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BELIEF LEVELS VARYING IN INITIAL LEVELS OF
ACCEPTANCE.

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RESISTANCE TO PERSUASIVE ATTACKS
AGAINST BELIEF LEVELS VARYING
IN INITIAL LEVELS OF
ACCEPTANCE

by
Albert Pryor

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Speech)
in The University of Michigan
1972

Doctoral Committee:

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TO MOM AND DAD

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A number of individuals have made notable contributions to this work. First, I wish to express my sincere gratitude to the members of the committee. My interest in the study of resistance to persuasion was kindled in a seminar taught by Dr. Thomas Steinfatt. From the inception of this experiment to its completion, Dr. Steinfatt, as committee chairman, has been a source of continual guidance, insight, and encouragement. The other committee members, Dr. Dorwin Cartwright, Dr. William Donaghy, and Dr. Richard Haas have also provided timely suggestions and willing help. I also wish to thank Dr. Howard Martin for his participation as a substitute committee member at the oral defense of the dissertation.

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CHAPTER I

INTRODUCTION AND RATIONALE

"The history of mankind is a record of controversy. In his slow rise from ignorant barbarism, man has been embroiled in perpetual dispute about matters both weighty and trivial" (Minnick, 1957). Indeed, man has always been about the business of attempting to influence others. Today, the average person is continually bombarded with messages designed to influence his thoughts and actions on an array of issues ranging from choice of mouthwash, to what political candidate to vote for, to whether or not Johnny should be allowed more use of the family car. Beginning with the early writings of Plato, Aristotle, and other classicists countless volumes have been written about persuasion and related topics. With the development of sophisticated tools of measurement around the 1930's, psychologists began to explore elements of the persuasive process and their effects on listeners in controlled, laboratory settings. Subsequent decades have produced a vast amount of attitude research in persuasion.

It is somewhat surprising that comparatively little investigation has focused upon resistance to persuasion.

One of the earliest efforts to study methods of counteracting the effects of persuasive messages occurred in the World War II research conducted by Hovland, Lumsdaine, and Sheffield (1949) under the auspices of the U.S. Army. The U.S. War Department, concerned about overly optimistic attitudes regarding an early end to the war, commissioned the Hovland research team to study methods of persuading the soldiers not to adopt such a viewpoint. Hovland et al. designed persuasive messages which presented either one or both sides of the issue regarding the probable length of the war with Japan. The investigators first asked the subjects, U.S. soldiers, to estimate the length of the war, then exposed them to one of the prepared communications via the Armed Forces Radio Service. The results support their hypotheses that the two-sided appeal will produce more attitude change than the one-sided appeal with receivers initially opposed to the message and with educated audiences. One-sided messages proved superior to two-sided messages for subjects who were either uneducated or initially in favor of the message. Interaction results indicated the superiority of the two-sided appeal for all conditions except those in which receivers were both low in education and initially in favor of the message. A one-sided appeal was far superior for this group.

This research was extended by Lumsdaine and Janis (1953) who demonstrated that two-sided messages confer significantly more resistance to subsequent counterpropaganda

than one-sided messages. The experiment was conducted several months preceding President Truman's announcement that Russia had produced an atomic explosion. Both one-sided and two-sided messages were transcriptions of an alleged radio program which predicted that Russia would not produce significant numbers of atomic bombs for at least five years. One week later, subjects listened to speeches arguing that Russia had already developed the bomb. Subjects who had originally received the two-sided messages were found less susceptible to attitude change in the direction advocated by the latter speech.

Hovland, Janis, and Kelly (1953) discuss the effects of initial and final messages in terms of "associative facilitation" and "associative interference." Associative facilitation refers to situations where a second message, or second side of an issue, is learned more effectively than the first; associative interference refers to instances where the second message is learned less effectively than the first. Since interference with learning may also interfere with persuasion, resistance research might profit from a better understanding of what source, message, and receiver variables contribute to associative interference.

A number of approaches have been taken toward the study of resistance. It has been shown, for example, that individuals can become resistant to attitude change as a result of private decision (Bennett, 1955), public commitment (Lewin, 1958), participation in counter-attitudinal

activities (King and Janis, 1956), and by being told that someone else thinks they hold a given belief (Rosenbaum and Franc, 1960). Resistance may also be heightened by linking beliefs to other cognitions, and by inducing cognitive states such as aggressiveness or high self-esteem which have been shown to lead to resistance. McGuire's (1964) work on resistance to persuasion involves exposing subjects to "pretreatments" (defensive messages) which are designed to render their attitudes resistant to subsequent counter-attitudinal attacks on the same or related issues.

As in McGuire's research the present study will examine the effects of various forms of written messages on the persuasiveness of subsequent counterpropaganda. The question to be investigated may be formulated as follows: Given an anticipated future persuasive communication, what type of prior communication may be administered to the receivers to induce a state of resistance to influence in which they will defend and maintain current attitudes toward an issue? In such situations resistance to persuasion is distinguished from persuasion itself in that resistance messages are tailored to ward off the effects of counterpropaganda. Persuasive messages attack attitudes in an attempt to change them; resistance messages defend existing attitudes in an effort to maintain them against counterpropaganda. In the present study resistance to persuasion is defined as a psychological state of resistance to attitude change in the face of a persuasive message,

brought about by prior exposure to messages designed to defend and maintain existing attitudes. Central to this definition is that the persuasive attack would have successfully altered attitudes without the defensive, resistance-conferring message.

McGuire's carefully constructed research program, which began in 1961, is one of two major bodies of resistance research available. The other was reported by Tannenbaum (1967). McGuire summarizes contemporary approaches to resistance, assumptions underlying his inoculation approach, and his experiments in Berkowitz (Vol. 1, 1964, pp. 191-229). The following review will serve to clarify the purpose and hypotheses of the present study.

McGuire reasons from a biological analogy. In the biological sense, inoculation is achieved by injecting a person with a weakened form of a virus which serves to stimulate defenses against subsequent, more massive viral attacks. Certain amounts of biological resistance can also be achieved through supportive therapy, such as rest, good diet, etc. However, "Inoculation is likely to be superior to supportive therapy to the extent that the person has previously been brought up in a germ-free environment... individuals raised aseptically tend to appear vigorously healthy (even without supportive therapy) but are highly vulnerable when suddenly exposed to massive doses of the disease virus" (1964, p. 200). McGuire draws an analogy between biological inoculation against viral attacks, and

attitudinal inoculation against counter-attitudinal attacks. Thus, he refers to his theory of resistance to persuasion as inoculation theory. He theorizes that certain types of messages, when administered to receivers prior to a persuasive attack, inoculate the receivers against attitude change. McGuire reasons that to directly apply his biological analogy, he should "deal as far as possible with beliefs that had been maintained in a 'germ-free' ideological environment, that is, beliefs that the person has seldom, if ever, heard attacked" (McGuire, 1964, p. 200).

After much pre-testing, McGuire discovered that certain beliefs concerning health seem to be almost unanimously accepted by the populations he tested. Thus, health truisms such as "The effects of penicillin have been, almost without exception, of great benefit to mankind," "Everyone should get a yearly chest x-ray to detect any signs of TB at an early stage," and "Mental illness is not contagious" served as topics in his experiments. McGuire defines cultural truisms as "beliefs that are so widely shared within the person's social milieu that he should not have heard them attacked, and indeed, would doubt that an attack were possible" (1964, p. 201).

McGuire believes that to render "cultural truisms" resistant to attitude change, two obstacles need to be overcome. First, the auditor is unpracticed in defending his belief; second, he is unmotivated to do so. "He is unpracticed because he has never been called upon to defend

the truism. He is unmotivated to start practicing because he regards the belief as unassailable" (1964, p. 201). Completing the analogy, McGuire suggests that motivation to defend a belief can be effected by causing the listener to perceive his belief as vulnerable, and that such a perception can be accomplished through pre-exposure to weakened forms of subsequent attacking arguments. He suggests that motivation alone will not supply resistance as an individual may not have available any defensive material with which to refute an attack. Thus, some amount of guidance, and/or time is needed to aid in the development of such belief-bolstering material. .

In line with his biological analogy, McGuire developed messages which, when administered prior to a persuasive attack, were designed to inoculate the receiver against the effects of the attack. The defensive messages are of two types: refutational-same, which refutes weak forms of the same arguments to be used in the subsequent attacks on the belief; and refutational-different defenses, employed to test the generalizability of inoculation by refuting arguments related to, but different from, those used in the attack. A third type of defense, supportive, is analogous to supportive therapy in the biological sense and provides the listener only with belief-bolstering material.

The refutational defenses are designed to lead the receiver to perceive the belief as vulnerable. That is,

these defenses should produce a threat to the belief and thereby motivate the receiver to develop defensive, belief-bolstering, material. The supportive defense does not threaten the belief and, therefore, does not motivate receivers to develop defensive material. On the other hand, the supportive defense provides more belief-bolstering material than either form of the refutational defense. The refutational-same defense affords more relevant defensive material than does the refutational-different defense. McGuire's overall prediction, based upon his biological analogy, is that the refutational defenses, which motivate by threat, will supply greater resistance to persuasive attacks than will the supportive defense.

The first experiment (McGuire and Papageorgis, 1961) compared the resistance-conferring effects of supportive versus refutational-same defenses. Subjects were further split into passive and active conditions. In the passive treatments, subjects read prepared defensive and attacking messages, while subjects in the active treatments were asked to write such messages. The attacking messages were administered two days after the defensive session.

