DOCUMENT RESUME

ED 193 726 CS 503 100

AUTHOR McDermott, Steve: Hylton, Cal
TITLE An Explanation of Persistence and Sleeper Effects: An Empirical Test of the Delayed Opinion Response Model.
PUB DATE May 80
NOTE 34p.: Paper presented at the Annual Meeting of the International Communication Association (30th, Acapulco, Mexico, May 18-23, 1980).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Attitude Change: Change Strategies: *Communication Research: *Models: *Persuasive Discourse: Public Opinion: *Redundancy: Theories: *Time Factors (Learning)

ABSTRACT

A theoretical model was tested for its ability to explain persistence and delayed credibility (or "sleeper") effects in attitude change via persuasive variables. The model predicted opinion effects from two major components: a multiplicative effect of message repetition and credibility, and a simple effect of time since receipt of message. The subjects, 124 college students, read a cover story, a speaker description (the source credibility manipulation), and one of three messages advocating federal control of education. Four time increments were selected for measurement of opinion, varying from immediately after the treatment to six weeks later. Thus, the students were presented with variations in repetition and credibility and their opinions were assessed over time. The experiment yielded data supporting the viability of the time explanations, but failed to support the hypothesized multiplicative effect on opinions. Problems in inducing manipulations may have contributed to obtaining only partial support for the model. The results suggested the need to reevaluate previous research. (RL)

AN EXPLANATION OF PERSISTENCE AND SLEEPER EFFECTS: AN EMPIRICAL TEST OF THE DELAYED OPINION RESPONSE MODEL.

by

Steve McDermott and Cal Hylton

Department of Communication Studies

San Jose State University

Paper presented to the Interpersonal Communication Division of the International Communication Association, Acapulco, Mexico, May 1980.

AN EXPLANATION OF PERSISTENCE AND SLEEPER EFFECTS:
AN EMPIRICAL TEST OF THE DELAYED OPINION RESPONSE MODEL.
(Abstract)

This study tested a theoretical model that provides explanations for persistence and sleeper effects. The model predicts opinion effects from two major components: (1) a multiplicative effect of message repetition and credibility, and (2) a simple effect of time since receipt of message. Students were presented with variations in repetition and credibility, and their opinions were assessed over time. The experiment yielded data supporting the viability of the time explanations but failed to support the hypothesized multiplicative effect on opinions. Problems in inducing manipulations may have contributed to obtaining only partial support for the model. The study did provide evidence that past research should be reevaluated regarding the effect of time on opinions, and that since the model provides both a simple and elegant explanation for the sleeper effect, it deserves furtner exploration.

AN EXPLANATION OF PERSISTENCE AND SLEEPER EFFECTS: AN EMPIRICAL TEST OF THE DELAYED OPINION RESPONSE MODEL

For nearly half a century, from early research by Kulp (1934) through the seminal Yale studies (Hovland, Lumsdaine, & Sheffield, 1949; Hovland & Weiss, 1951; Kelman & Hovland, 1953) to current efforts (Cook & Flay, 1978), the effects of source credibility over time has been of both empirical and theoretical interest to students of persuasion. Only recently has the data base been sufficiently extensive enough to begin to suggest certain patterns which may have theoretical import. This paper utilizes one theoretical explanation and attempts to test a model for such delayed credibility effects, commonly known as the sleeper effect.

Several theoretical lines may be pursued in this quest (Cook & Flay, 1978), but perhaps the most promising is provided by learning theories where explanations of relationships among initial opinion levels, persistence, and opinion changes have been provided.

Evidence for a sleeper effect has been most often cited when there appears to be an increase in opinion toward an advocated position over time, for a low credible source; however, Capon & Hubert (1973) point out the pattern of the sleeper effect "...is far from conclusive (p.334)" Other researchers have claimed sleeper effects when there was a regression of credibility effects to a baseline after a lapse of time (Weiss, 1953; Schulman & Worral, 1970). Regardless of the labels employed, the significant body of research in this area suggests the following propositions:

(1) High credibility will generally lose its effectiveness over time in inducing opinion toward the advocated position (Kulp, 1934; Cohen, 1957; Duncker, 1938; Whittaker & Meade, 1968); and when compared with low credibility, will produce more immediate attitude change, but will generally lose its effectiveness over time such that its effects are either indistinguishable or are similar to delayed effects for low credibility (Hovland & Weiss, 1951; Kelman & Hovland, 1953; Watts & McGuire, 1964; Schulman & Worral, 1970).

(2) Low credibility effects either slightly decline over time (Whittaker & Meade, 1968; Johnson, Torcivia & Poprick, 1968; Watts & McGuire, 1964; Schulman & Warrall, 1970) or increase (Kelman & Hovland, 1953; Hovland & Weiss, 1951), but in either event, the effects approximate the delayed level of high credibility.

(3) Reinstatement of source, recall of source, or association of source with content produces differential effects of source credibility on opinion change such that high credibility is more effective over time than low credibility (Hovland & Weiss, 1951; Kelman & Hovland, 1953; Watts & McGuire, 1964; Schulman & Worrall, 1970).

These propositions indicate that unless a source is subsequently reassociated with a message the initial credibility effects dissipate. Learning theory suggests that individuals who can recall the source of a message have established an association. Individuals who have, therefore, learned to associate a source with a message continue to be influenced by credibility over time, and those who have not learned are not influenced by credibility over time. Consequently, an examination of a learning model may prove useful in seeking an explanation for such effects.

