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## ABSTRACT

This document presents papers, critiques, and comments from a symposium which assessed the current status of preventive dental behavior. The field was divided into the following three major areas: (a) mass media programs, (b) school health programs, and (c) effect of the private practitioner. Each author was asked to review the literature, provide an assessment of the current state of knowledge, and suggest future research needs in his or her area. Members of the reactor panel were asked to respond from the vantage point of the application of behavioral science technology to preventive programs. One of the most striking outcomes of the program was acknowledgement of the communication gap between behavioral scientists and practicing dentists. Some dentists felt that behavioral scientists were withholding immediately applicable techniques, while others felt there was little to be obtained from such techniques. Many behavioral scientists felt that dentists did not appreciate or support their concern and efforts in this field. (Editor/PB)

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# Health Education Monographs

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SYMPOSIUM ON DENTAL HEALTH  
BEHAVIOR

CONTRIBUTED PAPERS RELATED TO  
FAMILY PLANNING

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# BEHAVIORAL SCIENCE SYMPOSIUM PREVENTIVE DENTAL BEHAVIOR

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## Foreword

This symposium on Preventive Dental Behavior was presented on March 21, 1974 as part of the 52nd General Session of the International Association for Dental Research meeting in Atlanta, Georgia. It was part of the program organized by the Behavioral Sciences Group whose Program Chairman, Howard L. Bailit of the University of Connecticut Health Center, was responsible for its inception and success.

The session consisted of two parts: the symposium itself chaired by Stephen Kegeles, and a reactor panel whose moderator was Lois Cohen. The symposium was organized to provide an assessment of the current status of preventive dental behavior. The field was divided into three major parts: mass media programs, school health programs, and the effect of the private practitioner. Each of the three invited authors of the major papers was asked to review the literature in his area, provide an assessment of the current state of knowledge, and make suggestions for future research needs to assist in promoting preventive behaviors. The members of the reactor panel were asked to respond from the vantage point of the application of behavioral science technology to preventive programs.

There were many strong and varied reactions to the program. One of the most striking outcomes was the realization of the communication gap between the behavioral scientists and the practicing dentists. Some dentists felt that behavioral scientists had immediately applicable techniques which were being withheld while others felt that there was nothing worth obtaining from such techniques. Many of the behavioral scientists, on the other hand, felt that dentists did not appreciate their concern and efforts in this field and did little to support it.

Perhaps, if it accomplished nothing else, the conference put these groups in greater touch with each other. There have been few opportunities for such dialogue. Behavioral researchers have been few in number in dentistry and have become recognizable as a distinct group only within the past decade. Hopefully, the dialogue which began with this conference will lead to more productive interactions in promoting preventive dental behavior.

Finally, we wish to acknowledge grants from the Johnson and Johnson Company and the John O. Butler Company without whose support the conference would not have been possible.

*Norman L. Corah*  
*Guest Editor*

# **Current Status of Preventive Dental Health Behavior in the Population**

S. Stephen Kegeles, Ph.D.

*University of Connecticut Health Center*

This paper is intended to set the stage for the three statements and three critiques which follow. It will discuss three issues:

1. What is intended by the term, preventive dental health behavior?
2. Who carries out these activities?
3. What factors predispose people who carry out preventive dental behavior to do so, and what factors predispose the population to avoid carrying out preventive dental health behavior?

## **DEFINITION OF PREVENTIVE DENTAL BEHAVIOR**

By preventive dental behavior, I will mean one or more of the following:

1. Visits to dentists periodically on a routine basis
2. Brushing at appropriate times and intervals
3. Control of plaque through use of other mechanical procedures
4. Maintenance of low cariogenic diets either through avoiding certain foods or increasing consumption of certain foods

## **FREQUENCY OF PREVENTIVE BEHAVIORS**

### *Frequency of Dental Visits*

#### *By Demographic Factors*

The most recent nationwide data indicate that about 46 percent of the United States population visit a dentist at least once a year.<sup>11</sup> The frequency of such visits has increased over the past 40 years; this increase has been at the rate of a little more than one half percent per year from a base of 20 percent in 1930. Annual visits to dentists and annual expenditures for dental services are distributed quite unequally among the U.S. population.<sup>12</sup>

Few studies have attempted to obtain answers from the population about why they seek dental care as contrasted with what is provided them once in dental offices. Thus, it is difficult to provide other than socioeconomic data about characteristics of populations who visit dentists for preventive purposes.

Available data indicates that about 25 to 30 percent of the United States' population visit dentists on a routine periodic basis. This has increased slightly over the past 15 years from about 20 percent. Again, routine periodic visits are distributed unequally among the population.<sup>13</sup>

There appears to be a direct and substantial relationship between



amount of income, amount of education, and level of occupation and both frequency of annual visits and frequency of routine, periodic visits. Members of underprivileged minority groups made fewer overall visits and fewer routine visits than members of the white majority, older persons made fewer overall dental visits and fewer routine visits than persons under 45 years of age, persons who live in rural areas make fewer overall dental visits and fewer routine visits than persons who live in non-rural areas.<sup>6</sup>

### *Frequency of Activities Carried Out at Home*

A number of additional activities have been recommended by the dental profession to reduce dental caries and periodontal disease. These include reduction of sweets and carbohydrates, use of dietary additives including calcium and fluoride tablets, and use of mechanical means for ridding teeth and gums of debris. Though no systematic data have been collected, it is probable that an extremely small proportion of the population follows any of these procedures.<sup>6</sup>

Brushing is the single home activity followed by a substantive proportion of the population. In nationwide surveys, about 50 to 70 percent of respondents state they "brushed their teeth one or more times yesterday." Women are invariably found to indicate they brush more than men. Sales persons seem to be the occupation group most likely to indicate brushing.<sup>7,8</sup>

## FACTORS RELATED TO PREVENTIVE BEHAVIORS

### *Predisposing Factors to Obtain Preventive Care*

Four perceptual factors, belief in one's susceptibility to dental problems, belief in the seriousness of dental problems, belief in the effectiveness of activities to be carried out, and belief in the importance of dental problems have been studied in regard to making preventive dental visits and in regard to brushing teeth. Findings are mixed in regard to the relation of each to the behaviors.

As the result of a series of studies over the years, it can be stated clearly that most people believe they are susceptible to dental caries while only a small number of persons see themselves susceptible to periodontal disease. There seems to be no relation between perception of susceptibility to dental caries and either visiting dentists or brushing teeth to prevent caries. There does seem to be a relationship between susceptibility to "serious dental problems" and preventive dental visits.<sup>6</sup>

The evidence seems to indicate three major factors about the relevance of the concept, "seriousness," to dental disease and behavior. First, verbal statements can be obtained which indicate people believe that dental disease is serious whether this is defined as clinical severity, or of effect on appearance. However, if one compares people's conceptions of severity of dental disease to other diseases, it is found

that dental caries are seen as minimally serious while periodontal disease is seen as moderately serious. Second, most persons do not see dental problems as interfering greatly with anything important to them. Third, relatively few people who see dental problems as serious, whether for clinical or aesthetic reasons, are likely to take preventive dental actions because of that perception.<sup>6</sup>

Overall, far more people (in some studies, more than double the number) who indicate that brushing teeth and visiting dentists are effective measures carry out these activities than those who fail to indicate that these are effective measures. Relatively few people believe dental problems are important as compared to other things which might befall them. However, recent data indicate that more persons who believe dental problems important take preventive dental actions than persons who do not have the belief.<sup>1</sup>

### *Factors Which Predispose People to Avoid Preventive Care*

Three separate perceptions of barriers to dental care have been studied: (1) negative appraisal of dentists, (2) fear of pain and anxiety about treatment and (3) cost of care. Again, the data are somewhat mixed.

*Perception of Dentists.* Most people see dentists positively. Negative appraisal of dentists seems relevant only for persons who perceive themselves to have had profoundly poor experiences; partially for this reason this small group tends not to seek dental care. Most patients seem not to have had poor experiences, do not conceive of dentists negatively, and do not stay away from dentists for this reason.<sup>6</sup>

*Anxiety and Fear of Pain.* A large proportion of the population is anxious about dentists but a relatively smaller proportion of the population is unable to tolerate pain or anxiety from dental treatment. In a number of studies carried out over the past 15 years, between seven and ten percent of the population indicate they do not seek checkups because of fear of pain or anxiety about treatment.<sup>4,7,8</sup> Anxiety and fear of pain seem most likely to keep people from adequate care when coupled with low levels of motivation; persons with high motivation for care seem to disregard anxiety and fear of pain.

*Perceived Cost of Care.* As noted earlier, frequency of dental visits and frequency of dental visits for preventive purposes are related directly to economic status. Equally important, far more people believe dentistry costs too much than believe that medicine costs too much. A large segment of the population defines dentistry as a luxury which it cannot afford.<sup>6</sup>

*Other Social Variables.* Data are quite clear that families tend to get similar dental care with the mother the main force for care. Mothers who get preventive care for themselves tend to obtain preventive care

for their children. 4\* mothers who have themselves lost many teeth tend not to gain preventive care for their children.

Adults who have preventive orientations toward general health matters tend to have preventive orientations toward dental visits. In addition, adults who make preventive medical visits tend to make preventive dental visits as well. The converse is also true. Adults who do not have preventive dental orientations or who do not make preventive dental visits tend not to have preventive health orientations or to make preventive medical visits.<sup>5</sup>

These data are the context for the papers which follow. The question raised is how does one persuade people who do not now carry out preventive dental behavior to do so. Many suggestions have been offered for this purpose. Three places and means have been chosen for discussion for this symposium. (1) use of mass communication, (2) use of the school, and (3) use of the private dental office and dental practitioner. The three papers and their critical appraisals will deal with both values and problems in using these locations and means.

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# **Mass Communications and Dental Health Behavior**

Arthur W. Thornton, Ph.D., M.B.A.

*The Proctor & Gamble Company*

Through research, the scientific community has gathered a great deal of information concerning ways in which dental health can be improved. Some of this information concerns the value of personal hygiene in dental health, and can be directly applied at home by individuals in improving their own dental health. The means must be found, however, to transfer this information to the public in an efficient, meaningful way. Because nearly every person comes in frequent contact with television, radio and/or newspapers, these mass media represent a potentially important means of reaching the public with dental health information.

Unlike other forms of communication, mass media require the efforts of relatively few in order to contact many. The large size of the mass media industry, and the many companies willing to spend considerable sums of money to promote their product messages, give some indication of the effectiveness of mass media in communicating certain types of information to the public.

It therefore seems reasonable to explore mass media as a means of conveying dental health messages to the public. I would first like to describe some of the dental health programs that have utilized mass media in their campaigns, and discuss some of their merits.

## **DENTAL HEALTH PROGRAMS**

### *Community Dental Health Education*

An excellent example of the effectiveness of mass media in promoting dental health education at the community level is represented by the "Dr. Dial" program conducted in Casper, Wyoming.<sup>16</sup> During the six-week project, mass media were used to convey information concerning periodontal disease to Casper's 40,000 residents. An important aspect of the Casper project was a recorded telephone message service referred to as "Dr. Dial," which had been established as an authoritative source of general health information.

