FEAR AROUSAL, PERSUASION, AND ACTUAL VERSUS IMPLIED BEHAVIORAL CHANGE:

NEW PERSPECTIVE UTILIZING A REAL-LIFE DENTAL HYGIENE PROGRAM

RICHARD I. EVANS, RICHARD M. ROZELLE, THOMAS M. LASATER, THEODORE M. DEMBROSKI, AND BEM P. ALLEN

University of Houston

In three junior high schools, students were exposed to high fear arousal, moderate fear arousal, positive affect arousal, elaborated recommendations only, and brief recommendations only directed at improving toothbrushing behavior. Criterion measures of information, anxiety, intention to behave, self-report of behavior, and a new chemical indicator of actual toothbrushing behavior were administered precommunication, immediately postcommunication, 5-days postcommunication, and 6-weeks postcommunication. Results suggest that elaborated recommendations and positive affect were most effective in changing actual behavior, but that high fear and recommendations only were the most effective in changing reported behavior. Effects of all conditions were attenuated over time.

The present report presents the results of an investigation designed to explore the differential impact of various patterns of appeals on retention, intention to behave, reported behavior, and, most significantly, on actual behavior. The focus on the effects of persuasive communications on actual behavior and the utilization of an innovative behavioral measure (Evans, Rozelle, Lasater, Dembroski, & Allen, 1968) in the present study is responsive in general to the growing need for research in social psychology which examined the effects of persuasion on actual behavior, as well as on attitudes, beliefs, and intended or reported behavior. More specifically, it attempts to utilize as a criterion a specific behavioral measure to further explore the effect of fear arousal in persuasion communications.

In his review of research in the fear arousal area during the past 1.5 years, Higbee (1969) pointed to inconsistencies in the literature. In spite of such contradictions in the literature, the present authors agree with Higbee and suggest further that there exists at least some evidence for the following generalizations: (a) Generally, high fear is more effective than low fear, or there is no difference between the two in changing intentions to behave, self-report of behavior, or actual behavior. (b) The effect is usually greatest immediately following the communication and dissipates with time. (c) The effects of fear arousing communications are more clearly demonstrated through changes in reported intentions to behave, attitudes toward the topic.
of the appeal, or for self-reports of behavior, than for changes in actual behavior. (d) At least some minimum level of affect arousal coupled with instructions appears to be involved in most of the fear-arousal studies. (e) There have been few if any comparisons made between effectiveness of negative (fear) appeals and positive (optimistic) appeals. (f) There is a need in fear-arousal studies to not only examine the immediate effects of the communication, but to examine the relative long-term effects as well. (g) There may be an overriding need that aside from affect arousal, the instructions in such studies should be quite specific. (k) Learning and retention as well as anxiety may be crucial considerations in studies in the effectiveness of communications.

**The Present Study**

The present study was designed both to further clarify issues suggested in the above eight generalizations and to consider some yet unexplored considerations in the area of affect-arousing communications. It utilizes the pretest-treatment-posttest design found in virtually all the affect-arousing communication studies reported in the literature.

An innovative aspect of the present study is the inclusion of a novel behavioral measure of *toothbrushing* behavior, which was developed to fill the need for more adequate criteria of behavior in such studies.

Another aspect of the present study rarely found in previous studies is the utilization of three posttreatment periods: immediately following the presentation of the message, 5 days after the presentation, and 6 weeks after the presentation.

Still another aspect of the present study not often found in previous ones is the inclusion of a positive (optimistic) affect appeal. It is possible that fear-arousal appeals may not have the persuasive effectiveness of an appeal emphasizing positive consequences. Because positive consequences are often not visible, examining the effects of positive appeals are difficult in some health communications. However, because of its nature, the dental hygiene situation permits the inclusion of positive affect appeals.

Given a certain amount of motivation, subjects need also to know when and where to behave and have access to the necessary equipment needed to behave if persuasion is to be effective in line with the findings of Leventhal, Singer, and Jones (1965). It was in response to this consideration that the procedure was included of giving each subject a dental care kit, as well as the detailed recommendations for its use. In fact, one plausible explanation for the relative ineffectiveness of high fear as a persuasive condition found in the Janis and Feshbach (1953) study is the possibility that inadequate recommendations were provided with the high-fear message. For example, Janis and Feshbach (1953) reported the following quotes from subjects in the high-fear condition: “Leave out the slides that show the rottiness of the teeth and have more in about how to brush your teeth; I don’t think you should have shown so many gory pictures without showing more to prevent it [p. 83].”

