MATHEMATICAL MODELS OF COMMUNICATION AND BELIEF CHANGE: PROPORTIONAL CHANGE, ACCUMULATED INFORMATION, AND BELIEF CERTAINTY

> Dissertation for the Degree of Ph. D. MICHIGAN STATE UNIVERSITY JEFFREY E. DANES 1976





This is to certify that the

thesis entitled

MATHEMATICAL MODELS OF COMMUNICATION AND BELIEF CHANGE: PROPORTIONAL CHANGE, ACCUMULATED INFORMATION, AND BELIEF CERTAINTY

presented by

Jeffrey E. Danes

has been accepted towards fulfillment of the requirements for

Major professor

Date July 29, 1976

O-7639

W 031 I 355 ALLA ML- 7678 141 1 196





ABSTRACT

MATHEMATICAL MODELS OF COMMUNICATION AND BELIEF CHANGE: PROPORTIONAL CHANGE, ACCUMULATED INFORMATION, AND BELIEF CERTAINTY

By

Jeffrey E. Danes

Three models of communication and belief change were proposed and tested. The proportional change model stated that receivers change their beliefs in the direction of the message with the resulting belief change being proportional to the amount of change requested. The accumulated information model was based upon the same logic; however, it stated that belief change would be inhibited by the degree to which information has been accumulated into the belief. It was hypothesized that accumulated information and belief certainty would be positively correlated; hence, a belief certainty model was also proposed and tested.

The three models were tested with two sets of data, and the results obtained showed clear support for the accumulated information model. The belief certainty model was the most inferior of the three. Although a positive correlation was found between accumulated information and belief certainty, the "informed neutrals" were almost nonexistent; while "uninformed resolutes" prevailed. Regardless of

Jeffrey E. Danes

initial belief, the "uninformed" were the most affected by the belief-change messages.

MATHEMATICAL MODELS OF COMMUNICATION AND BELIEF CHANGE: PROPORTIONAL CHANGE, ACCUMULATED INFORMATION, AND BELIEF CERTAINTY

By Jeffrey E. Danes

A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Communication

Accepted by the faculty of the Department of Communication, College of Communication Arts, Michigan State University, in partial fulfillment of the requirements for the Doctor of Philosophy degree.

John E. J

Difector of Dissertation

Guidance Committee:

G102 773

Chairman 11 leans H. and i

All of this work and more is dedicated to the three most important people in my life: Katherine, Nathan, and Eric Danes.

ACKNOWLEDGMENTS

I would like to express my thanks and appreciation to the two persons who were most influential during my graduate training in Communication: Dr. Joseph Woelfel and Dr. John Hunter. I thank Dr. Woelfel for the many stimulating conversations and the many hours put into this disser-His help was deeply appreciated. I thank Dr. tation. Hunter, for without his help, this dissertation might never have been completed. His assistance in math modeling and in the analysis of model data was very much appreciated. My appreciation also goes to Drs. Bettinghaus, Atkin, and Ebel. Dr. Bettinghaus provided many useful and perceptive comments on earlier drafts of this dissertation. Both Drs. Atkin and Ebel also did much to bring the dissertation into a clearer focus. Dr. Atkin gets a special word of thanks for allowing me time to write when I was suppose to be in the classroom.

My thanks and gratitude are also given to many of my colleagues and students: I express my thanks to Nick Stoyanoff for the many hours spent listening and criticizing the ideas presented in this dissertation. Nick also deserves thanks for his help during data collection. Patti Kluck and Donna Borris who also helped collect the data are

iii

also thanked for their efforts. Paul Taperek and Helen Short gave continual support and overall encouragement; for this, I express my thanks and appreciation to them.

Lastly and most importantly, I would like to thank my family: Katherine, Nathan, and Eric, for their patience and love while I spent three years working toward the Ph.D. in Communication.

TABLE OF CONTENTS

Chapter				Page							
I	INTRODUCTION	•	•	1							
	Introduction to the Problem .	•	•	3							
	The Proportional Change Model	•	•	4							
	Accumulated Information	•	•	7							
	The Accumulated Informational Mod	el	•	9							
	Belief Certainty	•		12							
	The Belief Certainty Model .	•	•	13							
II	METHOD	•	•	16							
	Pilot Study	•	•	16							
	Accumulated Information . Belief Topic and Message	•	•	16							
	Selection	•	•	17							
	Testing the Models: Main Study	•	•	18							
	Experimental Design	•	•	18							
	Procedures	•	•	19							
	Measurement	•	•	20							
III	PRELIMINARY ANALYSES	•	•	22							
	Scale Construction, Evaluation,										
	and Reliability			22							
	Message Effect Manipulation Check	•	•	24							
	hebbage bileet manipulation check		•	4 7							
IV	RESULTS	•	•	27							
	Testing the Models	•	•	27							
	Belief Certainty	•	•	32							

Chapte	r
--------	---

v	DISC	USSI	ON	•	•	•	•	•	•	•	•	•	36
APPENDI	ES	•	•	•	•	•	•	•	•	•	•	•	40
	Α.	Beli for info stud	ef t the rmat Y	opic beli ion	s an ef c meas •	d st erta sures	anda inty use	rd d and d in	levia lacc the	umul pil	ated ot	•	40
	в.	The peri from the Alar	mili ment an Marc ming	tary . I actu h 8, Sov	r mes be m al n 197 riet	sage nater news 6 is Buil	use ial stor sue dup.	d in was y pr of <u>1</u> "	the adap esen ime:	e ex- oted ited "1	in That	•	43
	с.	The ment an a Marc Stru	nucl . I .ctua h 8, .ggle	ear The m 11 ne 197 2 Ove	mess ater ws s 6 is r Nu	age ial tory sue clea	used was pre of <u>1</u> r Pc	in adap sent ime: wer.	the oted ed i "1	expe from n th The	eri- n Ne	•	47
	D.	The tere	pret d on	est May	ques 13,	tion 197	nair '6	e.	Admi •	.nis- •	•	•	51
	E.	Post May	test 13,	: que 1976	stic •	nnai •	re.	Adn •	ninis •	tere •	ed •	•	60
	F.	Dela 20,	yed 1976	post	test •	. А •	dmin •	iste •	ered •	May •	•	•	68
	G.	Mult anal	iple ysis	e gro s (ke	oups, y to	obl o ind	ique licat	clu cors)	ster •	•	•	•	76
REFERENC	ES	•	•	•	•	•	•	•	•	•	•	•	78

.



LIST OF TABLES

Table		Page
1.	Reliability Estimates for the Pretest Measures of Belief and Accumulated Information	24
2.	Mean Pretest, Posttest, and Change Values and Standard Deviations for the Experimental and Control Situations	24
3.	ANOVA Regression Summary for Effects of Nuclear Message upon Nuclear Belief Change .	25
4.	ANOVA Regression Summary for Effects of Military Message upon Military Belief Change	26
5.	Correlations Between Δb and <u>d</u> for the Nuclear and Military Topics in Both the Experimental and Control Situations	27
6.	Belief Change Means and Sample Size for the Three Levels of Accumulated Information and the Three Levels of Belief for the Nuclear Message	30
7.	Belief Change Means and Sample Size for the Three Levels of Accumulated Information and the Three Levels of Belief for the Military Message	31
8a.	Number of Subjects in Each of the Cells for the Three Levels of Belief and the Three Levels of Accumulated Information for the Nuclear Pretest Group	33
8b.	Number of Subjects in Each of the Cells for the Three Levels of Belief and the Three Levels of Accumulated Information for the Military Pretest Group	34
8c.	Number of Subjects in Each of the Belief- Accumulated Information Cells for Both the Nuclear and Military Topics	34

LIST OF FIGURES

Figure	e	Page
1.	Parametric curves for the proportional change model with α parameterized. The curves graphically represent predicted change as a function of the amount of change requested	5
2.	Parametric curves for the accumulated information model with α held constant at one; and accumulated information (i ₀) controlled. The curves graphically represent predicted change as a function of the amount of change requested, in-hibited by prior information accumulation .	10
3.	Parametric curves for the belief certainty model with α controlled. The curves graphically represent predicted change as a function of the amount of change requested, inhibited by belief certainty.	14
4.	Regression curves of nuclear belief change on initial belief with accumulated information parameterized	30
5.	Regression curves of military belief change on initial belief with accumulated information parameterized	32

CHAPTER I

INTRODUCTION

In much of communication research, a major construct used for the assessment of communication effects is typically "attitude" change. It is recognized by numerous communication scholars, however, that communication affects a multitude of other mental variables. That is, not only are "attitudes" possibly altered by the reception of messages, but "knowledge," "perception," "opinions," "meaning," belief," and a host of other constructs may change during the process of communicating.

A current view adopted by many communication scholars is that communication has its <u>primary</u> effect upon the ways in which the human structures, maps, or organizes the symbolic environment so that it becomes understandable (Roberts, 1971). The structuring and restructuring of one's symbolic environment goes by many different terms; however, the term currently in vogue for much of communication research is Boulding's (1956) construct of the "image."

Boulding (1956) has conceptualized the image to be what one <u>believes to be true</u>--one's subjective knowledge of the various aspects of the physical, social, and symbolic world. By another name, the image construct has also been

referred to as <u>belief;</u> Bem (1970) has offered the following treatment of belief:

If a man perceives some relationship between two things or between something and a characteristic of it, he is said to hold a belief. For example, he might suppose asteroids to be round, the dean of women to be square, God to be dead, men to love freedom, himself to dislike spinach, and Republicans to promote congress. Collectively, a man's beliefs compose his understanding of himself and his environment (pp. 4-5).

The focus of this study is upon the change of beliefs using messages; the belief of concern is what Rokeach (1968) has termed the "authority" belief and Fishbein and Azjen (1975) "informational" beliefs.

> Many of our beliefs are formed neither on the basis of direct experience with the object of belief nor by way of some inference process. Instead, we often accept information about some object provided by an outside source. Such sources include newspapers, books, magazines, radio and television, lectures, friends, relatives, coworkers, etc. Beliefs formed by accepting the information provided by an outside source may be termed <u>informational</u> beliefs (Fishbein & Ajzen, 1975, p. 133).