The purpose of the mass media effort was to draw attention to periodontal disease and to prompt listeners to call "Dr. Dial" for additional information. A different telephone recorded message was used for each of the six weeks of the study. Television spots were shown over 100 times during the six weeks. Five different radio spot announcements were aired over 600 times. Printed dental material related to the project also appeared in Casper's newspaper. Although attention was also drawn to the "Dr. Dial" program through hand-out material, bumper stickers, and the like, mass media were the major

communication channels used to promote the "Dr. Dial" program.

The results of the six-week "Dr. Dial" program in Casper were measured in several ways. Data collected from the study showed that about 60 percent of the patients who visited their dentists during and after the project had either seen or heard announcements about the "Dr. Dial" program. More importantly, about 14 percent of the people who visited dental offices during and shortly after this period indicated that their visit had been prompted directly by the "Dr. Dial" program. Further, the 33,000 telephone calls received by "Dr. Dial" during the entire six weeks, or about 5500 calls per week, indicated that the program was highly effective in arousing public interest in dental health in general and periodontal disease in particular.

The results of the "Dr. Dial" program suggest that community projects can effectively motivate people to seek information regarding public health as well as prompting them to visit their dentists. This project was believed to be so successful, in fact, that similar programs are being considered or have been initiated in other communities.<sup>5</sup>

### *National Dental Health Education*

Mass media have also been used at the national level to help promote dental health education. An outstanding example of a program of this type is the television spot announcement campaign sponsored by the American Dental Association.<sup>6</sup> During the past ten years, the Association has been providing 30-second and 60-second films on dental topics for use on television. At present, these films are mailed periodically to over 480 television stations throughout the nation.

This program utilizes the availability of free television public service time to convey its message. It is estimated that approximately ten million dollars of free television time is donated annually to this program.<sup>2,6</sup> While the effectiveness of this program in changing the dental health behavior of the general population has not been measured, the wide exposure given to this program over the past ten years would seem to assure some measure of success at least at the cognitive or attitudinal level.

Mass media have also been used on a national basis during Children's Dental Health Week to help promote dental education.<sup>1</sup> During this period, national exposure to dental health information has been provided by children's television shows and by major magazine and syndicated news column coverage of such topics as the current status of fluoridation and the importance of healthy teeth. Further, interviews concerning dental disease have also been aired on national radio networks. While the effects of this annual program have not been definitively measured, the Children's Dental Health Week program has disseminated much dental health information to the public in general, and to children in particular.

### *Commercial Product Messages*

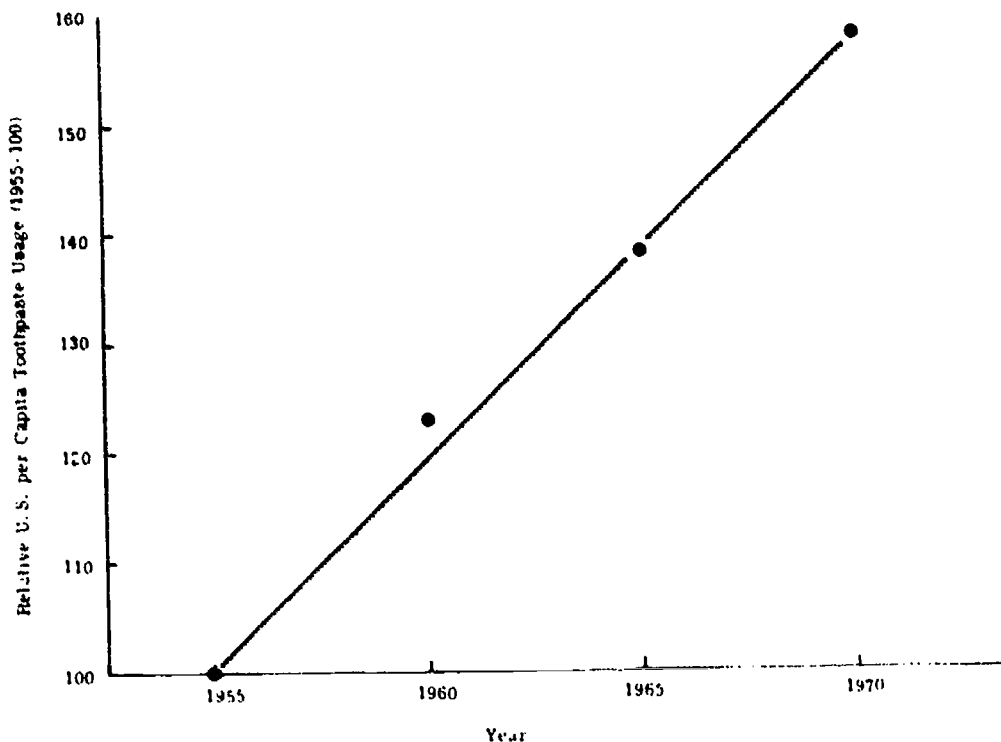
Since it is generally difficult to quantify values such as personal attitudes or habits, it is hard to determine the effectiveness of mass media in changing these values. If a value change in attitude or habit can be linked to some other response such as a product purchase, however, product sales can give an indication of a change in value. For this reason, the impact of commercial advertisements for dental products can give some insight into the ability of mass media to help shape dental health behavior.

One example of how commercial product messages have directly helped to influence dental health behavior is the public acceptance and use of fluoridated toothpastes. Since the mid-50's when these toothpastes were first introduced, mass media have been used as the major communications source to convince the public that fluoridated toothpastes are more effective in reducing cavities. The results of these commercial product messages are two-fold. First, the public has generally accepted the fact that fluoridated toothpastes are more effective in reducing cavities. Second, fluoridated toothpastes account for about two thirds of all toothpaste sold today. The shift to fluoridated toothpastes represents a substantial change in the public's dental health preferences with regard to their purchase choices. The use of mass media must therefore be considered instrumental in convincing people of the value of using these toothpastes, thereby bringing about widespread dental health benefits to the general public.

An example of how commercial product messages have indirectly helped to influence dental health behavior can be seen in the increased per capita consumption of toothpaste from 1955 to 1970, as shown in Figure 1. Since the percentage of people using toothpaste and the quantity of toothpaste used per brushing is believed to have remained relatively constant over this period, this trend is most likely indicative of an increased frequency of toothbrushing of about 50 to 60 percent from 1955 to 1970. Obviously, factors other than toothpaste advertisements could also have helped bring about such a trend. Nevertheless, it is reasonable to believe that the aggregate effect of toothpaste advertising has helped to increase the frequency of brushing. It seems, therefore, that mass media, through commercial product messages for toothpaste, have indirectly influenced the dental health behavior of the public.

### ELEMENTS OF SUCCESSFUL MASS MEDIA CAMPAIGNS

The preceding examples give us some idea how mass media have been useful in promoting dental health. They also highlight three elements which I believe must be integrated into a mass media campaign to assure its effectiveness in reaching the general public.



*Figure 1 Trend of per capita toothpaste usage in the United States.*

### *Conveying The Message*

First, the communication itself must effectively convey the desired message. The manner in which the message is presented can importantly influence its impact on the general public. In a study conducted for the Food and Drug Administration regarding its OTC Drug Education Program, it was determined that public awareness of potential problems stemming from OTC drug misuse was low.<sup>7</sup> It was concluded that public awareness of the potential problems could be facilitated more readily through a direct message approach using a bold presentation of facts than by more subtle message approaches. It seems reasonable that a direct message approach would similarly offer the best means of reaching the public with dental health messages, since good dental health is not an everyday concern to most people.

It seems appropriate that most dental health messages promote preventive rather than curative dental measures. This requires, however, that the message recipients accept, more or less on faith, that the preventive measures are worth the effort. This emphasizes the fact that a dental message must be believable if it is to have any impact. This includes both the believability of the message itself and the credibility of the source of the message.

In the previously mentioned study for the FDA, it was concluded that the direct message approach also increased the believability of the message. The same could reasonably be expected for dental health

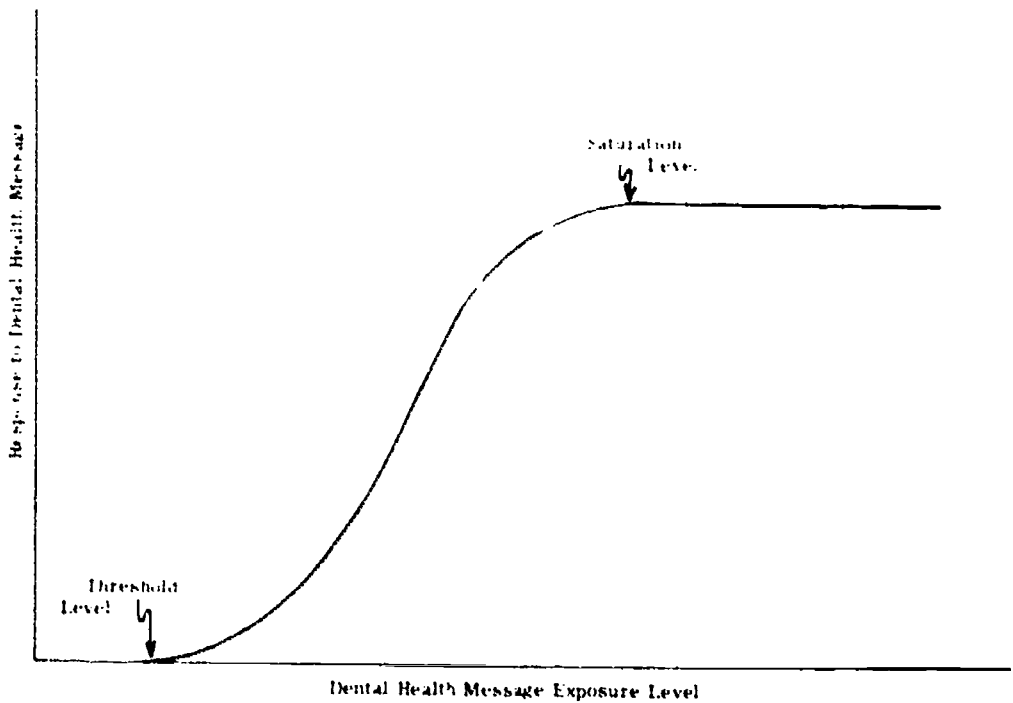


Figure 2 Response to dental health message exposure level.

messages. The most credible and authoritative source of dental health information in the minds of the public is probably the American Dental Association. The fact that ADA product endorsement has helped influence the use of fluoridated toothpastes supports this contention.<sup>3</sup> It also seems reasonable that toothpaste advertisements have increased the public awareness of the ADA name, thereby reinforcing its credibility as an information source. ADA sponsorship of dental health messages therefore seems appropriate.

#### *Level of Exposure*

Second, the message must have an effective level of exposure in order to reach the public and bring about a significant change in dental health behavior. While the exact way in which mass media exposure works is not well understood, there are some basic assumptions regarding media exposure which are generally accepted as valid.<sup>4,9</sup>

One of these is the concept of a "threshold level" of exposure below which media messages are wasted. Stated in another way, the message will tend to be lost among the thousands of competing messages unless some minimum level of exposure is attained. At the other extreme is the concept of a "saturation level" beyond which additional exposure is wasted. Between these two extremes lies a range over which responses to media messages can be influenced by exposure level.

