

Efforts to Increase Pesticide Label-Reading

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FOUR YEARS OF WORK with the Pesticides Regulation Division of the U. S. Environmental Protection Agency have given us a unique opportunity to learn something about pesticide labels and the dynamics of their use.

During Phase I (1968-70) we concentrated on the label itself. Analyses revealed major characteristics of more than 35,000 labels currently registered for use in this country. We also explored some ways to make labels easier to read and understand, assuming the user desires to do so. Results of Phase I research have been reported elsewhere.(1)

Phase II (1970-72) moved beyond the label as we searched for answers to questions of why pesticide users often fail to read even those labels that are easily read and understood.(2) Two questions became the basis of our research efforts in this phase:

1. How aggressively are pesticide users being encouraged to read labels and use them as advised?

2. To what extent does this encouragement conform to what is known of the psychological and communication principles that one might use in choosing appeals, referents, and other communication strategies? We considered it important to identify some of those principles which might apply to a fear-related topic such as pesticide usage, then test them in a realistic, practical setting.

Results reported here encompass Question 1 and the content analysis portion of Question 2. A subsequent report will present the findings of a companion field experiment.

Previous Studies

To our knowledge, no previous study has documented past efforts to encourage label reading. Although pesticide use is widespread in the United States, Bot has claimed that this country lacks a tradition of pesticide safety.(3)

A concern for safety in pesticide use is justified. Each year, in the United States, approximately half a million children are treated for suspected or actual ingestion or contamination by pesticides or poisons in and around the home.(4) In addition, charges of illegal residues, vanishing wildlife, and unrestrained pollution of air and water supplies have been raised at one time or another from almost every sector of the nation.

Attempts at pesticide safety education have focused largely on the encouragement of label reading. Hence, admonitions to read the label are usually included in communication materials produced by both public and private agencies that are concerned with pesticide safety. The most ubiquitous of these materials is a symbol and the statement, "Stop. Read the Label."(5)

The Study

A total of 496 printed and 143 electronic pieces that encourage pesticide label reading were content analyzed. These pieces represented all available materials obtained through a nationwide search involving public and private agencies. Dimensions included library research plus personal visits and/or correspondence with representatives of state and federal governments, land-grant universities, private chemical companies, and associations of private chemical companies. The effort provided what appears to be a majority of all materials available.

Magazine advertisements that included admonitions to read pesticide labels were not included in this analysis. Other kinds of promotional material were included.

The analysis involved viewing, listening to, or reading all available materials in terms of 13 types of information:

1. Year in which the message was produced
2. Title of journal, magazine, or book in which the material appeared

3. Month of issue
4. Frequency of issue (of magazine or journal)
5. Source of message
6. Type of appeal used to encourage label reading
7. Specific positive consequences indicated
8. Specific negative consequences indicated
9. Referents of the appeal
10. Approximate number of words (or length of the film or tape in minutes)
11. Method or channel of dissemination
12. Presence or absence of graphics or illustrations
13. Intended audience of the message

Findings and Implications

Year of publication. More than two-thirds of the 496 printed pieces that encouraged label reading were published after 1962, although chemical pesticides have been widely used in the United States since the 1940s. This finding supports what Bot called the lack of a tradition of pesticide safety in the United States. It also may document some of the impact of social concerns such as those expressed in Rachel Carson's book *Silent Spring*, which appeared in 1962.

Season of issue. Most (79 percent) of the printed materials were issued during the spring, summer, and fall months when pesticides are used most frequently (Table 1). However, more than 21 percent were published during the winter months of December to February. It appears that a sizeable portion of the written materials may have been distributed when they were of limited immediate use to the public.

Sources. A larger share of the printed materials came from public (57 percent) than from private agencies (43 percent). More than 90 percent of the electronic materials were produced by public agencies, most notably the U. S. Department of Agriculture (Table 2).

In total, it appears that the greater burden in promoting pesticide safety education has been borne by public agencies. This judgment is based on the relative volume of available communications that public and private agencies have produced to encourage label reading.