For the present, belief is conceptualized as the conceived truth value of an assertion or statement. And as such, a belief exists when one thinks "true," "uncertain," or "false" to a given assertion or statement. Gradations of truth value may also be considered; thus, belief is viewed as continuum ranging from "true" to "false."

Introduction to the Problem

Currently there is an increased interest in the modeling of communication effects within the domain of "passive communication." Passive communication as opposed to active communication restricts the domain of inquiry to those situations where a receiver decodes a message sent by a source, and the receiver ". . . is not asked to respond to the message in any active way (argue, give money, risk life, etc.) or openly commit himself to a position that might be contrary to that taken by his peers or reference groups" (Hunter and Cohen, 1972, pp. 4-5). This context for which to study communication effects is desirable in that it does represent many forms of symbol transmission actually applied to practice: many forms of the mass communication of news and many forms of advertising fall within the domain of passive communication.

Within the passive communication context, the simplest possible model for the effects of communication upon belief change is one that predicts changes that are <u>equal</u> to the amount of change advocated. Of the identical genre, a slightly more complex model would predict changes that are proportional to the amount of change advocated. The proportional change model is derived from the equal change model below.

The Proportional Change Model

With the assumption that a message is <u>perfectly</u> effective, a change in belief (Δ b) as a result of receiving a belief-change message would result in maximum change; i.e., <u>all</u> of the change requested would be obtained. The perfect effects model is quantified below (for the purpose of quantification, true will be set to zero and false to 100):

$$\Delta b = -b_0 \qquad (1)$$

where, Δb = the change in the original belief
 b_0 = the original belief
 b_0 = the subjective probability for
truth-value; totally true equals
0 and totally false equals 100.

Consistent with the assumption, this model states that a perfectly effective message would produce a change equal to the negative of the original belief (b_0) ; this would render the next belief (b_1) to be zero (maximum truth):

$$b_1 = b_0 + \Delta b$$
 (2)
 $b_1 = b_0 - b_0$ (3)
 $b_1 = 0$ (4)

This model, however, assumes that the message is perfectly effective; as is well known among communication scholars, the impact of a message typically yields changes that are proportional to those recommended.

The proportional change model was first suggested by French (1956) and has since been elaborated by a variety of authors (Hovland and Pritzker, 1957; Anderson and Hovland,

1957; Anderson, 1959; Anderson, 1965; Hunter and Cohen, 1972; Anderson, 1971; Whittaker, 1967). This model asserts that the change in a belief is proportional to the discrepancy between the belief and the message. If b₀ is the initial belief and the message asserts the truth of the statement, then this model becomes (see Figure 1.):

 $\Delta b = -\alpha b_0 \qquad (5)$ where, $\alpha = a \text{ parameter for measured}$ message effectiveness $\alpha = 0 < \alpha < 1$



Figure 1. Parametric curves for the proportional change model with a parameterized. The curves graphically represent predicted change as a function of the amount of change requested.

If it were absolutely true that the amount of belief change obtained was proportional to the amount of change commanded, then once α was measured, the future states of b_0 (i.e., b_n) could be clearly and unambiguously predicted by the calculation of the prediction equation latent within



this difference model. The change in b_0 (Δb) may also be written as:

$$\Delta b = b_1 - b_0 \qquad (6)$$

where, $b_1 =$ the next belief
 $b_0 =$ the original belief

Adding b_0 to both sides of equation (6) gives:

$$\Delta b + b_0 = b_1 \qquad (7)$$
$$b_1 = b_0 + \Delta b \qquad (8)$$

Equation (5), however, specifies that Δb is equal to $-\alpha b_0$; thus:

$$b_{1} = b_{0} - \alpha b_{0}$$
(9)
$$b_{1} = (1 - \alpha) b_{0}$$
(10)

As such, the model predicts that after one exposure to a belief-change message, the next belief $((b_1)$ will be $(1 - \alpha)$ times the original (last) belief (b_0) . Thus, the general predictive equation for <u>n</u> repeated exposures to a change message becomes:

$$b_n = (1 - \alpha) b_0$$
 (11)

The resulting predictive equation for <u>n</u> message repetitions of one change message results in an exponentially declining sequence, indicating that as <u>n</u> grows large, the acceptance of the truth claim increases; that is as $\underline{n} \neq \infty$, $\underline{b}_n \neq 0$. As such, it is clear that even with relatively minute changes, the accumulative effects of message repetition may be rather dramatic.

There are a number of communication variables that are believed to be related to the accuracy of predicting belief change. Given the initial assumption that belief change will be proportional to the amount of change commanded, increased accuracy of prediction would be enhanced if one incorporated those communication variables that impede, enhance, and interact with the amount of change commanded. That is, if one knew the values for the credibility of source, message sidedness, message distraction, evidence, topic relevance, topic interest, the entertainment value of the message, accumulated information, belief certainty, etc. then one might be in a better position to accurately predict the amount of This dissertation focused upon the followchange expected. ing variables: Accumulated information and belief certainty.

Accumulated Information

For some years we have known that "established" attitudes are more difficult to change than are "de novo" attitudes (Hovland, 1959). Anderson (1959, 1965) and Rosenberg (1968) suggested that this effect could be accounted for within the context of the discrepancy model if the parameter α were to decrease as a function of accumulated information. This model was specialized by Saltiel and Woelfel (1975) who asserted that the parameter α is

$$\alpha_n = \frac{1}{n} \tag{12}$$

where \underline{n} is the number of messages ever received on the topic. If α were to decline in this manner, then the belief after \underline{n} messages would simply be the arithmetic mean of those message values.

Using the average number of times an individual has communicated with his or her significant others about a particular topic (a composite of American values) as a measure of accumulated information, Saltiel and Woelfel (1975) have provided path analytic support for this hypothesized relationship. Saltiel and Woelfel (1975), however, failed to present a conceptual definition for "information" or for "accumulated information"; nonetheless, they do assert that messages carry information and that the reception of messages causes information to internally accumulate within the receiver. On the definition of information for human communication, Lin (1973) has argued that information exists only when a receiver is familiar with the symbols of a message: unfamiliar symbols convey little to no information. Further, Lin (1973) has argued that information may be ". . . defined as a set of symbols which both the source and receiver are familiar" (p. 23). As such, accumulated information may be defined as the mental aggregation (storage) of a set of familiar symbols sent from a source to a receiver. Accumulated information is seen to differ from "knowledge" in that knowledge implies "correctness"; whereas the notion of accumulated information makes no such

implication.

The relationship of accumulated information to belief change messages may be interpreted in the following way: when a receiver decodes a message advocating belief change, the receiver according to the proportional change model, makes a mental comparison between his or her initial belief and the proposed belief, and then yields proportionately. Likewise, other mental comparisons are likely; the accumulated information hypothesis implies that a receiver not only makes belief comparisons but also assesses the degree to which he or she is "informed" about the belief topic. If one is not informed; that is, if one cannot retrieve prior message content (pro or con) then this new information compared to the old (none) takes precedent and consequently alter the initial belief. Further, if one has accumulated much information, then during the comparison process this information might be retrieved and used in defense of the initial belief, resulting in little to no belief change.

A model which incorporates the accumulated information hypothesis into the proportional change model is presented below.

The Accumulated Informational Model

According to the accumulated information hypothesis, the amount of information that one has accumulated into a belief will be inversely related to that belief's susceptibility to change. In the model presented below, the

accumulated information hypothesis is compactly incorporated into the proportional change model (see Figure 2):

$$\Delta \mathbf{b} = -\alpha \left(\frac{1}{\mathbf{i}_0 + 1}\right) \mathbf{b}_0 \qquad (13)$$

$$\Delta b = -\alpha \left(\frac{b_0}{i_0 + 1}\right) \tag{14}$$

where, $i_0 =$ the amount of information that has been accumulated into the original belief (b_0) .



Figure 2. Parametric curves for the accumulated information model with α held constant at one; and accumulated information (i₀) controlled. The curves graphically represent predicted change as a function of the amount of change requested, inhibited by prior information accumulation.

To derive the predictive form of the above change equation, it is first noted that a change in belief may also be written as:

$$\Delta \mathbf{b} = \mathbf{b}_1 - \mathbf{b}_0 \tag{15}$$

Adding b_0 to both sides of the equation gives:

$$bb + b_0 = b_1$$
 (16)

$$b_1 = \Delta b + b_0 \tag{17}$$

$$\mathbf{b}_1 = \mathbf{b}_0 + \Delta \mathbf{b} \tag{18}$$

Substituting the identity given in (13) above yields:

$$b_{1} = b_{0} - \alpha \left(\frac{b_{0}}{i_{0}+1}\right)$$
(19)

Factoring gives:

$$\mathbf{b}_{1} = \begin{bmatrix} 1 & - & (\frac{\alpha}{1+\mathbf{i}_{0}}) \end{bmatrix} \mathbf{b}_{0}$$
 (20)

The value for i₀ after the reception of one belief message may or may not change. If accumulated information does not change, then the model presented below is appropriate for predicting the number of messages necessary to change the belief to a desired value:

$$\mathbf{b}_{n} = \left[1 - \left(\frac{\alpha}{1+i_{0}}\right)\right]^{n} \mathbf{b}_{0}$$
 (21)

If, however, accumulated information does change as a result of message repetition, then the succeeding beliefs may be predicted by the following equations:

$$b_2 = \left[1 - \left(\frac{\alpha}{1+i_1}\right)\right] b_1$$
 (22)

$$\mathbf{b}_{2} = \begin{bmatrix} 1 - \left(\frac{\alpha}{1+i}\right) \end{bmatrix} \begin{bmatrix} 1 - \left(\frac{\alpha}{1+i}\right) \end{bmatrix} \mathbf{b}_{0} \qquad (23)$$

$$b_2 = b_0 \prod_{k=0}^{\Pi} \left[1 - \left(\frac{\alpha}{1+i_k} \right) \right]$$
 (24)

As such, belief after the nth message repetition is:

$$\mathbf{b}_{n} = \mathbf{b}_{0 \ \mathbf{k}=0}^{n-1} \left[1 - \left(\frac{\alpha}{1+\mathbf{i}_{k}} \right) \right]$$
(25)

Belief Certainty

The forthcoming argument makes the following claim: accumulated information and belief certainty are positively correlated. In ordinary English "don't know" and "uncertain" sometimes mean the same thing. If one does not "know" or is not informed about a given belief issue, then it might be presumptious for that person to assume an extreme belief stance. On the other hand, if one does assume an extreme belief stance, then it is likely that one is also informed about the topic of concern, an assumption implied by the work of Patterson and McClue (1976).