Using these basic concepts to describe dental health messages, the response to different media exposure levels can be depicted graphically by an S-shaped curve as shown in Figure 2. Since the attainment of a



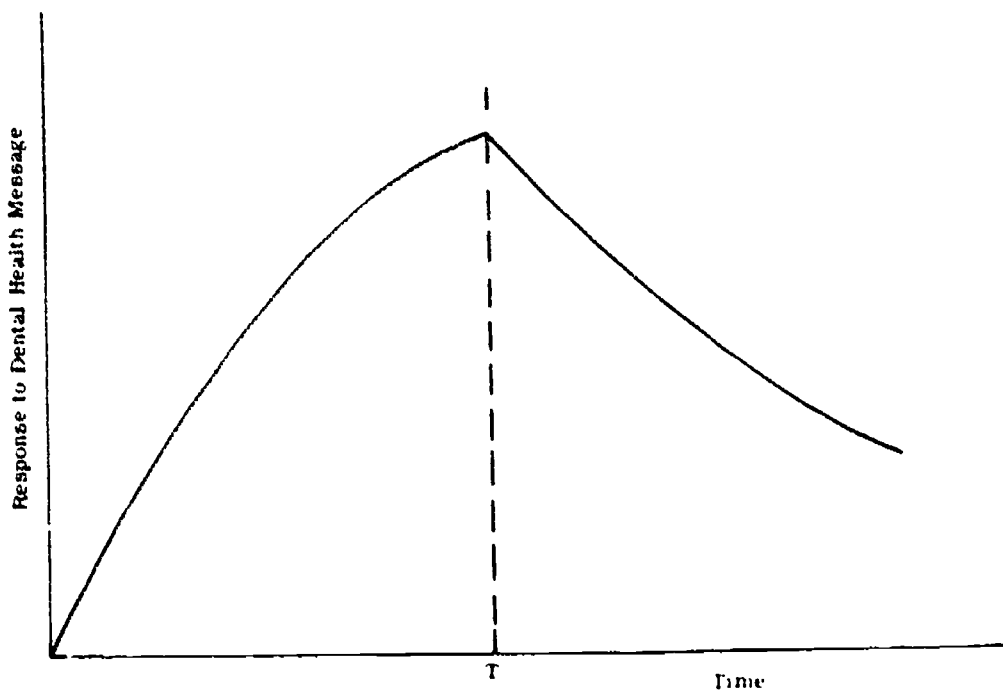


Figure 3. Response to a dental health campaign of duration  $T$

saturation level is generally believed to require very high exposure, it is unlikely that this level has much significance in dental health campaigns. The threshold level is significant, however; unless this level is exceeded, the campaign will not make a contribution to improved dental health behavior.

To best achieve good dental health, proper dental health techniques should be practiced on a continuing basis. If a mass media program has succeeded in improving some aspect of dental health behavior, it is therefore important to assess whether this improvement will be sustained if the program is discontinued or redirected.

Borrowing from advertising dynamics studies conducted in other areas, the response to the dental health message built up during the mass media campaign will likely undergo a more-or-less logarithmic decay if the campaign is terminated.<sup>8</sup> This is described qualitatively in Figure 3. In net, this implies that some level of continuing media effort will be necessary to sustain an improvement in dental health behavior. Since it is expectedly more difficult to bring about an improvement than to sustain it, the program should probably consist of two phases. The objective of the first phase would be to bring about improved behavior, and would emphasize media support to accomplish this. The objective of the second phase would be to sustain the improvement from the first. Since the second phase of the program should require lesser media support, other dental health mass media programs could then be initiated.

### *Feedback Mechanisms*

Third, the mass media campaign should have a feedback mechanism to measure its effectiveness in reaching the intended objectives. Feedback from a mass media campaign is analogous to data from a scientific experiment. The experiment is generally conducted with some desired result in mind, and data are collected to determine if that result was achieved. If not, the experimental conditions are changed until the desired result is obtained. Similarly, feedback from a mass media campaign is used to determine if the objectives of the campaign were met, and if not, how the campaign should be changed to meet its objectives.

The success of the "Dr. Dial" program discussed earlier could not have been determined without feedback measurements of its effectiveness in reaching the people. The large number of telephone inquiries to "Dr. Dial" indicate that many people were motivated to learn more about periodontal disease and how it affects them personally. Additionally, the program's influence in motivating people to visit their dentists, an action not everyone considers particularly pleasant, accentuates the effectiveness of the program in moving people to action. Without these feedback measurements, the effectiveness of the "Dr. Dial" program in Casper, and its potential in other communities, would have remained unknown and uncertain.

By way of contrast, the effectiveness of the ADA spot television program has not yet been definitively measured, although I understand that some research is being planned. While the large amount of donated television time probably assures the program some measure of success, I would also expect feedback measurements to be of significant value in giving guidance to the program. For example, such measurements could help identify those messages which have the highest impact. This would provide a criterion for selecting the best messages for subsequent exposure. Effectiveness evaluations could also help define the minimum levels of exposure needed by establishing the threshold level for dental health messages. Additionally, measurements of effectiveness could help determine if it is better to concentrate the available media resources on one program at a time or to spread the resources over several different campaigns simultaneously.

### SUMMARY

Mass media represent a potentially important means of reaching the public with dental health information. Examples discussed earlier indicate that dental health behavior can be positively influenced through the use of mass media.

In order to reach the public most effectively, the dental health message should have high impact and believability. This can be done

best through a direct message approach using a bold presentation of facts relating to the dental issue.

A threshold level of mass media exposure, below which media efforts are ineffectual, is generally believed to exist. This indicates that individual dental health messages must exceed some minimum level of exposure before they can begin to influence dental health behavior. Following any change in behavior, a low level of exposure may be necessary to sustain the change.

A feedback mechanism to measure effectiveness should be included as an integral part of dental health mass media campaigns. Effectiveness measurements would provide valuable guidance in selecting the most promising dental health messages as well as the exposure levels necessary to meet the campaign objectives. I believe that added emphasis in this area is necessary to maximize the effectiveness of mass media in promoting good dental health behavior among the general public.

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## Critique of Thornton's Paper

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Thornton's recommendation that added emphasis be given to evaluating the effectiveness of mass media campaigns on dental health deserves the endorsement of all organizations active in this field. Unfortunately, endorsement is not likely to be followed by action. It is difficult for persons responsible for designing health campaigns to accept the idea that an appropriate evaluation is not only an appraisal, but also a diagnosis — a means of specifying changes which could improve future campaigns. Agency administrators and funding sources often apply, or are seen as applying, pressures which preclude taking the risk of an evaluation which might reveal weaknesses in a campaign. For this or other reasons, the evaluations reported by Thornton have deficiencies which deserve mention here.

### PROBLEMS OF EVALUATION

In the study of the "Dr. Dial" program in Casper, for example, no mention was made of measures taken prior to the program or in a comparison city. The fact that 33,000 calls were received in a city of 40,000 people is impressive — in fact, astonishing — and many people may have gained useful dental information from the taped messages. However, the figures indicate only that such information was *sought*, not whether it was *learned*. Of the 14 percent of dental patients who said their visit was prompted by the campaign, how many would have made a visit without exposure to the campaign? How many came for prophylaxis rather than for treatment? What *increase* in patient visits, if any, was produced by the campaign? How many people saw the messages but did not respond? How many both called Dr. Dial *and* visited a dentist? How many changed their daily dental health behavior in some way? Although the full study report may have answered these questions, the description provided does not indicate that the design used would have made it possible to answer them.

The conclusions drawn concerning the effectiveness of advertising for anticavity toothpaste brands are questionable for somewhat different reasons, since no real assessment is reported. Since the mass media campaigns are purportedly promoting three behaviors — using anticavity toothpaste, reducing intake of "treats," and seeing a dentist regularly — it seems fair to judge effectiveness in terms of achieving all three goals. Campaign effects on the latter two would be especially difficult to ascertain, but would help greatly to support the contention that advertising can influence dental health behavior. It is possible that advertising for anticavity brands is *too* effective in one sense; by convincing people that using the right toothpaste will prevent cavities,

it may produce carelessness in other dental habits and less frequent prophylactic visits. Comprehensive evaluations of advertising effects could include measures of these factors, as well as assessments of actual dental health status, to determine the net effect of dentifrice advertising. Ideally, these evaluations would also include measurement of the number of persons induced to begin toothbrushing.

Thornton points out that the effects of national dental health programs are uncertain, but concludes that the wide distribution and exposure of such programs "would seem to assure some measure of success." If exposure were all that were needed, this statement could not be disputed; the estimated ten million dollars worth of television time donated annually for dental health public service announcements should certainly have some effect. Unfortunately, even a campaign on this scale may produce no measureable results. Many people are not exposed to the messages; some who see them pay little attention; some who attend to them fail to learn their content; some who learn do not accept the messages; some who accept them are not motivated to act; and some who are motivated to act fail to do so. Sound evaluations of major dental health campaigns would incorporate measures at each stage of this sequence to determine not only *to what extent* beliefs and behavior are changed, but also *for what reasons* less-than-desired success is achieved. Such evaluations are costly when compared with what often passes for program evaluation, i.e., comments by "experts" and descriptions of program activity, but their findings can lead to significant improvements in the design of future campaigns. A thorough and well-planned assessment of a major public service campaign can be conducted for a very small proportion of the "donated time" value of such a campaign. This point has been made by many others, and it has been endorsed by a number of national conferences on health communications, but organizations which produce campaigns continue to rely largely upon content specialists rather than lay audiences in judging the effectiveness of their programs. This approach has value but does not permit firm conclusions to be drawn about the probable or actual impact of campaigns. Thornton is charitable in saying that they have probably been successful, but as he notes, the evidence for this judgment is slight. In fact, most probably fail to attain a "threshold" level of exposure.

### PERSUASION vs COMMUNICATION

The other general recommendations offered by Thornton are reasonable, but the first one — that communications should convey "facts" and "a message" — does raise an issue which deserves special emphasis. Some would argue that the problem is not so much a lack of information as a lack of motivation, and that programs directed to the public should therefore stress persuasion rather than education. In one

national survey, for example, 83 percent of the respondents mentioned toothbrushing as a way to prevent dental disease, but only 55 percent said they had brushed their teeth the day before.<sup>1</sup> While this survey included only adults, it is likely that the gap between belief and behavior is even greater among children whose school health education programs include information about dental care. Most people already know they should brush their teeth, but there is evidence that they are not equally well informed about flossing or other dental care measures. Even if they shared professionals' beliefs about such measures, however, the odds are that they would not use them on a regular basis.

This may be true because dental health behavior is particularly hard to influence. Dental problems are regarded as less serious than other health concerns; tooth decay occurs gradually, so it is hard for people to perceive the connection between daily actions and their remote consequences; there is widespread faith that dentists can effectively handle most dental problems; recommended actions (brushing, flossing, avoiding sweets) are troublesome, and need to be taken daily rather than at rare intervals; and some people may regard fluoridation as so effective a decay preventive that individual actions are no longer required.

Given this array of factors which inhibit the success of programs to influence dental health behavior, and the fact that people's beliefs are so imperfectly related to their actions, perhaps mass media programs should utilize nonhealth-related appeals to a greater extent in the future. Tailoring the standard appeals used in commercial product advertising — good dental practices can save you money, make you more attractive, set a good example for your children, make you resemble a movie star, and so on — might be far more effective than stressing the seriousness and preventability of periodontal disease.