There is a separate body of research, although not sufficiently extensive to provide a basis for propositions, that raises an important issue. This is the research which investigates repetition of a message and opinion persistence. Unfortunately, the state of this

research is bleak. As Cook & Flay (1978) state:

> "...we have not yet explored the effect of repetition in any systematic way. This is sad because it means that the attributes of persuasive messages most germane to persistence have not been detailed even though in everyday life many messages are heard frequently... Moreover, the repetition and distribution of information play crucial roles in various learning approaches to the acquisition and maintenance of skills, and it is reasonable to assume that they might be just as important for attitudes (p.45)."

Nonetheless, Johnson & Watkins (1971) identified persistence when subjects heard a message five times, and Wilson & Miller (1968) found a persistence effect when some arguments in a court case were repeated. Although these findings were obtained in research where credibility was not under investigation, linking the source to a message through several repetitions might produce opinion persistence (Mortensen, 1971; McCroskey, Larson, & Knapp, 1971). Additionally, such repetition influences have theoretical support.

Given these two lines of research, a theoretical model containing repetition and learning elements was generated.

Theoretical Model

Weiss (1962) employed a modification of Hullian learning theory (Hull, 1943) as a basis for a model for predicting attitude change via persuasion variables. Weiss stated that in developing the model he took liberties with learning theory, and as such, the research based on his theory of persuasive communication "...cannot be regarded as tests of the Hullian theory...(p. 710)." Although Weiss' (1962) model may not meet the requisites of Hullian learning theory, it is, in its own right, a coherent and useful model of persuasion.

The Weiss (1962) model utilizes many of the assumptions of learning theory, of which classical conditioning and extinction are part. As such, the model allows for the introduction of "Drive," "Habit Strength," and "Inhibition" into the general equation:

$$(D \times H) - I = \bar{E}$$

where D = Drive, H = Habit Strength, I - Inhibition, and $\bar{E}$ = Response (either probability of agreement, or degree of agreement).

The model's elements may be combined into two major components: (1) Drive times Habit Strength, and (2) negative Inhibition. The (D x H) component deals with the activation and production of behavior. Drive is an activation process, and habit strength is anything that reduces drive and is, thus, reinforcing (Hill, 1971). The second component, Inhibition, is the component dealing with the reduction in response; it roughly parallels extinction. More will be said about these components later.

Weiss does not define his terms nor explicate Hull's definitions. Neither are Hull's (1943) definitions presented here, but the analagous persuasion variables, as presented by Weiss (1962, p. 728) are shown in Figure 1. Weiss does not indicate if these persuasion variables combine or are alternative antecedents, and he does not operationalize the model's elements.

According to Weiss' model, holding all else constant, as habit strength increases so does the degree of agreement ($\bar{E}$). In other words, as habit strength increases, reinforcement increases. Differential levels of this reinforcement will produce different levels of $\bar{E}$ depending on the initial reinforcement condition (D). Therefore,

according to the Weiss model, changes in the number of presentations of a cue statement with an argument should produce changes in the probability or amplitude of agreement depending on the initial level of the "Drive" variable. Cue statement is interpreted as the message which accompanies the argument.

Assume that the initial drive is a positive value. Then, as habit strength increases, $\bar{E}$ will increase. If the initial drive level is zero, then there will be no change in $\bar{E}$ as habit strength increases: changes in the number of presentations of a cue statement with an argument would make no difference in terms of $\bar{E}$. Consider what would happen if the initial drive level were a negative value. Increases in the number of presentations (an increase in habit strength) would decrease the level of $\bar{E}$. Of course, drive is considered as an aroused state of an organism (Hill, 1971) and, therefore, cannot take on negative values. This conceptualization of drive has important implications for operationalizations of the variable, and will be discussed later.

Of interest here, is how to sustain initial credibility effects. The Weiss model predicts that any element of habit strength in the model will be useful in predicting delayed opinion effects. Source credibility, however, is not explicitly displayed as affecting habit strength in the Weiss model. Therefore, the Weiss model was modified.

As presented, it includes both argument strength and source credibility as "Drive" variables yet includes only argument as an element of habit strength. Since both source credibility and argument strength are defined as drive variables, then the association

of either with a cue statement should not require changes in the propositions derived from the model. In classical conditioning terms, from which the Weiss model has its roots, both argument strength and source credibility may be considered unconditioned stimuli (Weiss, 1962). Through repetition of the pairing of the unconditioned stimuli with the conditioned stimulus (cue statement) a response is conditioned. In persuasion terms, then, the pairing of source credibility with a cue statement is analogous to pairing argument strength with the cue statement. Viewed thus, the model would predict that habit strength will be influenced by the number of paired presentations of a cue statement and source credibility.

Conclusions drawn from a review of the credibility and repetition literature, correspond fairly closely with the deductions derivable from the modified Weiss model. The effect of reinstatement, recall, and association of source with content, correspond with the predictable effects of increased habit strength through repetition in the modified model. Second, the evidence indicating that both high and low credible source effects may be epxected to decline and/or revert to some sort of "baseline" value over time corresponds to the theoretical notion of extinction. The theoretical notion of extinction is symbolized as I (Inhibition) in the model.