Results confirmed McGuire's predictions. Attitudes were measured on a 15-point scale, ranging from 1, complete rejection, to 15, complete acceptance of an assertion. The attacks, without defenses, reduced the overall mean belief level on the four truisms from 12.62 to 6.64. The main effect of the refutational defense resulted in a mean

belief level of 10.33, significantly higher ($p < .001$) than the 6.64 of the attack-only condition. Supportive treatments produced a final belief level of 7.39, significantly lower than the 10.33 of the refutational defense, and not significantly different from the attack-only treatment. The refutational defense, then, proved significantly superior to the supportive defense in conferring resistance to persuasion.

Though supportive defenses failed to confer significant resistance, they did produce a higher amount of direct strengthening than did the refutational defenses. Comparing mean belief levels measured immediately after the defensive session, prior to attack, the supportive defense mean belief score was 14.34, refutational, 13.91. The direct strengthening but lack of immunizing efficacy of the supportive defense is termed the "paper tiger" effect, and "shows the peril of assuming the immunizing effectiveness of a defense to be a direct function of its apparent strengthening effect, and is in accord with inoculation theory" (McGuire, 1964, p. 212).

In a second experiment Papageorgis and McGuire (1961) compared refutational-same with refutational-different defenses. They theorize that if the immunizing effectiveness of the refutational defense is due to the threatening mention of counterarguments, its effects should generalize to attacks using different arguments. Alternatively, if the refutation itself causes resistance the effects should

not generalize. Only passive forms of the refutational defenses were used. Defensive and attacking sessions were separated by a one-week interval.

Results again showed the vulnerability of the beliefs when attacked without defense. The initial mean belief level was 13.23. In comparison, the attack-only treatment produced a mean belief level of 5.73 ($p < .001$), refutational-same defense, 9.25, and refutational-different defense, 8.70. The two types of refutational defenses did not significantly differ from each other in resistance-conferring efficacy, and each was significantly higher than the 5.73 mean of the attack-only treatment. The resistance conferred by the refutational-different defense does not clearly follow from McGuire's biological analogy. That is, when given an immunization shot, such as a polio shot, we are not then inoculated against related diseases. Yet the refutational-different defense (Papageorgis and McGuire, 1961) provides such a generalized immunization.

The third experiment (McGuire, 1961b) tested the resistance-conferring efficacy of combinations of defenses versus single defenses. McGuire hypothesized that the supportive defense would increase the immunizing efficacy of both refutational defenses, more so for refutational-different than for refutational-same defenses, when used in combination with those defenses. He concluded from results that although the supportive defense failed to confer an appreciable amount of resistance when used alone,

it did confer a "sizable increment" over the refutational defense (1961b, p. 193).

Though the addition of the supportive defense proved more beneficial to the refutational-different than the refutational-same defense, the effects appear to be due to the lack of resistance conferred by the refutational-different defense when used alone. Unlike the results obtained by McGuire and Papageorgis (1961) the refutational-different defense supplied significantly less resistance than the refutational-same defense, 9.96 and 12.16 respectively. Thus, although the refutational-different-supportive defense combination produced a smaller overall mean, 11.25, than the refutational-same-supportive double defense, 11.51, the refutational-different defense benefitted most from the addition of the supportive defense.

McGuire attributes the apparent discrepancy regarding the effects of the refutational defense when used alone to varying time intervals between defense and attack, two days or one week for the second experiment, immediate in the third experiment. If the refutational defenses motivate a person to seek belief-bolstering material, this should take an appreciable amount of time. McGuire believes that combining the supportive with either refutational defense causes an immediate source of bolstering material, thus removing the need for time. An alternative explanation for the superiority of the double over the single defenses is relative message length. Since the double defenses were

twice the length of the single defenses, the effects may have been due to the additional time and material rather than to specific types of defenses complimenting each other to produce additive effects.

A fourth experiment (McGuire, 1962) explored the effects of additional threats. Ninety-six subjects participated in four treatments: supportive, refutational-same, refutational-different, and no defense. Subjects were further split into forewarning and no forewarning treatments. Forewarning was accomplished by telling subjects that the experimenter was measuring how persuasible they were by exposing them to attacks on beliefs they took for granted. As predicted, forewarning significantly enhanced resistance. The final belief level in the forewarning treatment was 11.67; no forewarning, 10.93. Support was also obtained for the prediction that the increased resistance of the supportive treatments, due to forewarning, would be greater than that of the refutational defense.

Anderson and McGuire (1965) examined the effects of reassurance, as opposed to threat. As would be expected under inoculation theory, reassuring subjects prior to administering defensive and attacking treatments decreases the immunizing effectiveness of the defenses. Using refutational-same defenses, McGuire (1963a) further investigated the reassurance factor. Four levels of reassurance, high and low reassurance and high and low threat, were used. As expected, the high threat treatments conferred

significantly more resistance than low threat at the .01 level. Surprisingly, however, high reassurance proved superior to low reassurance in resistance conferral.

McGuire explains:

. . . that reassurance promotes resistance is not necessarily in conflict with inoculation theory. The experimenter's conjecture is that if the reassurance comes before the threat, the believer's confidence in the truism is increased and his tendency not to heed the defenses is augmented. If on the other hand, the reassurance comes after the threat has already stimulated the believer's motivation to assimilate defense, then it will heighten resistance to attack (1964, p. 214).

Since the latter was true in this experiment, McGuire's explanation is consistent with a previous hypothesis regarding sequence effects (1961b) which predicted greater immunizing efficacy for the refutational-supportive defense sequence (threat followed by reassurance) than the opposite order. However, the results of the latter experiment did not support the prediction.

The six studies reviewed above deal primarily with the problem of motivating subjects to develop belief-bolstering defensive material. A second set of experiments investigated the problem of the lack of material available to defend previously unassailed beliefs.

McGuire and Papageorgis (1961) varied amounts of guided participation, materials, over four levels: unguided writing, in which subjects were given 20 minutes to write a defensive essay; guided writing, in which possible arguments for use in such an essay were suggested; reading

and underlining of crucial clauses in a 1000 word defensive essay within five minutes; and reading a 1000 word defensive essay within five minutes. Treatments were further broken down into supportive and refutational defenses. McGuire predicted that the detrimental effects of active participation (lack of supportive material) would dominate over the beneficial effects of motivation, resulting in a lowering of the immunizing effectiveness of the defenses.

Belief levels were measured after the defensive treatments, then again after the attacks two days later. The superiority of reading over writing in resistance conferral was significant at .001, confirming the main effect prediction. Reading also proved superior to writing in direct strengthening effects. McGuire and Papageorgis note that the immunizing superiority of reading over writing is especially striking considering that the time allotted for the writing defense (20 minutes) was four times that allowed for the reading.

Support was also found for the interaction hypothesis that the degree of superiority of reading over writing defenses would be greater in the refutational than in the supportive treatments. Theoretically, the refutational defense, which induces motivation but lacks defensive material, benefitted more from the addition of material than did the supportive defense, which lacks motivational efficacy but already provides materials.

One might question why McGuire predicts the dominance of the detrimental effects of active treatments, i.e., the lack of supportive material. A possible answer is that motivation can be viewed as a means to achieving a goal, which is the finding of material. It may be that the two-day interval between defense and attack provided subjects insufficient time to put motivation to effective use, and that possession of material, the goal, is more valuable than possession of motivation, a means to that goal.

McGuire (1961a) dealt with various combinations of active (writing) and passive (reading) defenses. He predicted that the passive defense would be superior to the active in refutational-same treatments, active superior to passive in refutational-different treatments. Theoretically, since the passive material is irrelevant to the attack in refutational-different treatments, the motivation-conferring active defenses should be superior. Conversely, passive material is relevant to the later attack in refutational-same treatments, causing the superiority of passive over active defenses.

In regard to combinational effects, McGuire predicted the superiority of double defenses, active plus passive, over single defenses in the refutational-same treatment, single defense superiority in the refutational-different treatment. He reports significance at the .02 level for the first hypothesis "in a weak interaction reformulation." The combinational effect prediction was confirmed at .01.

McGuire's rationale for the combinational results is that the refutational-same defense derives motivation from the active defense, material from the passive, but the refutational-different defense gains no relevant defensive material from the double defense. A possible bias inherent in the combinational treatments is message length. The double defenses are, by design, much greater in amounts of time and material than are the single defenses. Results may have been influenced by the varying lengths of time spent on defensive messages.

McGuire (1962) hypothesized that the supportive defense would confer less resistance, and that its effects would decay more rapidly than the refutational defense. He predicted that subjects would continue to be motivated by the refutational defense over time, thus partially offsetting the forgetting of material learned in the defensive session with the acquisition of additional belief-bolstering material. Secondly, McGuire predicted a more rapid decay of immunity against attacks by the same counterarguments than attacks by novel counterarguments. Theoretically, resistance in the refutational-same treatment derives from both recall of specific refutation, and the amount of belief-bolstering material acquired through motivation, which increases over time. On the other hand, resistance in the refutational-different treatment derives solely from motivation. Accordingly, a delayed action resistance effect was predicted for refutational-different treatments.

All three hypotheses were confirmed.