So the present investigation is an extension of the basic approach utilized in the earlier study (Evans et al., 1968), more systematically reexamining and extending several facets of the problem of fear-arousal persuasive communications, the background of which were reviewed by Janis (1967) and Higbee (1969). To more completely measure our knowledge of the impact of persuasive communications, measures of information retained and anxiety were also included.

On the basis of the rationale thus presented and generalizations in terms indigenous to the interaction of the independent and dependent variables in the present investigation, the following hypotheses were formulated: (a) The high-fear appeal generates a higher degree of anxiety than a low-fear appeal; the least amount of anxiety is generated by the positive appeal. (b) No significant differences are obtained in information retention among any of the conditions. (c) The high-fear, low-fear, and positive appeals generate a significantly greater intention to behave, in accordance with the recommendations, than the recommendations only and the elaborated recommendations. (d) The high-fear, low-fear, and positive appeals generate a significantly greater report of behavior in accord-
The subjects ranged from 12 to 14 years of age and that all subjects were homogeneous with respect to socioeconomic level, roughly lower middle-class. It was necessary to gain permission from subjects’ parents for their participation. Therefore, only subjects who returned a permission slip that indicated parental acceptance were included in the sample. There appeared to be an approximate 70% return rate. However, upon further investigation, it was discovered that some of the teachers had misplaced return slips, so this 70% may be a substantial underestimate of the actual return rate.

One junior high school was randomly selected for the presentation of two fear communications. Another was randomly selected for the presentation of the positive communication and the elaborated recommendations communication. A third was randomly selected for presentation of the recommendations only and to provide a control group which received no communications. However, the group intended as a control was not considered in the analysis of the results because the class had been dismissed to attend a track meet on the occasion of the fourth subject contact. Classes selected for the various messages were counterbalanced with respect to time of day (morning versus afternoon).

**Persuasive Appeals (Independent Variables)**

Five varieties of persuasive appeals were used in all. Three of the persuasive appeals, high fear, low fear, and positive, were each followed by an identical set of specific recommendations. A fourth communication consisted only of a set of these specific recommendations. A fifth communication condition consisted of an elaboration of the specific recommendations utilized in the other four appeals.

The positive communication began with a non-specific reference to the good health and popularity obtainable by those who take proper care of their teeth. This section was followed by the chronicle of a boy and his sister. Events in the lives of these two persons were integrated with their dental history, and several slides of these persons were shown. It was emphasized that both had always taken proper care of their teeth and that both had always been popular and otherwise socially successful. A cause and effect relationship between proper dental care and popularity was thus suggested. The communication ended with the suggestion that anyone can be healthy and popular if he takes proper care of his teeth.

The specific recommendations which were included in all communication conditions (see the discussion of Leventhal & Singer, 1965) began with a suggestion that procedures for the proper care of the teeth do exist and can, in fact, be stated. This suggestion was followed by the presentation of a step-by-step procedure concerning how to care for the teeth. This consisted of four specific recommended steps:

1. **Brush your teeth with toothpaste in your usual way, but as thoroughly as you can and remember to brush the back of your teeth.** Try to brush all of your teeth and be sure to clean in between your teeth. After brushing them as clean as you can, rinse your mouth thoroughly with water.

2. **Clean more thoroughly in between the teeth.** The dental floss is used to help clean the places a toothbrush misses. This is easy to do. Cut off a piece of dental floss about a foot or so long. Wrap the floss around your index finger and grab the loose end with your other hand, so about an inch of floss is left between your hands. Slip the floss between each pair of teeth by moving it gently back and forth. Then scrape the floss against both sides of the teeth until you feel they are clean.

3. **Chew the disclosing wafer and swish it around your teeth to see if you have missed any places.**

4. **Spot brush the few remaining places away and remember these places you’ve missed the next time you’re brushing your teeth.**

The “dental care kit” (produced by Proctor and Gamble) was given to all subjects at the conclusion of each message. The kit contained some disclosing wafers, a toothbrush, some toothpaste, and a cylinder.
of dental floss. Each kit contained a precise set of printed instructions which consisted of a restatement of the step-by-step recommendations presented in the communications presented orally.

The remaining communication condition was included in the light of results reported by Leventhal et al. (1965) which suggest the importance of elaborating instructions. These elaborated recommendations were combined with the set of recommendations which were included in all other communications, but were more detailed in describing proper dental hygiene practices.

An actor was hired and trained to present the various communications. This individual was chosen because he looked mature and had the appearance of a professional person. The actor, although identified as only a member of the research team, was told to speak with authority and confidence.