This special case of extinction refers to a reduction in response, and has been considered an aversive state. Weiss indicates four variables as elements of inhibition in his model. As with habit strength, modifications are also necessary for the inhibition

component of the model.

First, the literature cited has been concerned with the effects of the mere passage of time on opinion response. It has been concerned with opinion response over time without intercedent communications between the initial communication or communications and a response. Inhibition, defined by Weiss as the number of exposures to the cue statement alone, requires communications without "drive" elements (i.e., messages without paired sources).

Second, actual communications are not normally, if ever, without elements of "Drive." Communication is affective. If a communication is presented repeatedly, it probably contains some amount of "Drive" on each presentation. It is unlikely, for instance, that a receiver would be confronted by a high credible source advocating a position at one time and then be confronted again with the same message presented without a source. While there may be interest in determining the effects of similar messages presented by diferent sources in succession on opinion response, the present investigation concerns the effects of successive persuasive attempts by one source.

A further modification of the Weiss (1962) model, to accommodate these concerns, is possible without violating the essential tenets of Hullian learning theory. Such a modification should provide an improved model for investigations of persuasive effects over time.

Hullian learning theory permits a conceptualization of Inhibition which is a direct function of effort. Referred to as reactive

inhibition, it has been equated with fatigue.

> The amount of reactive inhibition resulting from a response depends on the amount of effort required to make the response, so that reactive inhibition is roughly equivalent to fatigue (Hill, 1971, p. 142).

Reactive inhibition is an explanation of why extinction occurs. Once reinforcement is removed, successive responses build up inhibition (Hill, 1971). The removal of reinforcement may be accomplished by removing the message and the source (i. e., Habit strength). Viewed in this manner, the passage of time without presentation of H will build up inhibition.

Therefore, Weiss' model has been modified in order to treat amount of time as an element of inhibition, and credibility as an element of habit strength.

The resulting modified Weiss persuasion model, (The Delayed Opinion Response Model - DOR) indicating only those variables which are of concern in the present research, is presented in Figure 2.

Hypotheses

Bearing in mind that the preceding interpretation of research and Weiss' model call for the rendering of general decline effects as extinction, and recall as indicating associational learning, the DOR model appears useful in understanding the delayed effects of source credibility. Specifically, the model allows for several deductions to be tested.

In order to test for the multiplicative function of Drive and Habit strength, the model allowed for the following prediction:

H1: Source credibility will interact with repetition such that a message presented by a high credible source will induce a more positive opinion toward the advocated position when presented three times rather than once, while a message presented by a low credible source will induce the same opinion toward the advocated position when presented three times as when presented once.

Additionally, Hypothesis One, if supported, should produce data indicating the multiplicative relationship indicated in the model. For high credibility the slope of a general regression equation should be positive and signficant, while for low credibility the slope should approximate zero and be non-significant. Such a data plot would lend support to a "learning" conceptualization of the findings summarized in the third proposition of the summary of findings.

To test for the general notion of extinction as indicated in the review of the literature and as specifically represented in the DOR model, the following hypothesis was examined.

H2: Opinion response toward the advocated position will decline with time, such that opinion response will be highest immediately following a message presentation and at each succeeeding time the opinion response will be lower than the opinion level at the time preceding.

This hypothesis addresses the decline effects noted in propositions

one and two of the summary of findings.

Support for both of the preceding hypotheses will be evidence for the viability of the DOR model.

METHODS

A 2 x 2 x 4 posttest only design was used to examine the effect of the three independent variables on opinions. Two levels of credibility were manipulated. The credibility manipulation had been previously validated (Hocking & Danowski, 1974) and consisted of source descriptions preceding the messages. Students were randomly assigned to the two credibility conditions (high and low).

Two levels of repetition were manipulated. One of three similar messages was presented to the subject either once (at random) with two filler messages which followed, or three times. Each of the three messages varied slightly but were all messages advocati federal control of education. Each of the messages was a shortened, paraphrased version of a longer message utilized by McCroskey (1966) and later by Hylton (1971), and his students (Monge, 1968; Babtiste, 1969; Hocking, 1972); and a shorter version of the McCroskey speech used by Margrieter (1972) and validated as a persuasive instrument. Students were randomly assigned to repetition conditions.

Four time increments were selected for measurement of opinion. Delayed opinion response (DOR) times were selected at random from a set of eight weeks, yielding delayed opinion response measures at two weeks (DOR2) following receipt of the message(s), at weeks four (DOR4), and at six weeks (DOR6). Delayed opinion response, DOR0, indicated immediate measurement and was not in the random selection pool. Problems encountered in random assignments of students to

these DOR conditions resulted in the use of intact classes (randomly assigned to condition).

Thus, the statistical model may be considered a Type III (Hays, 1973), where credibility and repetition represent fixed effects and DOR represents random effects. The utility of a random effects model for conclusions regarding DOR is that the variable may be treated as continuous and extrapolations may be made between measurement points.

Subjects

The initial pool of subjects consisted of 214 students drawn from basic communication classes at a large midwestern University. Thirty-three students either did not attend class on one of the days of the experiment or did not fill out the questionnaire. The OOR groups were made equal by random deletion of subjects from the DOR0, DOR2, and DOR4 groups. The final DOR groups consisted of 31 students each; resulting in data analyses on 124 subject responses.

