Direct Mail in a Cardiovascular Health Campaign: Use and Effectiveness
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Public health specialists have concluded that mass media information campaigns can be "moderately successful" in educating the public on certain health issues. The present study examines the effectiveness of a particular mass medium, direct mail, in influencing the perceived importance of three controllable cardiovascular risk factors: cigarette smoking, high blood pressure, and high-fat, high-salt diets. In addition, this study assesses the relative effectiveness of three message strategies—positive, negative and neutral appeals—in educating the public about cardiovascular disease. The results indicate that direct mail can have significant effects on individuals' awareness and perceptions of salience of cardiovascular disease.

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The incidence of coronary disease is a growing concern for public health specialists both because it is the number one cause of premature death in the United States and because it is largely preventable. Only one in ten of all heart attacks and strokes is due to "hereditary" causes. The vast majority are due to causes well within the control of individuals (Blackburn, 1979; Farquhar et al., 1977; Maccoby and Farquhar, 1975). Scientific evidence makes it clear that three risk factors, in particular, contribute directly to heart disease: untreated high blood pressure, high blood cholesterol levels, and cigarette smoking (Farquhar et al., 1977; Maccoby and Solomon, 1981).

Public health specialists have become increasingly cognizant of the potential of public service advertising and other mass media vehicles to efficiently disseminate health information to the public. For example, the effectiveness of the mass media in modifying health knowledge, attitudes, and behaviors has been investigated in the context of drug prevention, family planning, heart disease, safe driving, and anti-smoking campaigns. Reviews of this literature are cautiously optimistic concerning the efficacy of mass media in health promotion, and conclude that mass media health campaigns can be "moderately successful under certain conditions" (Atkin, 1979). In particular, mass mediated health campaigns are most likely to be successful in increasing awareness and knowledge levels of health problems, making health problems more salient, or reinforcing existing health attitudes and behaviors (Schlinger, 1976).

The present research explores the effectiveness of a specific mass medium, direct mail, in influencing the perceived importance of three controllable cardiovascular risk factors: cigarette smoking, high blood pressure, and high-fat, high-salt diets. In addition to studying the overall effectiveness of direct mail as a medium of health promotion, this study examines the relative effectiveness of three message strategies: a neutral, "straight facts" appeal, a positive appeal, and a negative appeal. This direct mail campaign is an outgrowth of a long-term, interdisciplinary, community-based public health campaign conducted in the Upper Midwest, similar in scope and nature to the Stanford Heart Disease
Prevention Program (Maccoby and Farquhar, 1975; Maccoby and Solomon, 1981).

THE USE OF DIRECT MAIL IN INFORMATION CAMPAIGNS

Direct mail has been described as among the most selective, personal, and flexible of all mass media (Sissors and Surmanek, 1982). Direct mail messages can be precisely tailored to pinpoint target segments in large or small geographic markets through the use of up-to-date mailing lists. Yet despite the many advantages of the medium and a virtual explosion in the use of direct mail in recent advertising and political fundraising campaigns (e.g., Haggerty, 1979), a minimum amount of space is devoted to the direct mail medium in texts on advertising and promotion (Bellenger and Pingry, 1977). Published research examining the effectiveness of direct mail messages is also limited. Published evaluations of direct mail studies usually have been restricted to measures of response rates, that is, political contributions (Haggerty, 1979), voting behavior (Hartman, 1936; Swinyard and Coney, 1978), or consumer sales (Bellenger and Pingry, 1977; Burnett and Wilkes, 1980; Capon and Farley, 1976), rather than cognitive or affective outcomes.

Studies reporting the effectiveness of direct mail for health care have occurred only comparatively recently. Steiber and Boscario (1984) argue that direct mail is a cost-effective medium for increasing market share for health services, but note that the typical response to a direct mail effort is only 0.5%–2%.

The majority of direct mail studies of health have concerned family planning. Several direct mail efforts in the 1960s and 1970s to increase the use of family-planning methods met with mixed results both nationally and internationally (Cernada, 1970; Rosa and Bogue, 1966; Schramm, 1971). However, the most encouraging results occurred when direct mail was used to create awareness, improve knowledge, and stimulate interpersonal discussion among recipients (Placek, 1974). A summary of this
literature by Placek found that most direct mail studies of family planning suffered from a serious deficiency—a chronic lack of control groups through which cognitive effects could be studied among comparable groups who have and have not received direct mailings.

ARE NEGATIVE, POSITIVE, OR NEUTRAL APPEALS MORE EFFECTIVE?