A field experiment comparing the effects of using such appeals in several cities and traditional educational efforts in others would provide a basis for judging the relative value of the two approaches. The same design could be used to find out whether mass media programs reinforced by personal contact and group meetings have significantly greater impact than campaigns not supplemented in this way. Experiments of this kind can be based on existing variations in programs, and they offer the best method of resolving present questions about the use of mass media to influence dental health behavior. If this research can also provide quantitative descriptions of "exposure threshold" and "response decay rate," such constructs will begin to have practical value for those who plan and produce communication programs.

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## **School Dental Health Programs**

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In principle, dental health education in the school setting should be an extremely important component of efforts to influence preventive dental behavior. For one thing, the other major approaches are of necessarily limited scope or efficacy. Take the dental office for example: In one study, over 40 percent of the dentists surveyed admitted that they themselves did not attempt to educate patients routinely in their own offices although they overwhelmingly recognized the importance of doing so.<sup>13</sup> In addition, nearly two thirds of the dental hygienists questioned reported spending less than 30 percent of their time on diet and oral hygiene instruction.

Even when the dentist does function as a dental health educator, the kind of education he provides in the treatment setting may be limited, with emphasis on the patient's current oral problem rather than on dental health in general. Furthermore, only about half the American public visit the dentist in a given year which limits the scope of coverage of the general population.<sup>14</sup>

Another approach that has been suggested to inform the public about dental health and to lead it to take appropriate preventive action is that of community educational campaigns via the mass media. Unfortunately, however, research studies have found educational campaigns to have varying and often limited effects. Cartwright has noted that many organizations have placed great reliance on media campaigns that do not succeed in producing the desired behaviors among any substantial proportion of the population.<sup>1</sup> Indeed, he has noted that significant behavioral changes resulting from such campaigns are the exception rather than the rule. A number of factors have been found to limit sharply the degree of success.<sup>1,6</sup> For example, people selectively attend to and interpret the contents of mass media communications. In addition, in the mass media situation as it presently exists, there is no opportunity for feedback from the audience (although cable television possesses the potential for such audience response). And all too often, the recommendations of such mass messages are so nonspecific as to have limited impact.

Why might one expect any better outcome from efforts to influence preventive dental behavior made in the school setting? The reasons for a more hopeful view are twofold: First, the school setting avoids the limitations associated with the dental office and with mass campaigns and second, the school setting possesses several positive features in its own right. One great asset is the opportunity for communication with nearly all persons within the entire school-age group in an explicitly educational context where learning is emphasized and rewarded.

Furthermore, continuing educational influence can be exerted on the target audience over a considerable time period. The process can begin at an early age, when habit patterns are still in the process of being formed rather than being firmly established and resistant to change, as is true of adults. Another advantage is that the dental health educator can use both mass communication and personal communication approaches on the same audience, deriving the maximum benefit from each. The school classroom setting also offers the possibility of making use of the powerful forces of group dynamics in inducing students to take appropriate dental health actions. Clearly, these are powerful advantages; one might anticipate that they would produce highly successful results. To what extent have such expectations been realized?

### CURRENT STATUS OF SCHOOL DENTAL HEALTH EDUCATION

Young has noted that there has been wide recognition of the need for dental health education programs in schools and that dental health has been one of the most frequently included topics in health curricula.<sup>22</sup> Unfortunately, however, dental health educational efforts in schools have not yielded results commensurate with their apparent potential.<sup>16,22</sup> They occupy a low priority in the view of many schools and are a frequent target of proposed budget cuts. By and large, they appear to have achieved relatively poor results in terms of demonstrable, sustained dental health benefits. Although there has been an instructional emphasis, most of the data indicates that students do not engage in the behaviors they have learned.<sup>22</sup> And where successes have been achieved, the particular reason for such success is not always clearcut.<sup>16</sup>

How can we account for this unsatisfactory state of affairs? In my view, a few major factors seem to be of particular importance. Among these are overemphasis on the acquisition of information rather than change in behavior; focus on classroom activity even though good oral hygiene performance in the home should be a key goal; lack of emphasis on maintaining changes produced by the educational program; failure to view the school-based dental health educational effort in a sufficiently broad perspective; and less than optimal program planning and evaluation. Let us now examine these factors in somewhat greater detail.

#### *Persuasion vs Information*

The idea that simply presenting information will necessarily lead to some desired outcome has persisted in spite of substantial research evidence showing that it is likely to result in action only on the part of those already predisposed to do so. Rayner and Cohen,<sup>16</sup> Cohen and Lucye,<sup>2</sup> Young,<sup>22</sup> and Kegeles<sup>8</sup> have all emphasized the need to go



beyond the presentation of information and facts and motivate individuals in the classroom to learn and subsequently perform healthful behaviors. The phrase "motivate individuals" should not be taken to mean simply combining the presentation of information with exhortation to do the "right" thing. Rather, it refers to inducing a person to act on the basis of some desired goal whose attainment the individual sees as being facilitated by that behavior. The desired goal may be to attain something positive or to avoid something negative. It seems possible that dental health educators may present content that students do not relate to their own goals. If so, the response to the attempted persuasion may be only situationally determined and not persist outside the immediate classroom situation. This poses substantial problems for efforts to elicit changes in beliefs and behavior not only in the classroom but more importantly in the home setting.

Kelman has pointed out three processes which may be involved when one person is influenced by another. He distinguishes among *compliance*, *identification*, and *internalization* by the recipient of the influence attempt.<sup>9</sup> *Compliance* occurs when an individual accepts influence because he hopes to achieve a favorable reaction from the source of influence. He does not necessarily believe the content of his induced response, but he does believe that making the response is necessary to be rewarded by the other. *Identification* occurs when a person adopts behavior like that of another person or group with which he desires to establish or maintain a positive relationship. As with compliance, the adoption of the particular behavior or attitude is motivated by a desire to be liked by the source. Both these types of influence have similar effects on behavior and attitudes. The compliant individual will drop the acquired belief or behavior when it no longer achieves the goal of eliciting a favorable reaction from the source. As the source with whom the individual identifies changes, so will his behaviors and attitudes change because they are tied to the external source and dependent on social support. *Internalization*, on the other hand, occurs when the individual accepts influence because the attitude or behavior being induced is consistent with his own set of values. In other words, the *content* of the change is intrinsically rewarding. This type of influence process is much more likely to be maintained over time than that of the other two processes. The individual motivated by internalization will give up an internalized behavior or attitude only when his views change as to the manner in which his values may be maximized.

I feel that Kelman's formulation contains insights that supplement and complement the emphasis on behavior change by the authors cited earlier. I heartily concur with the conviction of these authors that teaching information is not necessary for, and will not necessarily result in, the acquisition of particular behaviors. Following Kelman's analysis,

however, it seems to me desirable to work toward producing behavioral change on the basis of internalization rather than settling for its acquisition on the basis of compliance or identification. That is, the dental health educational effort should ideally be trying to produce students who end up performing the desired actions regularly on the basis of these actions being congruent with their own values.

### *Source of the Communication*

Let us now consider some additional communication factors that can importantly affect the outcome of school dental health education. One such factor is the source of the educational attempt. Research on persuasive communication has revealed that the credibility of the communicator as viewed by the recipient of the communication can make a significant difference in acceptance of the message.<sup>16</sup> This immediately raises a question as to the most appropriate source of classroom instruction in dental health in order to achieve maximum acceptance.

Two plausible but opposite viewpoints are typified by the approaches of Muhler and his colleagues on the one hand and Masters on the other.<sup>4,7,11</sup> Muhler and his colleagues have stressed the indispensability of the dentist as a source of motivation for students and have therefore recommended that a dentist conduct the school dental health program. Masters, on the other hand, has devised a detailed program of school dental health education that depends heavily on instruction by regular classroom teachers. Other points of view also exist — for example, use of dental hygienists,<sup>12</sup> combined efforts of classroom teachers and dental health professionals, and the like. Clearly, there is a range of firmly held opinion as to what should be the most effective source of dental health instruction. Few results of classroom programs, however, have been shown to be of such efficacy as to argue strongly for the clearcut superiority of one source or another. The adequacy of representing the various types of instructional sources in programs and studies also remains in question.

### *Characteristics of Students*

Another set of factors that clearly seems important in determining the impact of efforts at school dental health education is that of the characteristics of the target audience of such efforts. A number of research studies have shown that socioeconomic status is importantly related to both the possession of particular patterns of health beliefs and to the utilization of health services.<sup>18</sup> Such factors as one's perceived vulnerability to illness, the perceived efficacy of taking preventive action, and a subjective time horizon oriented toward the future are typically found to a lesser degree among individuals of lower socioeconomic status. Unfortunately, these are the same persons among

whom medical and dental problems are likely to be particularly pronounced and for whom such beliefs would be desirable. It is important to recognize and take this point into account.

Preventively oriented dental health education programs likely to emphasize the kinds of factors that I just indicated are in short supply among a substantial segment of our population. Such an emphasis is, therefore, likely to receive little social support from the children's own social groups, including that of the family. Several studies have cited the importance of the parent's role, particularly that of the mother, in influencing children's health behavior.<sup>10,19,20</sup> A few research studies also attest to the impact of involving the parents on the overall success of dental health education efforts.<sup>8,7</sup> Yet school programs in dental health education all too often fail to make systematic use of this factor; they concentrate almost exclusively on children and in so doing make their task more difficult.

Another key source of social influence is that of the peer group, which is particularly important with teenagers.<sup>15</sup> Dental health education efforts in schools, however well conceived, will have difficulty in changing either dental health attitudes or behaviors if there is strong peer group pressure against them.

### *Transfer From School To Home*

In addition to establishing supportive group standards, it is important that the classroom teaching be so done as to facilitate easy transfer to the home care setting and to maximize the likelihood that the newly changed behaviors will be retained rather than reverting to their former state. All too often, health educational efforts seem to have a sharply limited time dimension; this may account in large part for the failure to maintain over any appreciable period of time whatever gains have initially been realized. This seems to have at least two implications: First, the teaching of desired dental health practices needs to contain some components that will permit effective self-appraisal and self-reinforcement by the student in the home setting. Second, the educational efforts should be so paced as to involve follow-up and reinforcement by the school over time until the newly acquired habit is firmly established. The principles and techniques of behavior modification provide a promising approach to dealing with such problems.<sup>21</sup> It should be noted, however, that applying such techniques in a natural setting such as the school or home is substantially different from doing so in the research laboratory and should not be expected to produce automatic success.<sup>17</sup>

## PROGRAM EVALUATION

One thing that appears to be generally lacking in school dental health educational efforts is systematic program evaluation.<sup>16,22</sup> I am aware, of

course, that *any* analysis of the outcome of a dental health education program that uses either a true control group or a comparison group represents an attempt at evaluation. What I'm talking about, though, goes beyond merely assessing whether the particular educational program produced an outcome different from that of some other program or of no program at all. That type of analysis fails to deal adequately with the program process and fails to yield information that is crucial for understanding program success or failure. Two of my colleagues, Deniston and Rosenstock, have devoted considerable effort to a conceptual analysis of the evaluation process and to the development and application of effective methods of evaluation based upon this formulation.<sup>3</sup> They emphasize the need for specifying the ultimate objectives of the program, the subobjectives whose attainment is needed to reach the ultimate objectives, the activities whose performance is necessary to attain a given subobjective, and the resources allocated to perform these activities.

