

# Teaching-Learning Mechanisms in Consumer Health Education

*In a study of the effects of a health education program on students, teachers, and parents, the authors found that the students had more behavior-modification influence on the teachers and parents than vice versa.*

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IN THE CLASSROOM and in the community, health education often reveals its debt to a tradition of health guidance descended from yesteryear's medical practice. Typically, a superordinate authority dispenses knowledge and beliefs about health care, and a subordinate beneficiary receives and implements them. The provider influences but is presumably little influenced by this communication. Success of an educational effort is judged by the extent to which the recipient carries out the prescriptions of the mentor.

There is much to be said for the simplicity of the traditional approach, which has been widely accepted and used by educators and health professionals. Unfortunately, many health instruction programs based on this concept have yielded outcomes of dubious import. Accordingly, serious questions have arisen about

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the basic validity of the entire consumer health education effort (1). Yet, paradoxically, other health-oriented educational efforts—notably those which use mass communications media and technologies—are considered to be highly effective in shaping consumer attitudes and behavior over extended periods (2). Therefore, we cannot conclude that consumer health education is a moribund or an academic enterprise, even though it has fared badly in the hands of those who have relied overmuch on authoritarian models of teaching. Alternative learning-teaching models that might promise improved results have not been as clearly defined and widely tested as the authoritarian model.

The inspiration for fresh approaches comes from such heterogeneous sources as mass communications (3), research on inmate behavior (4,5), psychotherapy and self-help groups (6), studies of social class differences in response to health messages (7), and research on forceful indoctrination (8). As yet, there is no well-established framework to interrelate such a mosaic of conceptual elements and to provide a unifying structure for practice and investigation. We therefore offer the results of our study of responses to a school health education program as a stimulus to further exploration, rather than as a theoretical paradigm which is firmly grounded on empirical research.

## Background

Several years ago, we conducted a pilot project to explore the utility of videotapes as a health education medium with students in grades six through nine (9). While quantitative data were being gathered, careful qualitative observations of cooperating students and teachers were made. We had envisioned a neutral, noninvolved role for the teachers. However, although most teachers managed to hold this posture fairly well, we noticed that they had to strain to achieve it. This finding was consistent with reports indicating that teachers and health educators did not always behave as disinterested experts when dealing with socially sensitive topics (10–14). Results of analogous studies also suggested that families of pupils played a more active part in pupils' responses to health instruction than had been generally acknowledged (15,16).

Results of the pilot study led us to speculate that perhaps a "spread of effect" might be taking place, and that this might be obscured by undue focus on a single target group—in this study, the students. When an opportunity subsequently arose for a more complex health education project, we decided to include procedures for eliciting and recording responses from teachers and parents, as well as students. Among the aims of this project were (a) to determine if the school health education program produced visible effects on health functioning among teachers and parents and (b) if such effects were observed, to begin to conceptualize the means by which they might have been accomplished for each group.

Representative teachers, parents, and pupils took part in planning the project, basically as peers. However, group roles in execution of the project differed characteristically. Students and teachers were continually and actively engaged in the classroom in open-ended exchanges on health aspects of smoking, but parents were only indirectly exposed as "third parties." In testing for effects, it was thus important for us to anticipate variation in type and extent of exposure for students, parents, and teachers.

Effects of the special health program on knowledge, attitudes, and behavior of students and teachers have been described elsewhere (17,18). Our concern here is with reactions of the individual parents, with comparing the data for parents with those for teachers and students, and with drawing inferences pertinent to a theoretical base for consumer health education.

The study was carried out in five school districts of Niagara County, N.Y.—Lockport, Newfane, Royalton-Hartland, Starpoint, and Wilson—with the full cooperation throughout the project of administrators, teachers, students, and parents.

