

Signing for the 'No Smoking' Ordinance in Southern California

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ABSTRACT: Symbolic signs, especially designed to aid enforcement of "no smoking" ordinances, had high visibility and were correctly interpreted by most travelers. Signs with words "NO" and "OK" were superior to signs without these words. Observation and interpretation of the signs were greater among the younger persons and among those who smoked.

It is unlawful to smoke while traveling on many roads in the mountains of southern California, including some highspeed, multi-lane highways. Signs alerting motorists to their entrance into restricted zones are of diverse types, sometimes

difficult to comprehend at prevailing speeds and, consequently, confusing to many. Stops where smoking is permitted are sometimes provided, but are usually inadequately marked. As a result they are infrequently used. Similarly, motorists are often not made aware that they are leaving restricted zones. The resultant confusion may have an adverse effect upon public relations, and upon compliance with this and other regulations.

Even though opinions differ about the desirability of the restriction and the necessity for its enforcement, if the "no smoking" ordinance is to remain on the books, effective administration would seem desirable.

This note reports the results of a study to assess the effectiveness of signs of a new design intended to help administer the ordinance. The study represents one aspect of a continuing program in fire prevention research sponsored jointly by the California Division of Forestry and the Pacific Southwest Forest and Range Experiment Station.

The design tested is a simple, symbolic representation modeled after the international road signs already familiar to many motorists. One sign was designed to identify a no-smoking zone (fig. 1). It is 24 inches in diameter, white in color, with a red border and interdict bar. A burning cigarette is represented in black. The sign was designed to provide a standard, instantly recognizable,

easily interpreted means of identifying those portions of motorways where the restriction is in effect. It was felt to be imperative that the sign be understood with a minimum of educational effort or supplemental explanation. A second sign (fig. 2) in blue and white, was designed to identify the end of no-smoking zones, and to signal stopping places where smoking is allowed.

Two sets of each sign type were used, one set with the words "NO" and "OK" and the other with them omitted. The modification was used to determine if the words increased the signs' effectiveness sufficiently to justify their inclusion. Simplification makes a sign easier to take in at a glance, but there may be a point at which it also reduces comprehension of the sign's meaning.

METHODS

The "smoking-prohibited" signs were posted about a mile apart along a 5-mile stretch of road approaching the Lytle Creek Ranger Station, San Bernardino National Forest.¹ This is a paved, two-lane county road providing access to Lytle Creek Canyon. The canyon is heavily used and provided a wide sample of one-day recreation visitors, campers, and summer home users as well as year-long residents.

A check point was set up at the ranger station where motorists were stopped and asked to respond to a short questionnaire. One man was stationed at this point. When a driver granted permission for the interview, he was directed to pull ahead into the shade where one of two interviewers was waiting. Cars were waved on when both interviewers were occupied. Thus, the rate of interviewing was used to provide a random sample of the motorists. Interviewing was done Thursday through Monday over a 6-week period in July and August, 1964.

Each set of no-smoking signs, one set containing the word "NO", the other without, was posted one day at a time in such a schedule that each received the same amount of exposure on each day of the week (excluding Tuesday and Wednesday when no interviewing was done). As a check, one-third of the time no signs were posted, but the interviews were conducted as usual.

In each instance the driver of the vehicle was interviewed. A small piece of colored plastic tape was affixed to the front bumper of each car so that it could be readily identified to avoid repeat interviews. The 2,140 successful interviews were distributed as follows:

Sign with word "NO" displayed.... 753

Sign with no wording displayed.... 697

Check (no signs displayed)..... 690

While the interviews were being conducted at Lytle Creek, signs were also posted on State Highway 18 leading up to Lake Arrowhead

¹Owing to extremely high fire danger at the time, all smoking stops were closed. As a consequence, the "smoking-permitted" signs could not be posted.