Dependent Variables

The behavioral measure. Arnim (1963) developed a “disclosing wafer” which, when chewed, stains the plaque on the teeth red and thereby reveals the amount of this plaque. According to Arnim, this has proven to be a reliable indicator of dental hygiene behavior involving toothbrushing and use of dental floss. Using the disclosing wafer and a technique for photographing the teeth and gums, Evans et al. (1968) standardized a 5-point scale for rating plaque concentration which reflects such dental hygiene behavior. This scale was utilized to measure dental hygiene behavior in the present investigation. The ratings ranged from 1 (very clean) to 5 (very dirty).

Reported behavior. Reported behavior was measured by subjects’ responses to a question eliciting information concerning the relative frequency of toothbrushing behavior. The alternatives were scored from 1 (never) to 5 (two times a day).

Anxiety. A gross measure of anxiety was used to determine the degree to which affect was aroused by the communications. Using four questions which requested subjects to report their own anxiety level, scores of 4 (high anxiety) to 20 (no anxiety) were recorded.

Intention to behave. Intention to behave was determined from subjects’ responses to two questions eliciting estimates of intended frequency of engaging in dental hygiene behavior. Scores ranged from 2 (lowest intention to behave) to 10 (greatest intention to behave).

Information retained. The measure of information retained by the subject was composed of five multiple-choice questions covering only the content of the specific recommendations which were present in all communication conditions. Scores ranged from 4 (lowest retention) to 16 (highest retention).

Also administered in the present investigation were various attitudinal and personality measures including the Locus of Control scale (Rotter, 1966), Dogmatism scale (Rokeach, 1960), the Social Approval Scale (Crowne & Marlowe, 1964), and a measure of attitudes indirectly related to the dependent variables. Results of this aspect of the study and related theoretical and methodological considerations involving instruments with the exception of the Social Approval Scale have been reported elsewhere (Allen, 1969; Dembroski, 1969; Lasater, 1969). Complete results of the findings concerning the Social Approval Scale will be reported elsewhere.

Procedure

The experimental portion of the present investigation consisted of five subject contacts. Each subject contact involved a visit by three experimenters and their assistants to three junior high schools.

First subject contact. The first subject contact took place 6 weeks after the permission slips were distributed to potential subjects to avoid the possibility of subject reactivity to the permission slips.

The experimenters introduced themselves and their assistants. One of the experimenters told the subjects that they were to take part in a dental health program as part of their physical education class requirements. Following this brief introduction, the subjects were told how to complete the questionnaire booklets. Assurances of anonymity were given to the subjects.

After the questionnaire booklets had been administered, the procedure for utilizing the dental wafer and photographing subjects’ gums and teeth was implemented.

Second subject contact. The second subject contact took place 1 week after the first and involved the administration of the personality and attitudinal measures.

Third subject contact. The third subject contact occurred 1 week after the second, and the persuasive communications were presented. The anxiety, intention to behave, reported behavior, and retention measures were administered. Since only three schools were made available for the present investigation and five experimental groups were to be formed, a system for combining conditions within schools was developed.

Fourth subject contact. The fourth subject contact occurred 5 days after the third. The procedures were repeated involving the behavior measure, and measures of reported behavior, intention to behave, anxiety, and retention were once again administered.

Fifth subject contact. The fifth subject contact occurred approximately 6 weeks after the presentation of the communications (third subject contact). The same measures which were obtained during the fourth subject contact were again administered.

Results

While all conditions were homogeneous with reference to socioeconomic level, an erratic pattern of differences was obtained among conditions for the preexposure measures of reported behavior and actual behavior. As a
result, difference scores were used in the analysis of these measures for the purpose of assessing relative change among treatment conditions. Since there were no precommunication measures obtained for anxiety, retention of information, and intention to behave, means for each of these were obtained on each of the three postcommunication measurement occasions and used for the analyses of these measures. The data were analyzed by means of analysis of variance using the unweighted means formula for unequal ns with repeated measures given by Winer (1962, pp. 374-378). The \( n \) for each analysis was the number of subjects measured on all pretest and posttest occasions. Differences between the various treatment conditions were assessed by \( t \) tests.