McGuire (1963b) examined the relative persistence of actively and passively conferred resistance. Since resistance in active defenses derives solely from motivation, McGuire predicted delayed action effects for all active treatments. Three predictions involved passive treatments. Resistance conferred by the passive supportive defense was expected to decline progressively as the interval between defense and attack increased. In theory, what little resistance the supportive defense confers is derived from the material, which is forgotten over time. Secondly, since passive refutational-same defenses derive immunizing efficacy from both materials and motivation, McGuire predicted little decline at first, then a more rapid falloff with the deterioration of motivation and retention of belief-bolstering material. Finally, a delayed-action effect was predicted for the refutational-different treatment. Again, McGuire obtained support for all predictions.

Tannenbaum (1967) has reported on a second series of systematic studies on resistance to persuasion. The research explores relationships between the principle of congruity (Osgood and Tannenbaum, 1955) and inoculation theory. Congruity theory is designed to predict the direction and magnitude of attitude change caused by linking together a source and a concept via an assertion. The application to inoculation theory is based upon a

communication situation in which a favorably evaluated source makes a negative statement about a favorable concept. Under such circumstances, congruity theory predicts a negative shift in attitude toward the concept. Tannenbaum and others examined various methods of eliminating or reducing this negative shift. Tannenbaum reasons that "any means of reducing the prevailing degree of incongruity should render the situation more congruous and thus serve to reduce the degree of attitude change" (1967, p. 277). In an initial study, (Tannenbaum, Macauley, and Norris, 1966) an attempt was made to reduce incongruity, and its corresponding negative shift, by dissociating the source from the concept. The positive source, the U.S. Public Health Service, denied any connection with statements which had been "erroneously" attributed to it. The results showed the denial treatment to be ineffective in lessening attitude change. However, Macauley (1965) found denial to be an effective immunizer when the source also took an affirmative position in the opposite direction.

Using the same communication situation, Tannenbaum et al. (1966) discovered that source derogation resulted in less incongruity, thus less attitude change. These authors also adopted some of the McGuire messages in order to partially replicate refutational defense treatments. As predicted by inoculation theory, the refutational defense proved to be the most effective immunizer. Tannenbaum accounts for the results with a congruity, rather than an

inoculation theory explanation.

A final variable tested by Tannenbaum et al. (1966) was "concept boost." It was predicted that if initial attitude toward the concept were increased in intensity, the attitude would be more resistant to negative change. The treatment was roughly akin to McGuire's supportive defense treatment. The final mean belief level for the concept boost group was 10.85, significantly higher than the 8.39 produced by the attack-only control group. Apparently, the concept boost, or supportive defense, is effective when administered by a high ethos source.

Various combinations of these strategies, including source derogation plus refutation (Tannenbaum and Norris, 1965), refutation plus denial (Macauley, 1965), source derogation plus concept boost, and denial plus concept boost (Tannenbaum, 1967) showed additive effects, each superior to its respective components as an immunizer. Again, an alternate explanation for the increased resistance conferral of the double over the single defense is message length. That is, it is possible that any one type of defense, doubled in length, would have equaled the combined effects produced by two different types of defenses in immunizing efficacy.

Two authors have applied a dissonance theory (Festinger, 1957) interpretation to resistance research. Hardyck found support for the hypothesis that individuals with consistent belief systems surrounding a given opinion

are more resistant to influence attempts directed at that opinion "when they are considering the relationships of implication among these opinions than when they are disregarding these relationships" (1962, p. 17). The opposite finding was obtained for subjects with inconsistent belief systems. In the first case, thinking about consistent beliefs produced consonance, thus less pressure to change opinion; in the latter, the discovery of inconsistent opinions were said to have created dissonance, which was reduced through opinion change.

Braden (1962) attempted to refine inoculation theory by examining its relation to cognitive dissonance. Her conclusion, that dissonance is necessary for the occurrence of a refutation effect, is somewhat misleading. The refutational defense results of McGuire and Papageorgis (1961) did replicate, but the supportive defense also proved an effective immunizer. Thus, the refutational was not superior to the supportive defense in inducing resistance. Braden's replication of procedures was not precise. For example, McGuire's messages ranged from 500 to 1000 words across experiments, with the defensive messages about 100 words longer than their corresponding attacks. Braden used much shorter messages, 250 to 400 words, with the attacking messages 100 to 150 words longer than the defensive messages. Such methodological differences may have led to the seemingly variant findings on the supportive defense.

Perhaps the most severe limitation of McGuire's work is his use of cultural truisms. McGuire (1961a, p. 332) recognized this limitation:

Had the beliefs been controversial rather than truisms, the subjects would have been more practiced in defending them, and, hence, would have participated more effectively in the active defense conditions and would have been less in need of a threatening defense-stimulating pre-exposure. Had the issues been less involving than these health ones, there would have been more to gain, in regard to motivating the subject to pay adequate attention to the material from requiring his active participation in the defense. Hence, with different types of issues we would expect resulting differences not only in the size of the obtained results, but even in the directions.

The present experiment will explore resistance to persuasion using topics varying in levels of initial belief. One relevant study has been done. Troldahl, Costello, and Robeck (1971) conducted a field experiment which tested several of McGuire's hypotheses using "controversial" issues. Eighteen interviewers took part in a house to house quota control sample. The unpublished manuscript, however, provides no explanation of their measurement techniques; nor does it discuss validation of the topic which advocated building schools partially underground for use as radioactive fallout shelters, as being a controversial topic. The only significant finding was that greater message comprehension occurred when the basic message, similar to McGuire's defensive messages, followed rather than preceded the attack. None of the basic messages conferred a significant amount of resistance to persuasion.

In the present study it was decided to use only the passive forms of the defense due to limitations in the number of subjects available. Passive defenses were selected over active defenses since they are potentially more applicable to practical concerns. For example, if the experimenter were to discover that certain active (writing) defenses were successful immunizers under certain conditions, it is unlikely that the finding could be generally applied by a persuader, since to do so he would have to induce people to write defensive messages in order to immunize themselves against an expected counter-attack. It seems more reasonable to assume that people can be induced to read messages (passive defenses) which have been prepared for them, than to produce new persuasive defenses.

The inoculation theory findings of hypotheses tested by McGuire and others will not be restated here since the experimenter's basic expectation is that these previous findings will replicate. McGuire believes the lack of motivation and the lack of defensive material to be the major barriers to achieving resistance to persuasion for cultural truisms (high-range beliefs). Motivation and defensive material are expected to play somewhat different roles regarding the middle and low-range beliefs of this study. Belief-bolstering defensive material should be less important for middle than for high-range beliefs since the subjects are likely to be more aware of the existence of arguments on both sides of the middle-range issues. Since the middle-

range beliefs are expected to fall slightly above the middle of the 15-point scale, subjects should be somewhat motivated to defend current belief levels.

The four non-replication hypotheses of this study deal with beliefs which fall into the middle-range of the 15-point scale. The first hypothesis is based upon the findings of McGuire and Papageorgis (1961) which showed the resistance-conferring superiority of the refutational-same over the supportive defense, and on the results of the Papageorgis and McGuire (1961) study which indicated that the refutational-different defense is an effective immunizer. Subjects should view the defensive messages, which advocate an increased belief level, as more in tune with their existing attitudes than the attacking messages which argue for decreased belief in the middle-range issue.

H1:

The refutational-same and refutational-different defenses will confer significantly greater resistance to attacks on topics of middle-range acceptance than will the supportive defense.

McGuire (1961) found that although the supportive defense directly bolstered beliefs, it failed to confer resistance to subsequent attack. Since subjects should already possess a level of awareness regarding the vulnerabilities of their middle-range belief, they should be able to conjure arguments in its defense. The second hypothesis is as follows:

H2:

The supportive defense will confer a significant amount of resistance to attack on the middle-range beliefs.

Refutational-same defenses proved superior to refutational-different when defense and attack were immediately contiguous (McGuire, 1961b). The finding was attributed to the lack of time allotted subjects to make effective use of the motivation-conferring refutational-different defense. In the case of middle-range beliefs, subjects should be capable of building defensive material almost immediately.

The third hypothesis:

H3:

Refutational-same and refutational-different defenses will not differ significantly in the amount of conferred resistance to attack on the middle-range beliefs.

McGuire (1962) found that resistance conferred by refutational-same and supportive defenses significantly deteriorates when defense and attack are separated by one week. Again, with a middle-range belief, subjects possess a level of awareness regarding the vulnerability of their belief, and may even have rehearsed reasons for holding the belief. Since the time interval should not reduce their motivation or ability to defend the belief, the fourth hypothesis may be stated as follows:

H4:

Resistance to attack conferred by the supportive and refutational-same defenses will not significantly decrease between immediate and delayed measures.

There is little reason to assume that inoculation theory will apply directly to low-range beliefs since inoculation theory is based upon protecting an existing belief, rather than protecting a "disbelief," i.e., a belief level which ranks in the lower portion of the McGuire 15-point scale. Accordingly, no formal hypotheses are formulated for the low-range beliefs. It may be useful, however, to speculate on possible effects of the defensive and attacking messages. Defenses which attempt to increase the level of belief on topics which rank low in current belief level may be viewed as counter-attitudinal in nature. As in the case of McGuire's cultural truisms, subjects are probably unpracticed in defending these low-range beliefs, and are likely to be unmotivated to defend them. Unlike cultural truisms, subjects will probably not become motivated to defend these "disbeliefs" as a result of threatening mention of arguments which advocate decreased adherence to the already low-range belief. Inoculation theory might predict that since subjects lack both motivation and material to defend the low-range belief, and since subjects are not likely to become motivated to do so, the defenses would be unsuccessful as immunizers. It is possible, however, that such motivation could be derived as a result of a weak form of dissonance caused by reading the defenses which, again, are slightly counter-attitudinal in nature. Dissonance research has shown that attitude change occurs as a response to counter-attitudinal acts under certain conditions.

