

Abridgment

Advance Road Sign Messages for Highway Advisory Radio Systems

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Two laboratory studies of human factors were conducted to evaluate candidate messages to be displayed on an advance-notice road sign. The sign would be used to direct drivers to tune their radios for reception of traffic information, particularly in incident or construction situations that necessitate route diversion. Study 1 was conducted in Los Angeles and investigated the meanings implied by each of ten candidate messages by use of an independent group design. Study 2 was conducted in College Station, Texas, and investigated message preferences by use of the paired-comparisons method. The combined results suggest the briefest message to adequately alert drivers to adjust their radios to obtain traffic information.

A practical design question is the message content of an advance road sign to inform drivers to tune their radios to a particular AM frequency. Gatling (1) investigated distances between signing based on tuning time. His research suggested the need for two signs, one before the broadcast area and one after the area has been reached. He also studied the order of certain message elements but did not study specific message wording.

Brizell and Veale (2) studied three signs for the Walt Whitman Bridge highway advisory radio experiment. The first displayed RADIO TRAFFIC INFORMATION is AHEAD; the second also gave the distance and the frequency to set. The third repeated the information and added WHEN FLASHING. RADIO TRAFFIC INFORMATION was the only message studied and subjects were asked if the message was clear; no attempt was made to determine whether the messages were understood. A need existed to investigate specific content and wording of such a message with respect to both correct comprehension of the intended message and the preferences for messages and message elements.

METHOD

A study of understanding and interpretation of message content was conducted in Los Angeles with 247 subjects. Independent groups of approximately 25 subjects each were given one of ten candidate messages. They were required to complete a questionnaire of three to five questions. The first two questions asked for a write-in of the meaning of the message and the importance of responding immediately to the advisory. The other questions varied with the particular message and were designed to probe the connotations of specific message elements.

The second study was designed to determine preferences for ten candidate messages. Three of the messages employed in the Los Angeles study were either modified slightly or replaced, based on the findings of the previous study. Forty subjects from College Station, Texas, were given pairs of messages in random order on 3 x 5 cards. They were required to select the message that better prepared them to receive the radio message. Each subject evaluated all combinations of the messages, for a total of 45 comparisons. In this study, subjects were instructed that the radio message would concern an accident or construction blocking the highway and

would advise them about a diversion route. They were allowed to hear several typical messages. This information was given to ensure that the subject's choice of words in the messages was based on the type of radio message expected.

RESULTS

In the Los Angeles study, each subject was asked to rate on a five-point scale the importance of responding immediately to the message. A rating of 5 was very urgent, 4 was urgent, 3 meant at my convenience, 2 was may ignore, and 1 was message irrelevant.

Table 1 presents the ten candidate messages. In the second column is the mean urgency rating. Messages were listed in order of decreasing urgency. The mean urgency rating was 4.0. Note that the first four messages contain the word ALERT; only one message that contained ALERT ranked as low as seventh. The moderately urgent messages contained ADVISORY, and ROUTE INFORMATION was more often in the at-my-convenience category.

The word alert has been reserved in our society for emergency or critical situations, such as TORNADO ALERT or AIR RAID ALERT, and by extension of meaning, it implies a direction to motorists to expect to do something that is not routine. TRAFFIC ADVISORY has been used for more routine traffic conditions, and ROUTE INFORMATION may be thought to mean guidance to visitors as at a tourist center, rather than point diversion-guidance information because of traffic conditions.

Column 3 of Table 1 presents the percentage of subjects who mentioned in their answers that a radio message was involved. All messages except C and H began with the word radio; however, these messages had as many or more mentions of radio as the other messages. Therefore, the advisory portion of the message may carry this meaning sufficiently.

Column 4 gives the percentages of those who thought the message to be given dealt with traffic conditions. Overall, the frequency of write-ins was low, but previous research suggests that a request for meaning is more often interpreted as asking what the motorist should do, rather than asking about the incident or the effects of it. However, message A (RADIO ALERT) was interpreted as giving traffic information by the lowest percentage; only 19 percent expected traffic information to be given. Another question found that 25 percent of the subjects read into this message an emergency unrelated to traffic conditions, whereas few subjects completely misunderstood other messages.

Probe questions supported the above findings that messages containing ALERT were seldom interpreted as routine information, whereas over 40 percent of the messages that contained either ADVISORY or ROUTE INFORMATION were classified as interpretations of routine information.

