The Effects of Time and Initial Belief Level on the Restorability of Beliefs

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THE EFFECTS OF TIME AND INITIAL BELIEF LEVEL ON THE RESTORABILITY OF BELIEFS

BY

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THESIS

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TO MOM AND DAD
Acknowledgments

The successful completion of this work could not have taken place without the efforts and contributions of a number of individuals. First, I wish to express my sincere appreciation to the members of the committee, Dr. Albert Pryor, Dr. Raymond Buchanan, and Mr. Jeff Butler. All gave freely of their valuable time and provided timely suggestions. As committee chairman, Dr. Pryor has been a source of continual guidance and support.

Scheduling subjects is one of the more difficult tasks when conducting an experiment. Thanks to the cooperation of Mr. William Snider of Valencia Community College, problems associated with this task were held to a minimum. My appreciation is also extended to the basic speech instructors at this same institution who made their classes available for participation in the experiment.

For patiently enduring nights and weekends alone while this study was being researched, conducted, and written, I would like to thank my wife, Pat.

Finally, I would like to extend my gratitude to all of my instructors in the graduate program. All of these individuals provided support and inspiration throughout my entire course of study.
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Introduction and Rationale

It is virtually impossible to get through a day without some of our beliefs being attacked. Merchants urge us to change to their brand, politicians seek our votes, health officials promote changes in our thinking about harmful health practices, public relation professionals often seek a belief change about their organization, and lawyers urge jurors to render guilty or not guilty verdicts. In some cases these appeals are successful and our beliefs and behaviors change. In still other cases our belief and behaviors are not significantly modified.

The factors which determine the success or failure of a given persuasion attempt have been the focus of over half a century of social science research. Researchers have attempted to define attitudes and beliefs, describe conditions in which beliefs are most susceptible to change, and have even sought to predict the requirements necessary for producing resistance to change. The purpose of this study is to expand what we know about this last area of interest.

Background Research

The major thrust of persuasion research has no doubt been in the field of attempting to "persuade" an individual to change his
attitude towards something; that is, an individual holds a given belief and an attempt is made to change the valence and/or direction of that belief. When researchers refer to inducing resistance to persuasion, they mean that an attempt is made to hold that belief or attitude relatively constant even though it (the belief) may come under subsequent attack.

The only systematically developed theory of resistance to persuasion is McGuire's "inoculation theory" (McGuire & Papageorgis, 1961). Simply stated, this theory posits that a belief can be inoculated against attack in much the same way that a physician inoculates a patient against a disease. In McGuire's theory, the inoculation takes the form of exposing subjects to weakened forms of attacks on their beliefs. The weak forms of attack serve as belief-defenses.

The types of defenses used in the McGuire studies are labeled supportive, refutational-same, and refutational-different (McGuire & Papageorgis, 1961). In the supportive treatment, the defense simply adds additional support to the existing belief. This is akin to supportive therapy in the medical analogy. The refutational-same treatment includes mention and refutation of weak forms of the same arguments that are used in a subsequent attacking session. The refutational-different condition is distinguished from refutational-same in that the weakened forms of attack arguments are different from those used in the attack. In general, McGuire has shown that both the refutational-same and
different conditions confer resistance under specific circumstances. The supportive defense, on the other hand, has not been shown to be an effective immunizer (McGuire & Papageorgis, 1962, McGuire, 1962, 1964).

One of the conditions necessary for inoculation to occur is that the belief being attacked must live in a state which is roughly analogous to an organism which thrives in a germ-free environment. In this state, the organism (belief) is healthy, but lacks a defense mechanism to protect itself. As a result, McGuire used "cultural truisms" as issues in his experiment. For example, one of McGuire's cultural truisms is "we should brush our teeth after every meal if at all possible." This belief, according to McGuire, exists in a relatively "germ-free" environment in that people are seldom confronted with attacks on the desirability of tooth brushing.

McGuire feels that one of the primary reasons for the success of his refutational type defenses is the motivation it confers. Since people have little reason to suspect an attack on a truism, they are not motivated to rehearse reasons for holding these beliefs. When a possible threat is introduced in one of the refutational defenses, the subject is then motivated into rehearsing defenses for the threatened belief. Thus, in McGuire's opinion, one reason either type of refutational defense confers resistance is because they both contain the element of threat. On the other hand, the ineffective supportive defense belabors
the obvious and does not contain anything which would lead the receiver to believe his belief is attackable.

Since many of the studies on resistance to persuasion are partial replications of McGuire's work, a general overview of his methodology is in order. This will serve as a guide for some of the literature to be discussed later and also clarify the design of this study.

As already stated, McGuire's defensive and attacking messages all involve cultural truisms. By using a Likert-type 15-point scale, McGuire established control levels for comparison. Experimental group subjects typically read the defensive then the attacking arguments. A post-test measures the efficacy of the defense types. Even though certain of these elements are subject to minor changes, the basic designs follow this general pattern (McGuire & Papageorgis, 1961, McGuire, 1962, 1964).

In 1962, McGuire and Papageorgis showed that warning subjects that a belief was to be attacked increases their resistance to persuasion when the warning was accompanied by a defensive message. In a follow-up study, McGuire and Anderson (1965) provided extrinsic reassurance, rather than threat, prior to administering the defenses. They predicted that if the overconfident person receives further reassurance about the strength of the cultural truisms before the defenses, the defenses would be even less assimilated and hence confer less resistance to the subsequent persuasive attack. The results support this prediction. An
additional result of this study was that again the refutational defense was clearly superior to the supportive defense.