However, if the relationship between accumulated information to belief certainty were perfect then there would be no people of the following kind: those who are well informed about a given belief topic but refuse for one reason or another to take an extreme stance (the "informed neutrals"), and those who are not informed but yet adopt an extreme belief stance (the "uniformed resolutes").

For many years investigators have believed that people with extreme beliefs are more resistant to change than those with more neutral beliefs (Brim, 1955). This principle was dubbed the "polarity" principle by Osgood and Tannenbaum (1955) when they incorporated it into their congruity theory. The polarity principle was used in conjunction with discrepancy theory in a version of "information processing" theory by Hunter and Cohen (1972) and the model below is adapted from theirs.

The Belief Certainty Model

Like that of accumulated information, it was hypothesized above that the certainty of a belief should also be inversely related to change; as such, the model for belief certainty is:

$$\Delta b = - \left(\frac{1}{1 + Bc_0}\right) b_0$$
(26)
$$\Delta b = - \left(\frac{b_0}{1 + Bc_0}\right)$$
(27)

Where, c_0 = the certainty to which the belief is held B = a scaling parameter

Belief is operationalized as a response to a subjective probability scale such that 0 represents totally "true" and 100 represents totally "false." The uncertain or uncommitted position is represented by a score of 50. As the belief departs from the uncertain (50) position, then Bc₀ may be defined as:

$$Bc_0 = 2 | b_0 - 50 |$$
 (28)

And, the parametric curves for the belief certainty model are presented in Figure 3.



Figure 3. Parametric curves for the belief certainty model with α controlled. The curves graphically represent predicted change as a function of the amount of change requested, inhibited by belief certainty.

The predictive form of this model is:

$$b_n = b_0 \prod_{k=0}^{n-1} \left[1 - \left(\frac{\alpha}{1+Bc_k} \right) \right]$$
 (29)

The validity of the predictive equations for the proportional change, accumulated information, and the belief certainty models have their foundations upon the validity of the following change equations:

> $\Delta b = -\alpha b_0 \text{ (the proportional change model)}$ $\Delta b = -\alpha \left(\frac{b_0}{1+i_0}\right) \text{ (the accumulated information model)}$ $\Delta b = -\alpha \left(\frac{b_0}{1+Bc_0}\right) \text{ (the belief certainty model)}$

Thus, the change equation forms of these models are tested below.


CHAPTER II

METHOD

This chapter discusses a pilot study that was designed to evaluate two methods of measuring accumulated information and to select the belief topics and messages to be used in the main study. The main study begins with a discussion of the experimental design, and next the experimental procedures are presented. This chapter concludes with a discussion of the measurement instruments used in the main study.

Pilot Study

A questionnaire was administered to 33 introductory Communication students at Michigan State University with the purpose of (a) evaluating two methods for the measurement of accumulated information, and (2) selecting belief topics and messages to be used in the main study. The 18 belief topics used for the pilot study appear in Appendix A.

<u>Accumulated Information</u> - With an example topic, below are the scales used to measure accumulated information in the pilot study:

About the relative strength of the U.S.A. and the U.S.S.R. military forces, HOW MANY TIMES have you received communications on this topic?

 none(0) ______ one(1) ______ two(2) ______ three(3) _____ four(4) ______

 five(5) ______ six(6) ______ seven(7) _____ eight(8) ______ nine(9) ______

 ten(10) ______ 11-25 _____ 26-50 ______ 51-75 ______ 76-100 ______

 more than 100 ______

On this topic, I know

Nothing :___:__:__:__:__:__: A lot

The exposure scale was scored as indicated by the values in parentheses, and 11-25 = 18, 26-50 = 38, 51-75 = 63, 76-100 = 88, and 100+ was assigned 112. The Likerttype informed scales were scored from 0 to 6 with six indicating "A lot."

It was expected that the exposure scales would be highly correlated with the informed scales, but the resulting correlation averaged over the 18 topics equaled only .45. However, when the exposure scales were transformed such that the transformed value = log (x + .5), the correlation averaged over the 18 topic equaled .70. A correlation of sufficient magnitude to justify the use of both scales for the measurement of accumulated information--when the exposure scale is logrithmically transformed.

Belief Topic and Message Selection - Belief was measured using a bipolar scale with "true" set to 0 and "false" to 100; belief scores were obtained by subtracting the reported value from 100 (an example of this scale appears in Appendix D). As noted earlier, a fair test and comparison of the three models of communication and belief change demand that the beliefs used exhibit variance in both belief certainty and in accumulated information. The resulting standard deviations for the 18 beliefs and 36 information measures appear in Appendix A. All showed suitable distributions; thus, two of the more general topics were selected to be used in the main study: (a) The nuclear production of electricity is potentially more dangerous than the conventional methods of producing electricity, and (b) The U.S.S.R. military forces are becoming superior to the military forces of the U.S.A. Hereafter, these two statements will be respectively referred to as the "nuclear" and the "military" beliefs.

Each of the 18 topics that appear in Appendix A also appeared in a variety of current news magazines as news stories. Those stories corresponding to the nuclear and military beliefs were retrieved, modified, and transformed into the experimental messages used in the main study. These messages appear in Appendices B and C, and they will hereafter be called the "nuclear" and the "military" messages.

Testing the Models: Main Study

Experimental Design - The design employed is the Campbell and Stanley (1966) Pretest-Posttest Control Group Design with two modifications: (a) a delayed posttest was given for the purpose of reliability assessment, and (2)

the "experimental" and "control" groups served a double function: that group who read the nuclear message served as the control group for those who read the military message; likewise, that group who read the military message served as the control group for those who read the nuclear message. This design lead to the collection of two data sets to be used for the testing and comparison of the three models of communication and belief change: one for the nuclear message and one for the military message.

<u>Procedures</u> - Subjects were solicited from the Communication Department's Subject Research Pool, and a total of 134 subjects participated. Each subject took the pretest, the posttest, and the delayed posttest.

Upon entrance to the experimental laboratory, the subjects were given the questionnaire that appears in Appendix D. They were asked to quietly read the instructions and to raise their hand if clarification was needed. Upon the completion of this questionnaire, the questionnaire that appears in Appendix E was administered. Nested within the second questionnaire was one of the experimental messages. Each message was randomly attached to the second questionnaire, thus randomization was accomplished. The second questionnaire which contained one of the experimental messages also contained instructions which asked each subject to carefully read the enclosed message (article) and to underline the key points of the article (see Appendix D).

One week later, the subjects returned and took the delayed posttest.

Measurement - Accumulated information scales similar to those used in the pilot study were used in the main study; however, for the purpose of reliability assessment multiple indicators were employed. Four informed scales and four exposure scales were used and they appear in Appendix D. The informed scales were characterized by the following descrip-"know a little-know a lot," "not aware-aware," "not tors: informed-informed," and "not knowledgeable-knowledgeable." And, the exposure scales emphasized message exposures to the following informational sources: television and radio, newspapers and magazines, books, and interpersonal contacts. Score value assignment was identical to that in the pilot study; however, a different log transformation was used: $\ln (x + 1)$; this was done for two reasons: (a) to insure that zero exposure would be scored as zero, and (b) to expand the potential range from 2 to 4.7.

To obtain multiple measures of belief, three descriptors were used in two formats resulting in six belief indicators for each of the two topics. One format was similiar to that used in the pilot study; this consisted of assigning unlikely, improbable, and false = 0 and likely, probable, and true = 100. With this scale, each subject was asked to report his or her belief by choosing the number which best represented his or her belief.

The second scaling format for the measurement of belief used the identical descriptors, but in this case, the subjects were asked to make a forced choice between the two end-points. After their selection, they were then asked to estimate how certain they were by marking a Likert-type scale with the following end points: "just guessing-certain." For those who marked "just guessing" received a score of 50. If they initially choose "true," the score value was assigned in decrements of ten so that "certain" equaled 0. If they initially choose "false," the score was assigned in increments of ten so that "certain" equaled 100. Thus, for the analyses of the belief indicators were scored so that "true" was set to zero and "false" to 100.

CHAPTER III

PRELIMINARY ANALYSES

In this chapter, the results of the scale construction analyses and procedures are presented. The reliability of the resulting scale measures are then reported as internal consistency coefficients and reliability coefficients as derived by an over-time estimation procedure. Lastly, a check on the effectiveness of the message manipulation is reported.

Scale Construction, Evaluation, and Reliability

Since multiple indicators for the belief and accumulated information constructs were used, this permitted each of the indicators to be evaluated in terms of their relation to an underlying "unmeasured" variable. To assess the quality of each of the multiple indicators, an oblique multiple groups cluster analysis was performed on the pretest data (Hunter & Cohen, 1969). All of the indicators reported in Appendix D were cluster analyzed: the six indicators for military (and for nuclear) belief, and the eight indicators for military (and for nuclear) accumulated information. Logrithmic transformations were performed on all of the exposure indicators before the analysis of clusters.



The cluster matrix appears in Appendix G; the results of this analysis indicated that the belief indicators were (1) consistently intercorrelated with themselves, and (2) consistently correlated with indicators outside of the belief cluster. The accumulated information indicators were also consistently intercorrelated; however, they do show deviations in their correlations with outside indicators: the exposure and the informed indicators show slight deviations in outside correlations. This suggested that these two sets of indicators might be better treated as two separate clusters.

To evaluate whether the accumulated information indicators should be treated as two separate clusters, these two sets of indicators were separated and a second cluster analysis was performed. The results of this analysis yielded cluster correlations between the exposure and the informed clusters to be .73 (for the military indicators) and .81 (for the nuclear indicators). As such, an accumulated information measure using both the exposure and the informed indicators of accumulated information was constructed. All of the values for both the belief and the accumulated information measures reported below are based upon scales constructed by the simple average of the indicators.