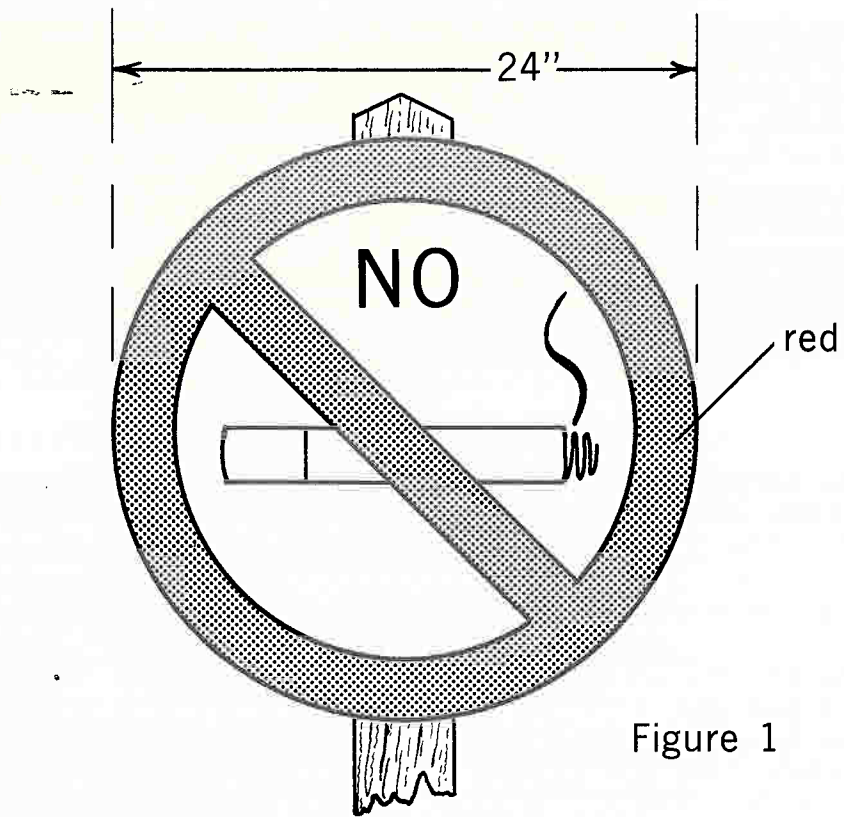


Figure 1

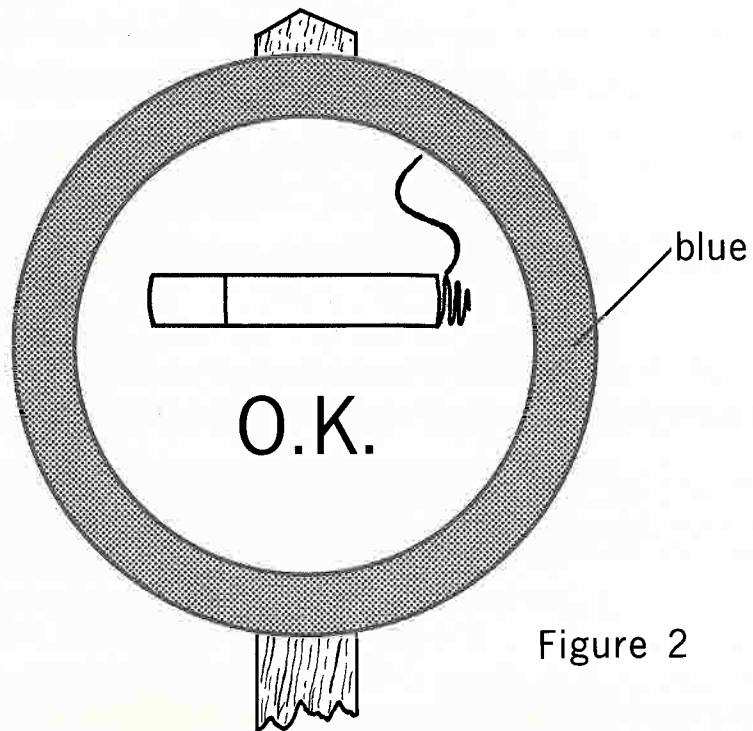


Figure 2

and on the Banning-Idyllwild county road. The smoking-permitted signs were posted at smoking stops in both of these areas. Both are far enough from the interview station that there was little possibility of any interaction with the study being conducted there. During the first half of the study one of the modifications of the signs was used on one highway and the second set on the other. Halfway through the study period the signs were switched so that both highways received equal exposure to both modifications of the signs. No interviewing was done in these areas, but all personnel on the Forest were alerted to keep a record of all spontaneous questions and comments the signs engendered among forest visitors.