Researchers have shown that when insufficient rewards or punishments are given for engaging in counter-attitudinal acts, dissonance may be reduced by attitude change in the direction advocated in the counter-attitudinal message (Aronson and Carlsmith, 1963; Freedman, 1965; Cohen and Brehm, 1962; Nuttin, 1966; and others). Brehm and Cohen (1959a) stated that for dissonance to occur the perception of choice, deciding whether or not to participate in the counter-attitudinal act, must be present.

In the current experiment, the only reward offered for participation is the fulfillment of a basic speech course requirement. Perception of choice should also be low, again, since participation in an experiment is required of all Speech 100 students. Still, some degree of choice should be perceived since the penalties for not participating are minimal, and since subjects may fulfill the requirement by participating in another experiment. If such a dissonance-producing, low reward situation were to occur, one might expect the defensive messages to bolster belief levels among the low-range issues. That is, since subjects would be forced to reduce dissonance produced by the belief that they have participated in a counter-attitudinal activity, reading the defensive message, and since the reward for the activity provides insufficient justification, dissonance reduction might be achieved through attitude change in the direction advocated by the counter-attitudinal defensive message. Freedman (1965) has shown that attitude change

produced by insufficient punishment persisted for up to 64 days, even in the face of subsequent conflicting information. Thus, dissonance theory would further predict that the directly bolstered beliefs would not be significantly reduced by attack.

CHAPTER II

METHOD

Subjects

A total of 144 University of Michigan students who were enrolled in the basic speech course during the winter term of 1972 served as subjects. Thirteen intact classes, ranging in size from nine to 16 students, were used to complete the data collection. Three classes with a total of 36 subjects were randomly assigned to delayed treatments. In one of the follow-up sessions, three subjects failed to report at the scheduled time. The class instructor was able to identify the three missing subjects who were then contacted by telephone and re-scheduled for the same afternoon. Anonymity was preserved since the Experimenter did not know which name coincided with an individual subject.

Design

The experiment involved three independent variables: belief level, defense type, and time, in a 3 X 3 X 2 design. The design is outlined in Table 1. Supportive, refutational-same, and refutational-different defenses were tested using both immediate and delayed attack treatments

for all three belief levels, high, middle, and low. Independent groups were used to obtain initial mean belief levels, as well as to examine the effects of the defenses without attacks and the effects of the attacks without

TABLE 1
DEFENSE AND ATTACK TYPES
FOR THE THREE BELIEF
LEVELS

Defense	Attack
Supportive	Immediate
Supportive	Delayed
Supportive	None (Control)
Refutational	Immediate-Same
Refutational	Immediate-Different
Refutational	Delayed-Same
Refutational	Delayed-Different
Refutational	None (Control)
None	Attack-Same Only (Control)
None	Attack-Different Only (Control)
None	None (Questionnaires 1 and 2)
None	None (Questionnaires 3 and 4)

defenses, again for all three belief levels. The initial belief levels were used as a point of reference from which to assess the impact of all independent variables. Twelve subjects participated in each condition.

Materials

The test booklet consisted of four parts for all subjects. Twelve immediate and 12 delayed measure subjects were employed for each of the three defense types. Thus, 72 subjects participated in these experimental conditions.

For these subjects, part one contained three defensive essays, each on a separate page and approximately 600 words in length. Part two contained the three attacking messages, approximately 500 words each, also on separate pages. The defensive and corresponding attacking messages concerned one high-range belief and either the two low or two middle-range beliefs for any given subject. On the basis of pilot-test data, the booklets were set up to contain a defensive and an attacking message for each of the three belief levels. However, the data of the control group subjects showed a reversal in the order of magnitude of the lowest middle and the highest low-range belief, resulting in the procedure described above. The third section of the booklet was a 12-item belief level questionnaire, the fourth, a rating form designed to assess the subjects' evaluation and knowledge levels concerning brand names mentioned in the experimental messages. This form was included to provide a check on the possibility of response bias due to variance across treatments in initial attitude toward the products.

Control group subjects were also exposed to three attacking and three defensive messages, followed by the questionnaire and rating form. However, the "defense-only" control group received three "filler" essays in the place of the attacking messages. The "attack-only" control group received three filler essays instead of the defensive messages, and a "no attack-no defense" control received six

such essays in place of the experimental defensive and attacking messages. In all cases the filler essays were McGuire's defensive and attacking messages on "toothbrushing." For the delayed measures, test booklets were divided into two separate booklets. The first contained the defensive essays, while the second, administered one week later, contained the attacks, questionnaire, and rating form.

The McGuire 15-point scale was used to measure belief levels on all messages. High, middle, and low-range beliefs were operationalized in terms of their relative positions on the scale. The high-range topics were those which elicited significantly higher initial belief levels than the middle-range topics, middle-range topics those which produced significantly higher belief levels than those of the low-range issues.

Belief levels were defined as a subject's scores along the 15-point continuum. Persuasion may be said to have occurred when an attacking message has produced a significant decrease in mean belief level on the 15-point scale. Operationally, resistance to persuasion occurred when a defense-attack experimental treatment produced a mean belief level significantly higher than its corresponding attack-only treatment.

Each questionnaire for measuring belief levels consisted of 12 items, four for each of the three belief levels. A subject's score on a given topic was the mean of his responses to the four items. The questionnaire may

be found in Appendix B. For those treatments which replicated McGuire's high belief level messages, the questionnaire items were also replicated. For example:

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/
Definitely			Probably			Uncertain			Probably			Definitely		
False			False						True				True	

An identical format was used to measure middle and low-range beliefs. Four forms of the questionnaire were used. This enabled both high-range topics to be coupled alternatively with the two middle or two low-range topics. To control for order effects, questionnaire items were rearranged in sequence between forms one and three, which included the "penicillin" high-range issue, and between forms two and four, which contained the other high-range issue, "chest x-rays."

The experimental messages for all defensive and attacking treatments replicated the McGuire format. The two cultural truism topics (high-range beliefs) selected for replication, "penicillin" and "chest x-rays," were selected on the basis of maximum content dissimilarity from each other and from the middle and low-range experimental messages. Two forms of the attacking messages were employed. Attack-different was used only to form the refutational-different treatment while the attack-same message followed supportive and refutational defenses to form the

supportive and refutational-same treatments.

The format for the middle and low-range beliefs was identical to that used for the high-range beliefs. Selection of low and middle-range topics was achieved through a series of pilot-tests. A total of forty topics were examined for possible use in the experiment. Selections were based upon standard deviations and means of pilot-test scores. Four messages, two with means between 4.0 and 6.5 and two with means between 7 and 9.5 on the 15-point scale in the pilot-test were selected to represent the low belief level condition and the middle belief level condition, respectively. From these, the control group subjects of the experiment itself established the two low-range (least believed) topics. These were: (1) The low quality of Japanese imports, and (2) the small number of traffic accidents attributable to vehicle failures. The two middle-range topics selected in this manner were: (1) The high quality of Japanese imports, and (2) the large number of traffic accidents attributable to vehicle failures.

Attacking messages were designed to reduce belief levels through strong arguments against a belief. They consisted of three paragraphs, the first making two statements counter to the position advocated in the defensive message, followed by two paragraphs, each developing one of the counterarguments.

As in McGuire's work, supportive defenses consisted of a statement about an issue, followed first by a paragraph

containing two supportive arguments, then by two paragraphs, each developing one of the arguments. Refutational defenses consisted of a statement about an issue, followed first by a paragraph containing two weak arguments against the statement, then by two paragraphs, each refuting one of the arguments. For the refutational-same condition, the arguments used in the subsequent attacks were the same. For the refutational-different condition, the attacking arguments were different than those used in the defense.

Administration

A random numbers table was used to place the 144 test booklets in random order for distribution to subjects during regularly scheduled class meetings. In each case, the booklets were handed out across seating rows, from left to right. Subjects were allowed to select their own seats. The 108 immediate measure booklets and 36 delayed measure booklets were randomized separately so that an entire class received either immediate or delayed treatments. Attacking and defensive messages were immediately contiguous under the immediate attack treatments, separated by a one-week interval in the delayed conditions. The questionnaire and rating form were administered after subjects had read all essays in a given treatment. All experimental messages may be found in Appendix A, the questionnaire and rating form in Appendix B.

In each experimental session, the instructions which

were included on the cover page of each booklet were read aloud. (see Appendix C). Subjects were told that the "essays have 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 of 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, three minutes for the 12-item attitude questionnaire. Subjects were also asked not to return to a page to determine previous responses, and to stop at the completion of each page to await instructions to continue. Since the responses were completely anonymous, subjects in the delayed measure groups were given numbered cards which they presented to the experimenter at the follow-up session to receive the appropriate test booklet. The same instructions were repeated at the beginning of the follow-up sessions in delayed measure treatments.