Procedures

All read a cover story, a speaker description (the source credibility manipulation), and one of the messages. After reading this message, students in the single repetition condition and DOR0 conditions completed scales on their attitudes toward federal control of education. These scales have been used repeatedly in measuring the effects on this topic (see, for example, McCroskey, 1966).

All students not in the single repetition and immediate DOR conditions were asked to rate the quality of the message. This scale was used as a filler to avoid any suspicion on the part of the other

students. Those students in the three repetition conditions were instructed to read the second message, fill out a quality of message scale, and then read a third message. All other students read filler messages.

The delayed opinion measures were included with measures of other topics and disguised as a survey from another university department.

Data Analysis

The study was concerned with the prediction of opinion response from a mathematical model. The model, although composed of three predictor variables, includes only two testable components: (1) I, and (2) D X H. The mathematical model may be tested by multiple regression procedures and would be represented by the following general regression equation:

$$\bar{Y} = a + b_1 X_1 - b_2 X_2 ;$$

where $\bar{Y}=\bar{E}$=Opinion response level, a=intercept, b-slope, X_1 = (D X H), X_2=I of the mathematical model. Notice that the (D X H) component is considered as one variable in the regression equation, indicating that the D X H component is not equivalent to an interaction in regression analysis (Blalock, 1969). In the present analysis, the mathematical relationship is computed with D taking on the values of 0 and 1, and H taking on the values of 1 and 3. This differs from the typical regression analysis in that the interaction term would have values of -1 and +1 in the cell diagonals. Recall that "Drive" is an activated state of an organism and can only take on positive values. Thus, the lower limit of values would be zero, according to the theoretical conceptualization. Therefore, the

multiplicative plot should display a positively increasing line for the high credibility condition and a slope approximating zero (i.e., a horizontal slope) for the low credibility condition.

The other component to be tested represents DOR (I), which is a main effect, therefore a negative value is required to support the predictions.

Secondary analyses of the hypotheses were completed in addition to the analyses noted above.

RESULTS

Preliminary Analysis

Manipulation checks were conducted on the sources and messages used in the study. Both manipulation checks were replications of previous research. The first check, on credibility, was made on the basis of the rationale that if there were a credibility difference, there should be an opinion difference for the respective credibility levels. To accomplish the test, an analysis of variance for the effect of credibility on opinions measured immediately following the treatment conditions (DORO) was conducted. The results indicated a non-significant difference ($F=1.404$, $df=1, 30$, $p < .25$) between the opinions induced by the credibility manipulation. The intended credibility manipulation was ineffective.

The second manipulation check, on message similarity, was analyzed with regression procedures. Regression analysis was especially appropriate because of the nature of the check. While an

analysis of variance provides information regarding whether or not the messages differed, it does not provide information on how much the messages differed in their ability to induce opinions. In this particular case, this added information is crucial since the interest is in how similar the messages are, i.e., a test of no difference. An r^2 of zero would permit more confidence in statements regarding the similarity of messages. The messages were not significantly different in the ability to induce opinions and accounted for only 0.2% of the variance in opinion (r^2=.002, F=.126, df=2/121, p=.882). The message similarity manipulation was successful.

To determine whether the opinion measure was primarily unidimensional, a principle components analysis was completed. This particular analysis was chosen primarily because the model assumes an exact transformation of the original variables; thus corresponding to the past operationalizations of the measure (see, for example, McCroskey, 1966). The factor analysis resulted in one factor accounting for 83.3% of the variance. All other emergent factors had eigen-values of less than 1.0. Given the extensive use of these scales as a simple summed index and the present attempt to provide a theoretical rationale and test for the past research, the scales were summed without the use of factor scores.

Primary Analysis

The entire model was analyzed with multiple regression procedures. The results of the analysis are shown in Table 1. The analysis indicates an overall R^2 which is small and non-significant (R^2 =.048, F=3.037, df=2/121, p=.052). Inspection of the table

reveals that the "near significance" is primarily the result of the DOR (I) component of the model. The effect for the multiplicative relationship hypothesized in hypothesis one was small (std. beta=-.010) and non-significant (p=.903). On the other hand, the weight for the I component was fairly large (std. beta=-.218) and significant (p=.015). Notice that the relationship between I and opinion response is negative, supporting the hypothesis (i.e., H2) that opinion response toward the advocated position will decline over time. Therefore, of the two hypotheses, only Hypothesis Two was supported.

Secondary Analysis

Both components of the model deserve further attention. The multiplicative component (D X H) may be broken down into two separate regression analyses: one for high credibility and one for low credibility. The I component may be analyzed further to determine the shape of the function in an attempt to ascertain whether the relationship is linear or non-linear, and to determine the decline effects for high and low credibility.

Previously it was reported that the I component was a significant affector of opinion. Opinion levels were found to decline over time. This significance refers to a linear analysis. It is also of interest to investigate a non-linear curve. An investigation of the proportion of variance which can be accounted for by linear and/or non-linear components was completed. The analysis indicated a significant R^2 for the analysis (R^2=.101, F=4.511, df=3/120, p=.005). These results indicated a significant effect

due to all the sources of variance, linear and non-linear, and inspection of the beta weights and as plotted demonstrates the function clearly (See Figure 3).