The reliability of these measures was estimated in two ways: (1) coefficient alphas (internal consistency) coefficients were computed for each of the measures from the



pretest data; (2) an over-time reliability procedure was used using the data collected at the three points in time (Wiley & Wiley, 1970). For this later over time procedure, only the data obtained from the control situations were used. The obtained reliability coefficients appear in Table 1.

Table 1. Reliability Estimates for the Pretest Measures of Belief and Accumulated Information

Measure	Topic	Reliability Estimates
Belief	Nuclear	.97(.90)*
	Military	.96(.93)
Accumulated	Nuclear	.94(.98)
Information	Military	.91(.94)

The first entry is the internal consistency coefficient and the entry in parenthesis is the over-time reliability estimate.

Message Effect Manipulation Check

The means and the standard deviations for the pretest, posttest, and the belief changes are presented in Table 2.

Table 2. Mean Pretest, Posttest, and Change Values and Standard Deviations for the Experimental and Control Situations

Message Treatment	Belief Topic	Pretest	Posttest	Belief Change
Nuclear	Nuclear	33.7(21.7)*	21.1(26.4)	-12.6(18.7)
Control	Nuclear	35.4(27.0)	35.8(26.7)	0.4(15.3)
Military	Military	38.9(26.2)	34.3(26.4)	- 4.6(16.3)
Control	Military	43.6(23.7)	46.0(26.4)	2.4(14.5)
Control	Military	43.6(23.7)	46.0(26.4)	2.4(14.5)

The value in parenthesis is the standard deviation.

For those who read the nuclear message, there was a mean change of -12.6 units; for those who did not read this message, the change on the nuclear belief topic equaled .4 units. For those who read the military message, there was a mean change of -4.6 units; for those who did not read this message, the change on the military belief topic equaled 2.4.

To evaluate whether the experimental messages had the desired impact upon belief change, the messages were dummy coded and used to predict the belief changes as revealed by the pretest and posttest. This was done for both the "nuclear-control" and the "military-control" situations. The resulting regression analysis (summarized in Tables 3 and 4) revealed that the messages did have the effect desired. The correlation between the dummy message variable and belief change for the nuclear message equaled .36 and the correlation between the dummy message variable and belief change for the military message equaled .21.

	Message	upon Nucl	ear Belie	f Chai	nge	
Source	df	SS	MS	r	F	sig.
Nuclear Message	1	5678.85	5678.85	.36	19.62	p <.001
Residual	132	38197.06	289.40			

Table 3. ANOVA Regression Summary for Effects of Nuclear Message upon Nuclear Belief Change



	j	- .			-) -	
Source	df	SS	MS	r	F	sig.
Military Message	1	1542.70	1542.70	.21	6.42	p=.01
Residual	132	31722.70	240.30			

Table 4. ANOVA Regression Summary for Effects of Military Message upon Military Belief Change



CHAPTER IV

RESULTS

Testing the Models

Each of the three models has the form

$$\Delta \mathbf{b} = -\alpha \mathbf{d}$$

where \underline{d} is either the message-belief discrepancy or a modification of that discrepancy. In each case \underline{d} can be calculated from the other variables. Thus, one quick check of the relative power of the three models is to compare the correlation $r_{d\Delta b}$ for each of the three models. These correlations are presented in Table 5.

Table 5. Correlations Between Δb and <u>d</u> for the Nuclear and Military Topics in Both the Experimental and Control Situations

Variable		Nuclear Message	Nuclear Control	Military Message	Military Control
Proportional Change	$d = b_0$	65	30	30	27
Accumulated Information	$d = b_0/i_0$	76	26	38	12
Belief Certainty	$d = b_0 / Bc_0$	16	13	08	.07
Accumulated Information	i ₀	.51	.04	.32	.16
Belief Certainty	BC ₀	. 39	.26	.14	.06

The first column of Table 5 has the correlations for the nuclear message group. The correlation for the proportional change model in which $d = b_0$ is -.65 which is substantial. In part, this is the well known regression artifact, but only in small part. The control group correlation for change on the nuclear belief is found in column two of Table 5 and is only -.30 and that represents the maximum value of this correlation that could be created by a regression artifact. The correlation for the accumulated information model in which $d = (b_0/i_0)$ is -.76 for the nuclear message group which is not only substantial in size, but is larger than the -.65 for the proportional change model. Thus belief change for those whose belief is based upon more accumulated information. The correlation for the belief certainty model in which $d = (Bc_0/b_0)$ is .16 which is negligible in comparison to the fit for the other two models.

The correlations for the military message group are presented in column three of Table 5 and the corresponding control group correlations are found in column four. The correlation for the proportional change model is -.30, the correlation for the accumulated information model is -.38, and the correlation for the belief certainty model is -.08. These correlations are all lower than those obtained for the nuclear message group and reflect a difference in the basic effectiveness of the two messages. However, the comparative size of the correlations is the same: the belief certainty model shows almost no fit at all, while the accumulated information model shows definitely better fit than the proportional change model.

However, there is one question which the correlations in Table 5 cannot answer: Might there be an even better functional form for the accumulated information model that hypothesized before the data was gathered? To answer this question a more general graphic method was used to analyze belief change as a function of initial belief and accumulated information.

For the analyses presented below, initial belief (b_0) was divided into the following three levels: 0-35 = 1, 35.001-65 = 2, and 65.001-100 = 3. And, initial accumulated information was divided into the following three levels: 0-1.75 = 1, 1.75001-3.25 = 2, and those values greater than 3.25001 were scored as 3. For the nuclear message, the belief change means and number of subjects are presented in Table 6.

The repression of belief change (Δb) onto the three levels of initial belief (b_0) and the three levels of initial accumulated information (i_0) produced the following parametric curves for the nuclear message (see Figure 4):

Table 6. Belief Change Means and Sample Size for the Three Levels of Accumulated Information and the Three Levels of Belief for the Nuclear Message

		Accumulat	ed Informat	ion (i ₀)	
		1	2	3	
	3	-53.9(2)*	-26.3(2)	-11.7(1)	-34.4(5)
Belief	2	-27.1(18)	-11.7(5)	- 2.7(1)	-22.9(24)
(b ₀) 1	1	- 7.0(11)	- 1.0(21)	- 2.1(5)	- 2.9(37)
		-21.7(31)	- 4.7(28)	- 3.6(7)	-12.6(66)

* The values in parenthesis refer to cell size, n = 66.





The results of the regression analysis reported in Figure 4 clearly support the accumulated information model. The parametric curves almost exactly reproduce the accumulated information parametric curve reported in Figure 2 in Chapter I.

The same analysis was performed for the military message; the belief change means and number of subjects are presented in Table 7. The resulting regression plot appears in Figure 5.

Table 7. Belief Change Means and Sample Size for the Three Levels of Accumulated Information and the Three Levels of Belief for the Military Message

			Accumula	ted Informat	ion (i ₀)		
			1	2	3		
	3		-25.0(3)	-12.7(4)	0.3(6)	, ,	-8.3(13)
Belief	2	•	-10.8(17)	6.0(5)	(0)		-7.9(22)
(b ₀) 1	- 6.9(6)	0.0(22)	-0.2(5)	•	-1.3(33)		
		· _	-11.5(26)	07(31)	.007(11)	1 1	-4.6(68)

The value in parenthesis refer to cell size, n = 68.

The results of this analysis for the military message supports the accumulated information model; however, the support received is not as clean as that produced by the nuclear message. One reason for the "rougher" looking parametric curves is due to the fact <u>less</u> change occurred with the military message. The belief and accumulated information measures for both the nuclear and military topics were about



Figure 5. Regression curves of military belief change on initial belief with accumulated information parameterized

equal in reliability; thus they shared about equal errors of measurement. These errors tend to become increasingly pronounced when smaller changes occur; with larger changes, they are there, but they are less obvious to the eye.

Accumulated Information and Belief Certainty

The discussion in Chapter I suggested that there would be a correlation between accumulated information and belief certainty. With the pretest data, the correlation equaled .56 for the military topic (.67 if corrected for attenuation); this correlation equaled .62 for the nuclear topic (.70 if corrected for attenuation).



However, this way of viewing the relationship between belief and accumulated information is somewhat misleading since it passes over the basic nonlinear relationship between accumulated information and belief. To draw out this nonlinear relationship, the same intervales for belief and accumulated information were used as were used in the preceding discussion of belief change (refer to discussion preceding Tables 6 and 7). Table 8a presents the number of persons in each of the cells for the three levels of belief and the three levels of accumulated information for the pretested nuclear beliefs and accumulated information. Table 8b presents the same, but for the military topic, and Table 8c presents both topics combined.

Table 8a. Number of Subjects in Each of the Cells for the Three Levels of Belief and the Three Levels of Accumulated Information for the Nuclear Pretest Group

		В	elief(b ₀)			
		1	2	3			
Accumulated	<u>.</u>	1					
Information (i)	3	' 7	1	17	11 11	25	
(10)	2	' 8 '	9	35	11 11	52	
	1	4	24	29	" "	57	
		!= = = =		= = =	="=	= = =	•
		' 19	34	81	11	134	



Table 8b. Number of Subjects in Each of the Cells for the Three Levels of Belief and the Three Levels of Accumulated Information for the Military Pretest Group

				Belief	(b_)		
			1	2	3		
Accumulated		;				"	
Information (i.)	3	;	7	0	8		15
0.	2	;	11	13	37		61
	1	;	8	36	14		58
		!=	= =			="=	= =
		1	26	49	59	"	134

Table 8c. Number of Subjects in Each of the Belief-Accumulated Information Cells for Both the Nuclear and Military Topics

		Belief(b ₀)						
		,	1	2	3			
Accumulated		;						
Information (i ₀)	3	;	14	1	25		40	
	2	;	19	22	72		113	
	1	;	12	50	43		115	
		!=				-"-		-
			45	83	140		268	

Table 8a and 8b shows the pretest relation between accumulated information and belief certainty for the nuclear topic and for the military topic. Since they are similar, the distribution was pooled and presented in Table 8c. The top row of Table 8c shows the distribution of belief among persons who are highly informed. Only 1 out of 40 persons is neutral. Looking at the middle column of Table 8c reveals the same fact viewed from the other perspective: of the 83 persons who were neutral on either the nuclear or military topics, only 1 person regarded him or herself as well informed. The bottom row of Table 8c shows the distribution of belief among those who were poorly informed on one topic of the other. Of these 115 subjects, 60 or 52 per cent were neutral. However, the other 48 per cent held intense beliefs in one direction or the other.