Data Analysis

Table 2 indicates the form of the statistical analysis. A 3 X 3 X 2 analysis of variance was used to examine the effects of belief level, type of defense, the time factor, and interactions. The effects of the attacks on initial belief levels were analyzed in a 2 X 3 analysis of variance which collapsed the two attack-only conditions (attack-same

TABLE 2
DESIGN FOR DATA ANALYSIS

Belief Level	Attack-Immediate			Attack-Delayed			Attack-Same	Attack-Different	No Attack		No Attack			
	S	Def	RS	Def	RD	Def	S	Def	RS	Def				
High	y		y		y		x		No Defense					No Defense
Medium	y		y		y		x							
Low	y		y		y		x							

Note. - Cells which contain y's were included in an analysis of variance test of belief level, type of defense, the time factor, and interactions. Cells with x's were used in an analysis of variance of the effects of attacks on initial belief levels. Cells with z's were analyzed with individual t tests.

and attack-different) together for comparison with the control. Analysis of variance test were followed by t tests on predictions involving individual mean comparisons. Where directional hypotheses based on previous research were formulated, one-tailed tests were used. Two-tailed tests were employed to examine differences between means where no clearcut directional hypothesis was predicted. The .25 level was selected as the appropriate significance ratio for the null predictions.

CHAPTER III

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

Condition	<u>Belief Level</u> ^a		
	High	Middle	Low
Supp.-Imm.	9.04 ^b (1.85) ^c	8.36 (1.91)	6.36 (2.08)
Ref.-Same Imm.	9.79 (3.08)	9.75 (3.53)	6.94 (2.71)
Ref.-Diff. Imm.	8.31 (2.74)	8.71 (3.49)	7.36 (2.78)
Supp. Delayed	9.69 (2.89)	8.11 (3.16)	4.53 (1.74)
Ref.-Same Del.	9.61 (2.11)	7.46 (2.59)	8.15 (2.98)
Ref.-Diff. Del.	8.02 (4.19)	9.54 (2.91)	6.07 (2.81)
Attack-Same Only	8.67 (1.79)	7.92 (3.61)	5.67 (1.87)
Attack-Diff. Only	7.85 (3.99)	7.36 (2.63)	5.01 (1.83)
Supp. Def. Only	12.67 (1.65)	10.53 (2.34)	6.98 (2.44)
Ref. Def. Only	11.54 (2.38)	8.22 (3.11)	8.09 (3.31)
No Def.-No Att. Control (Questionnaire 1 & 2)	10.96 (2.73)	9.23 (2.04)	7.06 (2.04)
No Def.-No Att. Control (Questionnaire 3 & 4)	10.52 (2.30)	8.67 (2.68)	6.90 (2.65)

^a15.00 indicates complete adherence to belief.

^bN=12 for all cells.

^cNumbers in parentheses are standard deviations.

The standard deviations in the conditions of this study ranged from 1.65 to 4.19 in the high-range beliefs, from 1.91 to 3.53 in the middle-range beliefs, and from 1.74 to 3.31 in the low-range beliefs.

According to the results of the "rating form," response bias due to subject differences in evaluation and knowledge levels of product names did not occur. Using a five point scale ranging from 1 (very low knowledge) to 5 (very high) the mean knowledge level was 2.09 for all treatments, with a range of 1.48 to 2.67. Thus, no treatments produced knowledge levels above "medium" which was represented as 3.0 on the scale. Subject ratings of products ranged from 2.67 to 3.49, on a scale ranging from 1 (poor) to 5 (excellent). The mean rating for all treatments was 3.31, slightly above the halfway point (no opinion) on the scale.

In order to examine the immunizing effects of the three types of defenses on subsequent attacks, it was necessary that these attacks significantly reduce initial belief levels. If an attack were unsuccessful, the value of a defense would be questionable. Table 4 contains an analysis of variance of the attack-only data from Table 3 in a 3 (high, middle, low) X 2 (control, attack-only) design.

The analysis of variance tests in this study treated the two attack-only conditions, attack-same and attack-different, as a single attack-only group. Similarly, the

two no attack-no defense control conditions (hereafter referred to as the "control") were treated as a single control group. Thus, Table 3 shows that the mean belief level in the low-range condition was 6.98 with no attack and no defense (control condition) and 5.36 with an attack-only. For the middle-range topics, the control group mean was 8.95 and attack-only, 7.64.

TABLE 4
ANALYSIS OF VARIANCE OF ATTACK-ONLY
AND CONTROL DATA ON INITIALLY
LOW, MIDDLE, AND HIGH
RANGE BELIEFS

Source of Variation	SS	df	MS	F
Belief level (A)	275.9713	2	137.8565	19.515**
Attack (B)	117.8048	1	117.8048	16.797**
A X B	8.5010	2	4.2505	.606
Error	967.8897	138	7.0138	
Total	1,370.1768	143		

** $p < .01$.

F.99 (2-138) = 4.79

F.99 (1-138) = 6.85

The high-range topics produced a mean belief level of 10.74 for the control condition and 8.28 for attack-only. The main effect of the attack factor (Table 4) compares the initial belief level (control) and the attack-only conditions. Individual t tests performed between the control and attack-only means within each belief level produced t ratios significant at the .01 level for low and high-range topics, and at the .05 level for the middle-range topic

(t tests are one-tailed unless otherwise noted). As would be expected, a significant F ratio (.01) was obtained for the belief level factor which was designed to contain three levels of belief. The interaction between the belief level and attack factors was non-significant.

Analysis of variance was also used to examine main effects of the initial belief level, type of defense, the time factor, and interaction. The results are reported in Table 5.

TABLE 5
MAIN AND INTERACTION EFFECTS
FOR ALL TREATMENTS INVOLVING A DEFENSE
AND AN ATTACK

Source of Variation	SS	df	MS	F
Belief level (A)	263.36	2	131.68	14.70**
Type Defense (B)	26.30	2	13.15	1.47
Time (C)	7.97	1	7.97	
A X B	28.48	4	7.12	
A X C	5.31	2	2.655	
B X C	.63	2	.315	
A X B X C	81.08	4	20.27	2.26
Error	1,774.32	198	8.96	
Total	2,187.45	215		

**p < .01.

F_{.99} (2-198) = 4.71.

Again, the belief level factor elicited the expected significant F ratio. Neither type of defense nor the time factor reached significance. The 2.26 F ratio obtained for the ABC interaction is close to the .05 level (F_{.95} = 2.42) and is significant at the .10 level (F_{.90} = 1.97).

Comparisons of Individual Means: McGuire's High-Range Beliefs

McGuire has termed the direct strengthening effect of the supportive defense, coupled with its lack of resistance conferral, the "paper tiger effect." Operationally, the paper tiger effect occurs when the supportive defense-only condition produces a mean belief level significantly higher than that of the initial control condition. In the present experiment, the supportive defense-only treatment produced a mean belief level of 12.67, compared to the control level, 10.74, ($p < .05$, t test). As can be seen in Table 3 the supportive defense, when followed by an attack, elicited a mean of 9.04 which is significantly lower than the 10.74 control level ($p < .05$, t test). The "paper tiger" phenomenon, therefore, did replicate.

In contrast to Papageorgis and McGuire (1961) neither the refutational-same nor refutational-different defenses produced mean belief levels significantly higher than their corresponding attack-only treatments. The refutational-same defense came closest ($p < .10$, t test). According to the definition of resistance used by McGuire and also in this study, resistance occurs when a defense-attack condition produces a mean belief level significantly higher than its corresponding attack-only treatment. In this sense, resistance did not occur under any defense condition.

Delayed Effects

Comparing the means produced by each defense when

attacked immediately and after seven days, McGuire found the supportive defense mean to be smaller ($-.89$) in the delayed than in the immediate attack treatments. Refutational-same and refutational-different means were also smaller after one week, -1.87 and $-.73$, respectively. In the present experiment the supportive-delayed treatment produced a slightly higher mean than that of supportive-immediate ($+.65$) while refutational-same and different defenses decreased at $-.18$ and $-.29$, respectively. McGuire did not report whether the reductions were significant. The changes observed over time in the current experiment were not significant.

Middle-Range Beliefs

The first hypothesis predicted superiority of resistance conferral for both refutational-same and refutational-different defenses over supportive defenses. Although the corresponding mean belief levels are in the predicted direction (see Table 3), significant differences were not observed among the three. Furthermore, the three defenses failed to achieve significantly higher mean belief levels than their corresponding attack-only treatments, attack-same 7.92 and attack-different 7.35 . Thus, all three defenses failed to supply resistance according to the McGuire definition used in this study.

The second hypothesis, which predicted that the supportive defense would confer an appreciable amount of resistance, received only minor support. The supportive

mean belief level (8.36) fell about halfway between the initial control level (8.95) and its corresponding attack-only treatment, attack-same (7.92). The 8.36 is not significantly larger than the 7.92, and is not significantly smaller than the 8.95 control level ($p > .40$, two-tailed t test). Thus, although the supportive defense did not supply resistance according to the operational definition of resistance, it did reduce the effects of the attack to a non-significant level.

Confirmation was obtained for hypothesis three, which stated that the two types of refutational defenses would not differ in immunizing efficacy. The 9.75 mean produced in the refutational-same treatment was not significantly different from that of refutational-different, 8.71 ($p > .40$, two-tailed t test). Neither refutational defense produced significantly higher mean belief levels than their corresponding attack-only treatments which were 7.92 and 7.35, respectively.

Delayed Effects

A final hypothesis regarding middle-range beliefs predicted that the time factor would not reduce the amount of resistance conferred by refutational-same and supportive defenses. Although the prediction was borne out for the supportive defense ($p > .60$, two-tailed t test), it was not clearly supported for the refutational-same defense, in which the mean belief level decreased over time from 9.75

to 7.46 ($p < .10$, two-tailed t test).