All except two messages displayed the number 1606 without explanation. The number was meant to imply 1606 KHz on the AM band. Answers to a probe question

Table 1. Average rating of message urgency and percentage of subjects understanding meaning.

Message	Urgency Rating	Radio Message Mentioned (%)	Traffic Conditions Mentioned (%)
A. RADIO ALERT TUNE 1606	4.5	95.2	19.0
B. RADIO TRAFFIC ALERT TUNE TO 1606 AM	4.4	81.0	66.7
C. TRAFFIC ALERT TUNE 1606	4.2	89.5	36.8
D. RADIO TRAFFIC ALERT TURN DIAL TO 1606	4.1	87.0	82.6
E. RADIO TRAFFIC ADVISORY 1606 ON YOUR AM DIAL	4.0	95.0	75.0
F. RADIO TRAFFIC ADVISORY TUNE 1606 FOR INFORMATION	4.0	68.8	50.0
G. RADIO TRAFFIC ALERT TUNE TO 1606	3.9	86.2	75.9
H. TRAFFIC ADVISORY TUNE 1606	3.8	100.0	42.1
I. RADIO ROUTE INFORMATION TURN DIAL TO 1606	3.7	76.2	71.4
J. RADIO ROUTE INFORMATION SET DIAL TO 1606	3.5	88.0	72.0

revealed that 75 percent of subjects felt it meant AM only and all but one of the others felt it meant either AM or FM.

The second study investigated preferences among the messages by means of the paired-comparisons method. Table 2 presents the messages in rank order in terms of percentage of times the message was preferred to all other messages. The two messages preferred most often were almost identical. Messages containing RADIO ROUTE INFORMATION or RADIO TRAFFIC INFORMATION were preferred less often than by chance. The latter message was not investigated in Los Angeles but was included because it was used in the study by Brizell and Veale (2). Messages that involved TRAFFIC ADVISORY were intermediate in preference. The RADIO ALERT message was preferred the least. In general, the preference data, using an independent sample in a different state, supported the findings of the Los Angeles study.

RECOMMENDATIONS FOR MESSAGE DESIGN

When the design objective is to imply an urgency to tune to a radio frequency, the word alert is most effective. Both the interpretation and preference data suggest the word implies a nonroutine, incident-related situation that requires action.

Abridgment

Legibility Study of a Lamp Matrix Sign

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The legibility of painted signs has received considerable attention and thus has been well developed in recent

Table 2. Order of preferences for messages.

Message	Preference	
	Rank	Percent
RADIO TRAFFIC ALERT TUNE DIAL TO 1606	1	70.5
RADIO TRAFFIC ALERT TUNE TO 1606	2	68.6
TRAFFIC ADVISORY TUNE 1606	3.5	56.4
TRAFFIC ALERT TUNE 1606	3.5	56.3
RADIO TRAFFIC ADVISORY TUNE 1606 FOR INFORMATION	5	48.2
RADIO TRAFFIC INFORMATION SET DIAL 1606	6	45.8
RADIO ROUTE INFORMATION TUNE DIAL TO 1606	7	43.7
RADIO TRAFFIC ADVISORY 1606 ON YOUR AM DIAL	8	43.1
RADIO ROUTE INFORMATION SET DIAL TO 1606	9	35.2
RADIO ALERT TUNE 1606	10	31.7

Although the word radio is implied somewhat from the advisory, the preference data support its inclusion. Omission of the word traffic can result in misunderstanding the message RADIO ALERT. Based on the two studies, RADIO TRAFFIC ALERT is recommended for this purpose.

The advisory message may be understood effectively by simply stating, "TURN TO (frequency number)" or "TUNE DIAL TO (frequency number)." Long advisory messages with redundant words should be avoided. SET DIAL and TURN DIAL were not evaluated independently, but the single word tune is well understood.

REFERENCES

1. F. P. Gatling. Advisory Message Studies for Route Diversion. Federal Highway Administration, Rept. FHWA-RD-75-73, June 1975.
2. E. G. Brizell III and N. L. Veale. Highway Advisory Radio in the Philadelphia Area. Delaware Valley Regional Planning Commission, Rept. FHWA-RD-78-77, April 1978.

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years; however, a similar body of knowledge about the legibility of lamp matrix signs is nonexistent. This un-