Deniston and Rosenstock make two points that I would particularly like to emphasize: First, the performance of activities is not necessarily the same thing as the attainment of subobjectives; it is possible to perform the former without necessarily achieving the latter. This distinction is sometimes missed by program operators who confuse the one with the other. Second, some of the things that are done to achieve particular program subobjectives (and hopefully the ultimate objectives), rest on what they label "validity assumptions," i.e., assumptions that doing a particular thing will have a positive effect on a particular outcome. Sometimes these validity assumptions are demonstrably true, while other times the assumptions are based on faith not fact. If one's validity assumptions are incorrect, then performing apparently appropriate activities may fail to result in the attainment of desired subobjectives or ultimate objectives.

Let me illustrate this point by applying it to the evaluation of educational efforts. The ultimate objective to be attained by a dental health education program is, of course, a health outcome — i.e., improved oral health status. But it is not appropriate to evaluate the impact of the educational activities in terms of the ultimate health objective. Why not? Because implicit in the program is the validity assumption that getting students to perform oral self-care at home in a particular manner (a subobjective), is directly linked with attainment of the dental health ultimate objective. This assumption may or may not be true, as appears evident from disagreements in the dental literature and variation over the years in recommended home oral hygiene practices. Rather, the criterion of effectiveness needs to be the extent to which the educational program induces people to take the actions it advocates. From my preceding remarks, it should be evident that program planning and evaluation should include specification of program

components, including validity assumptions, both to account for a given program outcome and to provide essential information for program improvement.

### SUGGESTIONS FOR FUTURE STUDIES

Based on the analysis presented in this paper, a number of areas seem to warrant further research study, among them the following:

1. The effect of parental involvement in dental health education programs, including the usefulness of various methods to induce such involvement.
2. The impact of various communication sources: classroom teacher, dentist, hygienist, etc. on acceptance and application of preventive recommendations.
3. Information acquisition vs motor skill training — how much of each is necessary/optimal for improving home oral care?
4. Use of behavioral science technology to improve both initial and sustained program outcomes.
5. Application of program evaluation models both to planning of programs and analysis of their outcomes.

In closing, may I suggest that to exploit fully the potential of dental health education in the schools, the combined efforts of many groups — teachers, health educators, parents, dental professionals, and behavioral scientists — are needed, drawing upon the unique competencies and insights of each.

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## Critique of Haefner's Paper

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It is hard to be critical of a paper that so closely reflects my own thinking and conclusions. In fact, I find very few statements in Haefner's paper with which I vigorously disagree. All of the potentials for dental health education specified by Haefner are certainly present in the school setting. That these potentials are seldom realized stems from a number of sources. Teachers rely on traditional teaching procedures, unaware that developing the *behavioral* potential for dental health may involve basically different techniques. A second deterrent to the total effort may be that the school represents only *one* of the important components of the total effort.

### ISSUES RELATED TO HEALTH EDUCATION

There are however, one or two of Haefner's statements which I accept with reservation. Because I am one of the authors who has emphasized the importance of compliance and identification, I feel compelled to defend my stand and to show how those of us using identification in the manner that we have, do not neglect the insights that are derivable from Kelman's formulation.

#### *Identification and Internalization*

Our differences appear to me to be semantic. Kelman's definitions are narrow and specific to Kelman's frame of reference. For example, "compliance" has no particular social science significance except by Kelman's special designation. Compliance is "temporary behavior," a necessary prerequisite perhaps to acquiring a new behavior. On the other hand, "identification" is an old and accepted social-psychological concept describing a well-studied and defined socio-psychological phenomenon of individuals and groups. Moreover, "identification" does not describe only positive relationships. Briefly, the *Modern Dictionary of Sociology* defines a positive "identification as a social-psychological process involving the assimilation and *internalization* of the values, standards, expectations or social roles of another person or persons into one's own behavior and self-conception." \* It is in this sense that I have used "identification." A basic assumption of my own research is that identification does not occur by simply adopting behavior like that of another person or group for the purpose of maintaining a positive relationship. Identification may occur where negative relationships exist. If one identifies negatively with an individual, the standards, interests and values of that individual are rejected, and very often the values subsequently assumed by the

identifying person are the opposite of the negative identification. Identification, then, is not merely imitation, it is a process involving incidental learning, modeling and observation which culminate in internalization or introjection of social, psychological and cultural values.<sup>2 4</sup>

When Haefner discussed internalization as occurring at the time individuals accept "influence because the attitude or behavior being induced is consistent with the individuals' own value-system," he was almost on target, but not quite. Rather, internalization of a value had already occurred. Moreover, what if the identification happened to be negative? It would scarcely be consistent with the individual's own value-system. However, as Haefner has stated, studies of school dental health education provide rather substantial evidence showing that school dental health education is likely to result in student acceptance of its content only on the part of those already predisposed to do so, thereby suggesting that only those already holding good dental health as a value are influenced in their behavior.

### *Dental Health as a Value*

The problem of inculcating good dental health practices, as I see it, is multifaceted, with "value" at the core. One of two situations usually exists: (1) if dental health is held as a value, then the problem becomes one of changing behavior so that it is congruent with the value held; or (2) if dental health is not valued, then the problem becomes one of establishing a value where none had existed before. We need to know more about value systems of students and their families, their hierarchy of values, and the attributes of a value that would promote a change in behavior. Health values in particular are of a generalized nature. Few people from any social class would admit that maintaining health is unimportant, though some might admit that teeth are less important. My point is that people claiming in all sincerity to hold similar values disagree on the specific norms embracing those values. The value systems of people are shaped by their social and cultural norms. Even if everyone were to admit dental health as a value, their dental practices and related behaviors could vary in accordance with group norms or social statuses. For example, a study of dental hygiene and socio-economic status revealed that the higher the social class, the more positive is parental example and the more directly it is related to the children's dental health practices.<sup>6</sup>

### *Dental Health as a Right*

To remove the barrier of social class differences, a major educational effort ought to be that of establishing a dental health value as a "right." A "right" which is not dependent upon perceived vulnerability, perceived efficacy of taking preventive action, or subjective orientation



toward the future, but a "right" in the current sense of being entitled to good health — that it is a prerogative of every human being. A method developed by Rokeach appears to level class differences. He has shown that confronting an individual with the discrepancies between his behavior and his declared value can induce the individual to change his behavior so that it is more congruent with his stated value. Moreover, the behavior change appears to be enduring.'

### *Establishing Dental Health as a Value*

When dental health is not valued, the issue becomes one of establishing value. How does one inculcate a value where none exists? This, I think, is the real problem of dental health education, and the one for which the schools have considerable potential. Since any value is a product of familial, social, cultural, and educational norms, each of these ought to be involved in creating and establishing the desired value. If the school is one of the best agents for creating a dental health value as Haefner suggests, then the school must find a way to marshal familial, social, cultural, and educational norms to this end since traditional forms of education are not adequate to the task. Rewards for desired behavior must come from several sources and primarily from significant persons in the individual's milieu. Who is significant may depend on the individual's age, family composition, relationships with teachers, and peer groups. For the very young, for those in the process of making a primary identification, parents, older siblings and other members of the family are the most likely to provide a model which eventually culminates in a value. A number of studies have shown that parental dental hygiene practices are the most influential factors affecting children's practices.<sup>3,4,5,6</sup> While it is difficult to involve parents in the schools' dental health programs, I do not believe it to be impossible even though the school has had little success so far. To succeed, school health and dental health programs need to be accorded a higher priority and budget, and the higher priority should be communicated to both parents and the community — the budget undoubtedly will be. Parental health education should be a part of the school's health education efforts.

If I seem insistent upon parental involvement, it is because I see it as a possible means of associating classroom behavior with the home setting. The parent, as part of the program, would help generalize the newly learned behavior to the home setting. Haefner is quite correct, however, in noting that we lack information on how to involve parents in the school's effort — at least this is the situation in the United States, and perhaps this needs to be our first priority for research. Because a situation is difficult to manage, is no excuse for eliminating it from study. Its relevance to the total problem should be our guiding principle. We know that parents are concerned for their children's

dental health. Haefner's recommendations for research on involving parents in educational programs is indeed an area for further effort — particularly for exploratory research. I suggest that study of even a handful of mothers might provide some excellent leads for more definitive research.

#### *Research on Communications Sources*

Haefner rightly recommends further research of the various communications sources. In this regard, I am reminded of the New Zealand school dental nurse. She appears to be a combination of dentist and classroom teacher. She not only provides care on a continuing basis up to adolescence, but she conducts regular programs of dental health education for both parents and children. Her functions seem to provide continuing educational influence on the target population over a considerable period of time; education begins at an early age; learning is emphasized and rewarded; parents are involved — if only because they also have experienced the same long period of early care and dental health education. Moreover, the status of the school dental nurse within the New Zealand school system, and the support given her by the dental profession and government enhances her credibility with both the community and individuals.<sup>1</sup>

I am not necessarily proposing that we need a school dental nurse in the image of the New Zealand auxiliary, but a dental health educator with comparable status, credibility and tenure might contribute much to school dental health education programs. This might be the only way that values can be acquired by the lower socioeconomic status groups. Through the school, a value *really* might be acquired in early childhood and be sustained by the salience and pertinence given it in school dental health education. It then might become a fixed value by adolescence.

#### *Need for Evaluation*

Unfortunately, I know of no attempts to evaluate New Zealand school dental health education, but the available literature indicates that it suffers from the same shortcomings as does evaluation in the United States. The increased dental fitness of the New Zealand population may be a product of the regular incremental care rather than the educational efforts of the school dental nurse. This sort of situation illustrates Haefner's point that program planning and evaluation need to include specification of program components if we are to know whether the education program actually induces home oral hygiene practice.

I also find myself in agreement with Haefner's recommendations regarding an optimal amount of cognitive change versus an optimal amount of motor-skill training. This is a virtually unexplored dimension — at least insofar as it provides guidelines for the

development of school dental health education programs. My own review of the literature suggests that age might be the crucial variable. The younger the individual, the greater the likelihood that motor-skill training will be effective; the older the individual, the greater the likelihood that cognitive change will be effective. And certainly the use of program evaluation models for planning dental health education programs and analyzing the outcomes, together with efforts to maintain desirable behavior change, is essential.

### PRIORITIES FOR RESEARCH

Finally, we should consider assigning priorities to Haefner's excellent recommendations. Defining the order of investigation to social questions, however, is somewhat difficult. We have an even greater need to specify a model of the problem, or, if you will, a greater need to define a system. In this respect, Haefner's last point, i.e., the need to study combinations of potentially important factors rather than analyze single factors, cannot be over-emphasized. Until we can identify the interactions of all the contributing variables and determine their roles, we can scarcely design effective dental health education programs. Yet to encompass all the contributing variables at one full swoop could defeat us. We must ask the significant questions, then posit priority in relation to them.

My particular bias propels me toward a combination of parental and child dental health education through the schools. But I find it difficult to decide on a single first priority that focuses on this combination. Rather, I think that research on application of program evaluation models to both planning of programs and analysis of outcomes and the role of parental involvement in dental health education should be assigned a first level position and be undertaken concomitantly. A second level priority I would accord to "cognitive change versus motor-skill training" and "use of behavioral science technology to improve both initial and sustained program outcomes." I have not relegated the impact of various communication sources, i.e., classroom teacher, dentist, hygienist to a third level priority because I think communication sources to be less important. It is because I think they must be studied in conjunction with the parental role, in terms of program evaluation models, and as one of the potentially important combined components.