Reported anxiety. A main effect was observed for reported anxiety (\( F = 14.3, df = 4/364, p < .001 \)). In support of the first hypothesis, subjects in the high-fear condition displayed the greatest amount of anxiety immediately following the communication and were significantly higher in anxiety than the low-fear-appeal condition (\( t = 2.2, p < .05 \)) and the positive-appeal condition (\( t = 6.4, p < .001 \)). In further support of the first hypothesis, the low-fear-appeal condition was higher in anxiety than the positive-appeal condition (\( t = 4.4, p < .001 \)). A significant main effect was obtained for time (\( F = 6.5, df = 2/728, p < .001 \)). The magnitude of the differences between conditions decreased over time, and, although the rank order of the conditions was somewhat altered on the S-day and 6-week postcommunication measure, no significant reversals for relative amount of anxiety were obtained. Also found was a significant interaction between time and condition (\( F = 5.3, df = 8/728, p < .01 \)).

Information retained. Contrary to the second hypothesis, a significant main effect was observed for information retention (\( F = 4.25, df = 4/364, p < .005 \)). The positive-appeal-condition groups retained significantly more information than all the other condition groups (high fear, \( t = 4.1, p < .001 \); low fear, \( t = 2.6, p < .01 \); recommendations only, \( t = 2.4, p < .05 \); elaborated recommendations, \( t = 2.2, p < .05 \)). The elaborated-recommendation groups in comparison with the other groups retained the second greatest amount of information. They retained significantly more information than the high-fear-condition group (\( t = 2.3, p < .05 \)). A significant difference was also obtained between the amount of retention in the recommendations-only-condition groups and the high-fear groups (\( t = 2.4, p < .05 \)), with the recommendations-only-condition group retaining the greater amount of information. A main effect was observed for time (\( F = 47.0, df = 2/728, p < .001 \)). The magnitude of the differences between the information-retention means generally decreased over time with no significant reversals in rank order among the conditions occurring. The differences attenuated to such an extent that there were no significant differences between any of the conditions on the 6-week posttest measure. Also obtained was a significant interaction between time and initial level of cleanliness (\( F = 2.5, df = 8/728, p < .05 \)).

Intention to behave. A significant main effect was obtained for intention to behave (\( F = 4.37, df = 4/364, p < .005 \)). Partial support of the hypotheses was obtained as the high- and low-fear conditions reported mutually equal and stronger intentions to behave than were expressed in the positive and elaborated recommendation groups (high fear versus positive, \( t = 2.4, p < .05 \); high fear versus elaborated recommendations, \( t = 2.5, p < .05 \); low fear versus positive, \( t = 2.9, p < .05 \).
A significant main effect was obtained for time \( t = 2.7, p < .01 \). For every condition the intention to behave decreased over time. On the 6-week postcommunication measure, the only significant differences were between the high-fear condition and both the positive \( t = 2.7, p < .01 \) and the recommendations-only conditions \( t = 2.1, p < .05 \). Thus, the high-fear appeal seemed to have the greatest effect in sustaining an intention to behave in accordance with the message. Parenthetically, no significant interaction effect was obtained between time and condition.

Reported behavior change. A significant main effect was obtained for reported behavior change \( F = 2.7, df = 4/364, p < .05 \). Figure 1 presents the mean reported behavior change scores for the five conditions of the experiment (the change scores consist of the difference between the score for the measurement occasion indicated and that of the precommunication measure). The mean reported behavior score taken immediately after the subject had been exposed to the communication was more similar to the precommunication score than that of the S-day postcommunication score, because it referred to toothbrushing practices prior to exposure to the communication. There were no significant differences among the change scores taken on the immediate postcommunication measure. As Figure 1 shows, there was considerable improvement for reported toothbrushing practices within all five conditions 5 days after exposure to the communications. The group hearing the high-fear appeal showed the greatest amount of reported behavior change, followed by the recommendations-only group, low-fear, positive-, with the elaborated-recommendations appeal group reporting the least change. In general, the data fail to support the fourth hypothesis. But the change for the high-fear and recommendations-only groups was significantly greater than for the elaborated-recommendations group (high fear versus elaborated recommendations, \( t = 3.1, p < .01 \); recommendations only versus elaborated recommendation, \( t = 2.6, p < .01 \)). None of the other \( t \) values were significant, however. As Figure 1 shows, there was a marked reduction in reported behavior change between the S-day and the 6-week postcommunication measure. A significant effect was obtained for time \( F = 21.68, df = 2/728, p < .01 \).
Fear arousal, persuasion, and behavioral change

All of the appeal groups showed a regression to precommunication reported behavior levels. Six weeks after exposure to the communication the high-fear group again displayed the greatest reported change, and again was followed by the recommendations-only group. Also obtained was a significant interaction effect between time and initial level of cleanliness (\(F = 3.5, \ df = 4/728, p < .01\)).