## Methods

The design and data-collecting methods of this research have been described previously (17,18). Briefly summarized, the statistical design for the project was a  $6 \times 3 \times 2 \times 2$  analysis of covariance model with  $n$  observations per cell. The principal factors were schools ( $n=6$ ), classes ( $n=3$ ), treatments ( $n=2$ ), and sequence ( $n=2$ ). The class factor was randomized and subsumed under schools. Treatments, schools, and sequence were treated as fixed factors (19). From the 6 participating schools, 36 seventh, eighth, and ninth grade classes were randomly chosen—18 were randomly assigned to the experimental group and 18 were controls. Four families were selected on a purely statistical basis from each class, with the expectation that at least one parent from half of the total number would participate.

Of the 144 families contacted, 105 parents (about 75 percent) agreed to take part, but because incomplete pre-program data from 20 people could not be used, they were not included in the followup or statistical analysis. The project interviewers could not reach 26 of the families for reasons such as illness, unexpected changes of plan, moving, or out of town, and 13 parents declined to be interviewed for reasons such as disapproval of the project's goals, did not wish to answer "personal" questions, or did not see health education as a school responsibility.

Complete questionnaire and interview data were given by 85 parents (about 58 percent) before the special health program was started, and 82 (about 55 percent) of these persons complied similarly 6 months after the program had been completed. (In fact, all were cooperative throughout the project. Three people in the experimental group had to be excluded from the

followup because portions of their followup data were lost by an interviewer. Inspection of the records failed to indicate that these three persons were in any sense nonrepresentative, and their scores were therefore not removed from the pre-program data.) The questionnaire information in the form of group scores constitutes the primary data base of this report. These data are supplemented by qualitative observations of participants in school and in their homes.

The statistics are based on parents' responses to a 58-item questionnaire: 45 items covered knowledge of health hazards in smoking, 10 concerned attitudes toward tobacco use, and 3 dealt with personal smoking practices. Three key hypotheses were tested—that parents of youngsters in the experimental group, compared with control group parents, would show (a) a statistically significant increase in knowledge concerning health hazards in smoking, (b) a statistically significant positive change in attitude toward greater personal responsibility for tobacco use, and (c) significantly greater reduction in cigarette smoking.

### Analysis of Parents' Responses

**Health knowledge.** Analysis of variance carried out on the 45 information items on the questionnaire showed that neither the main effects nor the interactions were significant at the .05 level of confidence (table 1). Preliminary tests were made on all factors with the data for parents, as with the information

received from students and teachers (17,18). For completeness, *F* tests were also conducted with pooled variances to yield more conservative significance tests ( $df=163$ ), and the inferences drawn from the data were validated. The results on the knowledge items, did not support our first hypothesis. Parents of pupils in the experimental classes did not show significantly greater gains in health information after the school program than did the control group parents. Actually, both groups displayed visible increases in knowledge, a finding which suggests that possibly the mere execution of the project had some enhancing effect.

**Health attitudes.** Results of the analysis of variance for the 10 health attitude items do not support our second hypothesis (table 1). Parents of students in the experimental groups did not appear to change their attitudes toward smoking in significantly greater numbers than did the control group parents. Mean scores on the attitude items for parents of pupils in experimental and control classes differed little throughout the study, although a small shift in the desired direction was noted among the nonsmokers. For completeness, the Mann-Whitney *U* statistic was used to test for significance of difference between group means (20). The null hypothesis could not be rejected at the .05 level.

**Health behavior.** The number of smokers in both the experimental and control groups decreased after the program, but the decrease was substantially greater

Table 1. Summary of analysis of variance on knowledge and attitude items for parents

Source of variation	Sum of squares	Degree of freedom	Mean square	F test
<b>Knowledge items</b>				
A (between schools) .....	3.80	5	.76	<sup>1</sup> .53
B within A (classes within schools) .....	19.22	12	1.60	<sup>2</sup> 1.12
C (between treatments) .....	3.03	1	3.03	2.20
AC (interaction, schools x treatments) .....	3.03	5	.78	.54
(B within A) x C (interaction, classes within schools x treatments) ...	14.68	12	1.22	.85
Within cells (error) .....	192.24	134	1.43	.....
<b>Attitude items</b>				
A (between schools) .....	5.17	5	1.03	.69
B within A (classes within schools) .....	20.73	12	1.73	1.15
C (between treatments) .....	4.11	1	4.11	<sup>2</sup> 2.74
AC (interaction, schools x treatments) .....	3.77	5	.75	.50
(B within A) x C (interaction, classes within schools x treatments) ...	16.03	12	1.34	.89
Within cells (error) .....	203.11	134	1.52	.....