Two other mid-level belief findings are worth mentioning. The refutational-different condition belief level (9.54) was appreciably greater than that of refutational-same (7.46) when defense and attack were separated by seven days, ($p < .10$, two-tailed t test). Secondly, McGuire's paper tiger effect did not occur with the middle-range beliefs. The supportive defense-only condition produced a mean belief level of 10.53 which was significantly higher than the 8.95 control level ($p < .05$, t test). However, when followed by an attack, the supportive defense elicited a mean belief level of 8.36 (immediate attack) which was not significantly less than the 8.95 control level ($p < .40$, two-tailed t test). The 8.11 mean belief level of the supportive delayed condition also was not significantly smaller than the 8.95 control mean ($p < .30$, two-tailed t test).

Low-Range Beliefs

As in the case of the middle-range beliefs, the paper tiger effect did not occur for the supportive condition of the low-range beliefs. In fact, the supportive defense-only condition (6.98) did not directly bolster the control mean belief level which was also 6.98.

Among the low-range beliefs only the refutational-same defense of the delayed attack condition produced a mean belief level (8.15) which was substantially higher

than its corresponding attack-only condition (5.67; $p < .10$, two-tailed t test). On the other hand, only one of the low-range conditions involving both a defense and an attack elicited a mean belief level which was significantly lower than the initial control mean. This was the supportive defense-delayed attack condition which produced a mean of 4.53 compared to the 6.98 mean of the control condition. Thus, in five of the six defense-attack treatments, the low-range defenses reduced the effects of the attack to a non-significant level.

The refutational-same and refutational-different means were not significantly altered by the one-week time interval. However, the mean belief level of the supportive defense decreased from 6.36 to 4.53 over one week ($p < .05$, two-tailed t test).

CHAPTER IV

DISCUSSION

Replication Findings: High-Range Beliefs

Although many of the replicated treatments produced findings consistent with earlier research, the mean belief levels were seldom as extreme as those reported by McGuire. First, the control mean belief level for the high-range beliefs (cultural truisms) was 10.74 for the present study, compared to 12.62 for McGuire and Papageorgis (1961). The increases in belief levels produced by the supportive defense-only treatments in this and in the McGuire and Papageorgis study were to 12.67 and to 14.34, respectively. The lower scores of the present study may be due to differences in the populations sampled, or perhaps what was a "truism" in 1962 is less so in 1972. When attacked immediately the supportive defense produced a mean belief level of 9.04. Thus, the effects of attack were also less extreme than the 7.39 mean for the supportive immediate condition reported by McGuire and Papageorgis (1961). If, indeed, the penicillin and x-ray topics are less believed today than they were 10 years ago one might predict that the effects of the attack would also be reduced. That is, McGuire believes

that the truisms are highly susceptible to attack because receivers have seldom, if ever, heard them attacked. The receivers are unpracticed in defending the beliefs and, in the absence of threat, unmotivated to do so. As a result of this lack of both practice and motivation the attacks without defenses are highly successful. On the other hand if the beliefs are less adhered to, perhaps they are not truisms in the McGuire sense (beliefs which subjects have seldom, if ever, heard attacked). It is possible that subjects are aware of certain arguments concerning these issues. Perhaps they have heard them attacked and defended on several occasions. If so, the subjects should be able to conjure defensive material more easily than was expected in the McGuire studies. In addition, a lower belief level which subjects have heard attacked is probably more solidly founded than a high level belief which they have never heard attacked. It is based upon an awareness of pro and con arguments and is less likely to be severely altered than a blindly held belief when exposed to a single attacking message.

An alternative explanation for the less extreme scores of the current study might be regression toward the mean. McGuire selected from a long list of topics only those which fell at the high extreme of the 15-point scale. It is possible that some of the items were pushed toward the extreme through chance measurement errors. The less extreme scores of the present study could then be explained in terms of regression toward the mean. However, such an

explanation must account for the fact that McGuire has replicated the issues several times and has consistently obtained similarly extreme scores. (1961a, 1961b, 1962, McGuire and Papageorgis, 1961).

An examination of the means which were obtained individually for the two high-range topics in the supportive-immediate condition of this study shows that while the x-ray issue elicited a mean belief of 7.83, that produced by penicillin issue was considerably higher at 10.25. Further comparisons of the two topics across treatments shows a consistent tendency of the penicillin issue to produce relatively high mean belief levels, indicating a general immunity toward the effects of the attacks. The penicillin issue elicited these higher means even though its control mean (10.65) was slightly lower than that of the x-ray issue (10.83). Table 6 summarizes the results. The grand mean belief level for the penicillin issue is considerably higher than that of the x-ray issue in the present study. Perhaps medical use of penicillin today is so universal that arguments against its worth are viewed as incredible.

McGuire (1962) reported similar findings for these two high-range issues in that the penicillin scores were somewhat higher than those produced by the x-ray issue. Using both refutational-same and refutational-different defenses in immediate and two-day delayed conditions, he obtained a mean over all four conditions of 12.41 for the penicillin issue and 9.42 for the x-ray topic. Since McGuire

TABLE 6
COMPARISON OF MEAN BELIEF LEVELS
PRODUCED BY X-RAY AND
PENICILLIN ISSUES

	Pencillin	X-Ray	Combined
Supp.-Imm.	10.25	7.83	9.04 (9.71)
Ref.-Same Imm.	9.50 (12.59) ^a	10.08 (10.10)	9.79 (11.36)
Ref.-Diff. Imm.	10.79 (11.92)	5.83 (8.96)	8.31 (10.41)
Supp. Delayed	11.25	8.13	9.69 (8.82)
Ref.-Same Del.	10.58	8.63	9.61 (9.49)
Ref.-Diff. Del.	11.17	4.88	8.02 (9.68)
Attack-Only	10.32	6.23	8.28 (8.49)
No Def-No Attack (Control)	10.65	10.83	10.74 (11.74)
Grand Mean	10.56 (12.26)	7.81 (9.53)	9.20 (9.96)

^aNumbers in parentheses are taken from McGuire (1962, pp. 245-246). McGuire's overall means are of four issues, also including messages on toothbrushing and annual physical check-ups. McGuire did not provide issue by issue submeans in those cells where none are shown.

used four topics, the scores of the pencillin issue had a smaller impact on the grand mean over all conditions and all topics than that observed in the current study which used only two such high-range issues. Although McGuire analyzed his data in terms of combined means on all four truisms, he reported that the individual issues were a highly significant ($p < .001$) source of variance (1962, p. 246). In the present experiment the relative immunity to attack of the penicillin issue contributed heavily to the lack of a

significant difference between refutational and supportive defenses over both topics. McGuire and Papageorgis (1961) obtained mean belief levels of 11.13 for the refutational-same defense and 7.63 for the supportive defense in their "reading and underlining" treatment. The present experiment produced corresponding scores of 10.08 and 7.83 for the x-ray topic but 9.50 and 10.25 for penicillin. Thus, Table 6 shows that although the difference in the effects of refutational and supportive defenses over all topics combined was in the same direction as that reported by McGuire, the difference was non-significant.

One reason that the defenses did not confer a significant amount of resistance in the current study is because the attack-only condition reduced the control level from 10.74 to 8.28, a drop of only 2.53. Though the decrease was significant ($p < .01$, F test) the defensive messages were thus charged with the task of producing mean belief levels significantly higher than 8.28 to achieve resistance. The McGuire series of studies consistently reported much greater effects of the attack-only conditions. For example, McGuire and Papageorgis (1961) reported a control mean of 12.62 and an attack-only mean of 6.64, a drop of 5.98. Papageorgis and McGuire (1961) obtained a control mean of 13.23 and an attack-only mean of 5.73, a decrease of 7.50. In these two studies the task of conferring resistance was much "easier" than in the current replication. The defenses needed only to produce mean belief levels significantly higher than the

vastly decreased means of the attack-only condition. Since the initial control levels were so high, the defensive messages easily achieved this effect. McGuire and Papageorgis (1961) reported a refutational-same defense mean of 10.33, while the Papageorgis and McGuire (1961) study showed a refutational-same defense mean of 9.25 and a refutational-different mean of 8.70. Though each of these means was significantly higher than its corresponding attack-only condition, it may also have been significantly lower than its initial control belief level. This fact suggests an alternative method of measuring resistance. It seems logical that a defense which produces a mean belief level that is significantly higher than its attack-only condition and not significantly lower than the initial control level is a more effective immunizer than the defense which produces a mean significantly higher than that of the attack-only condition, but also significantly lower than the initial control mean.

A 3 X 2 analysis of variance was performed to examine the effects of the two issues (penicillin and x-ray) under each defensive condition (supportive, refutational-same, and refutational-different). The results are shown in Table 7.