Several other investigators have sought to extend or refine inoculation theory. For example, Pryor and Steinfatt (1978) showed that inoculation theory can apply to nontruisms. Burgoon and Chase (1973) found that message intensity interacts with defense types to produce varying levels of resistance. Infante (1975) received support for his hypothesis that non-opinionated language would be superior to opinionated language in conferring resistance to persuasion.

A second area of research on the sustained impact of attitude change is the area of evidence usage. In a series of studies reported by McCroskey, it was observed consistently that including evidence in a persuasive message increased the amount of attitude change sustained over a period of three to seven weeks (McCroskey, 1969). In none of these studies, however, was there any attempt to manipulate the subjects' exposure to counter-persuasive attempts. Following Cohen's reasoning (1960), it was assumed that if a technique has proven effective in inducing persuasion, there should be some derivative of that technique which can be employed to cause people to resist influence. In a more recent study, McCroskey (1970) showed that indeed subjects are less affected by counter-persuasion from a second speaker if the first speaker's message contains evidence.

McCroskey, Young, and Scott (1972) provided further support
for the superiority of the refutational defense when they found that subjects were less influenced by counter-persuasion in a small group setting if an initial persuader employs a two-sided refutational message than if he employs a one-sided message. This result was significant in immediate and three week post-test measures.

As can be seen from these studies, investigators are rapidly exploring message factors which are potentially relevant to resistance to persuasion. As the variables which affect the persuasive process are studied, this largely unexplored area of resistance to persuasion will continue to grow.

Most of the studies discussed have dealt with the subject of immunization; that is, an individual is presented with a particular type of defense, followed by an attacking message on that belief. Then the efficacy of the defense is measured, usually on a Likert-type scale.

There is, however, another way of looking at the belief-maintenance process. While most of the studies on belief-maintenance have presented a defense before the attack, a few have examined the reverse order. In this way, the defense acts as a potential restorer of beliefs. This process is called restoration.

Infante (1975) showed that non-opinionated language would be superior to opinionated language in conferring resistance to persuasion. He also predicted that refutation-prior (inoculation)
would be superior to refutational-post (restoration) in conferring resistance to persuasion. His prediction was derived from the inoculation theory assumption which says essentially that "an ounce of prevention is worth a pound of cure." His results failed to show that the refutational-prior condition was superior. Infante employed only refutational-same messages as defenses.

McGuire (1961) explored the effects of restoration and inoculation. He showed that combining a supportive defense with a refutational defense does contribute a significant increment in resistance to persuasion. Additionally, this combined defense proved more effective than the refutational-only defense when the subsequent attacks involved novel counterarguments. He was unable to show, however, any superiority of either immunization or restoration treatments. Again, McGuire's method included the use of refutational-same defenses.

Tannenbaum and Norris (1965) used refutational defenses and source derogation as methods of producing resistance to attack. Additionally, they manipulated a refutational-prior and post to see if either was superior in creating resistance. The results showed that the derogation of a source making an unfavorable assertion about a positive concept did reduce the ability to be persuaded as did refuting arguments used in the attack. The combination of refutation and source attack produced the greatest amount of resistance. Again, these authors used refutational-same defenses, but their results favored immunization in the
refutational-only condition. One important point is that the attacking messages, without defenses, reduced the mean belief level to 4.70 on a 15-point scale. This is considerably lower than the "attack-only" treatment means reported by McGuire.

In reviewing the studies that deal with restoration, one can make the following observations: 1) All of these studies employed a refutational-same defense, 2) the element of time was not varied; messages were always administered contiguously, 3) belief levels following the attack-only control conditions were analyzed only to the extent necessary to show the effectiveness of an attack. It is important to note that the Tannenbaum and Norris attack-only control treatment produced a mean belief level of 4.70. At this point the previous belief had become a "disbelief," because it had fallen far below the mid-point of the 15-point scale. This being the case, the defense message following the attack was a belief-discrepant message. Its task was then to overcome a new belief. Had that same defense been presented prior to attack, its task would have been only to prevent belief change. This attack-only mean belief level is in sharp contrast to the McGuire and Infante levels which were both above the mid-point of their respective scales. In these cases, a new belief had not been created.

Based on this discussion it is now possible to generate predictions for the present experiment:
H1: When the impact of the attack is such that it reduced the extremity of one's belief, but does not create a disbelief, the restoration sequence will be equal to the inoculation sequence for maintaining the initial belief level.

H2: When the impact of the attack is such that it changes one's belief to a disbeliever, the inoculation sequence will be superior to the restoration sequence for maintaining the initial belief level.

If an attack is effective enough to reduce the belief below the mid-point of a 15-point scale, one may argue that a new belief has been formed as a result of the effective attack. It should follow that with the passage of time individuals build new cognitions to support new beliefs. This rationale forms the basis for the final hypothesis:

H3: When the impact of an attacking message is such that it changes one's belief to a disbelief, the superiority of the inoculation sequence over restoration will increase as the time increases between attack and defense.
Method

Subjects and Overview of Design

All subjects who took part in the study were enrolled in basic speech classes at Valencia Junior College, Orlando, Florida. Students enrolled in two classes during the Summer semester provided data for the control groups. Four classes participated in the experimental conditions during the Fall, 1980 semester. The experiment was conducted in two stages. The first stage consisted of pilot testing for topic selection. This stage also produced the two control conditions. Stage two involved administration of the eight experimental conditions described below.

Pilot Test for Topic Selection

The pilot test included two independent variables: attack and no-attack, and topic. The dependent variable for the pilot test was belief level. This was measured with a series of 15-interval scales. Topic selection was accomplished by administering the 2 X 4 design which is outlined in Figure 1. Students in one section of basic speech received attacks on two topics while students in the remaining section received attacks on two other topics. All subjects indicated their belief regarding all four issues. This facilitated collection of attack data on two
topics and no-attack data on the two other topics in each section. 
As was previously mentioned, the attacks were the same as those 
used by McGuire in his experiments on resistance to persuasion. 
Copies of the instructions and belief scales are included in the 
appendix.