<sup>1</sup>  $P > .25$ . <sup>2</sup>  $P < .25$ ,  $> .10$ .

in the experimental group as the following figures show:

Smoking status	Experimental group		Control group		Total number
	Number	Percent	Number	Percent	
Before program:					
Smokers . . . . .	22	48.5	18	44.5	40
Nonsmokers . . .	23	51.5	22	55.5	45
After program:					
Smokers . . . . .	14	35.3	15	37.5	29
Nonsmokers . . .	28	66.7	25	62.5	53

To determine whether the observed results indicated statistically significant program impact, data were transformed into percentages and tests were performed for the significance of differences between correlated proportions (21). These tests yielded a critical ratio of 2.17, which was significant beyond the .05 level. Thus, overall shifts in smoking behavior apparently had taken place following the school program, and the changes seemed to be related to the student's participation in either the experimental or control group. This is an interesting finding because the measures of knowledge and attitudes had not revealed a significant program impact.

The data on smoking behavior support our third hypothesis and are in general accord with previous research. One consistent finding in the literature is that informational and attitudinal dimensions do sometimes co-vary, but behavioral changes, if any are found, are seldom strongly correlated with the other factors (6).

For further analysis of the data on tobacco use, smoking behavior changes were examined in relation to urban-rural status of the schools attended by the youths:

Smokers	Urban		Rural	
	Number	Percent	Number	Percent
Before program:				
Experimental group . . . .	8	57.2	14	53.9
Control group . . . . .	6	42.8	12	46.1
After program:				
Experimental group . . . .	4	40.0	10	52.6
Control group . . . . .	6	60.0	9	47.4

It appeared that parents of youngsters attending urban schools responded differently from those in rural areas, although the number of persons who smoked reportedly decreased in both groups. The percentage of smoking parents in the experimental group especially decreased whether the children attended urban or rural schools; this finding is further evidence of program impact. However, the decrease in the experimental group was more pronounced for urban-dwelling parents. No comparable reduction among control group parents was reported; in fact, urban-dwelling control parents reported increased smoking after the program.

To clarify this point, the data—transformed into percentages—were tested for the significance of difference between correlated proportions. The resultant critical ratio of 2.63 was significant at the .01 level. This outcome suggested that the proportion of smoking parents did change after the instructional program and that this shift was not unrelated to the type of school the children attended. This urban-rural difference is consistent with findings of some earlier studies (22), and it was observed also for the teachers who took part in this project (18).

Several investigators also have pointed out that response to health instruction tends to vary with socioeconomic factors (22-24). To determine if such variation occurred in our study, we examined the data on cigarette use in relation to annual family income, the only socioeconomic factor for which we had data (table 2). We found that the decline in proportion of smoking parents after the health education program was more dramatic for those with incomes of \$10,000 or more than for those with less than \$10,000. Since comparatively few families' incomes were less than \$4,000, these were combined with the \$4,000-\$9,999 group for further evaluation. Of the \$10,000 or more group, 50 percent were smokers before the program, whereas 27.2 percent were smokers at the time of followup. Comparable figures for families with less than \$10,000 income were 45 and 41.8 percent respectively.

The data were transformed into percentages so that significance tests for the difference between correlated proportions could be made. These tests yielded a critical ratio of 2.09, which permitted rejection of the null hypothesis beyond the .05 level. It appeared that family income as reported in this study was related to reported smoking behavior.

These results are in accord with previous reports (6, 25,26). To the extent that antismoking education programs have produced behavior changes, affirmative responses seem likelier among persons of middle or higher socioeconomic status than for those lower on the continuum (6).