The main effect of the issues was significant at 8.63. This is in agreement with McGuire's (1962) analysis which included belief levels over four conditions of 12.41 for the penicillin issue, 9.42 for the x-ray issue, 10.18 for his toothbrushing issue, and 12.04 for the annual physical check-up issue. McGuire's (1962) study does not report a significant

TABLE 7
ANALYSIS OF VARIANCE OF HIGH-RANGE
ISSUES ACROSS THE THREE
DEFENSE TYPES

Source of Variation	SS	df	MS	F
Issues (A)	45.56	1	45.56	8.63**
Type Defense (B)	13.50	2	6.75	1.28
A X B	45.50	2	22.75	4.31*
Error	158.44	30	5.28	
Total	263.00	35		

** $p < .01$, * $p < .05$
 $F_{.99}(1-30) = 7.56$
 $F_{.95}(2-30) = 3.32$

interaction between issues and treatments. However, the current study found a significant interaction between issues and defense types ($p < .05$). This suggests that the amount of resistance produced by defensive messages against counter-arguments may be topic-bound and not universal for all "health truisms." That is, within the spectrum of topics that McGuire calls cultural truisms, some topics tend to lend themselves more readily to inoculation theory than others. At this point it would be difficult to say whether the topic itself, inequities between the persuasiveness of the messages used to defend and attack each topic, or some other variable caused the differences in results obtained between the two truisms (high-range issues) replicated in this study. Some evidence that the topics themselves tend to elicit variant responses can be seen in Table 6 which

shows that the defenses of the penicillin issue produced much higher mean belief levels for the supportive and refutational-different conditions, but a slightly smaller mean for the refutational-same condition than did the x-ray defenses of this study. The supportive and the refutational-different defenses are similar in that neither discusses the same arguments as used in the attack. It is possible that subjects in this study were more aware of defensive arguments on the penicillin issue, and thus more able to defend it than the x-ray issue without benefit of refutational information on the same arguments used in the attack. Most of the subjects have probably benefitted from the use of penicillin at some time. Perhaps the material proof of the worth of penicillin serves as immunizing ammunition against attacks on the issue. The experience of being cured by penicillin may provide both motivation and material with which to defend the belief. Although all subjects in this experiment have had chest x-rays (University requirement) the experience is probably less impressive than being cured by penicillin and consequently less likely to evoke positive cognitions and feelings toward the issue. Usually, the chest x-ray is a routine examination which confirms that a person is healthy. Thus, without the refutational-same defense, subjects lack both the motivation and material to defend the x-ray belief.

An additional possibility is suggested by the fact that the two issues elicited highly similar control belief

levels in this study. The penicillin issue control mean was 10.65 and the x-ray mean was 10.83. It is conceivable that while these initial surface reactions to the two issues were similar, the x-ray issue was more vulnerable to attack due to misgivings the subjects might have had about the effects of radiation received during an x-ray. If subjects held such misgivings at some level of consciousness, the attacking messages, which included an argument that radiation from x-rays causes cancer may have triggered these feelings and produced a highly effective attack.

The supportive defense yielded a non-significant increase from 9.04 to 9.69 between immediate and delayed measures. Both the penicillin and x-ray issues contributed to this increment. Conversely, McGuire (1962) reported that what little resistance the supportive defense conferred against immediate attacks decayed ($p < .05$) almost completely within two days. The finding was explained in terms of gradual forgetting of the belief bolstering material contained in the supportive defense messages. He, thus, predicted a simple decay function, with the effects of resistance decreasing over time. McGuire (1962) reported a supportive defense decay from 9.71 to 8.51 over a two-day interval, but an increase back to 8.82 after seven days. Though the reversal is probably not statistically significant, McGuire's monotonic time trend prediction was not clearly supported. Moreover, in view of the small increase (9.04 to 9.69) over time obtained in the present experiment,

one wonders whether the belief level might continue to increase up to a certain time. The possibility is worth exploring.

McGuire attributes the immunizing success of the refutational-same defense to its motivation-conferring efficacy. Beliefs are, theoretically, perceived as vulnerable; subjects are motivated to conjure defensive material. According to inoculation theory such motivation is not induced by the supportive defense, which provides information that is perceived as obvious, or trivial. However, certain demand characteristics appear to be present in the McGuire design. Demand characteristics as defined by Orne (1962, p. 779) refer to the "totality of cues which convey an experimental hypothesis to the subject." Orne believes that subjects engage in a problem-solving process aimed at discovering the experimenter's hypotheses, then act so as to support the hypothesis. It is conceivable that McGuire's procedures arouse some degree of suspicion when subjects find themselves presented with the "obvious," supportive information. That is, a subject may question the motives for being asked to read arguments in support of ideas which are so obviously true. If McGuire's subjects really perceived the truisms as unassailable (McGuire, 1964, p. 201) they may also have questioned the reasons for the attention given to 600 word supportive essays. It is possible that subjects became sensitized to the issues, as least to the point of consciously considering the beliefs which they had

previously taken for granted. Any suspicion-arousal created by such demand characteristics should confer some amount of the motivation previously ascribed solely to the refutational defense. To the extent that motivation to think about the belief compensates for the ignoring or forgetting of belief-bolstering material provided by the supportive messages, the supportive defense should not suffer a temporal decrease in mean belief level.

This does not explain, however, the reversal in direction of change between the findings of McGuire (1962) and those of the present experiment. Perhaps certain departures from the McGuire procedures are responsible. The current experiment employed independent control groups for comparison with experimental group data. McGuire rotated subjects around treatments, with each subject supplying either experimental or control group data on all four issues. McGuire also administered a personality test to his subjects immediately before their completion of the belief level questionnaire. Although this was done to help substantiate the alleged purpose of the experiment (investigation of personality correlates of verbal skills) the technique may have had an effect on subsequent responses. Rosenberg's (1965) concept of evaluation apprehension suggests that subjects may become fearful that their behavior is being evaluated. According to Rosenberg, a subject experiences "an active anxiety-toned concern that he win a positive evaluation from the experimenter, or at

least that he provide no grounds for a negative one [p. 29]."

Although it is not possible to conclude whether such evaluation apprehension was operative in McGuire's experiments, or how it might have affected questionnaire responses, the personality test may be one source of difference between the McGuire findings and the results of the present study.

Middle-Range Beliefs

The initial belief level for the middle-range beliefs (8.95) is located slightly above the mid-point on the 15-point continuum, and is well within the range of the "uncertain" category which includes points 7, 8, and 9 on the scale. Results were expected to conform to those of McGuire and Papageorgis (1961) and Papageorgis and McGuire (1961) which showed the refutational-same and refutational-different defenses to be effective immunizers. However, neither the refutational nor the supportive defenses conferred a significant amount of resistance. One reason for the failure of the defenses is that the attacks, though significant, did not reduce initial belief levels as severely as in the McGuire research. As previously discussed, since McGuire measures resistance in terms of the difference between a defense-attack condition and the attack-only condition, it is easier to achieve resistance when the attack reduces the initial control mean to the lowest level possible, thereby allowing the defensive condition mean to be significantly lower than the initial control mean, but still

significantly higher than the attack-only condition.

An alternative explanation for the lack of immunizing effectiveness of the middle-range defenses is suggested by the notion that the topics themselves may have been low in salience. It is conceivable that topics concerning the quality of Japanese commodities and automobiles and accident causation were low in salience for the subjects. If the subjects felt little personal involvement in the issues, one might predict that defensive and attacking messages would independently achieve a substantial amount of attitude shift. The attack-only and the supportive defense-only conditions did produce significant shifts from the initial control level (both $p < .05$, t tests). However, under treatments where both defensive and attacking messages were used, subjects' attitudes may have been changed about equally in both directions, resulting in a mean belief level not significantly higher or lower than the control mean. The fact that the refutational defense-only treatment did not produce a significant shift in mean belief level is consistent with such a rationale since the refutational defense presents subjects with both sides of the issue, and subjects may again have been equally influenced by the two conflicting arguments.

Among the middle-range beliefs, then, the supportive and refutational-different defenses functioned only to the extent that they reduced the effects of the attack to a non-significant level. The refutational-same defense,

which previous research, (McGuire, 1964; Tannenbaum, 1967) has consistently shown to be the most effective immunizer for high belief level topics, did establish its superiority for the middle-range beliefs in an indirect manner. Though the refutational-same defense failed to produce a mean belief level significantly higher than the other defense types, it was the only defense which elicited a mean significantly higher than the overall attack-only control group mean ($p < .05$, t test).

Confirmation was obtained for the third hypothesis which predicted that the refutational-same defense would not produce greater resistance than the refutational-different defense. McGuire (1961b) attributed the superiority of the refutational-same over the refutational-different defense to the lack of time allotted subjects to conjure belief-bolstering material to defend the previously unassailed belief. It was anticipated that when confronted with middle-range beliefs, subjects would already be aware of the existence of certain pros and cons toward the issues, and perhaps might even have rehearsed related arguments. Thus, the refutational-same defense was not expected to confer greater resistance than the refutational-different defense. That neither of the refutational defenses (nor the supportive defense) produced a mean belief level significantly higher than its corresponding attack-only treatment may have been a function of an attack which reduced the control level significantly at only .05 thus allowing too

little room between the control and attack-only means for the defense to produce a mean significantly higher than the attack-only mean.

Low-Range Beliefs

As in the case of the high and middle-range beliefs, the defensive messages for low range beliefs were designed to increase the initial belief levels, with attacking messages designed to reduce them. Since the belief levels were initially low, the defensive messages were close to counter-attitudinal in nature. As no measure of dissonance was obtained (such a measurement might have invalidated the replications of the McGuire work) it is not possible to ascertain whether reading the 600 word near counter-attitudinal messages produced dissonance.

If the defensive messages, which argued for the high level acceptance of an existing low-level belief, were counter-attitudinal in nature, subjects might have experienced anxiety or dissonance between the existing belief on the one hand and the counter-attitudinal defense on the other. The subjects would be expected to reduce any resultant dissonance through some justification for their participation in the somewhat counter-attitudinal task. Festinger (1957) and others have shown that one method of reducing dissonance is attitude change in the direction advocated by the counter-attitudinal message. Since in the current experiment subjects had a certain amount of choice

as to whether to participate (see Brehm and Cohen, 1959a) dissonance theory might predict that dissonance reduction would be achieved via attitude change. From a dissonance standpoint, a possible explanation for the failure of the defense-only treatments to increase initial belief levels is that the messages were not significantly counter-attitudinal to create dissonance. The initial control level for the low-range topic was 6.98, not far from the middle of the 15-point scale. It might be useful to replicate the procedures with belief levels which fall around points three and four on the scale. Another dissonance-oriented explanation for the failure of the defense-only treatment to increase the initial control level is that subjects were able to reduce dissonance by justifying their efforts in reading the counter-attitudinal essays in alternative ways. For example, they may have justified their behavior in terms of fulfilling a course requirement or learning new information.