Behavior change. A significant main effect was obtained for behavior change (tooth cleanliness ratings--\(F = 4.92, \ df = 4/364, p < .01\)). The mean behavior change scores for the five treatment conditions are presented in Figure 2. Change scores involved only two postcommunication measures, since, unlike that for reported behavior change, the disclosing tablet was not used immediately after exposure to the message. Although all of the groups showed increased tooth cleanliness, the group showing the greatest change from precommunication to S-day postcommunication was the elaborated-recommendations condition. The positive appeal was second in magnitude of behavior change, followed by the high-fear, low-fear, and recommendations-only conditions, respectively. In partial support of the fifth hypothesis, the positive and high-fear conditions yielded significantly greater change than did the recommendations-only condition (positive versus recommendations only, \(t = 3.6, p < .001\); high fear versus recommendations only, \(t = 2.0, p < .05\)). Contrary to the fifth hypothesis, the elaborated recommendations condition yielded significantly greater behavior change than did the high-fear, low-fear, and recommendations-only conditions (high fear versus elaborated recommendations, \(t = 2.1, p < .05\); low fear versus elaborated recommendations, \(t = 3.2, p < .01\); recommendations only versus elaborated recommendations, \(t = 4.2, p < .001\)). A significant main effect was also obtained for time (\(F = 21.01, \ df = 1/364, p < .001\)). Figure 2 shows that 6 weeks after exposure to the communication, all of the treatment groups showed a regression to their precommunication cleanliness levels.

Actual behavior versus reported behavior change. It is important to note that although significant effects of appeals were obtained for both reported behavior and the measure of actual behavior, evidence of their differences as criterion measures is supported by examining Figures 1 and 2. The conditions which yielded significant changes in report of behavior were high fear and recommendations only. On the other hand, the conditions which yielded significant changes in the measure of actual behavior were elaborated recommendations and the positive-appeal condition, with the high-fear condition proving to be only moderately effective.

In addition, as would be logically expected, the main effect of the initial level of tooth cleanliness was very large for the reported behavior and actual behavior measures (\(F = 13.98, \ df = 2/364, p < .01\) and \(F = 40.18, \ df = 2/364, p < .01\), respectively). This simply indicates that those subjects having cleaner teeth before the experiment both reported and exhibited less change after exposure to the communications than those having dirtier teeth.

Discussion

It appears that in the present investigation as a whole, some very provocative results from the tests of the various hypotheses were obtained which bear on various issues presented by Higbee (1969) concerning the overall problems involved in fear-arousal communication investigations over the past several years.
1. Once again, serious doubt has been cast concerning the generality of any principle which suggests that high fear arousal is or is not as effective as other appeals. In fact, the findings in the present study which show the surprising effectiveness of a positive motivating appeal, as well as the effectiveness of the elaborated recommendations, raise questions concerning the necessity of using fear arousal at all in order to effect behaviors such as the one sought in the present study. The results involving elaborated recommendations would agree essentially with the observations incorporated in the reports of Leventhal and his co-investigators.

2. The fact that this investigation was implemented within a natural setting utilizing a unique measure of behavior change provides additional evidence concerning the general theoretical notion that attitude or reported behavior and actual behavior do not necessarily correspond. However, it should be stressed that the measure of reported behavior unfortunately may not be recording the same type of activity as the measure of actual behavior (reported frequency of brushing teeth versus a direct indicator of the cleanliness of teeth). Additionally, it should be pointed out that the recommendations never referred to the frequency of brushing teeth as a desirable response. However, Pearson product-moment correlations between information retention and both reported and actual behavior failed to reach significance within any of the appeal groups. Thus, it is difficult to determine whether or not the actual behavior measure recorded a response that resulted from an information input that differed from the reported behavior measure.

3. The finding of a 6-week postcommunication regression through the utilization of a time-series dimension underlines the limitations of investigations involving only immediate postcommunication measures of the effects of persuasive appeals. It also suggests strongly that such research designs would be enhanced by schedules of repeated presentations or other reinforcers of messages.

The first and second authors of the present report are now completing an investigation which attempts to deal with these variables in another school setting. This investigation also is attempting to validate more precisely the measure of actual behavior and uses a more parallel measure of reported behavior. Responding to the need for evaluating the effects of repeated reinforcement of the message, a technique of interschool competition has been introduced.

REFERENCES


LEVENTHAL, H., & SINGER, R. P. Order of affect arousal and recommendations as determinants of attitude change. New Haven, Conn.: Author, 1965. (Mimeo)


(Received December 31, 1969)