Figure 1
Design of the Pilot Study

<table>
<thead>
<tr>
<th>Attack</th>
<th>X-Ray</th>
<th>Toothbrushing</th>
<th>Penicillin</th>
<th>Physicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-Attack</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Administration and Results of Pilot Test

The test booklet consisted of three parts for all subjects. 
The booklets were assembled with an instruction page first, the 
attacking messages second, and a 15-point belief scale third. 
The attacking messages were counterbalanced for topic before 
distribution. The booklets were then randomly distributed by 
the class instructor.

The attacking messages were all on health topics. The 
four attacks were entitled: 1) Some disadvantages of routine 
medical checkups, 2) some harmful effects of chest X-rays,
3) some drawbacks involved in the use of penicillin, and 4) some dangers of excessive toothbrushing. Completion of these booklets provided data on initial belief levels toward the four issues as well as on the impact of the attacking messages.

Four attacking messages were presented to the subjects to find two topics for use in the experiment. To qualify, the attack had to produce a belief level which was clearly on the high side or low side of the 15-point scale. In this case, it was hoped that the attacks would produce belief levels well above and below the "uncertain" category (7, 8, & 9) on the 15-point scale. This would mean that one attack had produced a disbelief while one attack had not.

Table 1 shows the mean belief levels of the two topics which were selected for use in the experiment. The data reveals that the X-ray topic was effectively attacked (X = 3.79) while the penicillin topic was less effectively attacked (X = 9.56). For the purposes of this experiment, the attacks produced mean belief levels well above and below the mid-point of the 15-point scale for these two topics. At this point one can argue that a disbelief has been created by the X-ray attacking message, while the belief on the topic of penicillin, though reduced from the no-attack level by the attacking message, is still a belief. The remaining two issues did not unambiguously fit this criteria.

Table 2 summarizes the ANOVA results of the pilot data. This table shows that the attacking messages were effective as
the treatment factor yielded a significant F ratio ($F(2, 108) = 4.79, p<.01$).

Table 1

Mean Belief Levels of Pilot Data

<table>
<thead>
<tr>
<th>X-Ray</th>
<th>Penicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATTACK</td>
<td>n = 19</td>
</tr>
<tr>
<td>$\bar{X} = 3.70$</td>
<td>$\bar{X} = 9.56$</td>
</tr>
<tr>
<td>NO-ATTACK</td>
<td>n = 19</td>
</tr>
<tr>
<td>$\bar{X} = 10.31$</td>
<td>$\bar{X} = 12.1$</td>
</tr>
</tbody>
</table>

Table 2

ANOVA Summary on Pilot Data

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (A)</td>
<td>856.09</td>
<td>1</td>
<td>856.09</td>
<td>130.50*</td>
</tr>
<tr>
<td>Topic (B)</td>
<td>364.09</td>
<td>2</td>
<td>182.04</td>
<td>27.75</td>
</tr>
<tr>
<td>A X B</td>
<td>70.55</td>
<td>2</td>
<td>35.28</td>
<td>5.38</td>
</tr>
<tr>
<td>Within Cell</td>
<td>709.00</td>
<td>108</td>
<td>6.56</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1999.73</td>
<td>114</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.01 (2, 108) = 4.79
Experimental Conditions

The experiment involved two independent variables: initial belief level and time in a 2 X 4 design. This design is outlined in Figure 2.

Figure 2
Experimental Conditions

<table>
<thead>
<tr>
<th>Inoculation Condition</th>
<th>Restoration Condition</th>
<th>2-Day Delay Condition</th>
<th>7-Day Delay Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-Ray Immediate</td>
<td>X-Ray Immediate</td>
<td>X-Ray delay condition</td>
<td>X-Ray delay condition</td>
</tr>
<tr>
<td>Penicillin Immediate</td>
<td>Penicillin Immediate</td>
<td>Penicillin delay</td>
<td>Penicillin delay</td>
</tr>
<tr>
<td>I = Inoculation</td>
<td>R = Restoration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Belief level was operationalized on a 15-point scale. Time was operationalized by simply distributing the questionnaires at the appropriate time intervals.

Resistance Defined. Pryor and Steinfatt (1978) operationalized two types of resistance to persuasion in their study. Type 1 resistance occurs when the defense-attack belief level is significantly above the attack-only level, and not significantly below the no-defense-no-attack level. Type 2 resistance occurs when the defense is significantly below the no-defense-no-attack level.
Thus a defense with Type 1 resistance produces a belief which is on the same level of acceptance after an attack as it was before the attack. A defense with Type 2 effectiveness produces a belief with higher acceptance after attack than a naked, undefended belief, but with less acceptance than the belief had before the attack. The current data analysis included measurement of both Type 1 and Type 2 resistance.

One can see from Figure 2 that subjects were divided into high and low attack effectiveness groups based on topic data collected in the pilot study. It also shows that subjects received an inoculation treatment and a restoration treatment in the immediate condition. The delay treatments were all restoration sequences and took place either 2 or 7 days following an attacking message. Refutational-same defenses were used in all experimental groups.

Materials

In assembling the booklets, care was taken to insure that the subjects received the defenses in the same order as the attack. For all conditions, two topics were selected. In the immediate conditions, booklets were counterbalanced for topic.

