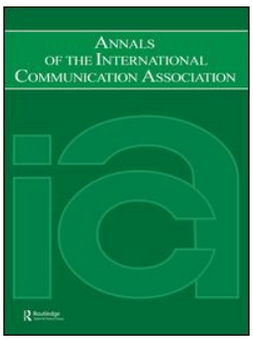

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12 • Fear-Arousing Persuasive Messages

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THE effects of including fear-arousing material in a persuasive message have been debated frequently (Sussman, 1973).[1] The antecedents of modern debate on this question reside in paradoxical experimental results. Some experiments show that there is more conformity to message recommendations when the amount of fear in the persuasive message is high than when it is low (for example, see Beck & Davis, 1978). Other experiments report data in which there is more conformity to message recommendations when the amount of fear in the persuasive message is low than when it is high (see Janis & Feshbach, 1953). Still other experiments present data that demonstrate that the amount of fear in the persuasive message has no impact on the extent to which a listener conforms to the recommendations of the persuasive message (see Wheatley & Oshikawa, 1970).

Moreover, there is no consensus among persuasion scholars as to how these conflicting data are to be reconciled. Some explanations suggest that messages high in fear-arousing content are more effective in obtaining conformity to message recommendations than are messages low in fear-arousing content (for example, see Leventhal, 1970). Other explanations suggest that the opposite relationship holds (see Miller, 1963). A third class of explanations posits that appeals low in fear and high in fear are relatively ineffective, while appeals with a moderate amount of fear-arousing content are relatively effective (see Janis, 1967). Yet another class of explanations argues that fear inter-

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acts with other variables, so that in some cases high fear messages are more effective than low fear messages, but in other cases low fear messages are more effective than high fear messages (see Leventhal, 1971).

This monograph addresses two issues. First, the available data are reviewed, and conclusions are drawn concerning the effect of incorporating fear-arousing material into a persuasive message. Second, implications of these conclusions for a theory of fear appeals are drawn. As a necessary preliminary step, the major explanations of fear appeal effects are sketched.

The Drive Explanation

The drive explanation, outlined, but not advocated, by Leventhal (1970) and Sutton (1982), suggests that the effect of persuasive messages, which vary in fear-arousing content, is the production of varying amounts of fear in the audience. While the relationship between the fear-arousing content of the persuasive message and the amount of fear generated in the audience is unlikely to be without error, the two variables are expected to be positively correlated. Put another way, high fear messages produce more perceived fear on the average than do moderate fear messages, and moderate fear messages produce more fear on the average than do low fear messages. Fear, in turn, is predicted to be positively correlated with the audience's attitude toward the topic in question. Thus, as perceived fear increases, the audience's attitude more closely approaches the attitude recommended in the persuasive message. Again, this correlation is not expected to be without error, but is expected to be substantial.

According to the drive explanation, the process that produces this set of relationships is a drive-reduction process. The perceived fear that is aroused by the persuasive message creates a state of drive, which audience members find unpleasant. Thus the audience members must perform some action in order to reduce the drive. Although there are many potential drive-reducing actions that persons might perform, the drive explanation posits that persons change their attitudes and/or behaviors as a means of drive reduction.

This relationship may be construed as a causal model. According to the mathematics of path analysis, this model predicts that the correlation between the fear-arousing content of the persuasive message and the attitude of the audience toward the topic in question is the product of the correlation between the fear-arousing content of the persuasive message and the amount of perceived fear generated in the audience and the correlation between the amount of perceived fear generated in the audience and the attitude of the audience toward the topic in question. If x represents a fear-arousing message, y perceived fear, and z the resultant attitudes, then $r_{xz} = r_{xy} r_{yz}$. This model predicts that if both r_{xy} and r_{yz} are positive, then r_{xz} is positive.

Put substantively, according to the drive explanation, the greater the amount of fear-arousing material in a persuasive message, the more closely the attitudes of audience members become to the attitude recommended in the persuasive message.

The Resistance Explanation

In an early review of the literature, Miller (1963, p. 119) concludes,

> A strong fear appeal is not effective in producing the desired audience response, but this conclusion is tempered by personality differences among audience members, the relevance and interest value of the communication for the audience, and other relevant factors that affect the relationship.

According to Miller a process of defensive avoidance produces this result. When a process of defensive avoidance is activated, "the audience becomes motivated to ignore, minimize, or deny the importance of the threat" (Janis, 1967, p. 293). Conversely, listeners attend to persuasive messages low in threatening content. Since the recommendations contained in low fear messages are heard, and the recommendations contained in high fear messages are ignored, the former are likely to be more persuasive.

The resistance explanation is similar to the drive explanation in two ways. First, the explanations posit a similar causal model. Put differently, both explanations predict that the effect of persuasive messages that vary in the amount of fear-arousing content is to produce differing amounts of fear in listeners, and that perceived fear, in turn, affects attitudinal and/or behavioral conformity to the recommendations of a persuasive message. Second, both explanations posit that the relationship between the amount of fear-arousing content in persuasive messages and the amount of perceived fear in listeners is positive.

The resistance explanation differs from the drive explanation concerning the relationship between perceived fear and attitude. The drive explanation hypothesizes that as perceived fear increases, listeners' attitudes and/or behaviors more closely resemble those recommended in the persuasive message. The resistance explanation hypothesizes that as perceived fear decreases, listeners' attitudes and/or behaviors more closely resemble those recommended in the persuasive message. Utilizing the mathematics of path analysis, it follows that the resistance explanation predicts a negative correlation between the amount of fear-arousing material in a persuasive message and listeners' conformity to the recommendations in that persuasive message, while the drive explanation predicts a positive correlation between these variables. Thus, according to the resistance explanation, r_{xz} is negative.

Curvilinear Hypotheses

As with the previous two explanations, advocates of curvilinear hypotheses suggest that as the fear-arousing content of a persuasive message increases, the amount of perceived fear in listeners increases. The curvilinear hypotheses differ from both the drive explanation and the resistance explanation in the specification of the link between perceived fear and the listeners' acceptance of message recommendations. According to the curvilinear hypotheses, the regression of attitude onto perceived fear is an inverted U. Thus when a listener is either extremely fearful or has very little fear, little attitudinal and/or behavioral conformity results. When, however, a listener is moderately fearful, an optimal amount of attitudinal and/or behavior conformity is produced. Similarly, persuasive messages that are either low in fear-arousing content or high in fear-arousing content are relatively ineffective. Alternatively, those persuasive messages that contain a moderate amount of fear-arousing content are most effective in yielding conformity to message recommendations. There are three different versions of the curvilinearity hypothesis. Following is a discussion of each variation.

Janis (1967) and Janis and Leventhal (1968) were the first to articulate a curvilinear hypothesis. Janis and Leventhal (1968, p. 1056) assert that at low levels of perceived fear,

> the average person remains unaffected by warning communications because he dismisses all information about the threats as inconsequential by means of blanket reassurances.

Thus no change in attitude is predicted when there is a low level of fear in the persuasive message, since the audience is not convinced that a need for change exists.

When the level of fear in the persuasive message is high, Janis and Leventhal (1968, p. 1056) argue that

> the average person's state of intense emotional excitement will be characterized by preoccupation with hypervigilant speculations and ruminations which generate defensive maneuvers—such as denial, detachment, and minimizing rationalizations that interfere with acceptance of the safety measures recommended by the communicator.

Therefore, at high levels of perceived fear Janis and Leventhal argue that audience members defensively avoid the threat, instead of accepting message recommendations.

On the other hand, at moderate levels of fear, the

> average person's vigilance and reassurance tendencies are stimulated, which is the optimal condition for developing compromise attitudes of the type required for sustained acceptance of whatever plausible safety measures are recommended by the communicator. (Janis & Leventhal, 1968, p. 1056)

Hence at moderate levels of fear listeners conform most closely to the recommendations in the persuasive message.

Janis and Leventhal (1968, p. 1056) maintain that the optimal fear content for producing attitudinal and/or behavioral conformity depends upon any number of "content, situational, and dispositional factors." Therefore, the specific point on the fear continuum at which attitude toward the topic in question is closest to that advocated by the persuasive communication depends upon a number of other factors. These factors create a family of inverted-U curves that incorporate the effects of other factors upon the relationship between the fear-arousing content of a persuasive message and the listeners' conformity to message recommendations.

The second derivation of the curvilinear hypothesis is McGuire's (1968, 1969) two-factor explanation. McGuire hypothesizes that fear acts both as a drive and as a cue. As a drive, perceived fear increases the probability of an individual's yielding to the recommendations made in the persuasive message. As a cue, perceived fear increases the probability of an individual's resisting the message recommendations. These yielding and resisting functions are exponential, according to McGuire (1968, p. 1164), and their combination results in "an overall nonmonotonic relation between anxiety and influenceability . . . with maximum susceptibility coming at intermediate levels of anxiety."

In a third statement of the curvilinear hypothesis, Higbee (1970) suggests the importance of two variables: severity of the threat and the probability that the threat will occur given that no preventive action is taken. Higbee predicts that these two variables are negatively correlated. He posits that as the level of perceived fear increases, perceived severity increases exponentially, while probability of occurrence decreases exponentially. These two effects combine to produce the inverted-U function in much the same manner as McGuire's two factors.

The Parallel Response Explanation

Several scholars suggest that fear interacts with other variables to affect attitudes and behaviors. Leventhal's (1970, 1971) parallel response explanation is one such hypothesis. The parallel response explanation asserts that fear-arousing persuasive messages activate two primary processes within the audience: fear control and danger control. The function of these

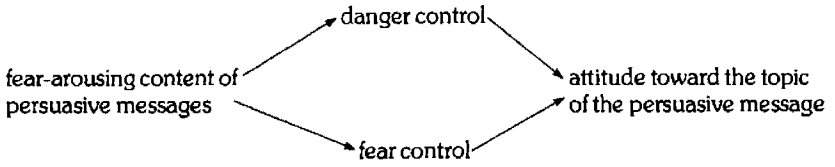

Figure 12.1. A diagram of a causal model depicting the set of relationships predicted by the parallel response explanation.

processes is to assist the listener in coping with the threat. The listener's attitude toward the topic in question is predicted to be a function of the amount of fear control and danger control aroused by the persuasive message. This set of relationships is depicted in Figure 12.1 From this figure one may observe that fear control and danger control mediate the relationship between the amount of fear-arousing material in the persuasive message and the listener's attitude toward the topic in question.

Danger control is conceived as a problem-solving process in which the listener scans the external environment for information pertinent to dealing with the threat presented in the persuasive message. When a danger control process is operative, the focus of attention is the danger that the threat poses. The danger control process produces responses that are instrumental in averting the threat.

Fear control is an emotional coping process in which listener strives to reduce the fear generated by the persuasive message. When a process of fear control is operative, listeners focus on their internal emotional responses, not on the threat. Thus the process of fear control may produce action that interferes with the acceptance of the recommendations of the persuasive message.

Leventhal (1970, 1971) asserts that these two processes interact to affect the extent to which listeners conform to message recommendations. The specific nature of this interaction, however, is unspecified. When a fear-arousing persuasive message generates solely a danger control process a positive relationship between the amount of fear-arousing material in the message and the listener's attitude toward the topic in question is predicted. When the fear-arousing persuasive message generates solely a fear control process an inverse relationship between the amount of fear in the message and listener's attitude toward the topic is predicted.

Overall, Leventhal (1970, p. 127) predicts that

> with respect to main effects, the parallel response model clearly leads us to expect that for the most part there will be positive associations between fear and persuasion.

The parallel response explanation has also been extended to predict a curvilinear relation between the level of fear-arousing material in a persuasive message and the listener's attitude toward the topic in question. Sternthal and Craig (1974, p. 26) argue that

> from parallel response analysis, it is predicted that incremental increases in emotional material ultimately lead to disruption of danger control resulting in a nonmonotonic relationship between fear and persuasion.