Thus the data revealed only 1 person in 268 who was an "informed neutral," but did find 55 out of 268 who were "un-informed resolutes."

CHAPTER V

DISCUSSION

The prediction of belief change was enhanced with the inclusion of the accumulated information operator, a finding which supports the Saltiel-Woelfel (1975) hypothesis. In this model, the amount of change obtained is inhibited by the amount of information accumulated into the belief. Higher amounts of accumulated information yield lesser changes and lower amounts of accumulated information yield greater changes.

Other literature also supports this finding. Patterson and McClure (1973) in a political mass communication study assessed the impact of paid political message upon belief change. The message and belief evaluated was a "Democrats for Nixon" political message which argued that: (a) Richard Nixon does not favor spending less money on the military, and (b) George McGovern favors spending less money on the military. The results they obtained appear in Table 9.

Exposure	Military Spending (McGovern)	Military Spending (Nixon)
High TV Viewers	29	19
Low TV Viewers	11	10

Table 9.	Mean Belief Changes	as a Function of Prime Time
	Television Exposure	(from Patterson & McClure,
	1973)	

They found that potential exposure to the commercial message (as measured by prime time TV exposure) lead to belief changes in the direction of the message. Also, they found that the commercial message had less of an effect on beliefs about Nixon than on beliefs about McGovern. At the time of the study, Nixon had been president for more than three years, a vice president for four years, and was in the news frequently. McGovern on the other hand was well known only in his home state of South Dakota. Thus, it is very likely that many receivers had already accumulated much information about Nixon's relationship to the military, and very little about McGovern's relationship.

Could these findings be explained by the proportional change model? True, if more persons already believed that "Nixon does not favor spending less money on the military," then there would be less distance to move and hence less possible change. However, the way in which Patterson and McClure (1973) calculated belief change suggests that this

is not so. These researchers obtained belief change values by subtracting the per cent of persons who changed in the direction of the message from the per cent of persons who changed in the direction away from the message. Thus, the amount of change was not considered, but only whether a person changed.

The belief certainty model clearly was the most inferior of the three models. It failed, and its failure indicates that the certainty to which one ascribes to a belief is unrelated to belief change, a finding that was contrary to the expectations of this study. Overall, the results of this study indicate that belief change resistance is best viewed as being linked to an informational base, rather than belief strength.

FOOTNOTE

1. Special care was taken to insure high reliability of measurement. For each variable multiple indicators were used: six for the belief measures and eight for the accumulated information measures. Reliability was also double checked for accuracy; in each case the reliability estimates were in the .90's. Thus, problems related to the use of change scores were minimized and correction procedures such as those suggested by Hunter and Cohen (1974) were not necessary.

APPENDIX A

Belief topics and standard deviations for the belief certainty and accumulated information measures used in the pilot study.


APPENDIX A

Belief topics and standard deviations for the belief certainty and accumulated information measures used in the pilot study.

	Belief Topic	Belief Certainty	In- formed	Expo- sure
1.	The price of gold is well over \$100 per ounce.	49.07	1.85	.55
2.	U.S. citizens are drinking less coffee today than in the 1960's.	36.63	1.58	.62
3.	Two out of three persons who run away (i.e., desert or leave without a divorce or separation) from their hus- bands or wives are women.	31.67	1.83	.67
4.*	The U.S.S.R. military forces are becoming superior to the military forces of the U.S.A.	. 39.60	1.95	.74
5.	Since 1962, the number of persons taking the IRS (In- ternal Revenue Service) to court has almost tripled.	31.80	1.33	.54
6.	Recently, the enrollment in theological seminaries (religion schools) has increased.	34.43	1.78	.66
7.	About 500,000 U.S. citizens make crime and criminal activities their sole source of economic support.	39.76	1.65	.67
8.	Large numbers of Jews are currently fleeing Israel.	35.60	1.58	.69

STANDARD DEVIATIONS FOR BELIEF CERTAINTY AND THE INFORMED AND EXPOSURE INFORMATION MEASURES (N = 33)

^{*} Denotes belief topic selected for the experiment.

APPENDIX A (cont'd.)

	Belief Topic	Belief Certainty	In- formed	Expo- sure
9.	The U.S. is importing more foreign oil now than ever before.	34.31	1.69	.69
10.*	The nuclear production of electricity is potentially more dangerous than the con- ventional methods of pro- ducing electricity.	- 34.99	1.94	.64
11.	More and more U.S. citizens are moving to the south- western states.	34.13	1.45	.61
12.	Women are committing more crimes and are engaged in mo criminal activities than even before.	ore er 38.05	1.87	.67
13.	The economic (trade) alliance between Communist China and the U.S.A. is becoming stronger.	≥ 37.11	1.57	.50
14.	Fidel Castro of Cuba and Prin Minister Pierre Trudeau of Canada are close personal friends.	ne 37.57	0.61	.34
15.	Of all the countries in the world, within the last few years most of the immigrants legally admitted to the U.S. were from Mexico.	s .A. 33.66	1.54	. 59
16.	The U.S. military forces are virtually useless against Cuba.	39.50	1.74	.71
17.	About 40% of Russian diplomat and scientists visiting and working in the United States are actually Russian spies.	25 5 38.70	1.11	.53

* Denotes belief topic selected for the experiment.

APPENDIX A (cont'd.)

	Belief Topic	Belief Certainty	In- formed	Expo- sure
18.	The big cities of the U.S. are currently losing large numbers of people.	37.30	1.99	.61



One of the experimental messages that appears in either Appendix B or in Appendix C was inserted in this section of the posttest.



APPENDIX B

The military message used in the experiment. The material was adapted from an actual news story presented in the March 8, 1976 issue of <u>Time</u>: "That Alarming Soviet Buildup."



APPENDIX B

The military message used in the experiment. The material was adapted from an actual news story presented in the March 8, 1976 issue of Time: "That Alarming Soviet Buildup."

THAT ALARMING SOVIET BUILDUP

(Adapted from Time magazine, March 8, 1976)

Whenever it has come to a choice between swords and plowshares, Moscow has seldom hesitated. Swords it has been. Neither bad harvests, shortages or consumer goods nor the spirit of detente with the West has braked the Soviet Military buildup. In the past decade, Moscow has so expanded its forces that most defense analysts around the world agree that the U.S. is currently losing its military superiority.

On land, the Soviet generals command 2.5 million men, supported by 40,000 tanks, compared with 790,000 men and 10,000 tanks in the U.S. Army.

<u>In the air</u>, the U.S. has 463 heavy bombers (mostly aging B-52s) to only 135 Soviet turbojet Bisions and turboprop Bears. But the Soviet air space is the most intensively defended in the world: 5000 radar stations, 2,600 fighter interceptors, 12,000 highly accurate antiaircraft missiles. By contrast, U.S. air defense has been cut back by Congress. There are only 12 squadrons of F-106 fighters--mostly assigned to Air National Guard--with primary mission of interception Soviet Bombers. With large scale production already underway of

Backfire--a new, supersonic Soviet intercontinental warplane--the U.S.S.R. will narrow the bomber gap. Meanwhile, the U.S. Air Force's supersonic B-1 is still in the development stage and faces stiff opposition in Congress.

<u>At sea</u>, the Soviet admirals deploy the world's largest naval force. The Soviets enjoy clear superiority in attack submarines (253 vs. 73 for the U.S.), cruisers and destroyers armed with ship-to-ship missiles (40 vs. 0 for the U.S.) and supply ships (2,358 vs. 1,009 for the U.S.). The Soviet Navy, however, would have trouble rushing troops and plans to intervene in sudden political or military crises far from the U.S.S.R. The U.S. has more bases abroad and can act quickly because of its 14 attack carriers (the Soviets have none).

In nuclear forces, the Soviets boast 1,603 intercontinental balistic missiles (the U.S. has 1,054) and 54 atomic submarines armed with nuclear warheads (to 41 for the U.S.). Nonetheless, the U.S. has a powerful strategic deterrent. A head start in developing launchers with multiple, independently targetable warheads (MIRVs), combined with the striking power of B-52 bombers, gives the U.S. a 9,000 versus 3,200 advantage in deliverable nuclear bombs and warheads. However, Soviet improvements of nuclear deliver systems could wipe out the American advantage. Reason: the very powerful Soviet rockets, especially the SS-9, SS-18, and SS-19, are capable of launching more individual warheads than can the relatively lightweight U.S. Minuteman III missiles.

The U.S. also has, in certain areas, an advantage created by sophisticated technology. American missiles are more accurate than their Soviet counterparts, American submarines are less noisy (thus more difficult to detect), and the U.S. Air Force F-4s and F-15s are more versatile and powerful than the Russian MIG 21s and MIG 23s.

What worries the analysts is that this superiority may not last, since the Soviets are determined to narrow the quality gap, for the U.S.S.R. is devoting increasing amounts of money to military defense. Pentagon experts estimate that last year's Soviet military budget was \$141 billion; the U.S. spent \$94 billion. In 1964 the U.S. spent \$110.4 billion on defense (in 1976 dollars) while the Soviets spent \$100 billion.

Western experts offer several theories for the massive Soviet build up: (1) to counter potential trouble along the 4,500-mile border with Russia's Marxist archenemy, China: (2) to maintain hegemony over Eastern Europe; (3) to overcome an "inferiority complex" vis-a-vis the U.S. that was aggravated when Moscow had to back down during the 1962 Cuban Missile Crisis; (4) to provide additional arms for its adventurous clients abroad (e.g., Angola).

Most ominous is the possibility that the Soviets, despite detente, have not yet given up their long-term goal of dominating all of Europe, by force if necessary. Indeed, Soviet forces are no longer primarily defensive as they were in the mid-1960's. Much of the modern Russian weaponry--from

missiles to tanks to fighter bombers--is offensive, aimed at a blitzkrieg attack with quick victory as its goal. In Central Europe, the Soviets have concentrated huge numbers of fast tanks and powerful artillery; at sea, the Soviet Fleet's ship-to-ship missiles could deal fatal, surprise blows to Western warships.