A slightly different procedure was followed for assembly of the delayed-treatment booklets. Here, a subject received attacks on both topics and refutations of those attacks either 2 or 7 days later. In order to preserve the anonymity of the
subjects, it was decided that the attacks and refutations should occur in the same order for all subjects. In this way, the subject did not identify him-her/self and the risk of sensitizing the subjects was not taken.

As in the case of the pilot study each subject received an instruction page first, the attacks second, and the questionnaire third. The exception to this was the immediate inoculation condition which by definition had the defenses precede the attacks. Also, even though each subject received all experimental components, it must be remembered that the subjects in delayed treatments did not receive the defenses and questionnaire until either 2 or 7 days following the attack.

Administration

All booklets were randomly distributed by their class instructor during regular class meetings. The same instructor conducted all treatments. Subjects were told that the "essays had been prepared by a research team at the Institute for Social Research and are designed to test reading skills. The Speech Department has agreed to assist in evaluating the validity to this test." Subjects in all sessions were instructed to read each paragraph, then go back and underline its crucial clause. Five minutes were allotted to the completion of each essay, and five minutes for the 10-item questionnaire. Subjects were also instructed not to return to a page to determine previous
responses, and to stop at the completion of each page to await further instructions to continue. All delayed-treatment subjects were present at both sessions.
Results

The mean belief levels produced by each treatment form the data of this study. These levels are summarized in Table 3.

Table 3
Mean Belief Levels Produced By All Treatments

<table>
<thead>
<tr>
<th>Topic</th>
<th>X-Ray</th>
<th>Penicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inoculation</strong></td>
<td>n = 21</td>
<td>n = 21</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 7.46$</td>
<td>$\bar{X} = 12.37$</td>
</tr>
<tr>
<td><strong>Restoration</strong></td>
<td>n = 19</td>
<td>n = 19</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 8.0$</td>
<td>$\bar{X} = 12.49$</td>
</tr>
<tr>
<td><strong>2-Day Delay</strong></td>
<td>n = 17</td>
<td>n = 17</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 7.71$</td>
<td>$\bar{X} = 11.28$</td>
</tr>
<tr>
<td><strong>7-Day Delay</strong></td>
<td>n = 19</td>
<td>n = 19</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 5.64$</td>
<td>$\bar{X} = 12.14$</td>
</tr>
<tr>
<td><strong>Attack</strong></td>
<td>n = 19</td>
<td>n = 19</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 3.70$</td>
<td>$\bar{X} = 9.56$</td>
</tr>
<tr>
<td><strong>No-Attack</strong></td>
<td>n = 19</td>
<td>n = 19</td>
</tr>
<tr>
<td></td>
<td>$\bar{X} = 10.32$</td>
<td>$\bar{X} = 12.78$</td>
</tr>
</tbody>
</table>
Hypothesis one predicted that when the impact of the attack is such that it reduces the extremity of one's belief, but does not create a disbelief, the restoration sequence will be equal to the inoculation sequence for maintaining the initial belief level. A one-way analysis across six levels (four treatment and two control) was conducted to test for differences among the means. The analysis included data from the penicillin issue which produced an attack-only mean of 9.56. Table 4 contains the ANOVA Summary.

Table 4
ANOVA Summary Table on Penicillin Data

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>138.93</td>
<td>5</td>
<td>27.79</td>
<td>10.97*</td>
</tr>
<tr>
<td>Within Cell</td>
<td>278.34</td>
<td>108</td>
<td>2.58</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>417.27</td>
<td>113</td>
<td>2.58</td>
<td></td>
</tr>
</tbody>
</table>

*p < .001 (5, 108) = 4.08

Table 4 reveals a treatment effect which is highly significant, $F(5, 108) = 4.08$, p < .001. This being the case, a Newman-Keuls analysis of critical differences was conducted to probe for specific areas of significance. These results are presented in Table 5.
Table 5
Newman-Keuls Matrix for Penicillin Issue

<table>
<thead>
<tr>
<th>Condition</th>
<th>2-day</th>
<th>7-day</th>
<th>Inoc.</th>
<th>Restore</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Means</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attack</td>
<td>9.56</td>
<td>1.72*</td>
<td>2.58*</td>
<td>2.81*</td>
<td>2.93*</td>
</tr>
<tr>
<td>2-day delay</td>
<td>11.28</td>
<td>-</td>
<td>0.86</td>
<td>1.09</td>
<td>1.21</td>
</tr>
<tr>
<td>7-day delay</td>
<td>12.24</td>
<td>-</td>
<td>0.23</td>
<td>0.35</td>
<td>0.64</td>
</tr>
<tr>
<td>Immed. Inoc.</td>
<td>12.37</td>
<td>-</td>
<td></td>
<td>0.12</td>
<td>0.41</td>
</tr>
<tr>
<td>Immed. Rest.</td>
<td>12.49</td>
<td>-</td>
<td></td>
<td></td>
<td>0.29</td>
</tr>
<tr>
<td>Control</td>
<td>12.78</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<.05

Note: Critical difference for 2 rows = 1.04;
      3 rows = 1.25; 4 rows = 1.37; 5 rows = 1.45; 6 rows = 1.52

Based on the data in Table 5, hypothesis one received general confirmation. This table also shows that the four defense treatment means did not differ among themselves. Using Pryor and Steinfatt's (1978) definition of resistance to persuasion, all four defensive treatments produced at least Type 2 resistance. In addition, the 7-day delay, Immediate Inoculation, and Immediate Restoration treatments produced Type 1 resistance.

Hypothesis two predicted that when the impact of the attack is such that it changes one's belief to a disbelief, the inoculation sequence will be superior to the restoration sequence for maintaining the initial belief level. Again a one-way analysis of variance was conducted across the six levels. Table
6 represents the ANOVA summary on the X-ray data. In the pilot study the attack-only treatment mean was 3.70 for this topic.