FINDINGS

The signs proved effective in attracting the eye in spite of competition from other signs and other objects in the visual environment. Few people had difficulty in correctly interpreting the symbolism. In general, signs with the word "NO" added were approximately 10 percent more effective than those which relied exclusively on symbols.

The drivers were first asked if they had noticed any new signs on their drive up the road. More than half of those exposed to either of the two experimental signs remembered seeing a new sign (or signs), less than one-third of those questioned while the signs were not displayed said they recalled a new sign.² When asked what the new signs were concerned with, 85 percent of those exposed to the signs with the word "NO" and 73 percent of those exposed to the sign with no wording replied that the new signs they saw concerned the prohibition of smoking. One-third of those of the check group (unexposed to either set of the experimental signs) who reported sighting new signs also said that these signs concerned prohibition of smoking. (Customary fire prevention signing was displayed as usual during the test period). During this portion of the interview no indication was given of the purpose of the study.

Next, the drivers were shown a picture of the sign displayed and then asked if they recalled having seen that particular sign. For the check group, the drivers were shown a picture of the one modification of the sign one day and the other the next "dry run" day; thus, about equal numbers were shown each modification of the sign.

With their memory jogged by the picture, 88 percent of those actually exposed to the "NO" sign recalled having seen it previously; 79 percent of those exposed to the wordless sign responded similarly (table 1). Twenty percent of the check group shown the "NO" sign said they had seen it before and 17 percent of the check group shown the other sign said they had seen that sign. Although the response from the check group gives some indication of the magnitude of error induced by people wanting to give what they feel is the socially acceptable response, this bias is probably exaggerated. Some of these people may have been passengers in vehicles on previous days, or

²Unless specifically stated otherwise, differences reported here and throughout this note were found to be significant at the 0.1 percent level as measured by Chi-square.

were waved on in an earlier trip, so it is possible that some of them had actually seen the signs before.

When asked what the sign meant to them, 93 percent of those exposed to the "NO" sign associated it correctly with a prohibition on smoking (table 1). Of those exposed to the other sign, exactly 10 percent fewer correctly interpreted it. In both groups, there was a statistically significant tendency for those who said they had not noticed the sign to give "Other" or "Don't Know" responses to the question of the meaning of the signs.

Because extremely high fire danger had closed all smoking stops, it was not possible to display the signs symbolizing smoking-permitted. Despite little possibility that any driver had seen the signs before, when shown a picture of one or the other of these signs, 6.4 percent said they had.

Again, wording helped interpretation: 89 percent of those shown the sign with the letters "OK" on it said it meant "smoke here." Only 49 percent shown the picture of the plain sign gave the correct interpretation (table 2). Those who said they had actually seen the sign tended to misinterpret the sign, or said they didn't know what it meant.

Table 1. Responses to questions regarding no smoking signs, San Bernardino National Forest, July-August, 1964

Question and response	Facsimile of sign with word "NO" shown		Facsimile of sign with no wording shown		Total
	Sign displayed	Check (No sign displayed)	Sign displayed	Check (No sign displayed)	
-----Percent-----					
Do you recall having seen this sign or not?					
Yes	87.6	20.5	79.2	17.3	62.8
No	11.8	79.2	20.1	82.0	36.6
No response	.6	.3	.7	.7	.6
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
What does the sign mean to you?					
No smoking	92.7	90.3	82.7	78.0	86.9
Other	4.5	6.1	10.6	16.0	8.4
Nothing, don't understand it	2.8	3.6	6.7	6.0	4.7
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
Basis, number of responses	753	390	697	300	2,140

Table 2. Responses to question regarding smoking permitted sign, San Bernardino
Nation Forest, July-August, 1964

Question and response	Facsimile of sign with word "OK" shown	Facsimile of sign with no wording shown	Total
Percent			
What does the sign mean to you?			
Smoking permitted	88.6	48.7	70.0
Other	6.9	25.8	15.7
Nothing, don't understand it	4.5	25.5	14.3
	100.0	100.0	100.0
Basis, number of responses	1,143	997	2,140

In an interview situation such as this, where motorists are halted momentarily for questioning, the number of questions to be asked must be kept to a minimum. It was possible, however, to obtain a few items of information about the respondents. Some proved to be significantly related to correct interpretation of the signs.