An analysis of variance which separates the linear from non-linear components was also completed. This analysis showed that the linear (r^2=.047, F=6.030, $p<.025$) and non linear(amount of variance=.054, F=3.583, $p<.030$) components accounted for about the same amount of variance.

The total regression of DOR (I) on opinion may be broken down into two separate regressions: one for high credibility and one for low credibility. The results, shown in Table 2 indicate that low credibility accounted for more of the decline effect than high credibility.

In the test of the hypothesized relationship between the multiplicative component (D X H) and opinion level, the relationship was found to be non-significant. Despite that finding, it may be useful to look at the part of the component dealing with repetition or Habit Strength. The H portion of the D X H component may be decomposed into two separate analyses, a regression for high credibility and one for low credibility. The results of the decomposition are shown in Table 3. Neither independent effect was positive and larger than the weight for low credibility. Despite the ineffective credibility manipulation, the slope for each credibility condition approximates the slopes hypothesized in Chapter One.

DISCUSSION

This study tested the Delayed Opinion Response model which made learning predictions about persistence and sleeper effects. The model was broken down into two components to be tested. One component (i.e., D X H) led to a hypothesized multiplicative function between source credibility and repetition. The result of a test of this relationship was nonsignificant: research hypothesis one was not supported. The other hypothesized effect dealt with the decline of opinions over time. This variable was strong enough to produce a nearly significant R^2 for predicting opinions from the model, despite the nonsignificance of the multiplicative component. The findings thus lend support to the viability of an Inhibition explanation for persistence effects.

The lack of significance for the first hypothesis is not surprising in view of the credibility manipulation. Several attributions for this ineffective manipulation are possible. The most tempting attribution would be that the sources were not high and low credible. This conclusion seems very unlikely in light of the previous research by Hocking & Danowski (1974) demonstrating the credibility level of the sources with a federal control of education message. Although possible, it also seems unlikely that if the sources were perceived as high and low credible, they would fail to induce the well documented initial opinion differences. One explanation for the findings is that the receivers failed to take note of the manipulations. This might account for the almost identical opinion levels for each of the credibility manipulations at DORO.

It may also be possible that since the opinion effects were above the mean level of opinion expected on the measure (i.e., 6 scales times 4 points=24), the cover story (i.e. message to be delivered on television) may have been powerful enough to raise the credibility level of the low credible source. In any event, since both sources induced high initial opinions, the test for D X H was ineffective.

The ineffectiveness was more pronounced for the low credibility manipulation. The high credibility manipulation did induce the expected high opinion. As such, the results should have indicated a positive and significant slope for a high credible source when the message is repeated. As it was, the slope was not significant, although it was in the anticipated direction.

Similarly, if the low credibility manipulation was perceived as high credible then the slope for opinion under repetition conditions should approximate the slope for the manipulated high credibility condition. This did not happen. The slope for the low credibility manipulation was nonsignificant and approached zero.

Interestingly the findings regarding repetition approximate (if roughly) the hypothesized relationship <u>despite</u> the ineffective manipulation. In other words, the manipulated high credible source condition with repetition produced a positive slope, while the low condition produced one that approximated zero.

The results obtained lead to some interesting speculations. It may be possible that the repetitions themselves lead to the receiver's perceptions of the source differences. In other words, it may have

taken some repetitions for the receivers to see the differences in the sources. The students may have been unwilling to admit that they could be prejudiced by a socialist (low credibility manipulation), but that over time and with repetitions they were more influenced by the source. It should, of course, be reemphasized that none of the opinion effects mentioned above are strong. Certainly, appropriate caution should be taken in consideration of these results and suggestions.

The amount of time between presentations may be an important factor with regard to opinion effects. It should be expected that the effects would be quite different if the time between repetitions were, for example, three weeks rather than three minutes.

Research is needed to determine if the repetitions that occur within one communication event differ from those which occur at different communication events. This study investigated repetition in a small time frame where repetition consisted of complete message repetition within one communication event. Repetition effects may be dramatic in situations where the messages are repeated at several different communication events.

The finding supporting hypothesis two (that opinions decline over time) conforms to the literature and, as such, is further evidence for the effect. The decline effect found in this study is best described as linear. The finding that the decline was less for the high credible source than the low credible source seems to question some previous findings. Recall, however, that the credibility manipulation was ineffective, and that the opinion level for

the low credible source manipulation at DORO was higher than for the high credibility manipulation (although not significantly higher).

The finding regarding the decline of credibility induced opinions was not a chance finding. The previous literature pointed to it and the model predicted it. As such, the importance of this finding cannot be overemphasized. Future research and theories of communication should include the time variable.