Put another way, Sternthal and Craig contend that as fear increases both the danger control process and the fear control process increase. At moderate levels of fear the danger control process is relatively strong and the fear control process is relatively weak. Consequently, listeners concentrate on reducing the threat by accepting the message recommendations. At low levels of fear both processes are weak. There is no reason for the listener to accept the message recommendations, since the threat does not appear to be serious. At high levels of fear both processes are strong. The tendency to control fear interferes with the process of danger control, and listeners fail to exhibit substantial attitudinal or behavioral shifts.

Rogers (1975) points out two inadequacies in the parallel response explanation. First, Rogers contends that the parallel response explanation fails to specify the stimulus variables that predict the extent to which the fear and danger control processes operate. Since, according to Leventhal, the amount of fear control and danger control generated by the persuasive message predict the listener's attitude toward the topic in question, this ambiguity makes it difficult to construct an adequate test of the explanation.

Second, Rogers argues that the constructs and linking statements in the parallel response explanation are too ambiguous to derive precise predictions regarding the relationship between fear and persuasion. Beck and Frankel (1981) concur, referring to the parallel response explanation as untestable.

In summary, the parallel response explanation contributes to this body of knowledge by introducing the fear control and danger control constructs. The major flaw in the explanation is the ambiguous nature of the concepts and linking statements. This ambiguity results in the parallel response explanation predicting all possible outcomes of a fear appeal experiment without specifying the conditions under which the different outcomes are expected to occur. This characteristic results in the explanation being untestable. Put differently, it is unfalsifiable in principle, and hence is of little scientific value.

The Protection Motivation Explanation

The premise central to Rogers's (1975) protection motivation explanation is that fear-arousing persuasive messages are composed of three factors:

> (a) the magnitude of noxiousness of a depicted event; (b) the conditional probability that the event will occur provided that no adaptive behavior is performed or there is no modification of an existing behavioral disposition; and (c) the availability and effectiveness of a coping response that might reduce or eliminate the noxious stimulus. (Rogers, 1975, p. 97)

Rogers claims that the greater the extent to which these three factors are present in a persuasive message, the greater the extent to which they are perceived by the audience. Listeners' perceptions of these three variables then combine multiplicatively to produce a state of protection motivation in the listeners. For Rogers, protection motivation refers to a listener's drive to take steps to avoid a potential threat. Thus the greater the noxiousness (fear), efficacy, and probability in a persuasive message, the greater the aroused protection motivation. Moreover, if any of these elements is missing from a persuasive message—that is, has a value of zero—then the message does not induce any protection motivation. Put another way, each of the three message components is necessary to produce protection motivation. A listener's attitude toward the topic in question is hypothesized to be a function of the amount of protection motivation produced in the listener by the persuasive message. Specifically, as the amount of protection motivation increases, the amount of conformity to the recommendations in the persuasive message increases proportionally. The correlation between protection motivation and attitude toward the topic is expected to be positive, but not without error.

This set of relationships is depicted in Figure 12.2. From this figure one may observe that the listener's perceptions of the message components mediate the relationship between the message components and protection motivation. Protection motivation, in turn, mediates the relationship between the perceived message components and the audience's attitude toward the topic in question. Since all causal links are predicted to be positive, the correlation between the three message characteristics and attitude is expected to be positive. Since there are several mediating links, however, this correla-

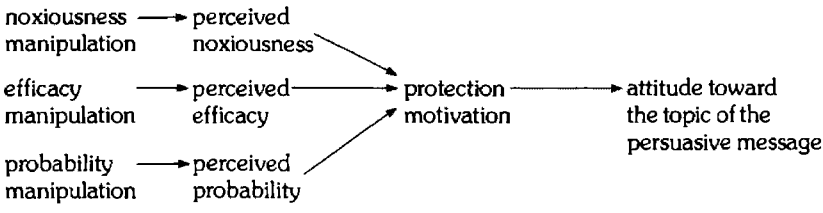

Figure 12.2. A diagram of a causal model depicting the set of relationships predicted by the protection motivation explanation.

tion may be low. Moreover, if any of the links between the perceived message characteristics is absent, then no protection motivation is aroused, and no conformity to message recommendations is expected to occur. In such a case the correlation between the message characteristics and attitude is predicted to be zero.

The Threat Control Explanation

The common thread running through all of the previous explanations is that listener's perceived fear, and in some cases other factors, mediates the relationship between the fear-arousing material in the persuasive message and the listener's attitude toward the topic in question. The threat control explanation, on the other hand, posits that the response to fear appeals depends entirely upon cognitive, rather than emotional, factors.

In the most recent attempt at theoretical integration, Beck and Frankel (1981, p. 211) state that "the important factor mediating the effects of health threat communications is not fear but the degree to which the communication depicts a real, but controllable threat." From this point of view negative correlations between the fear-arousing content in a persuasive message and the listener's attitude toward the topic in question (for example, see Janis & Feshbach, 1953) are said to be a result of the depiction of an uncontrollable threat and not the result of a defensive avoidance process.

The threat control explanation asserts that fear-arousing persuasive messages arouse two fundamental processes in the listener—response, efficacy and personal efficacy. Response efficacy is "the perceived contingency between the performance of the recommended response and the reduction of the depicted event" (Beck & Frankel, 1981, p. 212). In order for response efficacy to be high the listener must perceive that the performance of the recommended response is effective in eliminating or reducing the probability of the threat's occurrence. Personal efficacy is "the person's perceived ability to perform the recommended action successfully" (Beck & Frankel, 1981, p. 212). If personal efficacy is to be high, the recommended action must be perceived as something the listener is capable of doing.

Response efficacy and personal efficacy combine to create perceived threat control. Perceived threat control is "the extent to which recipients possess expectations of success in controlling the threat" (Beck & Frankel, 1981, p. 212). While Beck and Frankel fail to specify the way in which response efficacy and personal efficacy combine to produce threat control, they do claim that attitude toward the topic in question is a function of the amount of perceived threat control generated by the message. Specifically, as threat control increases, attitudes more closely approximate those recommended in the persuasive message. This relationship is assumed to be linear. Furthermore,

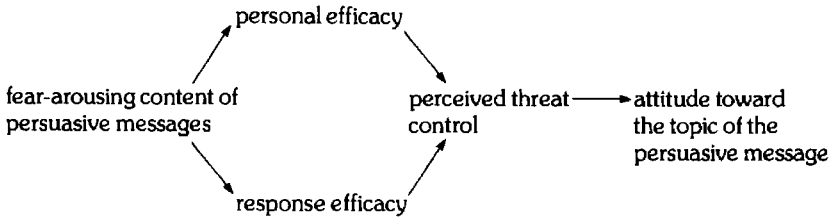

Figure 12.3. A diagram of a causal model depicting the set of relationships predicted by the threat control explanation.

although the correlation between threat control and attitude is not without error, it is expected to be both positive and substantial.

This set of relationships is depicted in Figure 12.3. This figure illustrates that personal efficacy and response efficacy mediate the relationship between the fear-arousing persuasive message and perceived threat control. Perceived threat control, in turn, mediates the relationship between personal efficacy and response efficacy and the listener's attitude toward the topic in question. When all causal links are assumed to be positive, the threat control explanation yields the prediction that as the amount of fear-arousing material in a persuasive message increases, the amount of attitude change produced in the listener increases. This relationship may be weak, however, since there are several mediating variables. On the other hand, it is possible that a fear appeal might have an inverse impact on either response efficacy or personal efficacy. In such cases the correlation between the amount of fear-arousing content in the persuasive message and conformity with message recommendations is expected to be negative.

Conclusion

The characteristic that distinguishes these classes of explanations is that they make different predictions about the relationship between the amount of fear in a persuasive message and the amount of attitudinal and/or behavioral conformity with the recommendations of the persuasive message. Thus it is possible to eliminate a number of these competing explanations, if not all of them, by gaining an understanding of how the amount of fear in a persuasive message affects attitudes and conforming behavior. The method of gaining this understanding that was employed in this study is meta-analysis. A brief discussion of meta-analysis follows.

METHOD

As the number of studies on a topic increases, the difficulty in integrating the results of the studies increases. Providing an accurate summary of any literature requires a method for combining the results of independent studies on a topic. Several methods of accomplishing this goal are available (for example, see Rosenthal, 1978). Meta-analysis is one such method.

Meta-analysis is "the quantitative cumulation and analysis of descriptive statistics across studies" (Hunter, Schmidt, & Jackson, 1982, p. 137). In performing a meta-analysis, the investigator computes the relevant statistic, or statistics, for each pertinent study. Subsequently, the investigator cumulates these data across studies. These computations yield an estimate of the population parameter of interest. Since the sample size of the cumulative estimate is the sum of the sample sizes of all of the pertinent studies, this estimate probably provides a more accurate estimate of the population parameter than does the estimate from any one study.

Furthermore, when the focus of the meta-analysis is the relationship between variables, it is possible to search for variables that moderate the relationship. There are two ways in which to conduct this search. The direct method requires that one estimate the size of interaction effects in those studies in which there are multiple independent variables. The indirect method requires that one examine the variance in the computed relational statistic(s) (for example, r or d) and ascertain if that variance is attributable to sampling error. If not, then there must be moderator variables that cause the effect size to vary across studies. For a comprehensive discussion of meta-analysis, see Glass, McGaw, and Smith (1981) and Hunter et al. (1982).

The Data

The data for this project consist of statistics and various characteristics of the experiments from which these statistics derive. The statistics include the correlations between fear appeal manipulations and perceived fear (manipulation checks), attitude, and behavior; the quadratic effect of the fear appeal manipulations on the same set of criterion measures; and sample size. The experimental characteristic measures include topic of the fear appeal message, the year of publication of the study, the nature of the participant population, whether the participants volunteered or did not volunteer to participate in the study, the type of fear appeal manipulation employed, the nature of the experimental design, and the number of items constituting each dependent measure.

These data were obtained from articles in which the effect of fear appeals on various criterion measures was assessed. The articles were ob-

tained by inspecting reference lists from major fear appeal review articles (Higbee, 1970; Janis, 1967; Leventhal, 1970; McGuire, 1969; Sutton, 1982). Any article relevant to the topic was reviewed, and the reference list searched for additional citations. Moreover, recent volumes (the last five years) of major social psychology, communication, and marketing journals were examined for relevant citations.

The literature search was restricted to studies published in journals; that is, dissertations, theses, convention papers, and other unpublished reports were eliminated from consideration. Since the majority of such reports located in the literature search were eventually published, this restriction is not likely to affect the results of this analysis.

Abstracts and computer search procedures were not used to locate articles. Since this analysis was restricted to published studies, the search procedure employed was sufficient to find applicable articles. Since more than 100 reference lists were inspected, the probability of omitting a substantial number of relevant studies is minimal. Furthermore, given the larger data base generated by the literature search, the results of an omitted study would have to be extreme in order to alter the substantive conclusions drawn here.

Criteria for Inclusion

Four criteria were used to determine if a study was pertinent for this meta-analysis. First, the study had to include data that had not been published previously. Thus review articles, reanalyses, and "think pieces" were eliminated.

Second, the persuasive message(s) had to include a fear manipulation, and the fear manipulation had to be relevant to the topic of the message. Thus studies investigating the effects of threats to attitudinal freedom (for example, Smith, 1977), the effects of irrelevant fear (for example, Simonson & Lundy, 1966), and emotional role playing (for example, Janis & Mann, 1965) were excluded.

Third, one or more of three dependent variables had to be measured in the study. These dependent variables were (1) perceived fear, (2) attitudes, and (3) behavior. These variables require explication.

Perceived fear measures are those items designed to tap how anxious or fearful participants felt during exposure to the persuasive message. For example, Rogers and Thistlethwaite (1970) asked their participants to indicate how they felt while they watched a film on smoking and lung cancer. Participants indicated their fright, tension, nervousness, anxiety, discomfort, and nausea on 9-point rating scales.