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# The Dental Practitioner and Preventive Health Behavior

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Most people will agree that the dental practitioner can be, should be, or even must be an important influence in promoting preventive oral health behavior. Unfortunately, it is also true that the dentist rarely fulfills the ideal role of influencing his patients in this way. The purpose of this paper will be to explore the role of the dental practitioner vis-a-vis patient preventive behaviors. I will focus on three specific questions:

1. Which efforts of the dentist have been shown to be effective in changing patient behavior?
2. What other knowledge do we have that can be applied to this problem?
3. What must we do to demonstrate the effectiveness of what we know?

## CONTEXTUAL ISSUES

I would like to deal with some contextual issues before considering these questions. The most salient contextual factor in the dentist-patient sphere is "making contact with the patient." If the patient does not come into contact with the dentist, he cannot be influenced by the dentist. While this point might be so obvious that it could be ignored, the facts suggest otherwise. Only about 46 percent of the population of the United States visit the dentist at least once in any given year.<sup>24</sup> This means that the majority of the population does not visit the dentist in any given year. I hasten to add that the corresponding figures for other countries appear to be far worse. Shoval, for example, found that only 18 percent of the urban population in Israel visited the dentist in a year.<sup>20</sup> These figures serve to point up the need for media and school programs to get people to the dentist.

Related to the problem of getting the patient to the dentist is that of getting the patient to continue or repeat the contact. Again, the issue is not as simple as it might at first seem, for it is neither abnormal nor unusual for patients to experience a visit to the dentist as stressful. Patients who have been raised in the era of modern dental technology still react negatively and in a stressful way to dental stimuli.<sup>4</sup> In order to prevent this state of affairs from inhibiting future visits, the dentist must communicate his concern for the patient's well-being and his concern for making the dental visit as palatable as possible.

It is interesting to note that the Florida surveys showed that dentists lost 50 percent of their patients in a five-year period.<sup>22</sup> More than half

of the lost group did not like the dentist or the work he did or did not understand why he charged such high fees. Furthermore, approximately half of the dentists surveyed were willing to lose patients who did not understand or appreciate them.<sup>23</sup>

Finally, the dentist should remind his patients to come for regular checkups. I do not know what the incidence is for use of recall systems. My impression is that the incidence is not high. I suspect that an efficient recall system can be quite effective in bringing patients into regular contact with their dentist but I know of no data which support this.

### EFFECTIVENESS OF THE DENTIST

Let us now deal with the first specific question, that is: Which efforts of the dentist have been shown to be effective in inducing preventive behaviors in the patient?

The answer to this question must be that I know of no evidence which demonstrates that dentists have any effect whatsoever. Let me hasten to add that I believe that some dentists do induce preventive behaviors in their patients and that many more could do so. However, I have found no data to support these beliefs.

Perhaps one reason for the lack of concern over preventive measures by many dentists has been the acute disease model under which they have operated. Traditionally, a patient presented himself to a dentist when something was wrong and the dentist carried out the appropriate restorative or surgical treatment. Dental disease, however, appears to fit better into a chronic disease paradigm where there are multiple factors contributing to the disease.<sup>11</sup> One of these precursors is the individual's behavior. Specifically, this involves the individual's failure to observe appropriate oral hygiene measures such as proper brushing and flossing, a low sucrose diet and regular checkup visits to the dentist. All of this suggests that in addition to conservation and surgery an important function of the dentist should now be one of modifying patient behavior to prevent disease.

There has been increasing recognition by the dental profession in recent years of the need for application of behavioral and educational measures in the management of patient behavior. Analyses of problems in the management of orthodontic patients and denture patients have been particularly prominent.<sup>2,8,15,21</sup> Some of these analyses have been particularly good at elaborating the nature of the behavioral problems confronted by the dentist. Recently, a number of papers have appeared which deal with plaque control and preventive dental practices.<sup>1,9,10,26</sup> How effective are the recommendations for changing patient behavior which these practitioners have given? Are the behavioral and educational techniques in themselves effective, or is the dentist's enthusiasm for his recommendations more important than the specific

communications themselves? The answer at the present time for dental applications is that we simply do not know.

### POTENTIALLY APPLICABLE KNOWLEDGE

The second specific question we will consider is: What potentially applicable knowledge do we have available?

I would like to indicate that wherever I use the term dentist, it is used in a broad context to include all dental personnel. I believe that the most effective preventive dentistry practice would have to use auxiliaries to whom many of the duties of behavior modification could be delegated.

Probably the first place to begin with the promotion of preventive behavior is the dental profession itself. In our teaching of students, it is important to make the skill of inducing preventive behaviors as important as or even more important than learning to make a preparation or polish an amalgam.

#### *Behavior vs Attitude*

It is commonly said that an important task for dental professionals is that of changing the attitudes and beliefs of patients so that they will carry out preventive behaviors. I think this statement is false. The vast majority of our population knows that oral hygiene and regular visits to the dentist are good for them. They just do not engage in this behavior very effectively. Therefore, the real task is to influence and change patient behavior, not merely their attitudes and beliefs.

The dentist's communication with the patient provides an excellent medium for the modification of patient behavior. Leventhal has recently summarized material on social influence and concluded that interpersonal influence is the major factor shaping beliefs and attitudes *and* presumably the behavior related to them.<sup>11</sup> He gives several reasons for the superiority of personal contact. First, the communicator can reward the individual for agreeing with him. The communicator can determine if the listener is paying attention. He can correct faulty interpretations or misunderstandings. He can determine whether there is resistance to the message and attempt to overcome it.

The dentist's position is a unique one then because he is an authority whose role provides ample opportunities for reinforcing appropriate behaviors in his patients. It is also clear that he can have a great deal of negative influence. Gale recently found that fear of the dentist's disapproval ranked third in a list of 25 fears which patients have about the dental situation.<sup>6</sup> Think of what this means in terms of dentists driving people away through fear of disapproval and thus being unable to influence them at all! While Leventhal believes that the authority of the professional, his exhortations to behave in a given way, and even his own behavior as an example will influence patient behavior, I have

some reservations about how effective these factors (especially the last) can be. The following is a case in point. Mass health examinations conducted in a community in Western Australia evaluated the health characteristics of patients of three physicians. Two of the physicians took no exercise and rarely tried to influence their patients' behavior. The third physician was an ex-smoker who ran four miles a day and constantly urged his patients to follow his example. The patients of the three physicians did not differ in amount of exercise taken, incidence of smoking or in dietary habits.<sup>4</sup>

The dentist, however, can use his position of status for teaching and reinforcement of patient behaviors. If he views the process as one of gradually shaping patient behaviors until they conform to his standards he may be more successful than he would be if he expects the patient to perform correctly after one lesson. Weisenberg has suggested that many dentists are very impatient and make unrealistic demands on their patients instead of viewing the preventive behaviors as a process of gradual shaping.<sup>25</sup>

### *Behavior Modification*

One variable that seems to be very important is the specificity of the behaviors which the dentist wants the patient to practice. Anyone, for example, can run a toothbrush over their teeth. However, some training and correction are necessary in order to learn to use the toothbrush for maximum effectiveness in plaque removal. Again, oral hygiene training must be viewed as an ongoing process. Studies which have evaluated the presentation of information about diseases and their treatment have found that people tend to remember symptoms and etiology best while information about treatment is remembered least well.<sup>14,16</sup> Therefore, it would appear to be important for the dentist to use repeated explicit training for oral hygiene behaviors in patients.

Another issue is the nature of the rewards that the dentist tries to use to change patient behavior. Leventhal has noted that abstract rewards are not very effective.<sup>11</sup> If the patient is told that he will lose his teeth in 20 years by not following an oral health regimen, he will not experience that as a particularly salient reward. If the reward is made more concrete, it will have greater salience. For example, the dentist upon completing a prophylaxis can encourage the patient to experience how good his teeth look, how clean they feel and how refreshed his mouth feels. These characteristics can be immediately reinforcing and, further, they can be internalized as self-reinforcing when the patient carries out his own oral hygiene.

### *Dentist-Patient Relationship*

An important dimension in changing patient behavior is the nature of the doctor-patient relationship. Traditionally, the patient comes to the



dentist and is the passive recipient of the dentist's expertise. In order to effect any meaningful change in the patient's behavior, he must become an active participant with the dentist in his own health care. Weisenberg has suggested that a contract management approach to dental care be taken.<sup>25</sup> This approach involves specifying what each of the parties will do in dealing with the patient's health care. It specifies definite goals and obligations. The behavior of each party becomes contingent upon the behavior of the other. For example, the dentist might not carry out some procedure until the patient reached a predetermined goal in his oral health behavior.

Another aspect of the dentist-patient relationship is the nature of the controls which the dentist attempts to invoke. Aversive control appears to be the easiest type to use. The dentist can tell the patient about all of the terrible things that will happen to his mouth and berate him for not reaching the goals of cleanliness set by the dentist. Sometimes this technique will work. More often it will not. The patient may become discouraged or defensive and avoid further contact with the dentist. It would seem that reward in the form of praise for whatever the patient has accomplished would be more effective. It will leave him open to further encouragement to improve his performance.

I would like to comment on the use of fear appeals to change behavior. Studies by Janis and Feshback<sup>7</sup> and by Leventhal and his co-workers<sup>12</sup> showed that fear appeals coupled with information about how to avoid the feared consequences lead to an expression of greater intent to carry out the desired behavior. However, the Houston and Alabama studies which used a behavioral criterion of change, that is — plaque indices, found that fear appeals produced no greater change in behavior than merely providing the appropriate information about how to keep one's teeth clean.<sup>5,17</sup> The verbal measures of intent tended to match the results of the earlier studies.

I think the personality characteristics and the attitudes and beliefs of the dentist are of prime importance in initiating change in the patient's behavior. I doubt that these characteristics are of importance as far as the information the patient receives or what he learns. They are likely to be of importance in motivating him to carry out the appropriate behaviors. If the dentist is cold and aloof, talks down to the patient, or conveys the impression that he would rather be on the golf course than in the office, the patient is going to get the message and be less likely to want to cooperate. If the dentist conveys feelings of warmth and genuine concern about the patient's health needs, the patient is more likely to respond with cooperation.

### *Techniques of Behavior Change*

Finally, in this section, I would like briefly to discuss techniques of attitude and behavior change. A substantial literature exists in social

psychology dealing with attitude change in the laboratory. Unfortunately, most of this work, like that with the fear appeals, has dealt only with changes in verbally expressed behavior and not with changes in action. Recently, more emphasis has been placed on actual changes in behavior and I would like to mention two such approaches.

The first is that of the belief congruence approach of Rokeach. He maintains that people hold widely disparate values without recognizing that many of them are inconsistent with each other. He has developed a list of values which people are asked to rank from most important to least important. The inconsistency between values is then pointed out in order to induce behavior change. He has demonstrated some success in getting people to become active in civil rights activities with this approach.<sup>14</sup>

Another technique which has proved somewhat successful in changing behavior is the behavior rehearsal method of Meichenbaum. Essentially, the method involves taking part of an individual's daily routine, inserting the desired behavior in the list of behaviors and having the individual visualize and mentally rehearse each of the behaviors in the list. Meichenbaum has demonstrated the efficacy of this method in a number of different contexts.<sup>15</sup>

Both of these techniques appear to be readily adaptable to the context of influencing oral hygiene behavior. I will discuss one such attempt to use them later. Undoubtedly, more techniques will be developed as behavioral scientists direct their energies toward dealing with real-life problems.