High in priority for future research would be a retest of the DOR model. The model provides a simple and a rather elegant explanation of the sleeper effect. Beyond that, research investigating other components of the Weiss model might be fruitful.

km

FIGURE 1

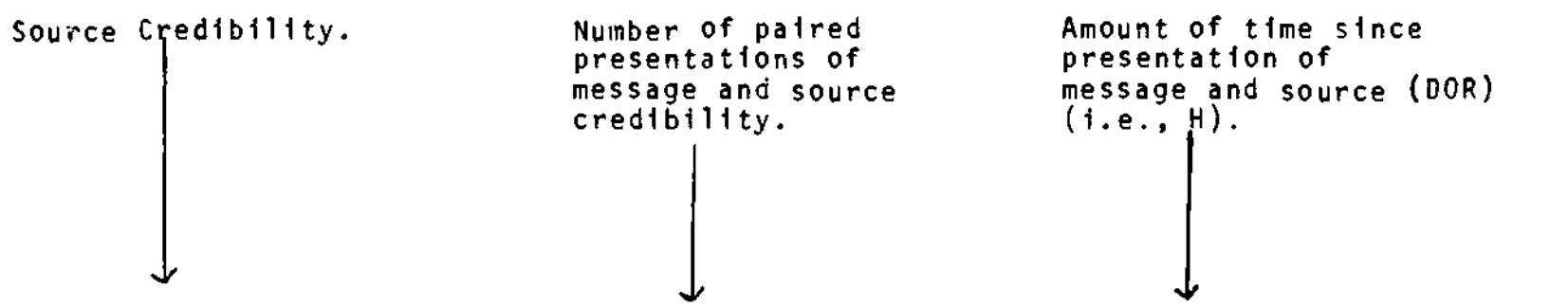
The Weiss Persuasion Model*
(Weiss, 1962, p.728)

1. Argument Strength. 2. Source Credibility 3. Activeness in participation in statement of argument. 4. (Taylor scale, Time stress).	↓	(D | X | 1. Number of paired presentations of cue statement and argument. 2. Difference in cue statement in persuasion and testing. 3. Activeness in participation in cue statement. 4. Cue statement-argument interval. | ↓ | H)	-	1. Number of exposures to cue statement alone. 2. Inter-communication interval. 3. Activeness in participation in cue statement. 4. Cue statement-argument interval.	↓	I	=	$\bar{E}$

*Note.- D=Drive, H=Habit Strength, I=Inhibition, and $\bar{E}$=Probability or amplitude of response. The left hand side of the equation consists of two components: (1) the multiplicative one of Drive times Habit Strength, and (2) the negative Inhibition component.

FIGURE 2

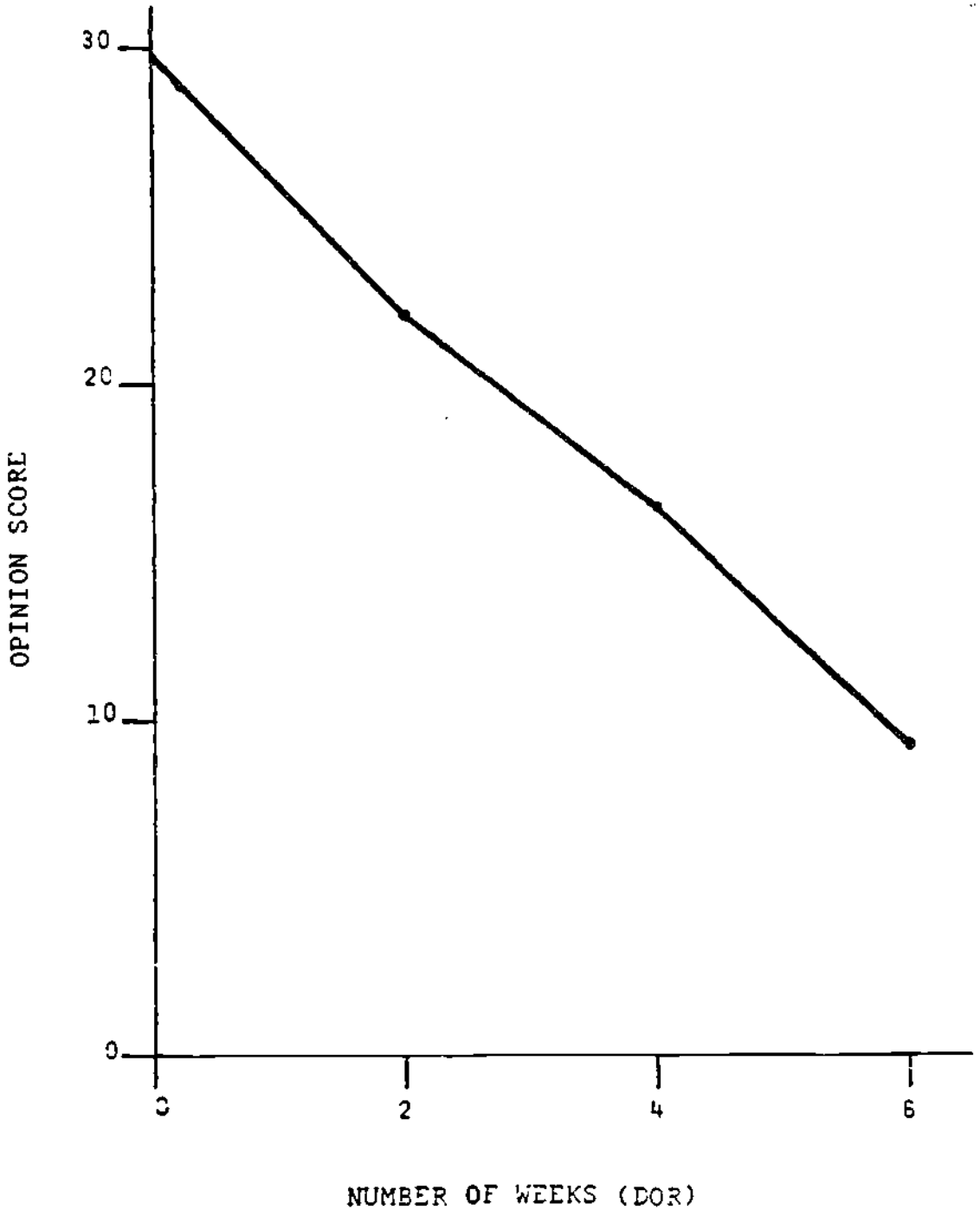
Modified Weiss Model:
The Delayed Opinion Response Model