Attitude measures are those items designed to assess the participants' affect toward the persuasive message's recommendations. For example,

Horowitz and Gumenik (1970) asked their participants to indicate their agreement with the three basic recommendations included in a persuasive message concerning the dangers of drug abuse. These ratings were made on 10-point scales.

Behavior measures are assessments of whether or not, or the extent to which, participants' actions conform to the persuasive message's recommendations. For example, Leventhal and Niles (1965) measured whether or not participants had a chest X-ray after exposure to a persuasive message concerning smoking and lung cancer.

Several additional criterion measures were taken in the studies examined. These measures were not included in this analysis, since there were relatively few studies that examined these measures and since they are not as relevant as the obtained measures to the theoretical controversy outlined previously.

Fourth, the study had to provide sufficient information to allow the computation of the correlation, and quadratic effect when possible, between the fear manipulation and at least one of the pertinent dependent variables. For example, Kirscht and Haefner (1969) report the effects of a fear appeal manipulation on several dependent measures. They do not, however, report the results in sufficient detail to compute the correlations between the fear manipulation and these dependent variables.

Measuring Effects

Pearson's r was chosen as a measure of the strength of the linear effect of a fear appeal manipulation on perceived fear, attitude, and behavior. While there are other measures, such as d, which are useful for this purpose, Pearson's r has a number of advantages. First, it is simple to compute. Second, since a discussion of Pearson's r appears in almost all introductory textbooks, the majority of social scientists are familiar with the measure. Third, it has a metric that is easily interpreted. Fourth, the sampling distribution of Pearson's r is known, and an examination of this sampling distribution shows that Pearson's r has properties that make it a desirable measure of linear association. Fifth, it is a flexible measure. It can be used in further multivariate analyses, such as multiple regression and multiple correlation, the analysis of covariance, and path analysis. And, in any case, if one prefers other measures, then r can be transformed to yield values of d, t, and F (Hunter et al., 1982, p. 98).

None of the studies examined presented the correlation between the fear manipulation and the dependent variables of interest. The presentation of these data took the form of either the analysis of variance or the t-test. Thus Pearson's r had to be computed from this information. The computa-

tion was performed in two ways. First, if sufficient information was given in the report, the analysis of variance table was reconstructed. The unweighted means algorithm was employed. Since Pearson's r equals η (that is, the square root of the correlation ratio, η^2) for the linear trend, the correlation coefficient was easily obtained from this table. Since η was calculated from an unweighted means analysis of variance, the obtained correlation is corrected for unequal cell size (see Hunter et al., 1982, p. 99). Second, since values of F or t can be transformed to yield values of r, these transformations were used to obtain a value of the correlation coefficient. When sufficient information was available in a report, both methods were used as a means of minimizing computational errors. In some instances, only the latter information was available. In these cases there were no available means of checking computations.

The quadratic effect was computed in the same manner. The value of η for the quadratic effect was taken as the effect size measure.

Special Problems

Some articles presented special computational problems. These problems were treated in a consistent manner. In this section the most crucial and frequent problems and the methods employed in dealing with them are discussed.

In several instances authors failed to report statistical information for variables that did not produce statistically significant findings. For example, Shelton and Rogers (1981) manipulated fear, empathy, and efficacy, and measured their effects on several dependent variables. While they report statistical information concerning the main effects of fear and empathy, they report only that efficacy main effect and all interactions did not exert statistically significant effects on the dependent variables. Since the size of the effect of all variables must be known in order to compute Pearson's r accurately, such omissions proved problematic.

In such cases Pearson's r was computed in two ways. First, r was calculated assuming that all statistically nonsignificant effects were zero. The resulting value provided an estimate of the maximum fear correlation. Second, r was computed assuming that all statistically nonsignificant effects were as large as possible without being statistically significant at the .05 level. The resulting value provided an estimate of the minimum fear correlation. These two correlations were averaged, and the mean correlation was entered as the estimate of Pearson's r. In each case in which this problem was encountered, the two estimates were within .02 of each other. Thus the amount of error introduced into these data is probably not substantial.

A second problem concerned the analysis of dependent variables for which there were multiple measures. For example, Leventhal, Singer, and

Jones (1965) discuss the effect of a fear manipulation on perceived fear. In their study, perceived fear was measured by seven items. In reporting these data Leventhal et al. present separate analyses for each of the seven items. That is, they did *not* sum participants' responses to all seven items and assess the effect of fear on this index. In this case, and in related cases, the effect of the fear appeal manipulation on each measure was calculated and the correlations were averaged. The mean correlation was entered, and it was treated as being computed from a one-item measure.

Control group analyses produced two problems. In some experiments the control group and the experimental groups were not comparable. For example, Janis and Feshbach (1953) exposed three experimental groups to a persuasive message concerning dental hygiene. The control group, in contrast, was exposed to a persuasive message on the structure and operation of the human eye. Since the persuasive message to which the control group was exposed differed from that of the experimental groups on a factor in addition to fear, the control group was not included in the computations.

The second control group problem concerned those designs in which the control group did not fit into a factorial design. For example, Powell (1965) manipulated both the amount of fear in a persuasive message (low, high) and the target of the appeal (self, family, nation). In addition, Powell included a control group that received no persuasive message. In such cases the analysis of variance was performed first excluding the control group, and the effects were computed for each variance component. Subsequently, the control group data were used to recompute the effect of the fear appeal manipulation. The sums of squares for the other variance components were adjusted for the increase in sample size produced by the addition of the control group participants. The initial analysis was used to estimate the strength of interaction effects. The latter analysis was used to estimate the strength of the effect of the fear appeal manipulation. This technique is similar to a procedure recommended by Himmelfarb (1975).

A final problem involved collapsing quantitative dependent variables. For example, although Janis and Feshbach (1953) measured attitude change on quantitative scales, they presented the results as the percentage of participants who exhibited change toward the recommendations in the persuasive message, change away from the recommendations in the persuasive message, and those exhibiting no change. Since the report precluded determining the extent of change, a value of $+1$ was assigned to those participants who changed toward the recommendations in the persuasive message, a value of -1 was assigned to those participants changing away from the recommendations in the persuasive message, and a value of 0 was assigned to those participants exhibiting no change. This procedure was followed in all such cases.

RESULTS

The presentation of the results of the meta-analysis is organized by dependent variable. The effects of the fear-arousing content of persuasive messages on perceived fear, attitude, and behavior are discussed in sequence.

Perceived Fear

Pertinent data are available from 40 studies. These 40 studies have a combined sample size of 7016 participants. The correlation between the fear manipulation and perceived fear ranges from .17 to .81, with a weighted mean of .36. The weighted (by sample size) variance in this distribution of correlations is .018. A weighted variance of .004 is expected by sampling error alone. Thus the obtained variance is larger than that expected by chance. The χ^2 test indicates that the variance in the distribution of correlations is significantly greater than that espected by sampling error alone ($\chi^2 = 168.14$, $df = 39$, $p < .001$; for a discussion of these computations, see Hunter et al., 1982, pp. 40—74).

The regression of perceived fear onto the fear manipulation is linear. There are 12 studies in which a quadratic effect can be estimated. These studies have a combined sample size of 3437 participants. The quadratic effect ranges from .03 to .19, with a mean of .07. Thus the degree of nonlinearity in these data is trivial.[2] The quadratic effect is substantially smaller than the linear effect. Moreover, with a mean sample size in these 12 studies of approximately 286, the mean quadratic effect is within sampling error of zero.

There is little evidence suggesting nonadditivity in these data. Several studies report that other variables interact with the fear manipulation to affect perceived fear, but these effects are small (see Chu, 1966; Leventhal, Jones, & Trembly, 1966; Leventhal & Singer, 1966; Rogers & Deckner, 1975). Specifically, none of these effects exceeds a correlation of .19. They reach accepted levels of statistical significance because of large sample sizes.

While there is little evidence of nonadditivity in these data, it is clear from a number of studies that the manipulation of other independent variables (that is, independent variables other than fear) is confounded with fear. Several investigators report that other independent variables have main effects on perceived fear (for example, see Hendrick, Giesen, & Borden, 1975; Powell, 1965; Powell & Miller, 1967; Ramirez & Lasater, 1977; Shelton & Rogers, 1981).

The variance in the distribution of perceived fear correlations, is, in part, attributable to methodological artifacts. For example, it is known that, ceteris paribus, the more items employed to measure a construct, the higher the reliability of the measure. Since unreliability has the systematic effect of

attenuating correlations, the number of items measuring perceived fear is expected to be positively correlated with the size of the fear manipulation-perceived fear correlation ($r = .11$, $df = 36$, $p = .27$). In addition, it is known that, ceteris paribus, change scores are less reliable than static scores. Thus the fear manipulation-perceived fear correlation is expected to be larger in posttest-only designs than in pretest-posttest designs. Type of design is correlated in the expected direction with the size of the fear manipulation-perceived fear correlation ($r = -.28$, $df = 40$, $p = .04$). While these correlations are not exceptionally large, the data suggest that these variables suppress the effect of each other. Hence, if the size of the fear manipulation-perceived fear correlation is regressed onto both number of items measuring perceived fear and type of design, then the standardized regression coefficients are found to be larger than the zero-order correlations ($B = .24$ and $-.36$, respectively; $R = .36$).

In general, authors do not report the reliability of the perceived fear measure. The exceptions are Beck and Davis (1978), who report that $\alpha = .86$; Mewborn and Rogers (1979), who report that $\alpha = .88$; and Shelton and Rogers, who report that $\alpha = .80$. The former two measures are composed of six items. The latter measure is composed of five items. Moreover, Janis and Terwilliger (1962) report an interrater correlation of .85 for their content analysis measure of perceived fear. Finally, Leventhal and Watts (1966) report that their six-item measure of perceived fear has an average item-total correlation of .60.

While no formal analyses, such as correcting all correlations for attenuation and performing the meta-analysis on the corrected correlations, can be performed on these data, some speculation concerning the effect of unreliability is warranted. If one assumes that the reliability of a six-item measure is .87, the mean of the Beck and Davis (1978) and Mewborn and Rogers (1979) data, then using the Spearman-Brown formula to calculate the estimated reliability of a one-item measure yields an estimated reliability of $\alpha = .52$. If this figure is used to correct the mean fear manipulation-perceived fear correlation for attenuation due to error of measurement, then a corrected correlation of .50 is obtained. Since approximately one-third of the studies in this sample employ a one-item measure of perceived fear, it is likely that many of these studies provide a substantial underestimate of the fear manipulation-perceived fear correlation. Had all studies been able to be corrected for attenuation due to error of measurement, it is not unlikely that there would have been substantially less variance in the distribution of fear manipulation-perceived fear correlations.

There is also evidence that another methodological artifact affects these results. For example, as a result of an extremely strong set of fear messages, Chu (1966) reports little difference in perceived fear among

three experimental groups. Thus the fear manipulation-perceived fear correlation is attenuated due to restriction of range in these data. If the variance among treatment conditions could be assessed, then these data could be corrected. Such a correction could reduce the variance in the fear manipulation-perceived fear correlations further.

Attitude[3]

Pertinent data are available from 25 studies. These studies have a total sample size of 3892 participants. The correlation between the fear manipulation and attitude ranges from −.25 to .63, with a weighted mean of .21. The weighted variance in this distribution of correlations is .03. A weighted variance of .01 is expected by sampling error alone. Thus the obtained variance is larger than the variance expected by chance. The χ^2 test indicates that the variance in this distribution of correlations is significantly greater than that expected by sampling error alone ($\chi^2 = 137.91$, $df = 24$, $p < .001$).

The regression of attitude onto the fear manipulation is linear. There are 14 studies in which a quadratic effect can be estimated. These studies have a total sample size of 2056 participants. The quadratic effect ranges from .00 to .26, with a weighted mean of .09. Thus the quadratic effect is substantially smaller than the linear effect, and with a mean sample size of approximately 147 the quadratic effect is within sampling error of zero.