Whether the Soviets actually plan to attack the Western world, one thing is clear according to NATO Commander-in-Chief General Alexander Haig, "the massive Soviet build up clearly indicates that the U.S.A. is becoming the weaker of the two military giants."

APPENDIX C

The nuclear message used in the experiment. The material was adapted from an actual news story presented in the March 8, 1976 issue of <u>Time</u>: "The Struggle Over Nuclear Power."



APPENDIX C

The nuclear message used in the experiment. The material was adapted from an actual news story presented in the March 8, 1976 issue of Time: "The Struggle Over Nuclear Power."

THE STRUGGLE OVER NUCLEAR POWER

(Adapted from Time magazine, March 8, 1976)

Around the nation, power company officials at press conferences and on podiums have been presenting figures to show that the nuclear production of electricity is more practical than the conventional means of producing electricity. In private they concede, however, that nuclear power is potentially more dangerous than the conventional sources of power.

In Washington last week, a parade of executives, engineers, and federal officials trooped before a joint congressional committee to rebut the charges that their installations are unsafe and to convince an increasingly anxious American public that nuclear plants are necessary.

The major reason for their concern is due to the increased momentum gathered by the anti-nuclear forces. Last month a trio of middle-level engineers at GE's nuclear energy division in San Jose, California, suddenly resigned their jobs in protest. The trio, Dale Bridenbrauh, 44, Gregory Minor, 38, and Richard Hubbard, 38, announced that they would instead work full time for Project Survival, the organization coordinating an anti-nuclear drive in California. Another nuclear engineer,

Robert Pollard, 36, quit his job with Federal Nuclear Regulatory Commission in protest over conditions at Consolidated Edison's Indian Point nuclear power plants in Buchannan, New York.

All four engineers cited the same basic reasons for their resignations: The nuclear production of electrical power is unsafe and hazardous. The public, said the three engineers from San Jose in a statement to the Congressional Joint Committee on Atomic Energy, "has the right to know that an electrical appliance, such as a toaster or hair dryer, has more stringent safety checks than the electrical instruments that control a nuclear plant."

<u>Threat of Meltdown</u>. What concerns these nuclear engineers --and many of their fellow protesters--is not any possibility that a nuclear plant will blow up in a mushroom cloud and wipe out a city. What is feared, however, is a "meltdown," which can occur if a reactor loses the water used to control the temperature of its uranium core. The four nuclear engineers claim that safety systems designed to prevent accidents have not undergone enough testing. If they failed in a crisis, say the four, the result could be disasterous.

They could indeed. An uncontrolled core would build up heat, melt and drop to the bottom of its container. Its heat would vaporize whatever water remained and the pressure of the resulting steam could burst the containment vessel and rupture the outer reaction container as well. This could

release a radioactive cloud that would drift where ever the wind blew it. Depending upon the location of the plant, such an accident could result in numerous immediate deaths from radiation and even more later, caused by radiationinduced cancers.

The possibility of a "meltdown" occurring is great. Last March, the worlds largest nuclear power plant, located at Brown's Ferry, Alabama, was well into the chain of events that could lead to a meltdown after human error caused failure of several key safety systems. On a lesser level, a Northeast Utilities plant in Waterford, Connecticut spilled radiation outside the plant when a steam condenser ruptured. Other nuclear power plants have had to suspend operations for anywhere from several weeks to several months as a result of equipment failure.

The nuclear production of electrical power also raise other questions and fears. One is that the expansion of the nuclear power industry would make it easy for terrorists to steal fissionable materials for homemade bombs. Another concern is nuclear wastes, one of which, plutonium, has a halflife of over 24,000 years. Safeguarding wastes alone says Biologist Barry Commoner, would require the creation of a kind of permanent "nuclear priesthood," to watch over the radioactive legacy each generation of Americans handed down to its successors.

To those in the anti-nuclear camp, the danger is obvious the conclusion is clear, "The nuclear production of electrical power poses a severe threat to the lives and health of millions of Americans," says nuclear engineer Richard Hubbard.



APPENDIX D

The pretest questionnaire. Administered on May 13, 1976.



APPENDIX D

The pretest questionnaire. Administered on May 13, 1976.

DEPARTMENT OF COMMUNICATION Participation Credit Record

Students: Please complete information below to insure you receive credit for participating in this study.

Name_____

Student Number_____

Class to which credit is to be applied_____

Section number_____

Instructor_____

Researcher: Please supply below information identifying study and amount of participation to be credited to the student. Return completed forms to Bruce Schreiman.



MICHIGAN STATE	UNIVERSITY	East	Lansing,	Michigan	48824

College of Communication Arts Cable: Commdept Department of Communication

The Department of Communication is currently interested in your <u>beliefs</u>, your <u>communication experiences</u>, and your <u>knowledge</u> that you may or may not have about a variety of issues and topics.

We appreciate the fact that you are responding to this study; <u>all that we ask is that you answer the questions as honestly</u> <u>as you can.</u> There are no right or wrong answers to these questions. Your responses will in no way adversely affect your standing in your Communication course. Further, all of your responses are strictly confidential.

While answering the questions that follow, PLEASE DO NOT TALK WITH YOUR NEIGHBOR. ANSWER THE QUESTIONS INDEPENDENTLY, AND ANSWER THEM AS HONESTLY AS YOU CAN.

If you have any questions about the scales, questions or topics, please raise your hand.

The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

- (1) On the scale below, what number best represents your belief? Totally Unlikely Uncertain Totally Likely 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish_____
- (2) If you had to choose, would you guess the above statement to be: LIKELY or UNLIKELY (please circle one)
- (3) How confident do you feel about that choice? Just Guessing: ___:__:__:__:Certain

The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

- (4) On the scale below, what number best represents your belief?
 Totally improbable Uncertain Totally probable 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish
- (5) If you had to choose, would you guess the above statement to be: PROBABLE or IMPROBABLE (please circle one)
- (6) How confident do you feel about that choice?
 Just Guessing:___:__:__:__:__:Certain



The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

- (7) On the scale below, what number best represents your belief?
 Totally False Uncertain Totally True 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish
- (8) If you had to choose, would you guess the above statement to be:TRUE or FALSE (please circle one)

(9) How confident do you feel about that choice?
Just Guessing: :__:_:_:_:_:Certain

On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

- (10) I know a: __:__:__:__:__:__:I know a lot little
- (11) I am not very: ___: __: __: __: I am very aware aware of the _____: ___: __: __: f the issue issue
- (13) I am not very: : :: :: : : : : : : I am very knowlknowledgeable edgeable

On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

(14) How MANY TIMES have you HEARD about this topic on <u>TELEVISION</u> or <u>RADIO</u>?

 none(0) ______ one(1) _____ two(2) _____ three(3) _____ four(4) _____

 five(5) ______ six(6) _____ seven(7) _____ eight(8) ______ nine(9) _____

 ten(10) ______ 11-25 _____ 26-50 _____ 51-75 _____ 76-100 _____

 more than 100 _____

(15) How MANY ARTICLES have you READ about this topic in NEWSPAPERS or MAGAZINES?

none(0)	one (1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	00			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than l	00			

(17) How MANY TIMES have you HEARD about this topic from INTERPERSONAL SOURCES?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 10	00			

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(1) On the scale below, what number best represents your belief?

 Totally Unlikely
 Uncertain
 Totally Likely

 0...10...20...30...40...50...60...70...80...90...100

 From 0-100, write any number you wish

(2) If you had to choose, would you guess the above statement to be:

LIKELY or UNLIKELY (please circle one)

(3) How confident do you feel about that choice?

Just Guessing: ___: __: __: Certain

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

- (4) On the scale below, what number best represents your belief?
 Totally improbable Uncertain Totally probable 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish
- (5) If you had to choose, would you guess the above statement to be:

PROBABLE or IMPROBABLE (please circle one)

(6) How confident do you feel about that choice?

Just Guessing: ___: __: __: Certain

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(7) On the scale below, what number best represents your belief? Totally False Uncertain Totally True

0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish_____

(8) If you had to choose, would you guess the above statement to be:

TRUE or FALSE (please circle one)

On the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of producing ELECTRICITY

- (10) I know a: ___: __: __: __: __: I know a lot little
- (11) I am not very: ___: __: __: __: I am very aware aware of the issue
- (12) I am not very: ___: __: __: __: I am very ininformed formed about about the the issue issue
- (13) I am not very: ___: __: __: __: I am very knowlknowledgeable edgeable

On the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of producing ELECTRICITY

(14) How MANY TIMES have you HEARD about this topic on TELEVISION or RADIO?

 none(0) ______one(1) _____two(2) _____three(3) _____four(4) _____

 five(5) ______six(6) _____seven(7) _____eight(8) _____nine(9) _____

 ten(10) _____11-25 _____26-50 _____51-75 _____76-100 _____

 more than 100 _____

(15) How MANY ARTICLES have you READ about this topic in <u>NEWSPAPERS</u> or <u>MAGAZINES</u>?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 10	00			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	00			

(17) How MANY TIMES have you HEARD about this topic from INTERPERSONAL SOURCES?

none(0)	one (1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	00			
(47) What is your sex? FEMALE or MALE (please circle one)

(48) What is your class standing? (please check one)

Freshman

Sophomore

Junior_____

Senior_____

Graduate

(49) What is your grade point average (GPA)? _____GPA

(50) How old are you? _____years old



APPENDIX E

Posttest questionnaire. Administered May 13, 1976.



APPENDIX E

Posttest questionnaire. Administered May 13, 1976.

DEPARTMENT OF COMMUNCIATION Participation Credit Record

Students: Please complete information below to insure you receive credit for participating in this study.

Name_____

Student	Number	•

Class to which credit is to be applied

Section number_____

Instructor

Researcher: Please supply below information identifying study and amount of participation to be credited to the student. Return completed forms to Bruce Schreiman.



INSTRUCTIONS

This booklet contains an article condensed from Time magazine. Please read the article carefully and underline (with your pencil or pen) the main points of the article.