And yet, one of the greatest advantages of using direct mail in communication research is the ability to randomly assign members of a target population to different treatment and control conditions in order to compare different presentations of the same information. Similar controls are much more difficult to attain when examining the effectiveness of different message strategies in other mass media such as radio, television, or newspapers.

Since the 1950s, probably the most studied strategy for the presentation of health information has been the use of fear appeals. In their seminal research on the topic, Janis and Feshbach varied levels of fear in their attempt to motivate high school seniors to adopt proper dental hygiene procedures. The researchers found that low levels of fear were actually more effective than high levels in inducing changes in health attitudes and behaviors (Janis and Feshbach, 1953). Since the original study, over 100 studies and several reviews of the literature have been conducted regarding the effectiveness of fear as a message strategy (Atkin, 1979; Ray and Ward, 1970; Sternthal and Craig, 1974; Webb, 1974).

Although extensive research has been conducted on negative appeals—varying levels of fear—far less has been conducted comparing the effectiveness of negative appeals relative to neutral or positive appeals. Whereas negative appeals dwell on the adverse consequences of behaving or failing to behave in a certain fashion, positive appeals concentrate on the benefits derived from a behavior. Although the two appeals differ in terms of stressing the opposite consequences of certain behaviors, both are designed
to motivate audience members primarily through positive or negative emotions and thoughts. Neutral appeals, on the other hand, are often designed to persuade through appeals to "learning" more about the facts associated with an issue.

METHODOLOGY

The following research questions motivated this study: (1) How effective, in general, is direct mail in increasing the public's awareness of heart disease and in influencing beliefs about the importance of controllable risk factors? (2) Which types of appeals—negative, positive, or neutral—will be most effective in increasing awareness and modifying health beliefs?

To investigate these questions, a small brochure was designed as a vehicle for different message strategies. The outside of the brochure bore a brief title, and the inside carried one of the three appeals: a positive appeal focusing on the positive implications of a healthy lifestyle; a negative appeal demonstrating the negative consequences of cardiovascular risk factors; and a neutral, informational message.¹

Flesch readability scores indicated that all appeals were of a comparable, standard level of reading ease. A key strength of the present research design was that formatting and informational content were kept identical for all three types of brochures. All three appeals provided the same basic information concerning the controllable risk factors: smoking, high blood pressure, and high-salt diets. The appearances of all three types of brochures—the color, size, and graphics—were identical. Further, each brochure contained the same return-addressed, postage-free postcard that could be returned for further information about any of the risk factors.

THE SAMPLE

We randomly selected 1000 households from the community telephone directory. These households were randomly assigned to one of four groups: experimental group one (positive appeal);
experimental group two (negative appeal); experimental group three (neutral appeal); and a control group. Brochures were then mailed to “occupant” for the 250 households in each of the three experimental groups. Members of the control groups were not sent any brochure.

A subsample of households was selected for follow-up telephone interviews, conducted approximately one week after the brochures were received. Respondents were selected from each household by a variation of the “next birthday” method (Salmon and Nichols, 1983) and included persons between the ages of 25 and 74. Interviewers were blind to the nature of the study and the type of appeal received by the respondent. Up to 15 callbacks were made to complete interviews, resulting in a completion rate of 84.1%. The refusal rate was not significantly different for any one of the subsamples. This process resulted in a posttest-only control group design, and sample sizes for the positive, negative, neutral, and control conditions were 106, 104, 114, and 105, respectively. Subsequent one-way analyses of variance indicated that, with one exception, the four groups were nonsignificantly different with respect to standard demographics and health behaviors.

**MEASURES**

Questions asked of all respondents in the telephone interviews were designed to determine respondents’ (1) perceptions of the salience of cardiovascular disease; (2) knowledge of the importance of cardiovascular disease as a cause of death in the United States; (3) beliefs concerning strategies for minimizing the risk of premature heart attack; (4) beliefs concerning the perceived importance of various cardiovascular risk factors (smoking, high blood pressure, heredity, high-fat diet, and high-salt diet); (5) recall of having received a brochure, as well as the name of the sponsoring organization, and any thoughts that occurred to respondents as they read the brochure; (6) demographics (age, sex, education, occupation, marital status, number of children living in household); and (7) health behaviors (past and present smoking habits, blood pressure status, and perceived healthiness of their diets).
The primary analysis strategy in evaluating the overall effectiveness of the direct mail campaign was to compare responses from members of the experimental versus control conditions. This comparison represents the classical strategy for analyzing experimental data and provides an assessment of the absolute magnitude of the effect of mailing brochures. However, it can be argued that such a comparison may not be entirely appropriate because a certain proportion of the members of the experimental group may not actually read the brochure that is mailed to their household. Thus in assessing the overall effect of the direct mailing, additional comparisons were made between readers and nonreaders in the experimental condition. This particular comparison gives a purer assessment of the effect of the mailing on people who receive and read direct mail literature.