Since the variance in this distribution of correlations is greater than that expected by chance, it is possible that there are variables that moderate the fear manipulation-attitude relationship. Prior to entertaining such a hypothesis, however, a search for possible artifacts is necessary.

The strength of the fear manipulation-perceived fear correlation differs across studies. Moreover, the size of the fear manipulation-perceived fear correlation is correlated with the size of the fear-attitude correlation ($r = .41$). Thus, as the size of the former increases, the size of the latter increases. It is possible that differences in the strength of the fear appeal manipulation produce differences in the fear manipulation-attitude correlations. For example, strong manipulations may produce high correlations with attitude, while weak manipulations may produce low correlations with attitude. In order to test this possibility the fear manipulation-attitude correlation is divided by the fear manipulation-perceived fear correlation. This quotient is interpretable in at least two ways. First, it is a measure of the strength of the fear manipulation-attitude correlation when corrected for the strength of the fear manipulation. Second, if perceived fear mediates the relationship between the fear manipulation and attitude, it is an estimate of the correlation between perceived fear and attitude.

There are 17 studies from which both a fear manipulation-perceived

fear correlation and a fear manipulation-attitude correlation can be obtained. These studies have combined sample size of 2572 participants. The ratio of the fear manipulation-perceived fear correlation to the fear manipulation-attitude correlation ranges from −.61 to 1.57, with a weighted mean of .57. The weighted variance of this distribution is .24. A weighted variance of .004 is expected by sampling error alone. Thus the obtained variance is substantially larger than the variance expected by chance. The χ^2 test indicates that the variance of this distribution is significantly greater than that expected by sampling error ($\chi^2 = 1354$, df = 16, $p < .001$).

The variance of the distribution of corrected correlations is larger than the variance of the distribution of uncorrected correlations. Therefore, the strength of the fear manipulation masks some of the variance in the fear manipulation-attitude correlations. One possible explanation for this result is that the stronger fear manipulations occur in those studies in which the perceived fear-attitude relationship is relatively weak, and the weaker fear manipulations occur in those studies in which the perceived fear-attitude relationship is relatively strong. Alternatively, the increased variance may be due to methodological artifacts. For example, assuming that the ratio of the fear manipulation correlation to the fear manipulation-attitude correlation is constant, differences in the reliability of the perceived fear measure and/or the attitude measure serve to attenuate correlations differentially and thus produce an increase in the variance of the distribution of the correlation ratio.

There are two pieces of indirect evidence that indicate that differential reliability increases the variance in the distribution of the fear manipulation-attitude correlations. First, the type of experimental design is correlated with the size of the fear manipulation-attitude correlation ($r = -.20$, df = 23, $p = .17$).[4] Although this correlation is not statistically significant at the .05 level, it does indicate a tendency for larger correlations in posttest-only designs than in pretest-posttest designs. Second, there is a statistically significant correlation between the number of items used to measure attitude and the size of the fear manipulation-attitude correlation ($r = .36$, df = 21, $p = .05$). This correlation indicates that the more items used to measure attitude, the higher the fear manipulation-attitude correlation. Again, suppressor effects are in evidence. Regressing the fear manipulation-attitude correlation onto both type of design and number of items, the standardized regression coefficients are found to be larger than the zero-order correlations ($B = -.24$ and .39, respectively; $R = .43$).

There is also evidence that fear manipulation-attitude correlations are attenuated due to restriction in range. There is a substantial correlation between the number of levels of the fear manipulation and the size of the fear manipulation-attitude correlation ($r = .31$, df = 23, $p = .07$). The greater the number of levels of the fear manipulation, the larger the variance of the

independent variable. The larger the variance of the independent variable, the less the fear manipulation-attitude correlation is attenuated due to restriction in range. Therefore, in general, fear manipulations that employ several levels of fear tend to produce larger fear manipulation-attitude correlations than those fear manipulations that employ only few levels of fear.

The extent to which the variance in the fear manipulation-attitude correlations is due to methodological artifacts may be estimated by the multiple correlation of the fear manipulation-attitude correlation with type of design, number of items employed to measure the criterion variable, and number of levels of the independent variable. This correlation is $R = .50$. Hence methodological artifacts are responsible for a considerable amount of the difference in the fear manipulation-attitude correlation distribution.

While methodological artifacts provide a partial explanation of why fear manipulation-attitude correlations differ across studies, moderator variables are responsible for a portion of the difference as well. Several studies include manipulations of independent variables in addition to fear. Some of these studies report that these other independent variables interact with fear to affect attitude. These results are discussed below.

Three experiments report the effect of both fear and source credibility on attitude (Hewgill & Miller, 1965; McCroskey & Wright, 1971; Powell & Miller, 1967). Two of these studies report a statistically significant fear × source credibility interaction (McCroskey & Wright, 1971; Powell & Miller, 1967). The third experiment reports a statistically nonsignificant interaction (Hewgill & Miller, 1965). Moreover, the effect size for the interaction in that study is small, $r = .04$.

The effect sizes for the two studies that report a statistically significant interaction are not trivial. There is reason to believe, however, that these interactions result from unusual features of the experimental designs, rather than a substantive fear × source credibility interaction. These studies are detailed below.

The effect size of the fear × source credibility interaction in the Powell and Miller (1967) experiment is large, $\eta = .36$ (4 df). The source credibility manipulation is primarily a trustworthiness manipulation in this experiment. The manipulation has a strong effect on trustworthiness ratings, but not on competence ratings. No dynamism ratings are reported. There are three source credibility treatments in this study: (1) low source credibility, (2) high source credibility, and (3) an unattributed source. The fear × source credibility interaction effect is due primarily to the unattributed source condition. If the unattributed source condition is removed, the size of the fear × source credibility interaction decreases dramatically, $\eta = .10$ (2 df). This effect is not statistically significant at the .05 level.

This interaction effect is difficult to derive from theory. While Powell

and Miller present a hypothesis suggesting such an effect, there is no rationale for the hypothesis. An important omission in their analysis is that, while there are credibility manipulation check data for the low credibility and high credibility sources, there are no credibility manipulation check data for the unattributed source. While the authors appear to assume that the unattributed source has higher source credibility than the low credibility source but lower credibility than the high credibility source, there is no evidence to support the claim. Moreover, it is undoubtably the case that the subjects in this experiment made some attribution of the source's credibility in the unattributed source condition. From an observation of the fear manipulation check data and the attitude data, a reasonable hypothesis is that participants assume that the unattributed source is highly credible. The rationale for this hypothesis is that the pattern of fear manipulation check data and attitude data is the same for both the high credibility source and the unattributed source. An alternative hypothesis is that there are vast individual differences in the credibility attributions made in the unattributed source condition. The interaction of these individual differences with fear, or with both fear and source credibility, might produce an apparent fear × source credibility interaction. While this hypothesis is extremely speculative, without a replication of this effect and data probing the process that produces the effect, it is reasonable to be skeptical of its validity.

In the McCroskey and Wright (1971) experiment two levels of source credibility are manipulated. The source credibility manipulation has no effect on dynamism ratings, but does affect both authoritativeness (competence) and character (trustworthiness), especially the former. The effect size of the interaction is smaller than in the Powell and Miller data, $\eta = .12$ (2 df).

The interaction is due to a strange control group difference. In both the low fear and high fear conditions more favorable attitudes are produced by the high credibility source than by the low credibility source. But in the control group the opposite effect occurs. This difference is not too large—witness the effect size—but it is sufficient to be statistically significant at the .05 level. If the control group data are removed, there is no interaction, $r = .00$. There is no satisfying rationale for the control group difference that produces the interaction. Unless this effect replicates, it is reasonable to be skeptical of its validity.

All three source credibility experiments have the common feature of including manipulations of two levels of source credibility and two levels of fear. When the data from the 2 × 2 design are analyzed, there is no evidence of substantial fear × source credibility interactions (Hewgill & Miller, 1965, $r = .04$; McCroskey & Wright, 1971, $r = .00$; Powell & Miller, 1967, $\eta = .10$, 2 df). Thus, despite some claims to the contrary, there is no strong evidence that source credibility is a powerful moderator of the fear manipulation-attitude relationship.

In a series of studies Leventhal and his associates have examined the effect of both fear and the specificity of instructions on attitude (Leventhal et al., 1965, 1966; Leventhal, Watts, & Pagano, 1967). Two of these reports claim statistically significant interactions involving fear and the specificity of recommendations. The third experiment reports no such effect. These experiments are reviewed chronologically.

Leventhal et al. (1965) report that fear, specificity of instructions, and whether or not one has had a prior tetanus shot interact to affect attitudes toward obtaining a tetanus shot. The nature of the interaction is that for those participants who have a prior shot there is no effect of fear when the message is accompanied by specific recommendations, but as fear increases participants conform more closely to message recommendations when the message does not include specific recommendations. For those participants not having a prior shot there is a small effect for fear when the message does not include specific recommendations, and a stronger fear effect when the message includes specific recommendations. Again, the nature of the fear effect in both instances is that as fear increases, conformity with message recommendations increases. The effect size for this three-way interaction is $r = .16$. The fear × specificity interaction is neither statistically significant at the .05 level nor substantial, $r = .02$.

Leventhal et al. (1966) report that fear and specificity of instructions interact to affect attitudes toward tetanus. Specifically, they produce data showing that as fear increases, conformity with message recommendations increases when the recommendations are specific. The size of this interaction effect is $r = .14$. There is no evidence of the three-way interaction that Leventhal et al. (1965) report. It is neither statistically significant at the .05 level nor substantial, $r = .03$.

Leventhal et al. (1967) include both a fear manipulation and an instructions manipulation in a study that assesses the effects of these and other independent variables on attitudes toward smoking and lung cancer. They do not report sufficient data to allow the estimation of interaction effects. Since they report statistically significant interaction effects in their analyses of other dependent variables, it is reasonable to conclude that there is no statistically significant fear × specificity interaction. With 118 participants providing data in this experiment, the effect size for the fear × specificity interaction cannot have exceeded $r = .16$ without being statistically significant at the .05 level. Therefore, it is probably reasonable to assume that fear and specificity do not interact to produce a substantial effect on attitude.

Thus the overall picture regarding how fear and specificity of instructions interact to affect attitudes is unclear. Leventhal et al. (1965) report a fear × specificity × prior shots interaction, but no fear × specificity interaction. Leventhal et al. (1966) report no fear × specificity × prior shots interaction, but do report a fear × specificity interaction. Leventhal et al. (1967)

report no fear × specificity interaction. Parenthetically, it is notable that these data are, in the main, inconsistent with Leventhal's hypothesis that a fear effect occurs only in the specific recommendations condition.

Hence, as with source credibility, it is reasonable to be skeptical of the validity of claims that fear and specificity of recommendations interact to affect attitudes. Since these three studies include only approximately 700 participants, a larger data base is needed in order to perform a meta-analysis of the fear × specificity interaction. Only such an analysis allows one to judge whether the paradoxical results from these three studies are due to sampling error, if there are additional moderator variables, or if some other explanation accounts for these data.

In a study of attitudes toward building community fallout shelters, Powell (1965) provides data that yield a statistically significant fear × target interaction. Powell reports that when the target of the persuasive message is the listener, there is a slight, but statistically nonsignificant, tendency for an increase in fear to produce a decrease in conformity to message recommendations. When the target of the persuasive message is the listener's family, however, an increase in fear produces an increase in conformity to the recommendations of the persuasive message. When the target of the persuasive message is the listener's nation, there is no effect of fear on attitude. The size of this effect is $\eta = .19$ (2 df).