Table 6
ANOVA Summary Table on X-Ray Data

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>478.21</td>
<td>5</td>
<td>95.64</td>
<td>7.52*</td>
</tr>
<tr>
<td>Within Cell</td>
<td>1305.03</td>
<td>108</td>
<td>12.08</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1783.24</td>
<td>113</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .001 (5, 108) = 4.08

Again, the ANOVA indicated differences among the means (F (5, 108) = 4.08 p < .001). Therefore, the Newman-Keuls analysis of critical differences was again performed to discover areas of significance. The results of this analysis are presented in Table 7.
The results in Table 7 do not support hypothesis two. That is, the inoculation sequence did not prove to be superior to the restoration sequence in maintaining the initial belief level. The data show that all defense types provided some resistance to persuasion with the exception of the 7-day delay condition. This result will be discussed further as it relates to the third hypothesis. As with the penicillin issue, there were no differences among the four defense conditions. Two types of resistance are shown in the table: Type 1 resistance is
displayed by the Immediate Inoculation and 2-delay conditions while Type 2 resistance was conferred by the Immediate Restoration condition. It should be noted that if a defense type is successful in conferring Type 1 resistance, it automatically confers Type 2 as Type 1 resistance is a more stringent operationalization of resistance to persuasion.

Hypothesis three predicted that when the impact of an attacking message is such that it changes one's belief to a disbelief, the superiority of the inoculation sequence will increase as the time increases between attack and defense. It is possible to test this hypothesis by again studying the Newman-Keuls analysis of critical differences shown in Table 7. The table shows that the 7-day delay was not successful in conferring resistance to persuasion; that is, as the time between attack and defense increased to 7 days, the restoration attempt failed to produce even Type 2 resistance. The resultant belief level is significantly lower than its corresponding initial control mean and not significantly above the attack-only mean. Therefore, general confirmation was received for hypothesis three.
Discussion

Prior research has shown that resistance to persuasion can be conferred in a number of ways. This study sought to compare the relative efficacy of inoculation (defense-attack) and restoration (attack-defense) strategies. In addition, the effects of time and initial belief levels were studied to explore how they affected this process.

Hypothesis one predicted that when the impact of the attack is such that it reduces the extremity of one's belief, but does not create a disbelief, the restoration sequence will be equal to the inoculation sequence for maintaining the initial belief level. This hypothesis received support as the data did now show that either sequence was superior. This result agrees with the McGuire (1961) and Infante (1975) findings and thus provides a replication of the previous findings.

Hypothesis two predicted that when the impact of the attack is such that it changes one's beliefs to a disbelief, the inoculation sequence will be superior to the restoration sequence for maintaining the initial belief level. This hypothesis was not supported by the data. The rationale for this hypothesis was taken from Tannenbaum and Norris (1965),
sequence for maintaining the initial belief level. The data supported this hypothesis. The current findings are in agreement with those of McGuire and Papageorgis (1961) and Infante (1975). 2) When the impact of the attack is such that it changes one's belief to a disbelief, the inoculation sequence will be superior to the restoration sequence for maintaining the initial belief level. This hypothesis did not receive support. 3) When the impact of an attacking message is such that it changes one's belief to a disbelief, the superiority of the inoculation sequence over restoration will increase as the time increases between attack and defense. The data provided general confirmation for this hypothesis.

It appears that if an attack produces a disbelief, that belief will become more difficult to restore with the passage of time as individuals build cognitions to support the new belief. This suggests that if any attack produces a disbelief, one should act as soon as possible to have the best chance at restoring that belief. Other studies might profitably consider the variables of topic, belief level, and time in the continuing effort to understand the restoration process.

McGuire likened his inoculation treatments to the immunization treatments in the medical sense. Using an extension of this medical analogy, restoration can be seen as a "resuscitation" process in which the success of restoring the attacked belief depends both on the severity of the attack.
who showed that the inoculation sequence was superior to the restoration sequence. The Tannenbaum and Morris methodology was quite similar to that of the current study. Both studies employed that x-ray message, the refutational defense and an immediately contiguous presentation of defense and attack. Additionally, the attack-only control condition was massively effective in each study. Tannenbaum and Norris reported an attack-only mean of 4.70, while the current study obtained a 3.70. In both studies, the initial belief actually became a disbelief following the attack-only control treatment. It seems reasonable to expect the two studies to produce similar results. One possible explanation for the conflicting findings involves the amount of belief reduction produced in the control conditions of the two studies. Tannenbaum and Norris reported an initial belief level of 13.75 of an attack-only mean of 4.70, a reduction of 9.05. By comparison, the means in this study were 10.32 and 3.70, a reduction of 6.62. Since the current theory posits an inverse relationship between level of belief reduction and restorability, more success would be expected with a smaller belief change. The different levels of reduction may explain why Tannenbaum reported restoration to be inferior to inoculation, while comparable treatments in the current study yielded no difference. Subsequent research is needed to examine the possible existence of a belief reduction threshold which would more accurately
predict the effects of restoration attempts.

Hypothesis three sought to explore the effects of initial belief levels and time in the restoration sequence. Hypothesis three predicted that when the impact of an attacking message is such that it changes one's belief to a disbelief, the superiority of the inoculation sequence over the restoration sequence will increase as the time increases between attack and defense. This hypothesis received general confirmation. Based on these results, one can say that following a belief change, it does become more difficult to restore a belief to its initial level with the passage of time. This is based on the rationale that once a new belief has been formed, the individual will begin to build new cognitions to support this newly acquired belief. It follows that one should act quickly to have the best chance to restore a changed belief to its original level.