#### FUTURE RESEARCH NEEDS

And now let us move to the last specific question: What research do we need to demonstrate the effectiveness of what we know?

First, we need research which evaluates the effectiveness of methods for inducing change in oral hygiene behavior. We need to know just how much is achieved by careful education and training of child and adult patients in oral care. We need to know whether or not the use of various behavior change techniques really add anything to training and gentle persuasion. I am convinced that the dentists who have written enthusiastically about their preventive dental practices have indeed influenced their patients. However, it is not clear how they have done this. What kinds of selective factors operate to limit their patient population to those who will benefit? How do their patients really compare with other patients who are just like them but are not urged by their dentists to practice good oral hygiene? We need the answers to these questions.

These issues raise the problem of controls for evaluation. We need to know in evaluating any given approach to behavior change that we are not merely dealing with patients who are essentially self-selected

because they are more concerned about health care than are other patients. After giving this problem considerable thought, I have come to the conclusion that we cannot answer these questions by investigating patients in different kinds of dental practices. We must go out, find our own populations to study, and conduct field experiments to evaluate these issues. In this way, we can at least be sure that we are not confounding patient characteristics with the other phenomena we wish to evaluate.

Another major area which needs careful investigation is that of the relationship between personality characteristics of dentists and those of their patients. This particular issue bothers me because as a researcher I know that it is a very difficult one to handle. However, the issue is an important one to me as a clinical psychologist. I do not know to what extent characteristics of the dentist are important in influencing patient behavior. I would like to know to what extent the beliefs and enthusiasm of the dentist for promoting preventive behaviors play in influencing those behaviors. I believe that they are very important but I do not have any real data on the matter.

The personality characteristics of patients may play an important role in their susceptibility to behavior change. For example, a recent study I conducted evaluated a number of patient dimensions in relation to response to restorative dental procedures. One of these dimensions was locus of control, that is, the extent to which a person believes he has some control over the events in his life.<sup>19</sup> This particular characteristic was negatively correlated with stress responses to the dental procedures. Patients who feel they are largely at the mercy of external forces, then, apparently experience the dental situation as more stressful. Based on these results, I suspect that patients who believe they *can* effect some change in their own destiny would be easier to influence in the promotion of good oral hygiene. However, this kind of evaluation remains to be done.

#### *An Example of an Evaluation Paradigm*

I want to conclude by discussing a study which I think is something of a paradigm for the kind of evaluative research we need. It is a behavioral study being conducted with the Buffalo Caries Project. Dr. Judith Albino is directing the research. The purpose of the study is to evaluate the effects of toothbrushing and flossing instruction and two methods of behavior change designed to induce such behaviors. The dependent variables are plaque and gingival indices obtained by both a dental hygienist and from color slides of the labial surfaces of the teeth and gingiva.

The subject population consists of 200 students in the seventh grade of Buffalo schools. They were randomly assigned to four different groups of 50 each. The basic study design is shown in Table I.

**TABLE I**  
**DESIGN OF THE BEHAVIOR CHANGE**  
**STUDY IN THE BUFFALO CARIES PROJECT**

	Group 1 Control	Group 2 Instruction	Group 3 Belief Congruence	Group 4 Behavioral Rehearsal
A.	Baseline plaque and gingival measures - all groups.			
B.	No treatment	Training in brushing and flossing. <i>Three week interval</i>		
C.	No treatment	No treatment	Induction 1	Induction 1
D.	No treatment	Training in brushing and flossing continued. <i>Three week interval</i>		
E.	No treatment	No treatment	Induction 2	Induction 2
F.	Posttest I	Plaque and gingival indices - all groups. <i>Five week interval</i>		
G.	Posttest II	Plaque and gingival indices - all groups. <i>Six week interval</i>		
H.	Posttest III	Plaque and gingival indices - all groups.		

The control group received only baseline evaluations and will receive the posttest evaluations. The second group merely received instruction in toothbrushing and flossing on two different occasions. I should point out that this is individual instruction with correction and a lot of encouragement.

The third and fourth groups in addition to the instructional procedure received a method of behavior change induction which is interspersed at two intervals between the instructional procedures. These were also done individually. The third group received a variation of the Rokeach belief congruence approach in which they ranked a series of beliefs of some consequence to seventh graders. Inconsistencies between highly ranked values and behavior were then used to induce oral hygiene behavior. The fourth group received a version of the behavioral rehearsal approach of Meichenbaum in which toothbrushing and flossing were inserted as salient activities in preparation for going to bed. In addition, schedules were sent to these children to be placed in the medicine cabinet to keep a record of their brushing and flossing behavior.

Following the final induction procedures, plaque and gingival indices will be obtained after one week, six weeks, and 12 weeks. The time intervals of Groups 1 and 2 were locked to those of 3 and 4 since we were primarily concerned with the behavior change techniques. We will be able to determine the relative effectiveness of each of our procedures in reducing plaque and gingival irritation. The study is approximately two thirds completed at this time. Any positive findings would indicate

that the procedures we have employed could be readily introduced into a dental practice. It should also be noted that no dentist is involved in the conduct of this study. Any potential applications could be carried out by auxiliary personnel.

This particular research is not without some specific shortcomings. However, it is far superior to most similar work done in the past. I hope we see a good deal more research like this in the near future. We need the information.

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## **Critique of Corah's Paper**

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Preventive dentistry has become associated in the minds of most dentists and many dental educators and researchers with a set of nonclinical activities that might loosely be called patient dental health education. One consequence of this "set" has been to expose dental practitioners and students to a variety of motivational approaches for instilling in their patients new dental health attitudes and behaviors.

### **MAJOR ISSUES**

Corah's paper accurately reflects the "state of the art" of the current approaches to preventive dental health behavior as undertaken by the individual practitioner. Answering the question: "Which efforts of the dentist have been shown to be effective in inducing preventive behaviors in the patient?," Corah forthrightly states that he "knows of no evidence which demonstrates that dentists have any effect whatsoever" by which he intends that no data exists to evaluate differential effectiveness of the preventive programs of practicing dentists. The stress on the paucity of evaluation data forms a continuous thread throughout this paper. It helps place in proper perspective the proliferation of "how-to" methods now so readily available to the dentist wanting to become more prevention oriented. It is unfortunately true that we simply do not yet know if some of the current approaches to preventive dentistry are having more of an impact than others.<sup>1</sup>

#### *Modification of Behavior*

Corah cites strategies and variables that currently deserve attention since they have been isolated by research in relevant disciplines. The suggestions he makes come largely from learning theory approaches to behavior modification supplemented by research from social psychology into attitude change and small group communications. He correctly stresses the well-documented observation that people, by and large, will readily verbalize appropriate attitudes about the value of oral health but will not usually undertake requisite systematic prevention behaviors.<sup>2</sup>

In addition to reinforcing the need to distinguish between attitudes and behaviors as outcome measures for evaluating preventive dental health measures, Corah suggests the following strategies as being consistent with the limited available evidence: reliance on concrete positive reinforcers, gradual shaping rather than radical altering of

behavior, active patient participation, careful use of fear arousal, positive appeals to self-esteem, and the interpersonal influence of the dentist.

### *Preventive Dentistry Programs*

An examination of the most popularized preventive dentistry programs, better known as "plaque control programs," do in fact incorporate many, if not all, of these variables.<sup>1</sup> The most well-known plaque control programs advocate providing cognitive clarity through information, putting the locus of control literally in the patient's hands and using reinforcements that appeal to enhanced self-esteem — looking and feeling better, obtaining a higher level of oral health, etc. In addition, current programs at least imply that interpersonal influence is a lever for shaping desired patient behavior.

However, there is one major omission from this list. A variable well-recognized in communication and motivational research is the personal persuasibility characteristics of the dentist as communicator-motivator. Included here are such notions as self-confidence, perceived self-conviction in the validity of the message and a perceived commitment to the well being of the patient. Unfortunately, while recognizing the potential of persuasive influence for behavior change, social scientists have not been able to identify and control the crucial aspects of the process by which one individual actually persuades another to change his ways.

### *Deficiencies of Social Science Contributions*

While the variables mentioned and approaches suggested follow from what is ostensibly known about motivation and behavior change, there are no data to indicate how these variables should be combined and what contextual settings might be optimal. In fact, one has only to look at cigarette smoking statistics, infrequency of annual medical examinations, cancer detection programs, physical fitness appeals, etc., to appreciate the limited success social scientists have had in predicting and controlling prevention-oriented health behavior.

In this regard, social scientists would perform a service for dentistry if they could provide some boundaries for realistic expectancies. Clinical dentists, willing and able to make important changes in office routine, tend to look upon psychologists as professionals with answers about the complexities of human behavior, much as the dentist perceives himself the professional competent in the management of oral disease. Research tactics and findings from behavioral science should clearly communicate to the dentist appropriate perspectives concerning the size of the problem. It might be helpful, for example, to state in understandable terms the confidence limits and/or probability levels associated with research findings about



health behavior changes. Such a strategy might better allow the clinician to evaluate his own efforts against the probability of obtaining an effect of a certain size as reported in the research literature.

### RESEARCH NEEDS

If our present focus is on the individual practitioner, then we should extend research to the individual practitioner's environment. Applied research which has turned out to be most relevant, especially in education, has been research which simulates the real thing as closely as possible. For example, it may not be too much to suggest that attitudes and behaviors were not readily isolated as separate variables because the context in which such research was largely conducted, the social psychology laboratory, never created an opportunity to observe behavioral outcomes, but only verbalizations of attitude change.

Returning closer to home, preventive dental health programs conducted in school settings, such as the excellent paradigm presented by Corah, still need validation in the dental setting. Simply grafting such externally derived programs into dental offices without concern for differences in the psychosocial dynamics between schools and dental offices may present discouraging problems to the private practitioner. There is a precedent for such a concern. It appears that too often private practitioners have tried to graft someone else's highly publicized plaque control program onto his office routine without due respect for variability in interpersonal persuasibility, ability to transfer control, clarity of information presented, etc. The resultant impact on patients falls short of the dentist's expectations. He tends to become disenchanted with attempts "to get the patient to do it," i.e., the dentist is turned off and preventive dentistry as a dental office undertaking is devalued.

The concern over this problem arises when Corah converts his list of research opportunities into specific research strategies. On the one hand, evaluation research is advocated which controls for population differences by studying patients isolated from dental practice settings. He next cites, however, a major need to investigate the relationship between "personality characteristics of dentists and those of their patients." But, in order to know which behaviors of the individual practitioner best motivate individual patients we will ultimately require exactly the kind of research which examines interpersonal interactions within the real-life contexts of patients in dental settings.<sup>4</sup>

#### *Dentist vs Paraprofessional*

Finally, there are some distinctions which Corah mentions but does not stress adequately, which are nevertheless important for the future of preventive dentistry as a viable concept in dental practice. Paraprofessionals have been assigned a prominent role in most

preventive dentistry programs, which is quite appropriate. No body of data exists to help make rational decisions concerning the timing, extent and specific content of the paraprofessional's activities in this area. We need to know more about the advantages and disadvantages of using authorities (e.g., dentists) versus peers (e.g., paraprofessionals) for communicating health-related messages to patients who differ in socio-economic status, mobility, age, sex, ethnicity, and past medical/dental experiences. There is evidence that general health information can be effectively transmitted by "nondoctors" but that patient-specific information is more reliably acted upon when transmitted by the doctor.