There are several factors that prohibit accepting the conclusion that fear and target interact to affect attitudes. First, this study is the only one in which the effect of fear and target on attitude can be assessed. Second, it is a relatively small sample study—N = 80 for this analysis. Third, the effect size is relatively small; while the effect is statistically significant at the .05 level, it is not statistically significant at the .025 level. Fourth, the internal validity of the target manipulation is questionable. The target manipulation has a large effect on perceived fear, $\eta = .46$ (2df). One plausible hypothesis is that the target manipulation and the fear manipulation combine additively to produce perceived fear, which, in turn, directly affects attitude. There is some evidence consistent with this hypothesis. The correlation between the mean perceived fear scores and the mean attitude scores for the six experimental conditions is substantial, r = .67. While it is premature to embrace such a hypothesis, there are sufficient questions concerning the Powell experiment to make embracing the veracity of the fear × target interaction premature.

Burnett and Oliver (1979) report data that describe the effect of both fear and various demographic, sociopsychological, and health attitude variables on attitudes toward health maintenance organizations. A cluster analysis of the demographic, sociopsychological, and health attitude variables is presented, and the relationship between fear and attitude toward health maintenance organizations is broken down by cluster. Two clusters, labeled "older liberals" and "older blue-collar blacks," prove to be the most recep-

tive to fear appeals. In other words, for these clusters as fear increases attitudes toward health maintenance organizations conform more closely to those recommended in the persuasive message.

The recondite character of the results of the cluster analysis makes it difficult to assess which demographic, sociopsychological, and/or health attitude variable(s) interacts with fear to affect attitude. Nevertheless, Burnett and Oliver's results suggest that age is such a variable.

In order to probe the fear × age interaction, the estimated age of the participants in each of the studies is correlated with the fear manipulation-attitude correlation.[5] From this analysis a correlation of $r = .52$ is obtained ($df = 23$, $p = .004$). Thus, as in the Burnett and Oliver (1979) study, the effect of fear manipulations on attitude is stronger as the age of the participants increases. Specifically, as fear increases attitudes conform more closely to message recommendations for older participants. An increase in fear produces either no effect or a decrease in conformity to message recommendations for younger participants.

Four studies report data pertinent to assessing the effect of both fear and anxiety on attitude (Goldstein, 1959; Janis & Feshbach, 1954; Millman, 1968; Wheatley & Oshikawa, 1970). Two of these experiments meet the criteria for this meta-analysis (Goldstein, 1959; Wheatley & Oshikawa, 1970). In neither of these experiments is the fear × anxiety interaction statistically significant at the .05 level. Moreover, in neither of these experiments is the effect size for the fear × anxiety interaction substantial. On the other hand, the effect size is consistent. In both experiments $r = .12$. Furthermore, the nature of the interaction effect is similar in all four experiments. Specifically, for low-anxiety participants there is either no correlation between manipulated fear and attitude or a small positive correlation between manipulated fear and attitude. For high-anxiety participants there is either no correlation between manipulated fear and attitude or a small negative correlation between manipulated fear and attitude. Given the consistency of this effect, and given that there is reason to believe that methodological artifacts attenuate the effect size in these experiments, they are detailed below.

A low fear message and a high fear message compose the fear manipulation in the Goldstein (1959) experiment. Mainord's (1956) adaptation of the Sentence Completion Test is employed as a measure of coping/avoiding tendencies.[6] The extreme quartiles are used to define copers and avoiders. The sample is composed of high school students. A pretest-posttest design is utilized to examine changes in attitudes toward dental hygiene. Five items, each with a five-point response scale, are included as attitude measures. The results are presented, however, as a trichotomy. Specifically, the participant changes in a negative direction, does not change, or changes in a positive direction.

For copers, or low-anxiety participants, the fear manipulation has no

effect, $r = -.01$ ($df = 65$, $p > .05$). For avoiders, or high-anxiety participants, an increase in fear produces a decrease in attitude change, $r = -.25$ ($df = 70$, $p < .05$). The anxiety-attitude change correlation reflects that the low fear message is more successful with avoiders than with copers, although the correlation is not statistically significant at the .05 level ($r = .12$, $df = 61$, $p > .05$). The high fear message is more successful with copers than with avoiders, although the correlation is not statistically significant at the .05 level ($r = -.13$, $df = 74$, $p > .05$).

While the effect size for the fear × anxiety interaction is not large in this experiment, it may be seriously attenuated because of several features of the experimental design. First, the design of the experiment is pretest-posttest and, as previously discussed, the unreliability of change scores tends to attenuate correlations to a greater extent than the more reliable posttest-only measures. Second, the experimental design includes only two levels of manipulated fear and only two levels of anxiety. As shown previously, range restriction tends to attenuate correlations in such studies. Third, while the dependent measure contains five items, a considerable amount of the variance in this scale is lost when the data are trichotomized. Again, the expected result is attenuation of the effect size. Fourth, high school students constitute the sample in the Goldstein experiment. As shown previously, the manipulated fear-attitude correlation is weaker for such relatively young participants. It is likely that the same is true for interaction effects. In sum, there is reason to suspect that a larger fear × anxiety interaction may be obtained if a replication of the Goldstein study is conducted with some design modifications. Or, given Goldstein's design, the application of statistical corrections for unreliability and restriction in range may be sufficient to produce a substantial fear × anxiety interaction.

A low fear message and a high fear message compose the fear manipulation in the Wheatley and Oshikawa (1970) experiment. Wheatley and Oshikawa employ the Sarason Lack of Protection Test to measure anxiety. The bottom one-third and the top one-third of the anxiety distribution divide participants into the low-anxiety and the high-anxiety groups. College students provide the data for this experiment. A pretest-posttest design is employed to examine changes in attitudes toward life insurance. Six items, each with a seven-point response scale, are utilized to measure attitude change.

For low-anxiety participants, as the amount of fear in the persuasive message increases, the amount of attitude change increases proportionally ($r = .15$, $df = 75$, $p > .05$), although the effect is not statistically significant at the .05 level. For high-anxiety participants, as the amount of fear in the persuasive message increases, the amount of attitude change decreases proportionally ($r = -.07$, $df = 75$, $p > .05$), although the effect is not statistically significant at the .05 level. The anxiety-attitude change correlation indicates that the low fear message is more successful with high-anxiety par-

ticipants than with low-anxiety participants ($r_s = .12$, df = 75, $p > .05$). Again, this effect is not statistically significant at the .05 level. The high fear message, however, is more successful with low-anxiety participants than with high-anxiety participants ($r = -.11$, df = 75, $p > .05$). This effect is not statistically significantly at the .05 level.

Some of the same factors that may serve to attenuate the effect size of the fear × anxiety interaction in the Goldstein (1959) experiment may serve to attenuate the Wheatley and Oshikawa (1970) effects as well. Particularly, the design is a pretest-posttest design, and both the fear manipulation and the anxiety measure are dichotomized. So again there is reason to believe that a larger effect size for the fear × anxiety interaction may be obtained in a modified replication of the Wheatley and Oshikawa experiment. Alternatively, statistical corrections applied to data collected from a direct replication of the Wheatley and Oshikawa experiment are likely to produce the same result.

Neither the Janis and Feshbach (1954) experiment nor the Millman (1968) experiment report data in a way that allows the estimation of effect sizes. But their data appear consistent with those of the Goldstein experiment and the Wheatley and Oshikawa experiment. Janis and Feshbach (1954) report similar fear × anxiety interactions for two dependent measures: (1) change in dental practice and (2) resistance to counterpropaganda. Millman (1968) reports that chronic anxiety and acute anxiety interact to affect opinion change. While she interprets these data as consistent with the curvilinearity hypothesis, an alternative interpretation is that they are evidence of a fear × anxiety interaction. Put differently, acute anxiety is similar to the effect that a fear manipulation produces. Assuming that these variables indicate a common factor, Millman's interaction is of exactly the same form as Goldstein's, Wheatley and Oshikawa's, and Janis and Feshbach's fear × anxiety interaction.

In sum, the available evidence indicates that fear and anxiety interact consistently to affect attitude change. While that effect is weak, there are methodological artifacts that serve to suppress it. Therefore it is possible that future carefully designed experiments may produce data that indicate that fear and anxiety interact substantially to affect attitude. Or application of statistical corrections for unreliability and restriction in range may produce the same result.

Three studies present data examining the effects of both fear and whether the participant is a volunteer or a nonvolunteer on attitude (Horowitz, 1969, 1972; Horowitz & Gumenik, 1970). In each of these experiments the fear × volunteer interaction is substantial: $r = .25$ (Horowitz, 1969); $r = .15$ (Horowitz & Gumenik, 1970); and $\eta = .23$ with 4 df (Horowitz, 1972). These studies are detailed below.

Horowitz (1969) provides data that examine the effect of fear, whether

the participant volunteered or did not volunteer for the experiment, and number of exposures to the persuasive message on attitude toward drug abuse. He reports a main effect for the volunteering manipulation, volunteers conform more closely to message recommendations than nonvolunteers, and a fear × volunteer interaction. Specifically, for volunteers, as fear increases, conformity to the message recommendations increases ($r = .46$, $df = 58$, $p < .05$). For nonvolunteers, as fear increases, conformity to the message recommendations decreases ($r = -.21$, $df = 58$, $p > .05$), although this effect is not quite statistically significant at the .05 level. Both the low fear message and the high fear message produce more conformity to message recommendations. For the low fear message this effect is not statistically significant at the .05 level ($r = -.15$, $df = 58$, $p > .05$). For the high fear message this effect is statistically significant at the .05 level ($r = -.42$, $df = 58$, $p < .05$).

Horowitz and Gumenik (1970) manipulate fear, whether the participant is a volunteer or nonvolunteer, and whether or not the participant has a choice of experiments in which to participate, and assess their impact on attitude toward drug abuse. In addition to their decision to manipulate choice instead of number of exposures, the Horowitz and Gumenik design differs from the Horowitz (1969) design in one important way: The volunteering manipulation is different. Horowitz's (1969, p. 35) nonvolunteer participant sample was recruited from a "subject file-card index." The volunteer participant sample was composed of persons responding to a request to participate. Horowitz and Gumenik (1970), on the other hand, posted a request for participants to take part in a psychological experiment. Those persons volunteering to participate in that experiment are considered volunteers, whereas those persons not volunteering to participate in that experiment are considered nonvolunteers. Horowitz and Gumenik then canceled the experiment. Subsequently, they required persons to participate in another experiment, choosing both those volunteering for the previous experiment (volunteers) and those refusing to participate in the previous experiment (nonvolunteers).

Horowitz and Gumenik (1970) report substantial volunteer and choice main effects. Volunteers conform more closely to message recommendations than do nonvolunteers. Participants given a choice of experiments conform more closely to message recommendations than do participants not given a choice. They also report a statistically significant fear × volunteer interaction, and a statistically significant fear × volunteer × choice interaction, the latter being an especially large effect ($r = .34$).

For volunteers, as fear increases, attitudes more closely resemble those advocated in the persuasive message ($r = .33$, $df = 58$, $p < .05$). For nonvolunteers, as fear increases, attitudes are unaffected ($r = -.02$, $df = 58$, $p >$

.05). For both the low fear message and the high fear message volunteers conform more closely to message recommendations than do nonvolunteers, the difference being more pronounced in the high fear condition. For the low fear message, $r = -.22$ ($df = 58$, $p > .05$). For the high fear message, $r = -.52$ ($df = 58$, $p < .05$).

The triple interaction occurs because of a difference among the nonvolunteers. Put another way, for volunteers whether or not the participant has a choice of experiments makes little difference ($r = .35$ and $r = .33$, respectively). For nonvolunteers, however, choice makes a substantial difference in the size of the fear manipulation-attitude correlation. When nonvolunteers are given a choice, an increase in fear produces an increase in conformity to message recommendations ($r = .20$, $df = 28$, $p > .05$), although this effect is not statistically significant at the .05 level. When nonvolunteers are not given a choice an increase in fear produces a decrease in conformity to message recommendations ($r = -.24$, $df = 28$, $p > .05$), although this effect is not statistically significant at the .05 level. While neither of these correlations significantly differs from zero, they are very close to being significantly different from each other ($z = 1.62$, $p = .0526$).