After you have <u>read</u> and <u>underlined</u> the <u>main points</u> of the article, please <u>fill</u> <u>out</u> the attached <u>questionnaire</u> and be sure to <u>answer</u> <u>all</u> of the <u>questions</u> contained in that questionnaire.

Take as much time as you need; be sure to answer the questions as honestly as you can. After you are finished you may leave.

REMEMBER, WE MEET AGAIN NEXT THURSDAY--SAME TIME, SAME PLACE.

and the second se

The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

(1) On the scale below, what number best represents your belief?

 Totally Unlikely
 Uncertain
 Totally Likely

 0...10...20...30...40...50...60...70...80...90...100

 From 0-100, write any number you wish

(2) If you had to choose, would you guess the above statement to be:

LIKELY or UNLIKELY (please circle one)

The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

- (4) On the scale below, what number best represents your belief?
 Totally improbable Uncertain Totally probable
 0...10...20...30...40...50...60...70...80...90...100
 From 0-100, write any number you wish
- (5) If you had to choose, would you guess the above statement to be: PROBABLE or IMPROBABLE (please circle one)
- (6) How confident do you feel about that choice? Just Guessing: ___: __: __: __: Certain



The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

- (10) I know a: __:__:__:__:__:__: I know a lot little
- (11) I am not very:___:__:__:__:__:I am very aware aware of the issue
- (12) I am not very:___:__:__:__:__:__:I am very ininformed formed about about the the issue issue
- (13) I am not very: __: _: _: _: _: _: I am very knowlknowledgeable edgeable





On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

(14) How MANY TIMES have you HEARD about this topic on TELEVISION or RADIO?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	00			

(15) How MANY ARTICLES have you READ about this topic in NEWSPAPERS or MAGAZINES?

none(0)	one (1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 10	000			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 10	00			

(17) How MANY TIMES have you HEARD about this topic from INTERPERSONAL SOURCES? none(0) ____ one(1) ____ two(2) ____ three(3) ____ four(4) ____ five(5) ____ six(6) ____ seven(7) ____ eight(8) ____ nine(9) ____

ten(10) 11-25 26-50 51-75 76-100 more than 100



The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(1) On the scale below, what number best represents your belief?

 Totally Unlikely
 Uncertain
 Totally Likely

 0...10...20...30...40...50...60...70...80...90...100

 From 0-100, write any number you wish

(2) If you had to choose, would you guess the above statement to be:

LIKELY or UNLIKELY (please circle one)

(3) How confident do you feel about that choice?

Just Guessing: ___: __:__: Certain

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

- (4) On the scale below, what number best represents your belief?
 Totally improbable Uncertain Totally probable
 0...10...20...30...40...50...60...70...80...90...100
 From 0-100, write any number you wish
- (5) If you had to choose, would you guess the above statement to be:
 PROBABLE or IMPROBABLE (please circle one)
 (6) How confident do you feel about that choice?
- Just Guessing:___:__:__:__:__:__:Certain



The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(7) On the scale below, what number best represents your belief?

 Totally False
 Uncertain
 Totally True

 0...10...20...30...40...50...60...70...80...90...100
 From 0-100, write any number you wish

(8) If you had to choose, would you guess the above statement to be:

TRUE or FALSE (please circle one)

(9) How confident do you feel about that choice?

Just Guessing: ___:__:__:__:Certain

On the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of producing ELECTRICITY

- (10) I know a: __:__:__:__:__:__: I know a lot little
- (11) I am not very: ___: __: __: __: I am very aware aware of the ____: ___: __: __: I am very aware of the issue
- (12) I am not very: :__:_:_:_:_:_:_:I am very ininformed formed about about the the issue issue
- (13) I am not very: __:_: _: _: _: I am very knowlknowledgeable edgeable

and and a second s

On the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of producing ELECTRICITY

(14) How MANY TIMES have you HEARD about this topic on TELEVISION or RADIO?

 none(0) ______ one(1) ______ two(2) ______ three(3) ______ four(4) ______

 five(5) _______ six(6) ______ seven(7) _____ eight(8) ______ nine(9) ______

 ten(10) _______ 11-25 ______ 26-50 ______ 51-75 ______ 76-100 ______

 more than 100 ______

(15) How MANY ARTICLES have you READ about this topic in NEWSPAPERS or MAGAZINES?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than l	00			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 10	00			

(17) How MANY TIMES have you HEARD about this topic from INTERPERSONAL SOURCES? none(0)_____ one(1)____ two(2)____ three(3)____ four(4)____ five(5)_____ six(6)____ seven(7)__ eight(8)____ nine(9)____ ten(10)____ 11-25____ 26-50___ 51-75____ 76-100____ more than 100____ The second second

APPENDIX F

Delayed posttest. Administered May 20, 1976.



APPENDIX F

Delayed posttest. Administered May 20, 1976.

DEPARTMENT OF COMMUNICATION Participation Credit Record

Students: Please complete information below to insure you receive credit for participating in this study.

Name_____

Student Number_____

Class to which credit is to be applied

Section number_____

Instructor_____

Researcher: Please supply below information identifying study and amount of participation to be credited to the student. Return completed forms to Bruce Schreiman.



	MICHIGAN	STATE	UNIVERSITY	East	Lansing,	Michigan	48824
--	----------	-------	------------	------	----------	----------	-------

College of Communication Arts Cable: Commdept Department of Communication

The Department of Communication is currently interested in your <u>beliefs</u>, your <u>communication experiences</u>, and your <u>knowledge</u> that you may or may not have about a variety of issues and topics.

We appreciate the fact that you are responding to this study: <u>all that we ask is that you answer the questions as honestly</u> <u>as you can</u>. There are no right or wrong answers to these questions. Your responses will in no way adversely affect your standing in your Communication course. Further, all of your responses are strictly confidential.

While answering the questions that follow, PLEASE DO NOT TALK WITH YOUR NEIGHBOR. ANSWER THE QUESTIONS INDEPENDENTLY, AND ANSWER THEM AS HONESTLY AS YOU CAN.

If you have any questions about the scales, questions or topics, please raise your hand.



	The U.S. S. T
	to the MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.
(1)) On the scale below, what number best represents your belief?
	Totally Unlikely Uncertain Totally Likely 0102030405060708090100 From 0-100, write any number you wish
(2)	If you had to choose, would you guess the above state- ment to be:
	LIKELY or UNLIKELY (please circle one)
(3)	How confident do you feel about that choice? Just Guessing::::::Certain
-	The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.
(4)	On the scale below, what number best represents your belief?
3	Fotally improbable Uncertain Totally probable 0102030405060708090100 From 0-100, write any number you wish
(5) I me	f you had to choose, would you guess the above state-
PI	ROBABLE or IMPROBABLE (please circle one)
(6) Ho Ju	w confident do you feel about that choice? st Guessing::::::Certain



The U.S.S.R. MILITARY FORCES are becoming SUPERIOR to the MILITARY FORCES of the U.S.A.

- (7) On the scale below, what number best represents your belief? Totally False Uncertain Totally True 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish_____
- (8) If you had to choose, would you guess the above statement to be:TRUE or FALSE (please circle one)

On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

- (10) I know a: ___: __: __: __: I know a lot little
- (11) I am not very:___:__:__:__:__:I am very aware aware of the issue
- (12) I am not very: ___: __: __: __: __: I am very ininformed formed about about the the issue issue
- (13) I am not very: ___: __: __: __: I am very knowlknowledgeable edgeable

On the topic of:

The SUPERIORITY or INFERIORITY of the U.S.S.R. MILITARY FORCES relative to the MILITARY FORCES of the U.S.A.

(14) How MANY TIMES have you HEARD about this topic on TELEVISION or RADIO?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than l	.00			

(15) How MANY ARTICLES have you READ about this topic in NEWSPAPERS or MAGAZINES?

none(0)	one (1)	two(2)	three(3)	four(4)
five(5)	six(6)	<pre>seven(7)_</pre>	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	L00			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one (1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than l	.00			

(17) How MANY TIMES have you HEARD about this topic from INTERPERSONAL SOURCES?

 none(0)______one(1)_____two(2)_____three(3)_____four(4)_____

 five(5)______six(6)_____seven(7)____eight(8)_____nine(9)_____

 ten(10)_____11-25_____26-50____51-75_____76-100_____

 more than 100_____



The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(1) On the scale below, what number best represents your belief? Totally Unlikely Uncertain Totally Likely 0...10...20...30...40...50...60...70...80...90...100

From 0-100, write any number you wish

(2) If you had to choose, would you guess the above statement to be:

LIKELY or UNLIKELY (please circle one)

(3) How confident do you feel about that choice?

Just Guessing: ___: __: __: Certain

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

- (4) On the scale below, what number best represents your belief? Totally improbable Uncertain Totally probable 0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish_____
- (5) If you had to choose, would you guess the above statement to be: PROBABLE or IMPROBABLE (please circle one)

The NUCLEAR production of ELECTRICITY is potentially more DANGEROUS than the CONVENTIONAL methods of producing ELECTRICITY

(7) On the scale below, what number best represents your belief?Totally False Uncertain Totally True

0...10...20...30...40...50...60...70...80...90...100 From 0-100, write any number you wish

(8) If you had to choose, would you guess the above statement to be:TRUE or FALSE (please circle one)

(9) How confident do you feel about that choice?

Just Guessing: ___: __:__: Certain

One the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of produicing ELEC'HRICITY

- (10) I know a: __:__:__:__:__:_I know a lot little
- (11) I am not very: ___: __: __: __: I am very aware aware of the _____ of the issue issue

(12) I am not very: :__:_:_:_:_:_:_:I am very ininformed formed about about the the issue issue

(13) I am not very: : : : : : : : : : : I am very knowlknowledgeable edgeable On the topic of:

The SAFETY or DANGER of the NUCLEAR production of ELECTRICITY relative to the CONVENTIONAL methods of producing ELECTRICITY

(14) How MANY TIMES have you HEARD about this topic on <u>TELEVISION</u> or <u>RADIO</u>? none(0) ____ one(1) ____ two(2) ____ three(3) ____ four(4) ____ five(5) ____ six(6) ____ seven(7) ____ eight(8) ____ nine(9) ____

ten(10) 11-25 26-50 51-75 76-100 more than 100

(15) How MANY ARTICLES have you READ about this topic in NEWSPAPERS or MAGAZINES?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than 1	00			

(16) How MANY BOOKS have you READ on this topic?

none(0)	one(1)	two(2)	three(3)	four(4)
five(5)	six(6)	seven(7)_	eight(8)	nine(9)
ten(10)	11-25	26-50	51-75	76-100
more than i	100			

(17) How MANY TIMES have you HEARD about this topic from <u>INTERPERSONAL</u> <u>SOURCES</u>?

 none(0) ______one(1) _____two(2) _____three(3) _____four(4) _____

 five(5) ______six(6) _____seven(7) ____eight(8) _____nine(9) _____

 ten(10) _____11-25 _____26-50 _____51-75 _____76-100 _____

 more than 100 _____

.