RESULTS

BROCHURE AWARENESS AND READERSHIP

Approximately one-fifth (19%) of the overall sample in the combined experimental groups recalled having received the brochure, and 14.4% reported having read or skimmed the brochure. Only one individual in the control condition recalled having seen the brochure.4

Overall, 4.9% of the return-addressed postcards requesting more health information were returned to the sponsoring organization. This represents a slightly higher than average response to a direct mailing, but lower than some that have been reported in the consumer literature.

Again looking at the combined experimental groups, readers of the brochure were compared to nonreaders with respect to demographic measures (see Table 1). Consistent with previous studies of health-information acquisition, women were significantly more likely than men to read the brochure. Furthermore, there was a slight, but statistically nonsignificant tendency for people of lower education, in blue-collar occupations, and of ages 45-54 not to read the brochure.
**Table 1**

Reader/Nonreader Characteristic: Demographic Subgroup Comparisons, Chi-Square Values

<table>
<thead>
<tr>
<th></th>
<th>Readers</th>
<th>Non-readers</th>
<th>Chi-Square</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>30.4%</td>
<td>47.8%</td>
<td>4.88*</td>
<td>1</td>
</tr>
<tr>
<td>Females</td>
<td>69.6%</td>
<td>52.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-34</td>
<td>43.5%</td>
<td>38.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>21.7%</td>
<td>19.8%</td>
<td>3.28</td>
<td>3</td>
</tr>
<tr>
<td>45-54</td>
<td>6.5%</td>
<td>16.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-74</td>
<td>28.3%</td>
<td>24.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS or less</td>
<td>30.5%</td>
<td>35.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some College</td>
<td>32.6%</td>
<td>34.1%</td>
<td>0.80</td>
<td>2</td>
</tr>
<tr>
<td>College/more</td>
<td>37.0%</td>
<td>30.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>28.3%</td>
<td>23.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Collar</td>
<td>15.2%</td>
<td>24.1%</td>
<td>2.49</td>
<td>3</td>
</tr>
<tr>
<td>Clerical/Sales</td>
<td>28.3%</td>
<td>22.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>28.3%</td>
<td>30.6%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sample size** 46.0 278.0

**% Exper Grps** 14.2% 85.8%

*p < .05.

**Awareness, Salience, and Health Beliefs**

Overall, direct mail was effective in increasing the salience of cardiovascular disease. That is, respondents in the three experimental conditions (i.e., those who received a brochure) were more likely to say that heart disease is the number one cause of death in their area (48.5%) than members of the control group (33.3%, $\chi^2 = 7.34, 1$ df, $p < .01$). Among experimental group members, respondents who reported reading the brochure were slightly more likely
(60%) than those who reported not reading it (46.4%) to say heart disease is the number one cause of death ($\chi^2 = 3.74, 1 \text{ df}, p < .06$).

In addition, the level of personal concern for having heart disease was higher for respondents in the experimental group ($x = 1.37$) than for respondents in the control group [$x = 1.14, F(1,427) = 4.26, p < .05$]. Among members of the experimental group, readers of the brochure showed higher personal concern ($x = 1.54$) than nonreaders ($x = 1.34$), but the difference was statistically nonsignificant [$F(1,318) = 1.50, p = .22$].

The perceived importance of the controllable risk factors was expected to be greater among respondents in the experimental than the control condition, and greater among readers than nonreaders of the brochure. This tendency was also expected to be reversed for the noncontrollable risk factor, heredity. A multivariate analysis of variance was performed contrasting three groups (experimental-group readers versus experimental group nonreaders versus control) with respect to importance ratings of five risk factors. Overall, the differences were significant [$F(5, 422) = 2.30, p < .05$]. Results of univariate F-tests and a priori comparisons, shown in Table 2, indicate that experimental group members were significantly less likely than control group members to rate heredity as an important risk factor. Furthermore, readers in the experimental group were more likely than nonreaders in the experimental group to rate high-cholesterol diets as important. Both results are consistent with the messages contained in the brochures.