The last result has some important implications. The current Iranian crisis raises questions about belief changes and belief restorability of those held hostage in a foreign nation over an extended period. Also, if a defense lawyer's closing remarks are delayed following a prosecutor's closing presentation to a jury, this may affect his chances for success. If a salesman finds that the competition has been successful in changing his client's belief about a product, what are his chances of changing the belief back in favor of the product if the counter-proposal is delayed in time? Individuals involved
in marketing products would be very interested to know such information. In these and many other cases, the results of the present study suggest that a swift course of action is the best one.

These findings have implications for other areas of communication research as well. A study conducted by Macaulay (1965) showed that a denial treatment plays a role in conferring resistance to persuasion. Macaulay's operationalization of denial involved a source who denied having made an alleged statement. This research found that the use of denial effectively dissociates source from message only when the denial is accompanied by expression of another position which is congruent with the receiver's belief. The denial and counterstatement strategy was effective in both inoculation and restoration sequences. Macaulay did not test the effects of time delay. The results of the present study suggest that the effectiveness of such denials would decrease as the time between allegation and denial increases. Due to the prevalence of accusations in the 1980 presidential campaign, such information would be helpful in designing campaign strategies. If a candidate changes a belief about his opponent, for instance, the opponent should act promptly to restore the belief. This could be one reason Ronald Reagan was successful during the recent debates with Jimmy Carter. The debate format allows for an immediate denial and countermeasures. If this were not the case,
Mr. Reagan may have had a more difficult time restoring beliefs about his positions if he was unable to reply in a timely fashion. In any regard, this is another area for further testing.

Since the restoration sequence has been largely unexplored, many questions remain. In this study, a new area was explored and therefore replication is of great importance. Additionally, the present design should be replicated using various controversial and salient topics. One would expect that if a belief level on any given topic falls to the point of becoming a disbelief, the success of attempted restoration will be partially contingent on the promptness of the action.

Future research is needed to examine varying time intervals to discover the critical points of restoration. It would be interesting to follow the effects of a highly effective attacking message over an extended period of time.

When McGuire began his study of resistance to persuasion, he borrowed from the medical analogy of inoculation and suggested that beliefs could be immunized against subsequent attacks. This being the case, it may be said that restoration is roughly analogous to resuscitation in that the success of "resuscitating" a belief largely depends on the extent or severity of attack and the time one waits to act. Examples of this in the medical sense include heart attacks and drownings. One can clearly see that the success of rescue in both cases is dependent
on the massiveness of the attack and the promptness of action. The longer one waits after a severe attack, the less chance there is of successfully resuscitating the individual who is afflicted. In the present study, both the severity of the attack and the swiftness of counter-actions directly affected belief restoration.

Summary

Even though McGuire's inoculation theory has been systematically developed and replicated in various forms, few studies have examined the restoration process (attack-defense sequence). Additionally, none of the studies on restoration have considered the effects of time and initial belief levels in the belief maintainence process.

After pilot testing McGuire's attack messages, two topics were selected: X-ray and penicillin. The X-ray topic produced a mean belief level of 3.70 (disbelief) on a 15-point scale while the penicillin topic produced a mean belief level of 9.56 of the same scale. It was felt that, following attack, subjects would build cognitions to support their new belief on the X-ray topic. Thus, it would become more difficult to "restore" beliefs to their initial level on the X-ray issue than on the penicillin issue. This rationale and prior research on restoration provided the basis for the predictions listed below.

1) When the impact of the attack is such that it reduces the extremity of one's belief, but does not create a disbelief, the restoration sequence will be equal to the inoculation
and the time interval between attack and countermeasure.
APPENDIX A

Instructions to Subjects
The material herein has been prepared by a research team at the Institute for Social Research, and is part of a test designed to measure reading skills. The Communication department has agreed to assist in evaluating the validity of the test. Consequently, we are asking students to help us. Please follow the instructions below. If you have a question, come to the front of the room and ask it privately. Do not ask it aloud.

Instructions

1. Do not turn this, or any page until asked to do so.

2. When instructed, read the following page at a fairly rapid pace, underlining what you believe to be the crucial clause (or group of words) in each paragraph. You will be given 5 minutes to complete each page. When you finish a page, stop and await further instructions.

3. At no time should you turn back to a previous page.

PLEASE DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.
APPENDIX B

Experimental Messages
The Misguided Attacks on Penicillin

Medical researchers and physicians the world over are generally agreed that the discovery and use of penicillin has been one of the greatest steps in the history of medical science's long fight against disease and death. It is particularly unfortunate, therefore, that the press has seen fit to print some well-intentioned but misguided stories which attack the use of this miracle of modern science. These stories have harped on the allegation that penicillin's effectiveness against superficial symptoms have caused some physicians to neglect the underlying disease, or on the claim that exaggerated faith in penicillin has slowed down research on other needed antibiotics. Since it is so important that we do not deprive ourselves of the unmatched benefits derived from penicillin treatment, it will pay us to look briefly at these unfortunate attacks on penicillin in order to see the fallacies involved in them.

One distorted argument against the use of penicillin is that it is used quite often by physicians who are interested only in quick, superficial results and not in the ultimate cure of the patient. The argument is based on the fallacy that penicillin is somewhat akin to aspirin and is used to relieve symptoms of the disease, not to cure the disease itself. But all medical evidence is to the contrary. Penicillin actually attacks the underlying disease bacteria with a vigor unlike that of any other known drug. Some misguided critics have even gone so far as to argue that penicillin is used primarily by lazy or poorly trained doctors. And once again, all research evidence seems to point in exactly the other direction. A study undertaken by the U.S. Public Health Service in 1957 proves that the best doctors (as rated by the recovery rate of their patients) in the nation's finest hospitals are actually the ones who most frequently employ penicillin. The use of penicillin in the treatment of many diseases is the treatment preferred by the most competent and respected members of the medical profession, and is hardly the "ill-advised enthusiasm" of poorly trained physicians.

