with the field subjects and actively participated in the discussion for completing this manuscript.

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The Effect of Plain Packaging on Response to Health Warnings

Given that more than three quarters of those who smoke begin smoking before the age of 18 years,[1] reaching adolescents is critical if smoking rates are to be lowered. Getting them to pay more attention to the health warnings on cigarette packages may be helpful in this regard. Canadian public health officials have argued that plain packaging (i.e., packages with no logos, colors, or text except the brand name) could help achieve this goal.[2] This study was designed to evaluate the effects of plain packaging on calling attention to health warnings.

The study was conducted in a Vancouver, British Columbia, mall with 401 teenagers, aged 14 to 17 years, who indicated that they smoked cigarettes or were open to trying cigarettes within the next year. Subjects were randomly assigned to be exposed to 1 of 3 health warnings drawn from the 8 existing mandated ones: "Smoking can kill you," "Cigarettes are addictive," and "Tobacco smoke causes fatal lung disease in nonsmokers." Half of the members of each group (n=66 or 67) were randomly assigned to see the warning on the regular package, while the others saw the warning on the plain white package. Subjects privately viewed 1 of 3 images projected on a 15-inch color computer monitor for 4 seconds. The cigarette package was shown on a tabletop surrounded by a can of soda pop, a bottle of headache remedy, and a magazine. Following exposure, subjects were asked to recall the warning on the cigarette package.

As noted in Figure 1, recall levels for 2 of the 3 warnings were higher when subjects were exposed to the plain package. Recall levels for the "Smoking can kill you" warning were 22% for the regular package (95% confidence interval [CI]=14%, 34%) and 56% for the plain package (95% CI=44%, 67%; $\chi^2=15.83$; $P<.001$). Recall levels for the "Cigarettes are addictive" warning were 13% for the regular package (95% CI=8%, 23%) and 27% for the plain package (95% CI=18%, 39%; $\chi^2=3.75$; $P=.06$). Recall of the "Tobacco smoke causes fatal lung disease in nonsmokers" warning was not enhanced, however, but was actually adversely affected by the plain package: recall levels were 15% for the regular package (95% CI=11%, 24%) and 1% for the plain package (95% CI=0%, 6%; $\chi^2=6.34$; $P<.05$, by Yates correction).

Warnings on plain white packages may be more effective at getting attention and enhancing recall than warnings on regular packages. Responses to different messages varied, however. Recall of 2 starker, briefer, and more direct messages was enhanced by the plain packaging, but recall of a more technical, longer, and vaguer message was not. Further research is needed to determine exactly what accounts for these differences in response. □

Contributors

M. E. Goldberg planned and designed the study, analyzed the data, and wrote the paper. J. Liefeld assisted in the design of the study, analysis of the data, and writing of the paper. J. Madill and H. Vredenburg assisted in the design of the study.

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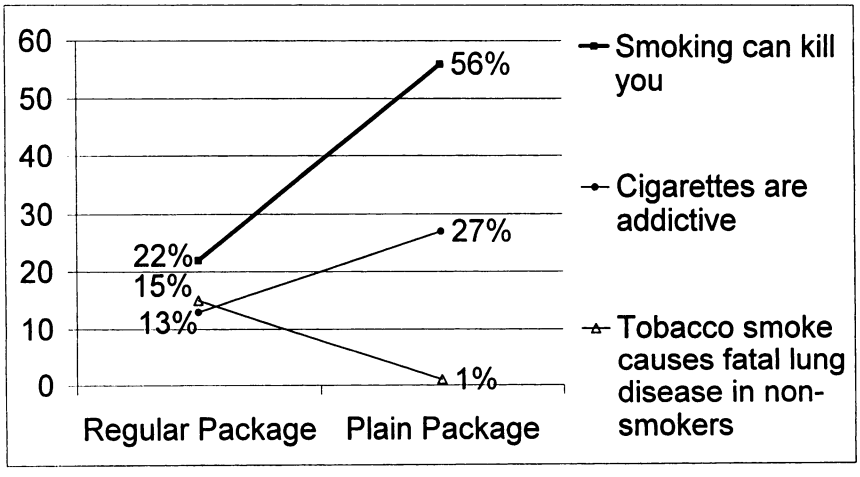

FIGURE 1—Percentage of subjects who correctly recalled health warning.

Health Canada; and Lynn T. Kozlowski, Pennsylvania State University.

Marvin E. Goldberg, PhD
John Liefeld, PhD
Judith Madill, PhD
Harrie Vredenburg, PhD

Marvin E. Goldberg is with the Department of Marketing, Pennsylvania State University, University Park. John Liefeld is with the Department of Consumer Studies, Guelph University, Guelph, Ontario. Judith Madill is with the Department of Marketing, Carleton University, Ottawa, Ontario. Harrie Vredenburg is with the Department of Marketing, University of Calgary, Calgary, Alberta.

Requests for reprints should be sent to Marvin E. Goldberg, PhD, Department of Marketing, Business Administration Building, Pennsylvania State University, University Park, PA 16802.

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Erratum

In: O'Malley PM, Johnston LD. Drinking and driving among US high school seniors, 1984–1997. *Am J Public Health.* 1999;89:678–684.

In the abstract, the second sentence under Results should have read as follows: "Rates of driving after drinking were higher among high school seniors who are male, White, living in the southern and north central regions of the United States, and living in rural areas."