Health beliefs were also assessed by evaluating the number of brochure (relative to nonbrochure) items mentioned in response to the open-ended question, “Thinking about your own situation for a minute, how could you go about preventing heart disease in yourself?” Note that in contrast to the previous “importance” measures, this question was personalized for the respondent. Comparisons involving mean responses of respondents in the experimental (.39) and control (.25) conditions showed no significant effects of the mailing ($F < 1$). However, consistent with predictions, respondents within the experimental condition who reported reading the brochure (.94) were more likely than nonreaders (.30) to give brochure response [$F(1,318) = 5.72, p < .05$].
TABLE 2
Means and Univariate F-Tests: Comparing Readers, Nonreaders, and Control Conditions, Risk Factor Importance Ratings

<table>
<thead>
<tr>
<th>Importance Ratings</th>
<th>Readers</th>
<th>Non-readers</th>
<th>Control</th>
<th>Univariate F-Ratio (1,456 df)</th>
<th>Experimental A Priori Contrasts (1,456 df)</th>
<th>Experimental Readers vs. Control</th>
<th>Experimental Readers vs. Non-readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>8.13</td>
<td>8.07</td>
<td>8.00</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>8.04</td>
<td>8.16</td>
<td>8.24</td>
<td>1.6+</td>
<td>&lt; 1</td>
<td>2.49</td>
<td></td>
</tr>
<tr>
<td>High Salt Diet</td>
<td>2.28</td>
<td>2.15</td>
<td>2.22</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td>&lt; 1</td>
<td></td>
</tr>
<tr>
<td>High Cholesterol Diet</td>
<td>-91</td>
<td>-93</td>
<td>-64</td>
<td>2.45*</td>
<td>&lt; 1</td>
<td>4.24**</td>
<td></td>
</tr>
<tr>
<td>Heredity</td>
<td>6.54</td>
<td>6.25</td>
<td>6.99</td>
<td>+4.5**</td>
<td>+4.5**</td>
<td>+4.5**</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

*Sample Size: Readers = 46, Non-readers = 278, Control = 105

*p = .06; **p < .05; ***p < .01.

THE EFFECT OF MESSAGE STRATEGY ON READERSHIP

In addition to the above analyses that compared statistics from the combined experimental groups to those of the control group, separate analyses were also conducted to assess the impact of each message strategy on several levels. First, the proportion of people who were aware of having received a brochure was significantly greater for the neutral appeal (28.1%) than for either the positive (15.1%) or negative appeals (13.5%; \( \chi^2 = 7.40, p < .05 \)). The proportion of people in each group who reported reading or skimming the brochure was also higher in the neutral (19.3%) than in the positive (11.3%) or negative (11.5%) conditions, but these differences were not statistically significant (\( \chi^2 = 3.22, p = .20 \)).

The direct mail response rate, measured by the actual rate of return of the self-addressed postcards, did not significantly vary for the three appeals. A slightly higher percentage of returns came from the neutral appeal (6.4%) than from the positive (4.0%) or negative (4.4%) appeals.

THE EFFECT OF MESSAGE STRATEGY ON AWARENESS AND HEALTH BELIEFS

The three message appeals were contrasted with respect to awareness of heart disease as a health concern and beliefs about
risk factor importance. Whereas earlier analyses indicated significant differences between experimental and control conditions, no significant differences due to different message strategies were found. This indicates that the three appeals were equally effective in their ability to influence awareness of heart disease or beliefs about risk factor importance.

RECALL OF BROCHURE INFORMATION AND THOUGHT CONTENT WERE AFFECTED BY MESSAGE STRATEGY

The number of people who recalled reading the brochures was not large enough to make strong inferences regarding message effectiveness. Nevertheless, certain differences appeared in recall and cognitive thought analyses that are worth noting as they pertain to message structure. First, among those individuals who read or skimmed the brochure, correct recall of information contained in the brochure did not vary for the three experimental groups (p > .10). The proportion of readers who recalled items pertaining to specific risk factors was slightly, but not significantly, greater (p = .09) in the neutral (45.2%) than in positive (22.7%) or negative (16.7%) conditions.

However, of the people who remembered receiving a brochure, the proportion who correctly recalled the name of the sponsoring organization was significantly greater for the positive appeal (46.7%) than for the negative (14.3%) or neutral (12.9%) appeals ($\chi^2 = 7.38$, p < .05).

A "thought" analysis revealed tendencies for the three appeals to show differences in the specific content of the thoughts that respondents generated about the brochure. For example, the neutral appeal generated more "factual information" relating to risk factors. That is, the neutral appeal tended to generate a greater proportion of thoughts regarding specific, controllable risk factors than the positive or negative appeals ($\chi^2 = 8.43$, p < .05).

The positive appeal tended to generate more general, positive thoughts about such things as the heart program, the brochure itself, or desire for more information. Because of the small sample sizes, a Fisher exact test was performed, comparing the proportion of positive thoughts generated between positive and nega-
ative, and positive and neutral appeals. The difference was significant in the first case (28.6% and 0.5% for positive and negative appeals, respectively ($p < .05$), and approached significance in the second case (28.6% and 15.2% for positive and neutral appeals, respectively, $p < .10$).