The final step in analyzing the data for parents was to determine whether the program effects differed in relation to the level of tobacco use. Although qualified by sample size, the results are provocative:

Cigarettes smoked per day	Experimental		Control	
	Before program	After program	Before program	After program
Occasionally . . . . .	0	0	2	1
Less than 3 . . . . .	1	2	0	0
3-5 . . . . .	1	2	3	1
6-10 . . . . .	2	1	2	1
10-20 . . . . .	7	3	4	4
More than a pack . . . .	11	6	7	8
Total . . . . .	22	14	18	15

Table 2. Relation between annual family income and smoking behavior

Income	Smokers			Nonsmokers		
	Experi- mental	Control	Total	Experi- mental	Control	Total
Before program						
Less than \$4,000 .....	1	0	1	1	1	2
\$4,000-\$9,999 .....	12	10	22	10	16	26
\$10,000 or more .....	9	8	17	7	10	17
After program						
Less than \$4,000 .....	1	0	1	0	1	1
\$4,000-\$9,999 .....	7	11	18	8	17	25
\$10,000 or more .....	6	4	10	16	11	27

Before the program, 91.5 percent ( $N=20$ ) of the experimental parents who smoked described themselves as "regular" smokers, that is, they smoked 5 cigarettes or more a day. Some 71.9 percent ( $N=10$ ) were in this category after the program. Among the controls, 72.5 percent ( $N=13$ ) were regular smokers before the program and 86.2 percent ( $N=13$ ) on followup. It should be noted here that in both groups the *absolute number* of regular smokers decreased, but a strong *percentage decrease* in regular smokers took place only among the experimental group parents. In fact, the reverse was true of the control parents. These results are consistent with our third hypothesis. However, we can offer no explanation for the increase among the control group. Perhaps it is relevant that during the time of this study cigarette smoking was generally on the rise (6,27,28).

After the data were transformed into proportions, a test was performed to determine the level of significance of these differences by the method of correlated proportions. The resultant critical ratio of 1.94 permitted rejection of the null hypothesis at the .05 level. Differences in the reported levels of tobacco use among the parents varied significantly from the initial questionnaire to the followup. We interpret this to mean that changes in response to the program seemed related to differences in reported smoking levels before the program.

### Discussion

In brief, the most salient empirical findings of this research for all three groups—teachers, students, and parents—were:

- Teachers generally showed the greatest range of response to the special health education program; students came next, and parents were last.

- Teachers and students showed pronounced changes in knowledge and attitudes, but parents did not.
- Teachers and parents showed significant changes in smoking behavior, but not the students.
- Those identified as smokers before the program appeared to be more greatly influenced than nonsmokers. The percentage of smokers was far greater among the teachers and parents than among the students.
- Urban teachers and parents showed somewhat more pronounced changes in relation to program exposure than did rural dwellers.

The situation for parents in this study differed from that for the pupils and teachers in one important respect: to our knowledge, no parent was ever personally exposed to the special classroom program. Whatever content parents acquired apparently was filtered to them through the children and perhaps occasionally through contacts with teachers. This indirect communication appeared to have little influence on their knowledge or attitudes about tobacco use, which conventional wisdom suggests should have been much easier to modify than overt behavior. It did, however, strongly affect their daily smoking habits. If we assume that the three groups accurately reported their experiences, what explanation can be offered for these observations?

What we have learned both in the classroom and from interviews in the home indicates that it is reasonable to begin to think about multiple channels through which health guidance might flow. Experience with this project suggests how we might start to define these channels, although the dearth of relevant data makes such theory building purely speculative at this time.

Given the data at hand, one might reasonably infer that the classic master-to-disciple mode of instruction

does not seem to explain what happened in our project. The teachers changed quite markedly in their smoking behavior, while the youths, nominally the recipients of instruction, appeared to show the least change. Concurrently, parents (who were not directly involved in the classroom teaching-learning sequence) significantly reduced their tobacco consumption.

(We cannot, of course, dismiss the possible operation in this study of a methodological artifact not uncommon to field research (29). Participants' responses were quantitatively represented along three continuums: knowledge, attitudes, and reported smoking behavior. Because the students were not as heavily involved from the start in smoking as either of the adult groups, there was correspondingly less opportunity for them to display evidence of program impact by a statistically significant decline in reported smoking (17). On the other hand, there was considerable room for variability of response on knowledge and attitude items, and here there was ample evidence of program effect in terms of statistically significant differences before and after the program, in predicted directions.)