A further mistaken argument has been presented by the critics of penicillin. They seem to infer that since physicians and medical researchers have an exaggerated idea about the effectiveness of penicillin, research on other drugs which would be effective where penicillin fails has been slowed down dangerously. Let us first repeat that the effectiveness of penicillin has not been exaggerated. No other drug known to us today can successfully combat as wide a variety of diseases
and disease-producing bacteria as can penicillin. As for the erroneous claim that the wide use of penicillin has caused a slowdown in research to discover additional drugs, one need only look at current literature on medical research to find that the discovery and use of penicillin has increased, not decreased, the amount of such research. The discovery of the mycin drugs (streptomycin, terramycin, aureomycin, etc.) has all come about since the discovery and general use of penicillin. Instead of interfering with further research, the successful example of penicillin has encouraged a greater amount of research to discover still other antibiotics, than occurred in the entire century preceding the discovery of penicillin. While we should realize that penicillin is not perfect, that it does not kill all germs, we should also realize that it is the nearest approach we have so far made to a perfect answer to all medical problems.
Some Drawbacks Involved in the Use of Penicillin

The discussions of penicillin in the popular press mention repeatedly and exclusively its beneficial effects. A rather different evaluation is seen when we study the discussions of this drug in the professional journals of the medical, biochemical, and pharmaceutical professions. While the beneficial effects of penicillin are not, of course, denied in the professional journals, the scientists who engage in continuing research on its effects are expressing increasing concern over some of this drug's highly undesirable side effects. For example, medical statistics indicate that the temporary relief given by penicillin often results in the patient's neglecting other precautions and treatments. Furthermore, the exaggerated belief in the effectiveness of penicillin has tended to slow down necessary research in the development of desperately needed additional antibiotics to combat diseases against which penicillin has no effect. Because the problem is so serious and the use of penicillin so widespread, it will be wise to look into some of these detrimental effects of penicillin in more detail.

One of the problems arising in connection with the use of penicillin arises, paradoxically, from the very swiftness with which penicillin relieves the symptoms of some disorders. It has been shown clearly in statistics collected by the Bureau of Medical Statistics of the John Hopkins Medical School that patients suffering from a number of chronic pathological conditions allow these conditions to go uncorrected for a longer average time if they have received penicillin treatment than if they have not; and also allow them to go uncorrected until they become a cause of death more often if they have received penicillin treatments. The reason for this seemingly-strange relationship is easy to find: penicillin so effectively relieves the superficial symptoms that the patient, relieved of the discomfort of the warning symptoms, tends to become less motivated to cooperate and less willing to undertake the major treatment needed to correct the basic pathological problem. This false sense of security produced by the removal of the warning symptoms, while leaving the basic problem uncorrected, is one of the undesirable side effects of penicillin.

Still another incidental bad effect of penicillin is that the exaggerated belief in its efficacy as a "cure-all" had had the result of slowing down research on developing other drugs needed to combat disease and infection. While this slowdown has not occurred in connection with University or private Foundation support for medical research, it has retarded Federal Government support, as can be easily
documented, and in these days it is on Federal Government Grants through the Public Health Service and the National Science Foundation that medical research primarily depends. Recently, for example, in 1959, the U.S. Senate subcommittee on Social Welfare voted 5 to 4 to reduce the recommended appropriation for antibiotic and antivirus research from 5 million to 2.1 million dollars. Three of the Senators who voted for the reduction stated during the course of the committee debate arguments to the effect that the availability of penicillin made such an appropriation excessive since any further research was needed only to fight the few very rare infectious diseases that penicillin did not combat. It was this reduced appropriation recommended by the committee that the Congress did pass. Those senators who voted against the appropriation because of the "cure-all" belief regarding penicillin were, of course, tragically in error: not only does penicillin have no effect against many common bacteria-caused diseases, but it is completely ineffective against all virus-caused diseases, and these virus diseases are as widespread as they are dangerous. It is most unfortunate that the limited successes of penicillin, instead of spurring an increasing amount of antibiotic and antivirus research, has had quite the opposite effect of reducing such research. While the good effects of penicillin are too well known to need repeating here, it is unfortunate indeed that it has had this bad side effect of reducing Government support for medical research.
Some Harmful Effects of Chest X-Rays

Medical associations and public health authorities have recently begun to question the wisdom of repeated X-ray examinations for detecting TB. Exposure to radiation - even the small amount encountered in the X-ray examination - has come to be recognized as a danger to health. Exposure to radiation can produce bone cancer as well as leukemia (cancer of the blood). The radiation produced by X-rays is also extremely damaging to reproductive tissues, resulting in sterility or ’defective’ children. Let us examine in more detail some of the evidence that has led public health officials to advise against the dangerous exposure to radiation involved in repeated chest X-rays.