Horowitz (1972) provides data that examine the effects of fear and whether or not the participant volunteered for the experiment on attitude toward drug abuse. The volunteering manipulation is the same as that used by Horowitz and Gumenik (1970). The fear manipulation, however, differs from both of the previous experiments. Both Horowitz (1969) and Horwitz and Gumenik (1970) varied fear by providing participants with pamphlets and films that differed in the amount of fear-arousing content. Horowitz (1972), on the other hand, manipulated fear by the use of false heart rate feedback.

Horowitz (1972) reports two significant main effects, and a substantial, but not statistically significant, interaction effect. Volunteers conform more closely to message recommendations than do nonvolunteers. The high fear message produces more conformity to message recommendations than does the low fear message. For both volunteers and nonvolunteers, as fear increases, conformity to the message recommendations increases ($r = .48$, $df = 58$, $p < .05$ for volunteers; $r = .20$, $df = 58$, $p > .05$ for nonvolunteers). There were five levels of the fear manipulation. In all but the second lowest fear condition volunteers conformed more closely than nonvolunteers to message recommendations. The volunteer/nonvolunteer-attitude correlations were $-.33$ (lowest fear), .10, $-.20$, $-.41$, and $-.57$ (highest fear), respectively. Only the last two correlations are statistically significant at the .05 level ($df = 22$ for each correlation).

In sum, the Horowitz research program illustrates that whether the participant volunteers or does not volunteer for the experiment is a strong mod-

erator of the fear manipulation-attitude correlation. Specifically, for volunteers an increase in the fear-arousing content of a persuasive message produces an increase in conformity to the recommendations contained in that message. This effect is a strong one. The mean correlation in these three studies is $r = .42$. For nonvolunteers there is considerable variance in the fear-attitude correlation across the three studies. The mean correlation is $r = -.01$. Given the small mean correlation, and since none of the fear manipulation-attitude correlations differ significantly from zero at the .05 level, the most reasonable conclusion is that for nonvolunteers fear has no impact on conformity to message recommendations.

Since whether or not participants volunteered for the experiment is one of the study characteristics coded in the meta-analysis, additional data are available to replicate the Horowitz results. In twelve studies, including the Horowitz studies, it is clear that the participants are volunteers. In eight studies, including the Horowitz studies, it is clear that the participants are nonvolunteers. An observation of these twenty studies shows that the fear manipulation-attitude correlation is much higher for volunteers than for nonvolunteers. There are two ways of illustrating this point. First, the weighted mean fear manipulation-attitude correlation is larger for volunteers than for nonvolunteers ($\bar{r} = .32$ for volunteers; .07 for nonvolunteers). Second, the volunteer/nonvolunteer variable correlates substantially with the fear manipulation-attitude correlation ($r = -.55$, $df = 18$, $p < .05$). Thus these data are consistent with the Horowitz data and with the hypothesis that whether or not one volunteers to participate in the experiment moderates the relationship between fear manipulations and attitude.

While it is important to note the variables that moderate the relationship between fear manipulations and attitude, it is equally important to note those variables that do not moderate this relationship.[7] In the fear appeal literature there are several variables that have not interacted with fear to exert a statistically significant and/or a substantial effect on attitudes. For example, Beck and Davis (1978) report that importance is not a moderator of the fear manipulation-attitude relationship. Berkowitz and Cottingham (1960) show that relevance does not interact with fear to exert a substantial effect on attitude. Frandsen (1963) reports a small fear × medium of presentation interaction effect. An experiment by Hendrick, Giesen, and Borden (1975) presents data that show a small fear × fear reduction interaction effect. Insko, Arkoff, and Insko (1965) demonstrate that time is not a strong moderator of the fear manipulation-attitude relationship. Leventhal et al. (1966) report no interaction effects among several independent variables, including sex, eligibility for a tetanus shot, and delay of attitude measurement. Finally, Leventhal et al. (1967) produce no evidence that fear interacts with smoking, smoking habit, and/or time to affect attitudes concerning smoking and lung cancer. The po-

tential moderating effect of several of these independent variables has been tested in only one experiment. Therefore it is premature to dismiss them as potential moderators until replications are conducted. Nevertheless, at this time there is no evidence to suggest that these variables are important moderators of the fear manipulation-attitude relationship.

Moreover, several study characteristics show no evidence of moderating the fear manipulation-attitude relationship. While there are not many studies per topic, the available evidence suggests that the fear manipulation-attitude correlation does not vary substantially across topic. Moreover, there is little evidence that either the method of manipulation or year of publication are strong moderators of the fear manipulation-attitude relationship.[8]

Behavior

Pertinent data are available from 15 studies, which have a combined sample size of 3080 participants. The correlation between the fear manipulation and behavior ranges from −.36 to .69, with a weighted mean of .10. The weighted variance in this distribution of correlations is .04. A weighted variance of .005 is expected by chance alone. Thus the obtained variance is larger than the variance expected by chance. The χ^2 test indicates that the variance in this distribution of correlations is significantly greater than that expected by sampling error alone ($\chi^2 = 125.70$, df = 14, $p < .001$).

The regression of behavior onto the fear manipulation is linear. There are eight studies in which a quadratic effect can be estimated. The quadratic effect ranges from −.22 to .43, with a weighted mean of .03. Thus, despite one study with an abnormally high quadratic effect, the mean quadratic effect is smaller than the linear effect. With a mean sample size of approximately 250 cases it is within sampling error of zero, while the linear effect is not ($\alpha = .05$).

Since the variance in this distribution of correlations is greater than that expected by chance, it is possible that there are variables that moderate the fear manipulation-behavior relationship. Prior to entertaining such a hypothesis, however, a search for artifacts is required.

First, the fear manipulation-behavior correlations are corrected for the strength of the manipulation. Of the 15 studies allowing the calculation of the fear manipulation-behavior correlation, 13 also allow the calculation of the fear manipulation-perceived fear correlation. These 13 studies include a total of 2951 participants. The ratio of the fear manipulation-behavior correlation to the fear manipulation-perceived fear correlation in these studies ranges from −.91 to .85, with a weighted mean of .45. The weighted variance of this distribution is .19. A weighted variance of .004 is expected by chance alone. Thus the obtained variance is larger than the variance ex-

pected by chance alone. The χ^2 test indicates that the variance of this distribution is significantly greater than that expected by sampling error alone ($\chi^2 = 881.58$, df = 12, $p < .001$).

As with attitudes, the variance of this distribution of corrected correlations is larger than the variance of the distribution of obtained correlations. One possible explanation of this result is differential reliability of the behavior measures. There is evidence consistent with this explanation. The correlation of the number of items measuring behavior with the fear manipulation-behavior correlation is r = .76 (df = 13, p = .001).

In addition to methodological artifacts, such as reliability, it is possible that other variables moderate the fear manipulation-behavior relationship. An observation of the 15 relevant studies shows that several of them include the manipulation of other independent variables. Few of them, however, yield either statistically significant interaction effects and/or substantial effect sizes for the interaction effect(s). These data are discussed below.

Chu (1966) reports that fear, imminency, and efficacy interact to affect whether or not children take a drug to inoculate them against roundworm. The effect size is small ($\eta = .11$, 4 df), but since Chu's experiment includes the measurement of 1071 participants, the three-way interaction is statistically significant at the .05 level. Chu's interpretation of this interaction is that imminency makes a difference in drug-taking behavior only when the perceived efficacy of the solution is high and the amount of fear arousal in the message is low.

Griffeth and Rogers (1976) report that fear, probability, and efficacy interact to affect high school students' error rates on a driving simulator task. This three-way interaction effect is statistically significant at the .05 level. The effect size is r = .15. The nature of the interaction is that the low probability-high efficacy and high probability-low efficacy cells contain more errors than the low probability-low efficacy and high probability-high efficacy conditions, and that this effect is stronger under conditions of low fear (low noxiousness).

As with the Chu (1966) experiment, there are no other experiments that manipulate these three independent variables and assess their effect on behavior. Rogers and Mewborn (1976), however, examine the effect of these three manipulations on behavioral intention. In this experiment the three-way interaction is not statistically significant at the .05 level. Moreover, the effect size is not substantial.

Ramirez and Lasater (1977) report that fear and self-esteem interact to affect participants' tooth-brushing behavior. This interaction is statistically significant at the .05 level. The effect size is r = .16. The nature of this interaction is that for high self-esteem participants there is no effect of fear on tooth-brushing behavior ($r = -.01$, df = 100, $p > .05$). For low self-esteem

participants, as fear increases, behavioral conformity to message recommendations increases ($r = .20$, $df = 100$, $p < .05$). For low fear messages, as self-esteem increases, behavior conformity to message recommendations decreases ($r = -.15$, $df = 100$, $p > .05$), although this effect is not statistically significant at the .05 level. For high fear messages, as self-esteem increases, there is no effect on behavioral conformity to message recommendations ($r = .04$, $df = 100$, $p > .05$).

Again, there are no other studies that manipulate both fear and self-esteem, assess their effect on behavior, and report sufficient information to allow further analysis. Leventhal and Trembly (1968), however, mention that self-esteem and fear interact to affect their criterion variable. But the interaction that they report is different from that reported by Ramirez and Lasater (1977). Specifically, they claim that as fear increases, conformity increases for the high self-esteem participants but not for the low self-esteem participants.

There are several variables that did not interact with fear to produce statistically significant effects on behavior. For example, Chu (1966) reports neither statistically significant nor substantial fear × immediacy and fear × efficacy two-way interactions. Dabbs and Leventhal (1966) indicate neither statistically significant nor substantial fear × effectiveness, fear × pain of shots, and fear × effectiveness × pain of shots interactions. Griffeth and Rogers (1976) offer no evidence of either a fear × probability or a fear × efficacy interaction. Leventhal et al.'s (1965) paper shows no evidence of a fear × recommendations interaction. Leventhal and Watts (1966) report no fear × smoking, fear × susceptibility, or fear × smoking × susceptibility interactions. Ramirez and Lasater (1977) indicate no fear × ethnicity of communicator and no fear × ethnicity of communicator × self-esteem interactions. Finally, Skilbeck, Tulips, and Ley (1972) report no evidence of a fear × sidedness, fear × exposure, or fear × sidedness × exposure interaction.

Interestingly, Hill and Gardner (1980) found a statistically nonsignificant fear × sensitizer/repressor interaction, $r = .18$. The nature of the interaction is that there is a slight positive effect for sensitizers, $r = .27$, and a slight negative effect for repressors, $r = -.08$. Since sensitizers are similar to low-anxiety participants, and since repressors are similar to high-anxiety participants, these data resemble the effect of the fear × anxiety interaction on attitude. They may indicate a mediated moderator effect. That is, had Hill and Gardner measured attitude, they would likely have found a substantial fear × sensitizer/repressor interaction effect. If attitude mediates the effect of this interaction on behavior, then the impact of the interaction on behavior is expected to be less substantial.

Given the small number of experiments that include behavior as a dependent measure, the correlations of study characteristics with the fear ma-

nipulation-behavior correlation are highly unstable. Nevertheless, several of these results deserve comment. The age of the participants is highly correlated with the fear manipulation-behavior correlation ($r = -.43$, $df = 13$, $p = .06$). Interestingly, this correlation is in the direction opposite that of the correlation of age with the fear manipulation-attitude correlation. Other coefficients exhibit the same pattern. For example, the fear manipulation-behavior correlation is stronger for nonvolunteers than for volunteers ($r = .37$, $df = 10$, $p = .12$). Given the small number of studies, it is necessary to remain cautious when interpreting these data. The safest course of action is to suspend judgment pending more evidence.

In sum, the behavior data are difficult to interpret. The large variance in the distribution of the fear manipulation-behavior correlation distribution indicates the possibility of moderator variables. Moreover, some authors report statistically significant, although not extremely large, interaction effects. There are, however insufficient data to allow firm conclusions to be drawn concerning these effects. Moreover, the large correlation between number of behavioral measures and the fear manipulation-behavior correlation suggests that error of measurement is an important contributor to the variance in the distribution of fear manipulation-behavior correlations.