Table 1. Selected Characteristics of 496 Written Materials That Encourage Pesticide Label Reading

<i>Category</i>	<i>Number</i>	<i>Percent</i>
A. <i>Season of Issue</i>		
Winter	105	21.17
Spring	75	15.12
Summer	54	10.89
Fall	48	9.68
Undated	214	43.15
B. <i>Source of Message</i>		
Public agency	282	56.86
Private agency	213	42.94
Unidentified	1	0.20
C. <i>Type of Appeal</i>		
Negative	174	35.08
Positive	153	30.85
Positive and negative	27	5.44
No appeal	142	28.63
D. <i>Referent of Appeal</i>		
Individual reader himself	326	92.09
Other people (family, friends, etc.)	11	3.11
Individual and other people	8	2.26
Individual himself, other people and physical environment	5	1.41
Individual himself and physical environment	3	0.85
Physical environment	1	0.28
E. <i>Intended Audience</i>		
Professionals (Extension advisers, farmers, professional applicators)	292	58.87
Non-professionals (housewives and urban householders)	127	25.60
Both professionals and non-professionals	76	15.32
Unidentified	1	0.20

Channels used. Of the 639 items analyzed, 78 percent were in print form (e.g., articles in journals, logos, advertising pieces, posters, balloons, bulletins, etc.). The rest (22 percent) were full-length

**Table 2. Selected Characteristics of 143 Electronic Pieces
That Encourage Pesticide Label Reading**

<i>Category</i>	<i>Number</i>	<i>Percent</i>
A. <i>Type of Electronic Message</i>		
Public service spot	135	94.41
Full-length film or slides	8	5.59
B. <i>Length of Message</i>		
One minute or less	134	93.70
1:01-5:00 minutes	3	2.10
More than 5 minutes	6	4.20
C. <i>Method of Dissemination</i>		
Radio (tapes and disc recordings)	82	57.34
Television	53	37.06
Motion pictures (films)	8	5.59
D. <i>Source</i>		
Public agency	133	93.01
Private agency	10	6.99
E. <i>Intended Audience</i>		
Non-professionals (housewives, children)	131	91.61
Professionals (farm producers, operators, dealers)	11	7.69
Professionals and non-professionals	1	0.70
F. <i>Type of Appeal</i>		
Positive and negative	123	86.01
Positive	8	5.59
Negative	1	0.70
No appeal	11	7.69

films and video tapes for television, radio tapes, and slides, most of which were usually disseminated as public service announcements.

Of these materials, only slide sets with accompanying scripts were explicitly designed with interpersonal mediation in mind. The rest of the print and electronic pieces were generally designed to reach the intended audience through established mass media channels.

Intended audience. Most (59 percent) of the printed materials

were aimed at the professional audience (e.g., farmers and other commercial users of pesticides). On the other hand, 92 percent of the electronic pieces were aimed at the non-professional audience (i.e., housewives, weekend gardeners, and other non-commercial users of pesticides).

Table 3 suggests that private agencies concentrated their efforts among farmers and custom applicators of pesticides. On the other hand, the public agencies' efforts to encourage label reading tended to be more evenly distributed among the professional and non-professional audiences.

According to Randell and Petty, nine out of 10 pesticide accidents happen in and around the home.(5) White-Stevens suggested

Table 3. Selected Comparisons, Public and Private Agencies as Sources of Printed Materials

<i>Category</i>	<i>Public Agency</i>		<i>Private Agency</i>	
	<i>Number</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>
<i>A. Intended Audience</i>				
Professionals	108	38.30	184	86.39
Non-professionals	117	41.49	10	4.69
Professionals and non-professionals	57	20.21	19	8.92
<i>B. Type of Appeal</i>				
Positive	96	34.04	57	26.76
Negative	124	43.97	50	23.47
Positive and Negative	11	3.90	15	7.04
No appeal	51	18.09	91	42.72
<i>C. Presence or Absence of Graphics</i>				
With graphics	171	60.64	41	19.25
Without graphics	111	39.36	172	80.75
<i>D. Referent of Appeals</i>				
Individual reader	214	92.64	111	90.98
Other people (family member, friends, etc.)	8	3.46	3	2.46
Individual and other people	6	2.60	2	1.64
Physical environment (air, water)	1	.43	0	—
Individual, other people, and physical environment	2	.87	3	2.46
Individual and physical environment	0	—	3	2.46

that urban residents were less knowledgeable about pesticides than were farmers.(6) Gruenhagen also pointed out that urban groups will have major influence on legislation concerning drugs, chemicals, and pesticides.(7) Booth, *et al.*, concluded from a 1966 study in Nebraska that "The unsafe user, among those having non-farm occupations, lived in an apartment, had less than a high school education, and used only one or two chemicals a year."(8)

All these facts indicate that more pesticide safety education programs should be addressed to non-professional users because they stand to profit more from such campaigns.

Types of appeals. Seventy percent of the printed pieces used positive (e.g., safety) and/or negative (e.g., death or injury) appeals to encourage label reading. About 43 percent of the printed materials produced by private agencies contained neither type of appeal, saying only "Read the Label," compared with 18 percent of the pieces produced by public agencies.