One of the most serious hazards involved in X-ray diagnosis is the possibility that repeated exposure to this type of radiation will produce cancer. In recent years there has been an alarming increase in the incidence of bone cancers, leukemia, and related malignant diseases. Studies on the effect of atomic fallout have shown that this alarming increase can be traced, at least in part, to the supposedly small amount of radioactive waste given off by these nuclear bomb tests. Exposure to any kind of radiation - gamma rays, X-rays, etc. - allows powerful invisible particles to penetrate to the vulnerable tissues deep within our bodies, damaging these tissues and producing malignant tumors or “cancer.” Scientists at Stanford Medical School recently exposed monkeys to regular X-ray radiations and found that 85% of these animals developed cancer at the region of exposure after ten such treatments. In humans, X-rays are particularly likely to produce bone cancer and leukemia (a form of cancer affecting the white blood cells). Because of this grave danger, it is essential that we keep X-ray dosage at a minimum and not undergo X-ray examinations for TB (or any other disease) routinely each year. Rather, we ought to confine our exposure to these dangerous radiations to the rare occasions when there is some positive reason for suspecting the disease and upon specific recommendation of a physician.

Another danger involved in X-ray examinations is that radiation is particularly damaging to the reproductive tissue. Hence, X-rays can cause sterility, that is, inability to have any children, or if they do not produce complete sterility, there is the highly undesirable possibility that the damage to the reproductive tissue will produce radical changes in
the chromosomes and genes of the germ cells, thus causing mutations. Children born of such damaged germ cells tend to have serious, often fatal defects. Probably the major cause of the current rise in the number of defective births is the increased amount of radiation to which we are now being exposed. These mutations may develop slowly and progressively and go undetected for generations. To avoid such damage to the germ cells we should limit our exposure to radiation of all sorts, including routine X-rays. For our own good, and for the sake of generations yet unborn, we should restrict our exposure to a minimum, and have X-rays taken only on individual medical advice.
The False Charges Against Chest X-Ray Examinations for TB

After centuries of brilliant and painstaking research by some of the world's finest scientists, we are finally in a position to control TB (tuberculosis), a disease which has plagued humanity since Biblical times. The major weapon in this successful fight against TB has been the widespread adoption of the practice of getting an annual chest X-ray as a means of detecting TB symptoms in their earliest stages. Unfortunately, there have been occasional articles in the press which argue that we should not take annual chest X-ray examinations for the detection of TB. Since it is so vital that the progress which we have made (TB was America's No. 1 killer before X-rays became available) should not be undone, we should review some of these misleading and distorted arguments. It has been occasionally claimed, for example, that chest X-rays can cause cancer. An equally misleading claim is that such X-ray examinations can cause sterility and defective children. By seeing the flaws in these arguments we can recognize why the practice of getting an annual chest X-ray examination is so important in the fight to keep TB under control.

The evidence that prolonged exposure to strong radiation can produce cancer has been erroneously interpreted by some laymen to mean that chest X-rays for TB are dangerous. It goes without saying that prolonged exposure to radiation of any kind (even the kind that comes from the sun) can be dangerous. But these critics fail to realize that the amount of radiation from a chest X-ray is so insignificant and lasts for such a short period of time, that the possibility of any harm being done is almost nonexistent. The amount of radiation which comes from one chest X-ray a year is almost as much as the amount we are exposed to during the same period by wearing a wrist watch with a luminous dial. Radios, TV sets and other household appliances emit comparable amounts of radiation. While it is indeed wise to avoid prolonged exposure to dangerous amounts of radiation, one chest X-ray a year is harmless, and, on the other hand, insures the early detection of any TB symptoms.

Another misleading and distorted argument against the use of chest X-ray examinations for the detection of TB is that the radiation produced can damage the reproductive tissue and produce sterility in humans or mutations of the genes. This argument is unwarranted for two reasons. While reproductive tissue can be damaged by radiation, the amount coming from a chest X-ray is absolutely insignificant in comparison to the amount needed to damage the reproductive tissue. Secondly, practically no radiation reaches the reproductive tissue during X-ray examinations because only the chest is X-rayed. X-ray machines are shielded to avoid exposure of any part of the body other than the
chest. Arguing against a simple chest X-ray for detection of TB is as ridiculous as arguing against going to the doctor for a routine medical check-up because one might get into an automobile accident on the way to the doctor's office. One can only hope that these misleading attacks on the practice of getting an annual chest X-ray do not prevent the American people from continuing this wise, precautionary practice which has been a major weapon in the successful fight against TB, which at the turn of the century was the No. 1 killer in the U. S.
APPENDIX C

Opinion Scale
Opinion Survey

As was indicated earlier, we are interested in determining the extent to which the reading comprehension score obtained in this test is affected by the person's feelings about the topics discussed. Hence, we here ask you to indicate your personal feelings about the truth of the statements listed below by circling the one number that best indicates your judgment of the truth of that statement. Notice that the larger the number, the more true the statement is judged; the smaller the number, the more false it is judged.

Please respond to each of the 10 statements on this and the following page by indicating your own personal opinion of the statement's truth regardless of whether your opinion agrees or disagrees with some or all of the material read in this test. Answer the questions in the order presented, and do not skip any question. Work rapidly, as only three minutes are allowed for answering all 10 questions.

1. Everyone should get a chest X-ray each year in order to detect any possible TB (tuberculosis) symptoms at an early stage.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

2. The effects of penicillin have been, almost without exception, of great benefit to mankind.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

3. Everyone should brush his teeth after every meal if at all possible.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

4. Everyone should see his doctor at least once a year.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

5. Chest X-ray examinations for TB should be taken regularly and often.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

6. The benefits to mankind from using penicillin have far outweighed any disadvantages.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15

7. Probably the greatest single advance in the history of medical science was the discovery of penicillin.
   / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15
8. The best way to prevent tooth decay is to brush one's teeth frequently.

9. All things considered, getting an annual chest X-ray for detecting TB is a very wise practice.

10. We should all have medical checkups, not only when we feel ill, but also at frequent intervals even when we feel well.
References