DISCUSSION

In this section the results of the meta-analysis are summarized. The theoretical, methodological, and pragmatic implications of these results are discussed.

Meta-Analytic Findings

The mean fear manipulation-perceived fear correlation, $r = .36$, indicates that, in the main, researchers do not create strong fear appeal manipulations. Nevertheless, the data do indicate that strong fear appeal manipulations are possible. For example, persuasive messages that generate high amounts of fear do exist (Chu, 1966). Moreover, persuasive messages that generate low amounts of fear do exist (Leventhal et al., 1966). Finally, there are studies in which researchers construct strong fear appeal manipulations (Griffeth & Rogers, 1976; Rogers & Thistlethwaite, 1970).

It is important to note that, according to most theories, perceived fear moderates the relationship between manipulated fear and attitude. If these theories are accurate, then it follows that if the fear appeal manipulation is not strong (if the fear manipulation-perceived fear correlation is small), then it is not possible for the fear manipulation to have a strong impact on attitude.

For example, given the mean fear manipulation-perceived fear correlation $r = .36$, if the perceived fear-attitude correlation is perfect, $r = 1.00$, then the fear manipulation-attitude correlation is not able to exceed $r = .36$ to within sampling error. In a study in which $N < 25$ this correlation is not statistically significant at the .05 level.

This example is a conservative one. Since there are determinants of attitude in addition to fear, the assumption that the perceived fear-attitude correlation is $r = 1.00$ is untenable. If one assumes that the correlation is still substantial, but more reasonable, then the case is made more dramatically. For example, if the perceived fear-attitude correlation is $r = .50$, then the fear manipulation-attitude correlation is not able to exceed $r = .17$ to within sampling error. This figure is approximately the mean fear manipulation-attitude correlation obtained in this meta-analysis. Such a correlation is statistically significant at the .05 level when $N > 92$. Of the studies reviewed in this chapter, 15 report measurements on fewer than 92 participants.

Thus future researchers must be sensitive to the problems of manipulating fear. Materials must be prepared and pretested carefully. Manipulation checks require several items in order to achieve levels of reliability sufficient to guard against attenuating the manipulated fear-perceived fear correlation. Moreover, it is wise to consider adding manipulation check items in order to see if fear manipulations bring about sources of variance in addition to or other than fear. For example, high fear messages may be more attitude discrepant than low fear messages. Such a potential confound is detectable if an experiment includes a discrepancy manipulation check.

There is no evidence of either nonlinearity or nonadditivity in the perceived fear data. The variance in the distribution of the fear manipulation-perceived fear correlations is larger than expected by chance, but this result may be due to methodological artifacts.

The weighted mean fear manipulation-attitude correlation of $r = .21$ appears to indicate that fear appeal manipulations do not exert a strong impact on attitudes. There are both substantive and methodological reasons that mitigate this conclusion.

Substantively, the data suggest that age of the participants, trait anxiety of the participants, and whether the participant volunteers or does not volunteer are potentially strong moderators of the fear manipulation-attitude relationship. Thus the mean fear manipulation-attitude correlation does not adequately represent the impact of fear on attitudes. For example, if the fear manipulation-attitude correlation is strong and positive for volunteers, but zero for nonvolunteers, then the fear manipulation-attitude correlation for all participants is positive, but weak.

These data are insufficient, however, to illuminate one important theoretical point. It is conceivable that these moderator variables interact with

the fear manipulation to affect perceived fear, which then has a direct impact on attitudes. Alternatively, the fear manipulation may exert a direct impact on perceived fear, which then interacts with moderator variables to affect attitudes. While these two suggestions do not exhaust the pool of potential hypotheses, clarification of this point is an important question for future investigators.

Methodologically, the data illustrate the importance of artifacts. Both unreliability of measurement and restriction of range in the independent variable seriously attenuate fear manipulation-attitude correlations. The same recommendations made for the perceived fear data apply to attitudes as well.

While there is evidence of nonadditivity in these data, there is no strong evidence of nonlinearity. This finding is particularly relevant, given theories that predict that the regression of attitude onto fear is curvilinear.

The weighted mean fear manipulation-behavior correlation of $r = .10$ is the expected size, given previous data. Expanding upon this point, if perceived fear mediates the fear manipulation-attitude relationship, and if attitude mediates the perceived fear-behavior relationship, then the fear manipulation-behavior correlation must be smaller than the correlation of the fear manipulation with attitude, which in turn must be less than the correlation of the fear manipulation with fear. This pattern of data is observed in the obtained results.

The behavior data are sparse. With only 15 experiments reporting relevant data, it is difficult to draw any firm conclusions concerning moderator variables and/or methodological artifacts. The warranted conclusion is that future researchers need to consider incorporating behavioral measures into their designs, in addition to manipulation check measures and attitude measures. Some fear appeal topics either preclude behavioral measures or make obtaining them very difficult (for example, such topics as seat belts, population control, or drug abuse). On the other hand, there are several topics that make obtaining such measures relatively easy (blood donation, tetanus shots, or taking a roundworm drug). In addition, there are ingenious methods of obtaining behavioral measures for topics that appear to preclude such measures (dental hygiene and safe driving). Therefore, there does exist a pool of topics for which such measures are easily obtained.

As with the attitude data, there is little evidence that the regression of behavior onto fear is nonlinear. One experiment reports such results (Krisher, Darley, & Darley, 1973). This study, however, employs a small sample. Moreover, the results of other experiments for which a quadratic effect could be computed are inconsistent with this finding.

Implications for Existing Theory

These results have implications for judging the veracity of fear appeal explanations. For example, the presence of a number of negative correlations between fear manipulations and attitude (Goldstein, 1959; Janis & Feshbach, 1953; Janis & Terwilliger, 1962), negative correlations between fear manipulations and behavior (Janis & Feshbach, 1953; Leventhal, et al., 1965; Leventhal & Watts, 1966), no correlation between fear manipulations and attitude (Kohn, Goodstadt, Cook, Sheppard, & Chan, 1982; Wheatley & Oshikawa, 1970), and the evidence that variables moderate the fear manipulation-attitude relationship show that the drive explanation is an inadequate explanation of the effect of fear-arousing messages. Similarly, the presence of numerous studies reporting a positive correlation between fear manipulations and attitudes (Beck & Davis, 1978; Berkowitz & Cottingham, 1960; Burnett & Oliver, 1979; Frandsen, 1963; Hendrick et al., 1975; Hewgill & Miller, 1965; Horowitz, 1969, 1972; Horowitz & Gumenik, 1970; Insko et al., 1965; Leventhal et al., 1965; McCroskey & Wright, 1971; Powell, 1965; Powell & Miller, 1967) is sufficient to show that the resistance explanation is inadequate to explain the effect of fear-arousing messages.

The various forms of curvilinearity hypotheses are inconsistent with the obtained data. For both attitude measures and behavior measures the mean quadratic effect is small. Moreover, there are few studies that report substantial effects and, of those studies that do report curvilinear effects that are not trivial, they are not of the functional form predicted by the curvilinear hypotheses (Powell, 1965). The one exception is the Krisher et al. (1973) experiment. Given the small sample size in this study ($N = 60$), this result may be due to sampling error.

To anticipate an argument from curvilinearity hypothesis advocates, the lack of strong quadratic effects cannot be attributed to the fear appeal manipulations. It is not the case that studies that manipulate low to moderate fear produce positive effects on attitudes and behavior, and that studies that manipulate moderate fear to high fear produce negative effects on attitudes and behavior. For example, Chu's (1966) manipulation is clearly moderate fear to high fear. Nevertheless, Chu reports that an increase in fear produces an increase in behavioral conformity to message recommendations. Furthermore, both Janis and Feshbach (1953) and Janis and Terwilliger (1962) report fear manipulations that clearly range from low to moderate, and in both experiments the fear manipulation-attitude correlation is negative. Thus there is little evidence consistent with the curvilinearity hypotheses, and there is considerable evidence inconsistent with these hypotheses.

There are few data consistent with the hypotheses that suggest that fear interacts with other variables to affect both attitudes and behavior. The parallel response explanation cannot be falsified, since it is not stated with sufficient precision to allow an empirical test. The protection motivation explanation is tested in at least one experiment (Griffeth & Rogers, 1976). While this explanation predicts that fear, efficacy, and probability interact to affect attitudes and behavior, and while such an interaction is reported, it is not the type of interaction predicted by the protection motivation explanation. Specifically, Rogers (1975) argues that the high fear, high efficacy, high probability cell produces the most conformity to message recommendations. That prediction is not consistent with the result reported by Griffeth and Rogers (1976). Moreover, Rogers and Mewborn (1976) report further falsifying evidence in an experiment in which behavioral intention is the dependent variable.

Finally, the threat control explanation has not received a rigorous test. Nevertheless, a notion central to this explanation is that fear manipulations and efficacy interact to affect attitudes and/or behavior. Both Chu (1966) and Griffeth and Rogers (1976) report statistically nonsignificant or small interaction effects of fear and efficacy on behavior. While these data are not a strong test of this explanation, the conclusion that there is no evidence consistent with the threat control explanation is warranted.

In sum, none of the fear appeal explanations are consistent with the available evidence. While no theory is offered here, a sketch of what an adequate theory must explain is presented in the next section.

Implications for Future Theory

While the variance in the distribution of fear manipulation-perceived fear correlations is larger than that expected by chance, there is no evidence of nonadditivity in these data. The results of the meta-analysis suggest that the variance may be due to methodological artifacts, such as error of measurement or restriction in range. Thus it is plausible that fear manipulations are generally successful in bringing about a state of perceived fear in the participants. In the main, however, these manipulations are weak. Moreover, two possible problems require consideration. First, there is evidence that other independent variables bring about varying degrees of perceived fear. Second, it is possible that fear manipulations bring about other affective/cognitive states in addition to fear. Put differently, both the manipulation of fear and the manipulations of other relevant independent variables are often confounded.

Since there is little nonadditivity in the perceived fear data, it is likely that the interactions of fear manipulations with age, trait anxiety, and volunteering actually reflect interactions of these variables with perceived fear. In

other words, a plausible hypothesis is that fear manipulations directly affect perceived fear, which interacts with age, trait anxiety, and volunteering to affect attitudes.

Furthermore, it is possible that these moderator variables are not unique. It may be the case that they are alternate indicators of the same underlying factor. For example, both the fear × anxiety and the fear × volunteering interactions may reflect a common factor. If volunteers have low anxiety and nonvolunteers have high anxiety, then a single factor could account for both interactions. The available evidence concerning the anxiety of volunteer and nonvolunteer participants is mixed, however (Rosenthal, 1965).

There is no strong evidence of nonadditivity in the fear manipulation-behavior data. One explanation of this result is that moderator variables, such as age, trait anxiety and volunteering, interact with perceived fear to affect attitudes, which then mediate the relationship between these interaction effects and behavior. One implication of such a model is that the interactions of fear with other variables have stronger effects on attitudes than on behavior, since the latter effects are mediated by attitudes.

A causal model depicting these effects is presented in Figure 12.4. This model is a reasonable representation of the results of the meta-analysis. Moreover, it is a null hypothesis against which future researchers may test experimental data. The model is not, however, a theory. If future data are shown to be consistent with this model, then a satisfactory theory must delineate the mechanisms that produce the model. In particular, such a theory must include an explanation of individual differences. Why, for example, are low-anxiety, older volunteers more susceptible to fear appeals than high-anxiety, younger nonvolunteers?