About 86 percent of all electronic pieces contained positive and/or negative appeals. Most of the "no appeal" pieces were 20-second spot announcements.

A review of related research suggests that the statement "Read the Label" is insufficient in itself to change attitudes or influence behavior. Some form of motivation or arousal of a motive seems necessary for change to occur.(9) Efforts to encourage pesticide label reading should have appropriate appeals—positive, negative, or both.

Positive consequences promised. Among the printed pieces, safety (27 percent) was the most prevalent positive consequence used to encourage label reading. The appeal to economy (or profit) through the proper use of pesticides was next (21 percent). Two-thirds of the pieces that contained positive appeals used single consequences rather than combinations.

On the other hand, more than one positive consequence was used in 80 percent of the electronic pieces analyzed. Good health and freedom from injury (21 percent) and good health, clean environment, and freedom from injury (15 percent) were the most prevalent combinations of positive appeals.

Negative consequences promised. Threat of injury (33 percent)

was the most prevalent consequence used by printed pieces that contained negative appeals. Threat of injury and death (22 percent) was the most prevalent combination of negative consequences. Death alone was mentioned in less than five percent.

Among the electronic pieces, death and injury (33 percent) was the most common combination of negative appeals, followed by death, injury, and environmental pollution (26 percent).

It appears that, in general, the electronic materials presented a "more complete" message than printed materials in encouraging label reading. This can be seen from the fact that more electronic pieces, compared to printed pieces, contained appeals to encourage label reading. Further, the electronic materials presented more positive and negative consequences in encouraging label reading, compared to the printed pieces.

Referents of the appeals. Ninety-two percent of the printed pieces told the individual reader to protect *himself* from pesticide accidents. Very few appeals explicitly included the protection of readers' "valued-others" (e.g., family members). On the other hand, about 60 percent of the electronic messages included such appeals.

Our review of literature suggested that it is fruitful to include many referents of appeals, especially the message recipients' "valued-others."¹⁰ Further, Maslow has stated that typically an act has more than one motivation. Hence, it seems logical to suggest that read-the-label communications should use multi-referents of appeals. In the context of read-the-label messages, the referents may include the receiver and his/her family, friends, pets, and environment.

Recommendations

Communicators who work in government and college information programs might consider the following recommendations for encouraging greater and more effective use of pesticide labels.

1. Increase the total amount of effort devoted to encouraging pesticide users to read and follow directions on labels. The level of information effort revealed by this study seems modest in relation to the nationwide scope and importance of pesticide use.

2. In particular, address more attention to urban residents and other non-professional pesticide users as primary targets of pesticide education programs because they stand to profit most from such campaigns.

3. Match the timing of information more closely to the season of intended use for a particular type of pesticide. On an aggregate basis, findings of this study imply that timing can be improved.

4. Communicators concerned with pesticide safety should consider using interpersonal mediation through established local groups to augment efforts through the mass media. In general, interpersonal communication is considered more effective than mass communication in affecting knowledge, attitudes and behavior. Hence, both private and public agencies might consider using interpersonal mediation through local groups. If the sources and channels of read-the-label messages could be localized, the message would gain more credibility and thereby more acceptance. The present extension set-up of the land-grant colleges and universities seems ideally suited for this approach because it permits a trained pesticide safety coordinator to serve as the university's liaison with local communities.

5. All materials designed to encourage the reading of pesticide labels should include appropriate appeals—positive, negative, or both. Evidence points overwhelmingly to the weakness of using only the unsupported imperative, "Read the Label."

6. Communicators might more effectively tap the needs and motives of pesticide users by using combinations of appeals, positive and/or negative, in a given message.

7. Communicators also might improve their effectiveness by including more than the individual receiver as a referent. Other possible referents include family members, friends, pets, and environment.

References

- (1) Unpublished materials include a summary report and three sub-reports (I—The Pesticide Label Today; II—Legibility of Pesticide Labels; III—Comprehension of Label Terms and Certain Attitudes Toward the Pesticide Label and Pesticide Chemical Manufacturers). They are on file with

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- (7) **R. H. Gruenhagen**, *The Effect of a Planned Communications Program on Change of Attitudes and Knowledge of the Urban Dweller Toward Chemicals and Pesticides*, Virginia Cooperative Extension Service, Virginia Polytechnic Institute, cooperating with the Federal Extension Service of the U.S. Department of Agriculture, November, 1969.
- (8) **A. Booth et al.**, *op. cit.*, 1968, p. 11.
- (9) **A. R. Cohen**, "Need for Cognition and Order of Communication as

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