APPENDIX G

Multiple groups, oblique cluster analysis (key to indicators)


APPENDIX G

Multiple Groups, Oblique Cluster Analysis

(Key to Indicators)

Belief (Military)

- 1. Unlikely-Likely (0-100)
- 2. Unlikely-Likely (Forced Choice-Interval)
- 3. Improbable-Probable (0-100)
- 4. Improbable-Probable (Forced Choice-Interval)
- 5. False-True (0-100)
- 6. False-True (Forced Choice-Interval)

Belief (Nuclear)

- 7. Unlikely-Likely (0-100)
- 8. Unlikely-Likely (Forced Choice-Interval)
- 9. Improbable-Probable (0-100)
- 10. Improbable-Probable (Forced Choice-Interval)
- 11. False-True (0-100)
- 12. False-True (Forced Choice-Interval)

Accumulated Information (Military)

- 13. Know a little-Know a lot
- 14. Not aware-Aware
- 15. Not Informed-Informed
- 16. Not Knowledgeable-Knowledgeable
- 17. Exposure to Television/Radio
- 18. Exposure to Newspapers/Magazines
- 19. Exposure to Books
- 20. Exposure to Interpersonal Sources

Accumulated Information (Nuclear)

- 21. Know a little-Know a lot
- 22. Not Aware-Aware
- 23. Not Informed-Informed
- 24. Not Knowledgeable-Knowledgeable
- 25. Exposure to Television/Radio
- 26. Exposure to Newspapers/Magazines
- 27. Exposure to Books
- 28. Exposure to Interpersonal Sources

1		· · ·						
	5 U 4			U 10 01 0 4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4	1 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	!	
	503	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	す いばい こういう Pyl k ~10 1 1 1 1 1	5 4 7 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	ፈህ – 1 – 1 – 1 – 1 – 1 – 1 – 1 – 1 – 1 –	N 65	1	
	505		HO 00 0 0 0					
	501	800 800 800 800 800 800 800 800 800 800	NW 40 0 0 0		8 40 74 4 60	0 4 N 1	I	
	58		121410 1014 1014 1014 1014 1014 1014 101	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 4 70 9 0 9 V	2 4 12 O		
	27	N-80 0 -1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	44 N N 4 3 43	0 ~ 4 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		•	
	24	4 60 1 01		AT IN N MA TH	のちょうじ 7 60 クアの思い 4 6 4	- 15 N K		
	.25	र पन नाइ नानना नाह		44 (N - 4 4 44 48 8 C 0 4 W+	0 0 4 VB 0 32 W V R V N R 40	4144		
	2 †	* ? ~ ~ ? .		40 01 M 10 01 M	φφφων τι του σειτι +Γ ε ος	2000	1	
	23			-00 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 10 (144 % 44 C 15 K 10 10 10 10 10 10 10 10 10 10 10 10 10	0 4 a m		
	23		त्र संस चर्नाल्ड ल्ड् संस स्वर्गल्ड ल्ड्	**************************************				
	21	и. сил тус та п та п		00. 2 M M M M M M	87 4 00 0 00 8 7 6 6 7 6 6 0 8 7 6 6 7 6 7 6 6	a her		
	20	2222		40 4 4 & N ON	45 44 M 34 0 C 0 K - F 0 F 0 F	N 10 M		
	19	200200		47 4 4 9 8 89 7 7 7 4 4 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	4 4 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	5. 9. 6		
	1,8	200 200 200 200		47 5 5 6 5 40 8 5 8 6 8 5 40	1 10 10 17 17 19 19 19 19 19 19 19 19 19 19 19 19 19	2 E E E E		
	17	242 43		474 4 V V 03 7 0 1 2 0 1 1 2 0 1 1 2 0 1 1 1 1	8 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	9 C C 4		
	16	100 40		VC N 4 N 00 44	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	× 40 5 1		
	15		· · · · · · · · · · · · · · · · · · ·	10 C M 0 E 14	5 ~ ~ ~ 5 ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		I 1	
	1	5 5 5	im nero ma	0 4 6 L 1 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 00 0 4 4 4 0 0 0 0 0 0 0 0 0 0 0	5 7 8 0	i	
	13	स्वर • • न न •		40 M V 44 44	0 4 1 44 4 44 (E V X 4 (())	1 10 N		
	12	404 44 40	2 2 2 2 2 F			COM C Not I		
	11	~~~~~~~				0 41% 0		
	13	502 54	 	10 2 C + C 	ଜ୍ଲ କରୁ କରୁ କରୁ କରୁ ଜ୍ଲାନ କରୁ	10- 20- 10-		*
	c	0 re	1 9 8 9 4 4 1 9 8 9 4 4		ମାନ୍ତର ୧୦୦୦ ମୁକ୍ତର ୧୦୦୦ ୧୮୮	014		1-6)- -12)- 110- THDEX(11798) 01- LNDEX(21-2)- 01- LNDEX(21-2)- 01- LNDEX(21-2)-
	æ	4 - 0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	HT T T T T T		451.4		
	٢			mer car			MAH	
	٩	*01 884					3754	
	ß	82 82 80 80 80 80 80 80 80 80 80 80 80 80 80			0 = 1. = 1 1 1. 0 = 1. = 1 1 1 1 1 1 1.	0 44 0 44 0 44 0 4 0 4 0 4 0 4 0 4 0 4 0	s	
	4	2 8 9 7 7 8 9 2 6 9 7 7 4 9 7 4 9 4				Car C L ette	+ 07 1	
	-	5 7 7 8 8 P	-		, т. т. М.К М С	6 1 1 1 1 1 1 1 1 1 1	V . 16	144 1447 1447 1900 1900 1900 1900 1900 1900 1900 190
	R.	5 C			् स्टिल्ल्स् १८७२ स्टिल्ल्स् १९७२	0 mm	101	
		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		11 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	P P 1 P 1 P 2 P		025	505 2005 2005 2005 2005 2005 2005 2005
1	l		-	• • • • •	•••		- 	
ANUM A				きまち ちょう ちう うつ	200 20 20 2 20 2 20 2 2 2 2 2 2 2 2 2 2		:	
110.3					1		• .	
			. I			1		

FAGTOR INTERJORGELATIONS AND LOADING MARKIX

77

REFERENCES

A state of the second sec

REFERENCES

- Anderson, N. Linear models for response measured on a continuous scale. Journal of Mathematical Psychology, 1964, 1, 121-142.
- Anderson, N. Primacy effects in personality impression formation. Journal of Personality and Social Psychology, 1965, 2, 1-9.
- Anderson, N. Information integration and attitude change. Psychological Review, 1971, 78, 171-206.
- Anderson, N., and Hovland, C. The representation of order effects in communication research. In C. Hovland (ed.), <u>The Order of Presentation in Persuasion</u>. New Haven: Yale University Press, 1957.
- Bem, D. <u>Beliefs, attitudes, and human affairs</u>. Belmont: Cole Publishing Co., 1970.
- Boulding, K. The image: Knowledge in life and society. Ann Arbor: University of Michigan Press, 1956.
- Brim, O. Attitude content-intensity. <u>American Sociological</u> Review, 1955, 20, 68-76.
- Campbell, D., and Stanley, J. Experimental and quasiexperimental designs for research. Chicago: Rand McNally, 1966.
- Cronbach, L. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.
- Fishbein, M., and Ajzen, I. Belief, attitude, intention, and behavior. Reading, Mass.: Addison-Wesley, 1975.
- French, J. A formal theory of social power. <u>Psychological</u> <u>Review</u>, 1956, <u>63</u>, 181-194.
- Hunter, J., and Cohen, S. <u>Mathematical models of attitude</u> <u>change in the passive communication context</u>. Unpublished book, Michigan State University, 1972.

- Hunter, J., and Cohen, S. Correcting for unreliability in nonlinear models of attitude change. <u>Psychometrika</u>, 1974, 39, 445-468.
- Hunter, J., and Cohen, S. PACKAGE: A system of computer routines for the analysis of correlational data. Educational and Psychological Measurement, 1969, 29, 697-700.
- Hovland, C. I. Reconciling conflicting results derived from experimental and survey studies of attitude change. American Psychologist, 1959, 14, 8-17.
- Lin, N. The study of human communication. Indianapolis: Bobbs-Merrill, Co., 1973.
- Osgood, C., and Tannenbaum, P. The principle of congruity in the prediction of attitude change. <u>Psychological</u> Review, 1955, 62, 42-55.
- Patterson, T., and McClure, R. Political advertising: Voter reaction to televised political commercials. <u>Citizens' Research Foundation</u>, 245 Nassau Street, Princeton, N.J., 1973.
- Patterson, T., and McClure, R. Political campaigns: TV power is a myth. Psychology Today, 1976, 10, 61.
- Roberts, D. Nature of communication effects. In W. Schramm and D. Roberts (eds.), <u>The Process and Effects of Mass</u> <u>Communication</u>: Urbana University of Illinois Press, <u>1971.</u>
- Rokeach, M. Beliefs, attitudes, and values. San Francisco: Jossey-Bass, Inc., 1969.
- Saltiel, J., and Woelfel, J. Inertia in cognitive processes: The role of accumulated information in attitude change. <u>Human Communication Research</u>, 1975, 1, 333-344.
- Wiley, D., and Wiley, J. The estimation of measurement error in panel data. <u>American Sociological Review</u>, 1970, <u>35</u>, 112-117.