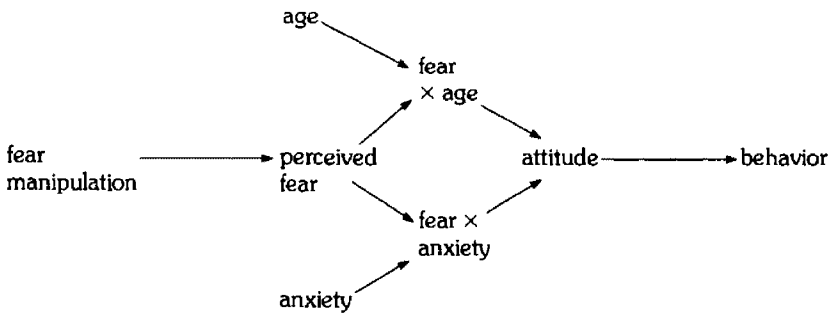

Figure 12.4. A model of a fear appeal experiment.

Methodological Implications

It is clear from the results of the meta-analysis that reliability of measurement has a substantial impact on the results of experimental studies. Both the type of experimental design—pretest-posttest or posttest only—and the number of items employed to measure the dependent variable are indicators of the reliability of the measurement of the dependent variable. Both measures correlate substantially with the size of the fear manipulation-attitude correlation. The multiple correlation of the fear manipulation-attitude correlation with these two study characteristics, $R = .50$, indicates the impact of error of measurement on experimental results. Experiments in which the dependent variable is measured reliably are more likely to find large effects of fear manipulations, and hence statistically significant findings. Those experiments in which the dependent variable is not measured with high reliability are likely to find that the effect of the fear manipulation is attenuated by error of measurement. Therefore, such studies are less likely to find statistically significant effects of the fear manipulation.

Clearly, it is possible to obtain reliable measures of the criterion variables discussed in this study. Generally, obtaining satisfactory levels of reliability is a function of pretesting and employing a sufficient number of items to measure the variables in question. While it may be difficult to obtain multiple behavioral measures, both Griffeth and Rogers (1976; safe driving) and Ramirez and Lasater (1977; dental hygiene) report multiple measures of behavior.

Finally, there are few studies that report the reliability of criterion measures. Thus it is impossible to apply corrections to obtained statistics. At least two advantages accrue if reliability coefficients are presented. First, the mean corrected correlation can be calculated, and thus a better estimate of the effect of fear on the criterion variable(s) may be obtained. Second, the distribution of corrected correlations may be examined. In this way a more accurate estimate of the relative contributions of methodological artifacts and moderator variables to the variance in the fear manipulation-criterion variable correlation distribution may be obtained.

There is also evidence consistent with the hypothesis that restricting the range of experimental manipulations attenuates the correlations of fear manipulations with the criterion variables. For example, the correlation between the number of levels of the fear manipulation and the size of the fear manipulation-attitude correlation is substantial. There are reasons to include more than two levels when manipulating fear, in addition to the restriction in range artifact. For example, only if more than two levels of fear are manipulated can quadratic effect estimates be obtained.

There is a paradoxical implication of including more than two levels in fear manipulations. While higher correlations of fear with the criterion varia-

ble(s) are likely to result, the main effect for fear is less likely to be statistically significant. Such a phenomenon is produced by the increased degrees of freedom associated with the main effect. For example, consider a design in which fear is the only independent variable, it is an independent groups factor, and there are two levels of the manipulation. Further, suppose that the sum of squares for the fear effect is 25 and the sum of squares for subjects nested within fear is 500. In this example the correlation of fear and the criterion variable is approximately $r = .22$. With $N = 85$ the analysis of variance yields an $F = 4.15$, which is statistically significant at the .05 level with 1 and 83 degrees of freedom. Assume that an exact replication of this study is performed, except that three levels of fear are included in the manipulation. Suppose that the sum of squares for fear increases by a factor of 1.48, so that it equals 37. And assume that the sum of squares is due to the linear effect. In this case the correlation of fear with the criterion variable is larger, $r = .26$. On the other hand, the results of the analysis of variance show that $F = MS_B/MS_W = 18.5/6.02 = 3.07$, which is not statistically significant at the .05 level with 2 and 83 degrees of freedom. In order to obtain consistent results from the F test in such a case one must decompose the sum of squares for the fear effect into linear and quadratic components and conduct the test on these components separately (Keppel, 1982, pp. 135-140).

The results of the meta-analysis suggest that demographic variables and/or personality traits may moderate the fear manipulation-criterion variable relationship. In order to test for interaction effects these variables are often dichotomized or trichotomized. For example, in the experiments that examine the effects of both fear and anxiety on attitudes, participants are divided into low-anxiety and high-anxiety groups for purposes of analysis. Restricting the variance of such a variable in this way is likely to attenuate the interaction effect. More important, it makes comparison across experiments difficult, especially when different measures of the demographic characteristic/personality trait are employed or descriptive statistics on the demographic characteristic/personality trait are not reported. An alternative method is to use regression techniques to estimate the strength of interaction effects (Cohen, 1968), although one may wish to dichotomize or trichotomize the presentation of results in order to illustrate the nature of the interaction effect. Moreover, a description of the distribution of the demographic characteristic/personality trait is an important piece of information to include in the report.

The discussions of fear appeal explanations and of the meta-analysis results rely heavily on path-analytic techniques. Although Costner (1971) illustrates how this technique may be used to illuminate experimental data, there are few experiments that utilize the technique. Path analysis is neces-

sary to provide an adequate test of some of the fear appeal explanations. For example, if the drive explanation is accurate, then the correlation between the fear manipulation and attitude must be equal to the product of the fear manipulation-perceived fear correlation and the perceived fear-attitude correlation. Finding that the fear manipulation exerts a statistically significant effect on both perceived fear and attitude is not sufficient to conclude that the data are consistent with the drive explanation. For example, a fear manipulation-attitude correlation of .5 is not consistent with the drive explanation if the fear manipulation-perceived fear correlation is .3 and the perceived fear-attitude correlation is .7. Such data suggest, for example, that the fear manipulation may bring about another variable in addition to fear, and that that variable also has an impact on attitude.

While path-analytic techniques can suggest the existence of an experimental confound, being theoretically blind algorithms, they are unable to specify what variables are confounded in the fear manipulation. Thus, when designing the experiment, and considering the possibility of confounding variables, one may construct measures of these variables and include them in the experiment. During analysis the hypothesis that these variables mediate the fear manipulation-attitude relationship may be tested directly by path-analytic techniques.

Pragmatic Implications

There are several important implications of these data for those desiring to use fear-arousing persuasive messages in applied contexts. First, judging from the perceived fear results, experimenters generally do not create strong manipulations. Thus one might well come to the conclusion that manipulating fear is not an easy task. What appears to be a highly fear-arousing persuasive message to the experimenter may not induce much fear into the recipient of the persuasive message. Thus, at minimum, a practitioner must pretest persuasive messages before using them in an applied context, such as a public service campaign. Moreover, both the practitioner and the theorist need to reconsider the question of message design. It is not clear exactly what features of a persuasive message are fear arousing.

Second, the finding that demographic characteristics and personality traits moderate the relationship between fear manipulations and attitudes suggests the importance of audience analysis. The focus of the Burnett and Oliver (1979) paper illustrates that marketing researchers are aware of, and concerned with, this problem. More accurate techniques of analyzing properties of audiences are necessary, however, before the results presented here can be of use to the practitioner.

These two pragmatic implications suggest the possibility of a union of both scientific and rhetorical approaches to the development of communi-

cation theory (Miller, 1975). Rhetorical scholars have long examined the properties of persuasive messages and persuasion situations. This knowledge base is of utility for the purposes of message design and audience analysis (see, for example, Sussman, 1973).

Third, in order to specify precisely the relationship between fear and attitude (and/or behavior), data must be collected from the entire range of fear stimuli. Many of the manipulations of fear fall within a relatively restricted range, however. There is an important question involved in employing stronger fear manipulations. Is it justifiable ethically to elicit high levels of fear with experimental materials? Is the potential harm that participants may incur as a result of being exposed to a highly fear-arousing message outweighed by the benefit of the data produced by the reactions to such messages? We can provide no concrete answer to this question. Nevertheless, it is perhaps the most important question researchers must confront when studying the effects of fear-arousing persuasive messages. It is also one of the least-discussed issues in the fear appeal literature.

Summary and Conclusion

This chapter reexamined the question of the effects of fear-arousing persuasive messages. Meta-analytic techniques were employed in order to assess quantitatively the effect of fear manipulations on three criterion variables: perceived fear, attitude, and behavior. The results of this analysis illustrate that existing explanations of the effects of fear-arousing persuasive messages are inadequate to account for the data. The theoretical, methodological, and pragmatic implications of the results are discussed.

NOTES

1. A fear appeal is an argument of the following form:

(1) You (the listener) are vulnerable to a threat.
(2) If you are vulnerable, then you should take action to reduce your vulnerability.
(3) If you are to reduce your vulnerability, then you must accept the recommendations contained in this message.
(4) Therefore, you should accept the recommendations contained in this message.

For example:

(1) If the USSR launches a nuclear attack you would be killed.
(2) Since you do not want to die, you should do something to protect yourself in the event of such an emergency.
(3) The only effective action that can be taken is to build a fallout shelter.
(4) Therefore, you should build a fallout shelter.

In order to prove the validity of the structure of such an argument, let V = one is vulnerable; A = take action to eliminate vulnerability; and R = accept the message recommendations. Then, the premises of the argument may be symbolized as follows:

(1) V
(2) V $\supset$ A
(3) A $\supset$ R
(4) $\therefore$ R

where $\supset$ is the symbol for a conditional statement and $\therefore$ symbolizes "therefore." The proof is as follows:

(5) V $\supset$ R	2, 3 hypothetical syllogism
(6) R	5,1 by modus ponens

For a discussion of the hypothetical syllogism and modus ponens inference rules, as well as a discussion of propositional logic in general, see Copi (1967). While the validity of the form of argument is easily demonstrated, the soundness of any fear appeal depends upon the quality of the evidence that supports the premises of the argument.

2. There was no evidence of strong higher-order nonlinearities, such as cubic effects or quartic effects, in any of the data examined in this monograph.Since there was no evidence of such effects, and since no theory predicts such effects, they are not presented in detail.

3. Only those studies that assessed attitude immediately after the message were considered. Since few studies included delayed attitude measures, there was not sufficient information to draw conclusions about the relationship between fear manipulations and delayed attitudes, or attitude change.

4. This correlation is computed using the absolute value of the fear manipulation-attitude correlation as the dependent variable. The absolute value is employed, since it is the strength of r, and not its sign, which is of theoretical interest in this case. Unless indicated otherwise, absolute values are used for both the fear manipulation-attitude correlations and the fear manipulation-behavior correlations when these variables are correlated with study characteristics.

5. The signed, rather than absolute value, of the fear manipulation-attitude correlation was used for this analysis.

6. Goldstein reports that the Mainord measure is not correlated substantially with the Janis and Feshbach (1954) anxiety measure, and concludes that the Mainord measure is not a measure of anxiety. Since there are no data to suggest that the Janis and Feshback measure is valid, the possibility exists that the Mainord scale is a measure of anxiety, but the Janis and Feshback measure is a weak indicator of anxiety. Moreover, since the Mainord scale looks like a measure of trait anxiety, and since it interacts with fear in the same manner as other known anxiety scales, it is reasonable to treat it as an anxiety measure.

7. Brown (1979) manipulated fear, and classified participants as either high conformers or low conformers, based upon their responses to a Crutchfield simulated group pressure situation. Brown found a strong fear $\times$ conformity interaction, $r = .30$. Specifically, for conformers the fear manipulation-attitude correlation was $r = .79$, while it was only .41 for nonconformers. The correlation between conformity and attitude was $r = -.36$ in the control condition and .42 in the experimental condition. The Brown study is the only known experiment that crossed these two independent variables. Thus, while it holds promise of being a moderator, this conclusion must await replication.

8. The latter correlates substantially with the fear manipulation-attitude correlation, $r = .25$. While this correlation is not statistically significant at the .05 level, the number of studies upon which is it based is small. When this correlation is controlled for other study characteristics, such as the type of design, however, the correlation decreases ($r = .17$ when controlling for type of design). Thus it does not appear to be an important moderator.

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