Color Identification in the Visual Periphery: Consequences for Color Coding of Vehicle Signals

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This field study investigated the efficiency of color coding for peripheral identification of vehicle signals. Specifically, the study dealt with identification of stimuli as “yellow” or “red” when presented at intensities corresponding to typical turn signal lamps and side marker lamps. Turn signal lamps were studied both during bright, sunny conditions and at night, while side marker lamps were studied at night only. We used two different yellow stimuli and two different red stimuli. For each color category, one stimulus was relatively far from the contrasting color category while the other stimulus was relatively near. Four viewing angles were used: 0, 10, 20, and 30 degrees from visual fixation. A total of 28 subjects participated, ranging from 21 to 78 years old.

Nighttime identification of colors was perfect at all viewing angles for stimuli representing turn signal lamps. On the other hand, there were strong effects of viewing angle for turn signals in the daytime and for side marker lamps at night. Although in these two conditions performance deteriorated for stimuli in both color categories, it did so more for the red stimuli. This finding is consistent with the previously reported finding that peripherally presented red stimuli often appear yellow.

The present findings imply that coding signals yellow and red is not sufficient for their peripheral identification under the two most difficult conditions tested (turn signals during bright daytime and side marker lamps during nighttime). To the extent that peripheral discriminability is important in actual driving, efficient signaling should rely on other coding parameters (e.g., intensity, and flashing versus steady burning).