### *Child vs Adult Disease Prevention*

Corah also does not sufficiently distinguish between preventive dentistry programs for children and adults. The prevalent oral disease of each group is different; caries is prevalent in children while periodontal disease is largely an adult problem. The dentist has a greater variety of approaches for preventing caries in children than periodontal disease in adults.<sup>3</sup> It seems appropriate to suggest we sharpen our research questions to focus differentially on eliciting behaviors which maximize the prevention of the most likely disease entity in these particular patient groups.

### *Modifying the Dentist's Behavior*

The final point is perhaps the most important. It seems overly reductionistic to discuss individual practitioners and preventive dental health behavior solely from the focus of the dentist or somebody else in his office changing the patient's behavior. Social science research must engage dentistry's reluctance to incorporate systematically into practice more ambitious topical fluoride programs, nutritional counseling programs and the latest available information on clinical techniques related to preventive concepts. In reality, preventive dentistry programs in individual offices have typically become plaque control programs which stress the patient's accomplishing highly limited behavior changes — namely, flossing and toothbrushing.

Thus, the overall problem of changing the patient's preventive dental health behaviors seemingly includes consideration of the individual practitioner's concept of preventive dentistry. For example, it might be hypothesized that dentists who perceive the objective of preventive dental health programs to be the patient's ability to manipulate floss and toothbrushes are less likely to remain prevention-oriented dentists. By contrast those dentists who evaluate their own need to obtain such behavior changes within the context of personal, interpersonal and clinical requirements of individual patients may tolerate a wider range of individual differences in patient behavior and be less likely to

abandon preventive dentistry programs. Therefore, the dentist's behavior must be changed first; he must be sensitized to distinctions among ideals, goals and realistic expectancies.

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## **Reactor Panel**

Lois K. Cohen, Ph.D.  
*Division of Dentistry, DHEW*

I want to set the stage briefly for the comments which follow. Our three reactors were asked to consider the material from the symposium as it relates to questions of *application* to preventive dentistry.

In addition, the panel will consider the following questions:

1. How does one extend research on mass media effectiveness for prevention when private industry is the only structure able to support such a communication medium? How does one gain access to experimentally test various media strategies?
2. How can change in school dental health programs be effected when other categorical entities vie for the same "time/space" in the curriculum?
3. How does one extend research in the laboratory to research settings in individual private practices where specific preventive measures might be employed?
4. Is there a possibility of negative behavior change and if so, have we examined the research results to date for the phenomena of regressive or reversed behavior patterns?
5. How would the reactors set priorities for the research questions proposed in the symposium?

## **Comments**

James P. Carlos, D.D.S.  
*National Institute of Dental Research*

I have the somewhat uncomfortable feeling that my inclusion on this panel is to represent the so-called research funding agencies. I accept that, but much prefer to comment from the viewpoint of one engaged in a highly mission-oriented program intended to bring about a major reduction in caries among our entire population.

Our most obvious activities involve research into etiologic factors and the testing and development of preventive measures. But we are also acutely concerned about the problems of delivery and public acceptance of caries prevention, which must be solved before our efforts can succeed.

In this context, the papers and critiques just presented impressed me first, for their concise and lucid analyses of various approaches to behavior modification but, equally, because they illustrate our tendency to fail to address the question of precisely what behavioral change we wish to bring about. This is not intended as a criticism of those engaged

in research on behavior, but rather as a criticism of all of us for failure to conduct sufficient dialogue to identify clearly our immediate as well as long-term goals.

Frequently, it seems, the notion of motivating persons toward preventive dental behavior is taken to be synonymous with getting them to brush their teeth in a prescribed manner. In this regard, Dr. Haefner's warning about the danger of defective validity assumptions seems to me to be of central importance, and often disregarded. Perhaps we tend to become preoccupied with the processes of education and motivation, important and complex in their own right, and lose sight of the immediate objective. It is possible that methods can be devised through research to induce mass behavior change in personal plaque removal habits. Frankly, I am skeptical regarding the probability of this occurrence. But more importantly, we must examine *other* possible strategies to achieve improved oral health, together with a critical and realistic appraisal of the resources available to implement each of them.

A consideration of optimum national strategies to prevent oral disease requires, first of all, some estimates of the expected biological effect of alternative preventive agents and techniques. These must come from clinical research. Equally important, however, are estimates of the degree to which each alternative method will be accepted and utilized by that subsegment of the population for which it is intended. Obviously, this question requires analyses of economic and personnel factors, in addition to studies of individual attitudes, priorities and behavioral patterns. Further, one can conceive of instances in which the key persons in gaining acceptance of a measure to prevent caries are not the ultimate recipients at all, but rather the parent, the teacher, the school administrator or the community official.

It may well be necessary to experiment with nontraditional methods to optimize levels of acceptance and utilization or, in some instances, simply to minimize resistance. As Dr. Swinehart suggested, the ability to "sell" a product to the public, not necessarily to their ultimate benefit, has been perfected to an awesome degree. There might be much to be gained from examination of these techniques.

But first, we need to be much clearer regarding what we wish to sell. That, I think, remains the crucial question for our collective scrutiny.

## Comments

Morton A. Fisher, D.D.S., M.P.H.  
*New York City Department of Health*

How to induce an individual to translate a perceived need into preventive or curative action has long been a pervasive problem in

public health. Twenty years ago, while working toward my master's degree in public health, I became deeply involved in the problems of influencing attitudes and behaviors. My immediate concern at that time was promoting the public acceptance of a proposal to fluoridate the New York City water supply.

Today I can do little but express disappointment. After hearing these papers and their critiques, I can detect very little evidence that we are any closer to influencing health behavior today than we were decades ago. Nor have we experienced better success in our attempts to influence even the perception of health needs.

The three papers and their techniques are essentially a continuum wherein health education at three discreet levels of interpersonal relationships are explored: the one-on-one, the instructor to classroom, and the mass media. I see nothing in the descriptive analysis nor in the proposed research that leaves me sanguine about their worth.

My experience with the one-on-one interplay leaves me feeling that, all things being equal, it is the most effective of the three alternatives albeit the most expensive. It offers the most reliable ability to build an interest level and to create and sustain an influence over behavior.

My 25 year experience with a classroom health education setting permits me to hold strong convictions on that mode. For over 50 years the New York City Health Department dental program had been supplementing the clinical dental services it rendered in its more than 200 clinics with classroom dental health education and follow-up. This classroom education activity, reaching over 1,000,000 elementary and junior high school children per year included efforts to involve the parents through conferences and home visits. As many as 170 dental hygienists were occupied on the classroom exercises and parent contacts each year.

I wish I could report endorsement of the technique. I cannot. In fact, I discontinued the classroom education activity a little over a year ago because the dental hygienists proved themselves in that setting to be totally ineffectual in reversing a 20-year decline in the number of school children seeking or receiving dental treatment annually. This despite the supplementation of the more than 200 Health Department clinics with the free private sector treatment opportunities offered by Medicaid. My other reason for discontinuing the classroom activity reflected my cost-benefit analysis of it. There was simply a greater relative good to be derived from employing hygienists to provide direct preventive services to the children along with one-on-one education. In this revised setting, classroom teachers are charged with reinforcement of dental health with hygienists serving solely as technical resources to the teacher.

An anecdote involving one of the panelists provides recent support for this administrative action. Upper classmen at the New York

University College of Dentistry have been engaged in a school program which, with great talent and ingenuity, virtually saturates one elementary school with dental health education facts and practices. Dental health verbalization by the children of that school is as good as, if not better than, that in any school or any setting. This has not, by one iota, reversed or improved the declining pattern of dental care in that school.

My experience with the mass media leads me to believe that they are quite effective in influencing the selection of a course of action once the individual has been motivated to act. I see these media as exerting very little influence over the decision to act per se. Unfortunately, mass media are also afflicted with a tendency to induce the consumer to substitute an easier albeit less desirable alternative. For example, why brush your teeth if a mouth wash will do the job, or why visit a dentist if you brush with *X* dentifrice?

The undistinguished record of behavioral scientists engaged in the quest for predictable techniques to influence dental health behavior or even for parameters of success must invite some uncomfortable decisions when subjected to the scrutiny of cost effectiveness. How much, in the face of scarce resources and the need for direct services, are we to be prepared to invest in uncertain research? In many ways it is a re-expression of John Galbraith's dilemma in his definition of diplomacy -- "not the art of the possible, but the choice between the unpalatable and the disastrous."

### **Comments**

Charles A. Amenta, Jr., D.D.S.  
*March Publishing Company*

As is generally the case, my reaction is predicated on my abilities to understand the content of the papers within the context of my previous experience. I concur with my fellow reactors in that I found the papers to be extremely well done and the critiques to be supportive in their constructiveness when theory was in conflict. My principal concern is that we tend to complicate through fragmentation the solution to influencing positive preventive dental health behavior.

Although we do not have a perfect insight into all the ramifications of the causative factors in dental caries, there are experts that contend that between mechanical plaque control, judicious utilization of fluorides, and good eating habits, we can literally overkill the disease. The latter applies in great part to periodontal disease as well. Since dental caries and periodontal disease account for in excess of 98 percent of all tooth loss and since both are believed to be caused from the products of bacterial plaque, I refer to the prevention of these two disease entities

when referring to preventive dentistry. Adequate dental health is nothing more than the preservation of the teeth and their supporting tissues in a functional disease-free state. At its basic level, preventive dentistry is saving teeth.

Realistic vehicles to generate awareness, transfer information, and train to skills do exist. Although the available methods are improving at a shocking rate, they are presently more than adequate if applied within the framework of a nationally organized campaign. As I noted earlier, a general fragmentation in the application of the principles of the above needs is the foremost barrier. We are, as John Hein stated sometime ago, lacking in a *Master Plan for Dentistry*. As a simple example, the American Dental Association, the American Society for Preventive Dentistry, the American Academy of Periodontology, the American Society of Dentistry for Children, and HEW, to mention but a few that come to mind immediately, are all supplying preventive dentistry messages to the mass media. Grade school programs such as presented by Den-Tal-Ez (ToothKeeper), ADA, Proctor & Gamble, and Colgate, again to mention but a few, are being implemented to a greater or lesser degree throughout the nation. Certainly the success of the American Society for Preventive Dentistry indicates an in-office concern for acquiring the methods to prevent dental disease. To say that the above are fragmented, confused, disorganized, conflicting, and wasteful, would be a gross understatement. We simply haven't put it together. It is somewhat discouraging to note that research has provided us with the necessary tools. Behaviorists have the vehicles and methods to adapt the tools but because of disunity of application, Americans are generally in an abominable state of dental health.

To my knowledge, the administrators of the Dental Health Center in San Francisco put together the only comprehensive mass media program in an attempt to prevent periodontal disease. They developed an ambitious campaign only to find that funds were not available for execution. Then, as the government is wont to do, the decision was made to close the Dental Health Center. This is just one more example of the disunity that exists. Be use vested interests present such monumental barriers, I see no force on the horizon capable of solving the problem of fragmentation.

In summary, although the papers were excellent and the critiques meaningful, I see them only as an academic exercise. All of us who are concerned with the prevention of dental disease must work with solidarity and unity in applying the many valid principles that were presented. Perhaps I am too optimistic, but the government and specifically the Division of Dentistry could one day pull it all together.