Finally, the negative appeal generated more thoughts pertaining to negative affect (e.g., "I tore it up," or "It doesn't apply to me") or reminders of specific friends or relatives who have heart disease. This greater proportion of negative thoughts for respondents in the negative condition (57.9%) than in the positive (38.1%) or neutral (26.3%) conditions approached significance ($\chi^2 = 5.43, p = .07$).

**DISCUSSION**

The primary objectives of this study were to determine: (1) whether direct mail appeals could be effective in increasing the public's awareness of heart disease and in modifying beliefs about the perceived importance of controllable risk factors; and (2) the relative effectiveness of positive, negative, and neutral appeals in altering health awareness, knowledge, and beliefs.

Results indicate that about 14% of the persons who received brochures read them and about 5% returned the self-addressed postcards for more information. These figures are slightly higher than expected for health direct mail, where a 2% response is considered good (Steiber and Boscarino, 1984). Consistent with findings from other studies, women were more likely than men to have read the brochure. But, although differences in education typically are found to be significantly related to differences in print media use for health information (Wade and Schramm, 1969), such was not the case in this study. Apparently, direct mail can somewhat mitigate differences in print media exposure due to differences in education.

Comparisons between experimental and control groups indicated that the mailing of the direct mail brochure succeeded in increasing people's awareness of heart disease as an important issue and as the number one cause of death, and to be personally concerned about having heart disease. Thus, direct mail was
effective in increasing levels of cardiovascular awareness and salience. But the overall effect of the direct mail campaign was less significant in terms of modifying beliefs concerning the importance of various risk factors in causing heart attack.

Because of the aforementioned problem of employing the classical comparison of responses from experimental versus control members, further analyses were conducted within the experimental groups to compare the impact of the mailing on readers and nonreaders of the brochures. These comparisons indicated that readers of the brochures were more likely than nonreaders—or members of the control group—to be aware of the importance of the issue and to rate controllable cardiovascular risk factors as important. Thus, the direct mail effort was successful in modifying health beliefs among the members of the experimental group who actually read the brochure.

In comparisons of the three message appeals, the neutral appeal was most effective in terms of (1) recall of having received a brochure, (2) readership of the brochure, and (3) recall of specific risk factor information. Of interest, though, people who received the positive appeal were more likely to recall the name of the organization that mailed the brochure. These results tend to suggest that the neutral appeal was perhaps the most effective in attracting attention to the brochure, and channeling that attention to risk factor information. But overall, differences due to the relative effectiveness of the three appeals tended to be less significant than differences due to whether subjects did or did not receive any direct mail message at all.

NOTES

1. Neutral, positive, and negative appeals, in absolute terms, are not mutually exclusive. They differ in terms of the extent to which each is predominantly neutral, positive, or negative. To verify that the appeals actually were perceived as differing along these dimensions, a manipulation check was conducted using a convenience sample of 47 university students. The subjects in this pretest read randomly assigned brochures and completed a series of semantic differentials measuring such dimensions as emotionality, factualness, fear, and ease of reading. The findings showed that both the positive and negative appeals were perceived as more emotional than the neutral appeal \( F = 11.37, p = .0000 \). The positive appeal was perceived as generating more positive than negative
feelings after reading ($F = 9.54, p = .0002$). The positive and neutral appeals were perceived as generating fewer negative or gloomy feelings about heart disease than was the negative appeal ($F = 23.75, p = .0000$). The negative appeal tended to generate more fear of getting heart disease than did the neutral or positive appeals ($F = 20.42, p = .0000$). On the other hand, there were no significant differences among the brochures in terms of ease of reading, degree of being interesting, believability, or degree of persuasiveness ($p > .25$ for all measures).

2. Although this procedure of selecting respondents could not guarantee that the respondent was actually the person who opened and read the brochure, it was the only way to select respondents without biasing them as to the goals of the survey, that is, testing for awareness of the brochure. Furthermore, this procedure guaranteed that the results were generalizable to the population of adults between the ages of 25 and 74, and not restricted to persons with greater a priori interest or a priori knowledge of health or heart disease.

3. Given the large number of statistical tests performed, this one significant finding may be attributable to chance.

4. It is conceivable that this person in the control condition actually did see the brochure. A small proportion of the brochures were mailed to apartment buildings, and containing no apartment number, may have been left in the lobby. Alternatively, a member of the control condition may have seen a brochure that belonged to a friend or relative.

REFERENCES