Age of the motorists was one such item. The older the respondent, the less likely he was to interpret the signs correctly. For the no-smoking sign containing the word "NO", 92 percent of those under 38 years of age gave a correct interpretation. The percentage was reduced to 75 percent among those 65 or more years of age. For the sign without wording, the corresponding figures were 88 and 48 percent. The response to the two smoking-permitted signs was similar.

Smokers were more likely to notice the signs and to interpret them correctly than were non-smokers.

Other characteristics of the travelers had little or no significant affect. Contrary to expectations, those who traveled the road frequently during the current year, or had driven it several years, were neither more nor less aware of the signs than were those who were less familiar with the road. There were, likewise, no differences in their ability to interpret the signs.

Place of residence--whether local or out of state--was not associated with awareness of the signs, nor with their correct interpretation. Males were neither more nor less aware of the signs, nor were there significant sex differences in the ability to interpret them. Knowledge of the regulation regarding smoking while traveling in the area, was not related to awareness of the signs, nor to their interpretation.

It was thought that persons who had traveled in Europe, especially those who had driven on European highways, would be more

familiar with, and hence better able to interpret, this type of signing. But European travel did not prove to be a particularly significant variable. Only with the plain sign symbolizing permission to smoke was there a statistically significant difference (at the 5 percent level) between those with European driving experience and those without.

It was also conceivable that other persons in the car, particularly children, might distract the driver and impair his observation of the signs. But in this study, children or other passengers did not significantly affect the proportions of respondents observing the experimental signs.

The spontaneous responses made to Forest Service personnel regarding the signing on State Highway 18 and the Banning-Idyllwild County road indicated that the signs were correctly interpreted and were favorably received. The only problem encountered was pilferage, especially of signs displayed at smoking stops. Apparently they represented an exceptionally attractive trophy to youthful sign collectors. There is no reason to assume, however, that this difficulty would be any greater than for any other type of signing once their use became established.

DISCUSSION

The signs tested in this study demonstrated exceptional effectiveness in attracting attention of motorists in spite of competing objects, and they were self-explanatory to most people. The test results also left little doubt that the modifications containing the words "NO" and "OK" were superior to the signs without wording. This study did not, of course, directly demonstrate the superiority of these signs over existing signs. However, if it is accepted that to be effective a sign must first be seen and then understood, then these signs must be rated highly. None of the other fire prevention signs tested thus far has demonstrated these qualities to the extent these signs have.³

The results of the experiment do suggest that an operational trial be made with the signs. It is not anticipated that the signs would entirely replace all currently used signing. Instead major entries into restricted areas should be marked by conspicuous signs, such as are presently used on some roads, and the new signs placed at appropriate intervals along the roads to reinforce the initial message and to keep motorists continually aware of the hazardous environment through which they are driving. With different agencies responsible for contiguous areas, signing practices must, of course, be closely coordinated.

It is considered highly desirable that smoking stops, and exits from restricted areas, be clearly marked, as with the smoking-permitted signs described in this note.

³Ruckel, Gail J., and Folkman, William S. Roadside fire prevention signs--standard and new designs compared. Berkeley, Calif.: Pacific SW. Forest & Range Expt. Sta. U.S. Forest Serv. Research Note PSW-65. 8 pp., illus. 1965.

Several co-workers suggested that green might be a more suitable color than blue for the smoking-permitted sign--green symbolizing approval, or "go ahead", from its association with the go signal of a traffic light. A trial comparing the effectiveness of green and blue might be considered. However, blue was originally selected not just to be consistent with the international signing system (which has not been adopted in this country), but also for two other reasons: its relatively high visibility in a forest situation, and its contrast to the smoking-prohibited sign. Then too, the extent to which symbolic significance of a green light is actually transferred to a green sign is an open question. Even if such a transfer does exist, its advantage in encouraging interpretation may be offset by the decrease in visibility among the prevailing colors of a forest environment.

The Author. . .

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