Based on the study results, it seems possible that the pupils' relationship to their teachers and parents subtly altered during the project. Conceivably, in their relations with the teachers, the students gradually came to represent a powerful, though informal, pressure group operating daily to modify the teachers' behavior. Teachers of the experimental classes would be most sensitive to this form of persuasion. It does not seem unlikely that in these classes the students' questions and comments reinforced covert inclinations of the teachers to reduce or discontinue smoking, perhaps partly as an example to the young people.

Of course, if teachers' observed verbal and smoking behavior did change under such circumstances, these changes could have reinforced tendencies toward non-smoking in the students, creating a "ripple effect" which might have ramified to others and thus became further reinforced over time. If research confirms these speculations, students at some ages or maturity levels may have considerably more influence as "health educators" on teachers and parents than the reverse.

Transactions between pupils and their parents, however, apparently were structured differently. The continuing and cumulative weight of group pressure and intellectual exchange which presumably prevailed in the classroom was probably not a major factor in the home. Interviewers' notes suggest that the main line of influence at home was an undisguised personal appeal for parents to reduce or stop cigarette use. (We have no special thoughts to offer on parent-teacher interaction. There is scant evidence, apart from the working committees set up by the project, of exchange between parents and teachers relative to the substance of the project. This lack of communication in itself may be a factor worth pondering.)

We also found that urban and middle-income parents showed more change in smoking behavior than rural and lower-income parents. However, we could not tell whether these differences occurred because the higher-income parents were more responsive to the knowledge content of the project than the poorer parents, as some have held (6,7), or for other reasons.

## Conclusions

If it is meaningful to interpret the students' functions in this project along the lines indicated, then the behavior shaping of teachers by students seemed to depend essentially on alteration of the teachers' personal normative systems by sustained intellectual and social engagement through group processes. Parents, on the other hand, were influenced through emotional bonds of the parent-child relationship, which minimized the importance of consciously directed change in values or knowledge and maximized unique affectional ties as the moving force for behavior redirection. Some credence for this view is afforded by the fact that smoking among parents was reduced after the program, most sharply among parents in the experimental families; yet no accompanying dramatic changes in either attitudes or knowledge were uncovered for either the experimental or control group.

Research focused on nonauthoritarian guidance patterns would now seem to be especially productive to validate these inferences and to further our understanding of what actually happens in a health education experience. It is conceivable that several different modes of communication and influence may operate within the framework of such complex social subsystems as the school, the workplace, and the home, and not always in synergy.

Correlatively, there is need to examine and explore under controlled conditions a variety of behavior-changing models derived from experiences in the mass-merchandising market. Such studies could lead to the formulation of alternative social influence mechanisms for modifying personal behavior that are adaptable to a broad range of target populations and health education concerns.

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## SYNOPSIS

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A study of a special school program on cigarette smoking and health was undertaken in Niagara County, N.Y., to determine whether it produced effects on knowledge, attitudes, and behavior among teachers and parents as well as students and, if so, how these effects were accomplished. Data for parents, the subject of this report, were collected by questionnaire and interview be-

fore and after the program from selected parents of students in 36 junior high school classes assigned equally to experimental and control groups.

The parents failed to show statistically significant modifications of either knowledge or attitudes after the program. They did, however, show a consistent and significant downward shift in numbers of reported tobacco users. This finding was true for both experimental and control groups, but the change was distinctly greater in the experimental group. Additionally, the changes were greater for urban than for rural parents and for parents with

incomes of \$10,000 or more than for those with lower incomes.

The results for parents differed from those for students and teachers concerning knowledge and attitudes, but they were similar to those for teachers and unlike those for students concerning smoking behavior.

The study findings suggest that teaching-learning mechanisms beyond the traditional superordinate-subordinate model may be operative, with pupils, parents, and teachers in roles quite different from what they are generally thought to be. Specifically, the students may serve as mediators of value change and behavior modification for both teachers and parents.