*Note.-As in the Weiss model, D=Drive, H=Habit Strength, and E= probability or amplitude of response. The left hand side of the equation consists of two components: (1) the multiplicative one of Drive times Habit Strength, and (2) the negative Inhibition component.

FIGURE 3

Plot of Regression Analysis
for DOR (I) to Opinion
(with no linear or non-linear constraints)*



*Note.-$\bar{Y}$=29.774-7.839D1-5.677D2-6.968D3, where D1=the DOR0 to DOR2 time, D2= the DOR2 to DOR4 time, and D3=the DOR4 to DOR6 time.

TABLE I.

Regression of the DOR Model to Opinion*

Source	df	SS	MS	F	SIG	R^2
Regression (D X H)-1	2	545.780	272.890	3.037	.052	.048
Residual	121	10872.309	89.854			

Variable	Unstandardized beta coefficient	Standardized beta coefficient	Sig.
Drive X Habit Strength	.918	-.010	.903
Inhibition	-.937	-.218	.015

*Note.-Intercept=27.538, therefore $Y=27.538+(.918)X_1+(-.937)X_2$

TABLE 2

Regression of DOR (I) to Opinions for Low Credible Sources[c]

Source	df	SS	MS	F	SIG.	R^2
Regression	3	891.059	297.020	3.410	.022	.134
Residual	66	5748.426	87.097			

Variable[a]	Unstandardized beta coefficient	Standardized beta coefficient	Sig.
D1[b]	-9.236	-.379	.006
D2[b]	-6.597	-.291	.036
D3[b]	-7.424	-.339	.016

Note.-a. Although these are successive time periods, the subjects were drawn from different groups and the variables D1, D2, and D3 are independent. b. D1=the DOR0 to DOR2 time, D2=the DOR2 to DOR4 time, and D3-the DOR4 to DOR6 time. c. Intercept=30.950.

TABLE 2b

Regression of DOR (I) to Opinion for High Credible Sources[c]

Source	df	SS	MS	F	SIG.	R^2
Regression	3	339.965	113.322	1.309	.282	.073
Residual	50	4327.239	86.545			

Variable[a]	Unstandardized beta coefficient	Standardized beta coefficient	Sig.
D1[b]	-5.519	-.276	.132
D2[b]	-2.636	-.118	.500
D3[b]	-6.708	-.316	.080

Note.-a. Although these were successive time periods, the subjects were drawn from different groups and the variables D1, D2, and D3 are independent. b. D1=the DDR0 to DOR2 time, D2=the DOR2 to DDR4 time, and D3-the DOR4 to DOR6 time. c. Intercept=27.636.

TABLE 2

Regression of DOR (I) to Opinions for Low Credible Sources[c]

Source	df	SS	MS	F	SIG.	R^2
Regression	3	891.059	297.020	3.410	.022	.134
Residual	66	5748.426	87.097			

Variable[a]	Unstandardized beta coefficient	Standardized beta coefficient	Sig.
D1[b]	-9.236	-.379	.006
D2[b]	-6.597	-.291	.036
D3[b]	-7.424	-.339	.016

Note.-a. Although these are successive time periods, the subjects were drawn from different groups and the variables D1, D2, and D3 are independent. b. D1=the DOR0 to DOR2 time, D2=the DOR2 to DOR4 time, and D3-the DOR4 to DOR6 time. c. Intercept=30.950.

TABLE 2b

Regression of DOR (I) to Opinion for High Credible Sources[c]

Source	df	SS	MS	F	SIG.	R^2
Regression	3	339.965	113.322	1.309	.282	.073
Residual	50	4327.239	86.545			

Variable[a]	Unstandardized beta coefficient	Standardized beta coefficient	Sig.
D1[b]	-5.519	-.276	.132
D2[b]	-2.636	-.118	.500
D3[b]	-6.708	-.316	.080

Note.-a. Although these were successive time periods, the subjects were drawn from different groups and the variables D1, D2, and D3 are independent. b. D1=the DOR0 to DOR2 time, D2=the DOR2 to DOR4 time, and D3-the DOR4 to DOR6 time. c. Intercept=27.636.

TABLE 3

Regression of H to Opinion for the Low Credible Source[a]

Source	df	SS	MS	F	Sig.	r^2	Unstd. beta
Regression	1	7.670	7.670	.079	.780	.001	.332
Residual	68	6631.816	97.527				

Regression of H to Opinion for the High Credible Source[a]

Source	df	SS	MS	F	Sig.	r^2	Unstd. beta
Regression	1	158.842	158.842	1.832	.182	.034	1.734
Residual	52	4508.362	86.699				

Note.-a. The intercept for High credibility=20.362, and Low credibility=24.793.

