

Existing administrative procedures in determining the effect of the experimental change of the signs had to be relied on because it was not possible to interview recreationists directly. Check-sheets for their voluntary participation were placed on the counter at Barton Flats where campfire permits were issued. The sheet requested visitors to check the signs they were sure they had seen in their drive up to the area and to indicate how often they had driven the road.

Given a rather small number of respondents and a high variability, it is still apparent from this experiment that the change in background color had little, if any, effect on the rate of recall (table 1). Several of the respondents said that they had noticed an unusual colored sign, indicating that the color and/or its uniqueness among the usual black and yellow signs may have increased its impact, but the message was not apparently retained.

Orange has the highest visibility rating of the five standard colors--orange, yellow, green, red, and blue--although yellow is rated nearly as high.¹

The change in background color possibly may have reduced the legibility of the signs. (Psychological tests rank black on yellow as the most effective color combination for legibility.)²

The failure of the experimental change to produce the hypothesized effect cannot be easily explained. One factor, no doubt, is the high level of familiarity with the messages of the signs. This familiarity apparently resulted in an over-reporting of signs actually seen. One third of the respondents indicated having seen the sign "Please be careful with any fire"--a sign not in use in the Barton Flats area during the test period. One of the most frequently reported signs,

¹"Use and visibility of five standard colors II." Data Sheet #3021.1 New York: McGraw-Hill Publishing Co., 1953.

²Hackl, Al. What are the hidden meanings of color? Printers' Ink 249(6): 40-44, 1954.

"Fire permits required for all fires," was actually worded "Fire permits required in this National Forest" on the signs displayed along the Mill Creek-Barton Flats road.

The frequency with which signs were recalled varied widely (table 1). Their rank in terms of recall remained quite consistent over the reporting period and over different rates of exposure.

The frequency of exposure to these fire prevention signs (as measured by the response to the question "How often have you driven this road?") influenced the number of signs reported observed (table 2). Those who had never been over the road before reported the fewest number of signs seen, on the average. Those for whom this was the first trip this year and those who had traveled the road a number of times had the highest average number of signs seen.

Table 1. Proportion of respondents reporting having seen specific fire prevention signs, Barton Flats, San Bernardino National Forest, October 5-6 and 12-13, 1963

Fire prevention sign	Percent reporting	
	Saturday Oct. 5 Sunday Oct. 13 combined (n=87)	Sunday Oct. 6 Saturday Oct. 12 combined (n=72)
Recreation depends upon your preventing fires	41.4	27.8
Fire permits required for all fires	78.2	62.5
Help prevent fires	87.4	¹ 73.6
Smokey says: Prevent forest fires	65.5	52.8
America needs productive forests	¹ 36.8	25.0
Please be careful with any fire	33.3	33.3
None of the above	1.1	9.7

¹Sign background changed to bright orange.

Table 2. Mean number of reported signs seen, by frequency of exposure, Barton Flats, San Bernardino National Forest, October 5-6 and 12-13, 1963

Frequency of exposure ('How often have you driven this road?')	Number reporting	Mean number of signs seen
First time today	50	2.60
First time this year	36	3.56
Second or third time this year	45	3.08
Fourth or more times this year	28	3.54
Total	159	3.10

WILLIAM S. FOLKMAN is responsible for studies of ways to aid the prevention of man-caused fires, with headquarters in Berkeley. He joined the Station staff in 1962. He was graduated from Utah State Agricultural College, and earned a master's degree at the University of Utah and a doctorate at Cornell University.