TABLE 3

Regression of H to Opinion for the Low Credible Source[a]

Source	df	SS	MS	F	Sig.	r^2	Unstd. beta
Regression	1	7.670	7.670	.079	.780	.001	.332
Residual	68	6631.816	97.527				

Regression of H to Opinion for the High Credible Source[a]

Source	df	SS	MS	F	Sig.	r^2	Unstd. beta
Regression	1	158.842	158.842	1.832	.182	.034	1.734
Residual	52	4508.362	86.699				

Note.-a. The intercept for High credibility=20.362, and Low credibility=24.793.

km

Hull, C.L. Principles of Behavior. New York: Appleton-Century, 1943.

Hylton, C. Intra-audience effects: observable audience response. The Journal of Communication, 1971, 21, 253-265.

Johnson, H.H., Torcivia, J.M., & Poprick, M.A. Effects of source credibility on the relationship between authoritatirianism and attitude change. Journal of Personality and Social Psychology, 1968, 9, 179-183.

Johnson, H.H. and Watkins, T.A. The effects of message repetition on immediate and delayed attitude change. Psychonomic Science, 1971, 22, 101-103.

Kelman, H.C. & Hovland, C.I. Reinstatement of the communicator in delayed measurement of opinion change. Journal of Abnormal and Social Psychology, 1953, 48, 327-335.

Kulp, D.H. Prestige as measured by single experience changes and their permanency. Journal of Educational Research, 1934, 27, 663-672.

Margreiter, D.G. An experimental study of the effects of observable audience response on attitude change and source credibility in dyads and triads. Unpublished Master's thesis, California State University, San Jose, 1972

McCroskey, J.C. Experimental studies of the effects of ethos and evidence in persuasive communication. Unpublished Doctoral dissertation, Pennsylvania State University, 1966.

McCroskey, J.C., Larson, E. & Knapp, M.L. An Introduction to Interpersonal Communication. Englewood Cliffs, New Jersey: Prentice Hall, 1971.

Monge, P. The effects of variations in observable audience response ratios on attitude change, source credibility, and comprehension. Unpublished Master's thesis, San Jose State College, 1969.

Mortensen, C.D. Communication: the study of human interaction. New York: McGraw-Hill Book Company, 1972.

Schreiman, D.B. The effects of authority influence and peer influence on the perception of credibility. Unpublished Master's thesis, California State University, San Jose, 1973.

Schulman, G.I. & Worrall, C. Salience patterns, source credibility, and the sleeper effect. Public Opinion Quarterly, 1970, 34, 371-382.

REFERENCES

Baptiste, L. The effects of observable authoritative response on attitude change. Unpublished Master's thesis, San Jose State College, 1969.

Blalock, H. M. Theory Construction: from verbal to mathematical formulations. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969.

Capon, N. & Hulbert, J. The sleeper effect--an awakening. Public Opinion Quarterly, 1973, 37, 333-358.

Cohen, A.R. Need for cognition and order of communication as a determinant of opinion change. In Hovland, C.I. (Ed.), Order of Presentation in Persuasion. New Haven: Yale University Press, 1957.

Cook, T.D. and Flay, B.R. The persistence of experimentally induced attitude change. In Berkowitz, L. (Ed.), Advances in Experimental Social Psychology, Vol. 11, New York: Academic Press, 1978.

Cook, T.D. & Insko, C.A. Persistence of attitude change as a function of conclusion reexposure: a laboratory-field experiment. Journal of Personality and Social Psychology, 1968, 9, 322-328.

Duncker, K. Experimental modification of children's food preferences through social suggestion. Journal of Abnormal and Social Psychology, 1938, 33, 489-507.

Hays, W.L. Statistics for the Social Sciences. New York: Holt, Rinehart, and Winston, Inc., 1973.

Hill, W.F. Learning: A Survey of Psychological Interpretations. Trenton: Chandler Publishing Co., 1971.

Hocking, J.E. The Effects of Sequentially Varied Observable Audience Response. Unpublished Master's thesis, California State University, San Jose, 1972.

Hocking, J.E. & Danowski, J. The Effects of Interpersonal Communication Network Integration on Susceptibility to Persuasion. Unpublished paper, Department of Communication, Michigan State University, 1974.

Hovland, C.I., Lunsdaine, A.A. & Sheffield, F.A. Experiments in Mass Communication. New York: Wiley, 1949.

Hovland, C.I. & Weiss, W. The Influence of Source Credibility on Communicative Effectiveness. Public Opinion Quarterly, 1951, 15, 635-650.

Watts, W.A. & McGuire, W.J. Persistence of induced opinion change and retention of the inducing message contents. Journal of Abnormal and Social Psychology, 1964, 68, 233-241.

Weiss, R.F. Persuasion and the acquisition of attitudes: models form conditioning and selective learning. Psychological Reports, 1962, 11, 709-732.

Whittaker, J.O. & Meade, R.D. Retention of opinion change as a function of differential source credibility. International Journal of Psychology, 1968, 3, 103-108.

Wilson, W. and Miller, H. Repetition, order of presentation, and timing of arguments and measures as determinants of opinion change. Journal of Personality and Social Psychology, 1968, 9, 184-188.