As in the treatments involving middle-range defenses, some of the low-range defensive messages were successful in reducing the effects of attack to a non-significant level. In all low-range treatments except the supportive-delayed condition, the defensive messages were not significantly lower than their corresponding initial control means. Without the defenses the attacks were highly successful, having reduced the initial mean belief level from 6.98 to 5.36 ($p < .01$, F test). This finding is particularly

intriguing since low-range defenses were essentially counter-attitudinal, while the attacks, which attempted to reduce the already low level beliefs, were primarily of a reinforcing nature. It is possible that reading the counter-attitudinal defensive essays produced just enough dissonance between existing beliefs and those endorsed by the defensive messages to ward off the effects of the attacking messages. That is, in order to justify time and effort spent in reading the somewhat counter-attitudinal defensive messages, subjects may have accepted and used some of the defensive information to refute the arguments advanced by the attacking messages. Of the six mean scores obtained in defense-attack treatments, including both immediate and delayed measures, only the supportive-delayed defense failed to reduce the effects of the attack to a non-significant level. This result is similar to the findings of Hovland, Lumsdaine, and Sheffield (1949, pp. 224-225) on the superiority of two-sided over one-sided messages for both educated receivers and those initially opposed to the advocated viewpoint.

McGuire's (1961b) experiment on restoration effects may be relevant to the low-range belief findings. By reversing the order of administration of his defensive and attacking messages, McGuire created a design somewhat similar to that of the present low-range condition. McGuire presented the attacks prior to the defenses to examine whether the defensive messages could restore belief levels after attacks, as well as immunize against subsequent

attacks. Messages which attack beliefs that are as strongly held as cultural truisms may certainly be labeled counter-attitudinal. McGuire found little difference between the two sequences, and concluded that "the overall difference between immunization and restoration procedures was negligible [p. 192]." Both sequences consistently produced mean belief levels significantly greater than McGuire's attack-only condition when defenses and attacks were immediately contiguous. In the current experiment, none of the defenses of the high-range, middle-range, or low-range beliefs achieved resistance when attacks immediately followed defenses. Possible reasons for the lack of immunizing effectiveness of the defenses have already been discussed. Another possible explanation for the differences between the results of McGuire and those of the current study is sample size. While McGuire employed anywhere from 24 to 80 subjects per cell in his experiments, the current study used 12 subjects per cell. It is conceivable that a large sample would have produced results even more consistent with inoculation theory since with a larger sample a small difference is more likely to show up as significant.

Among the low-range beliefs, the refutational-different defense produced a mean belief level significantly higher than that of its corresponding attack-only treatment ($p < .05$, t test), while the refutational-same defense did not. One explanation for the result might be that refutational-same counter-attitudinal messages were competing

directly with attacks which reinforced existing beliefs, while the refutational-different defense, by design, argued related, but different points.

Interaction

Table 5 reports a Belief Level X Defense Type X Time interaction which comes close to significance ($p < .10$, F test). As previously discussed, a reversal in the order of magnitude of initial mean belief levels obtained between pretest (pilot) and experimental control groups occurred. This dictated the treatment of all three factors as independent. Had the belief level factor been correlated the resultant error term may have been reduced, possibly increasing the significance level of this three-factor interaction.

Summary

McGuire's research has repeatedly shown that the refutational-same defense ranks as the most effective immunizer, followed by the refutational-different and supportive defenses in that order. Combining the six means produced by the refutational-same defense in this study, including the high, middle, and low-range versions of both immediate and delayed measures, a grand mean of 8.62 is obtained. The corresponding grand mean for the refutational-different defense is 8.00, and for the supportive defense it is 7.68. Thus, these grand means produced mean belief levels which are in the order which inoculation theory would predict.

The supportive defense seems to have achieved its greatest effects in the middle and low-range immediate measure conditions and in the middle-range delayed measure condition. In each of these cases the supportive defense mean belief level was not significantly lower than the initial control level. In no conditions did the supportive defense produce a mean belief level significantly higher than its corresponding attack-only mean. Thus, in the McGuire sense, the supportive defense did not achieve resistance to persuasion under any of the conditions.

As in the case of the supportive defense the refutational-same defense failed to produce a mean belief level which was significantly higher than its corresponding attack-only treatment under any of the conditions. However, the refutational-same defense came the closest of any defense to achieving resistance-conferral. This occurred in the low-range delayed attack condition ($p < .10$, two-tailed t test). The refutational-same defense also produced mean belief levels which were not significantly lower than the corresponding control means in the mid-range immediate measure condition and in the delayed conditions of both middle and low-range beliefs.

The refutational-different defense produced mean belief levels which were not significantly lower than the initial control mean in the low-range immediate measure condition and in both immediate and delayed measure conditions of the middle-range beliefs. The mean belief levels

produced by the refutational-different defense among the high-range beliefs were the lowest of any defense type.

The replication (high-range) conditions of this study furnished partial support for McGuire's inoculation theory. Although none of the three defense types conferred a significant amount of resistance to persuasion, the result was explained in terms of a significant variability between the two replicated topics. It appears that the inoculation approach to resistance is not universally effective across all health truisms. Demand characteristics and departures from the McGuire design were discussed as possible causes of the failure to replicate. Confirmation was obtained for McGuire's paper tiger effect of the supportive defense.

The middle and low-range defenses of this study were ineffective immunizers, except in the sense that some defenses reduced the effects of attack to a non-significant level. It was suggested that more ego-involving topics may have motivated subjects to defend current beliefs, thus rendering the middle-range defensive messages more effective. Finally, an experiment which employs initial belief levels which fall around points three or four on the 15-point scale is needed to more fully explore the role of counter-attitudinal behavior in inoculation theory.

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APPENDIX A
EXPERIMENTAL MESSAGES

[Supportive Defense: High-Range Belief]

The Importance of an Annual X-Ray Exam for Detecting TB

Great progress through medical research has been made in the past fifty years in the fight to control, detect, and cure TB (tuberculosis). At the turn of the century this disease was the nation's No. 1 killer. In the past few decades, however, TB has been reduced to a minor and well-controlled health problem. The most important single weapon that has made this historic advance possible has been the widespread adoption by the American people of the practice of getting annual chest X-Ray examinations, which remains the best way of detecting TB symptoms in their earliest stages. In order to maintain the gains which have been made, the public's continued cooperation in this X-Ray campaign is essential. The chest X-Ray is the surest way of detecting TB symptoms, thus providing maximum protection from this highly contagious disease, not only for the patient himself but also to his loved ones and others with whom he comes in contact. Furthermore, the annual chest X-Ray examination gives assurance that TB will be detected in its earliest stages when the cure is easy, painless, and complete. Let us explore more thoroughly the reasons which make the annual chest X-Ray so important for the detection of TB symptoms.

The chest X-Ray is extremely important because it is the only sure way of detecting TB. This disease can seldom be recognized by outward symptoms. People who have TB and have not had chest X-Rays, very rarely know it until it is far advanced, because the first outward symptoms are so slight that they are usually either ignored entirely or mistaken for a common cold. However, through the miracle of X-Rays, we can get a picture of the patient's lungs that will clearly show any signs of TB. With other methods, TB symptoms may go unnoticed, but when a chest X-Ray is used, the symptoms are always detectable. The detection of this disease is a vital necessity not only for the sufferer himself but for his loved ones and associates. TB is a contagious disease and a person who does not realize that he has it will be exposing his family, friends, and others with whom he comes in contact to the danger of getting the disease. Therefore, the annual chest X-Ray is extremely important for the patient and for the public at large because only through annual chest X-Ray examinations can we be confident that TB symptoms are detected.

One extremely important aspect of the chest X-Ray examination is that it can detect the disease in its very early stages, when it is easily cured. Since TB destroys

lung tissue, it is extremely important to diagnose and treat it as soon as possible, for the earlier it is discovered, the greater are the chances for a quick and complete recovery. Once the disease is discovered, modern medical treatment can stop further destruction of the lung tissue, but it cannot restore the tissue already damaged before the disease was discovered. The annual chest X-Ray assures early detection of the disease when treatment is so simple that in most cases the patient does not even have to be hospitalized. If the disease is not diagnosed until the more obvious symptoms appear and the disease is in the advanced stages, it may be too late to avoid serious and even fatal consequences. Treatment of TB in the late stages takes a long time and is quite expensive. And even if the patient lives, the disease has usually caused so much damage that he is partially incapacitated for life and is exposed to the danger of a later re-occurrence of the disease. On the other hand, if we faithfully carry out the necessary precaution of getting an annual chest X-Ray, we can be sure of quick and successful cure and prevent TB from ever again becoming the No. 1 killer in the U.S.

[Supportive Defense: High-Range Belief]

Penicillin: The Miracle Drug

Medical authorities are generally agreed that one of man's greatest steps in the fight against disease and death was achieved in this century by the discovery and use of penicillin. Innumerable benefits have been derived from the use of this now indispensable drug. Penicillin has an unmatched ability to cure a wide range of diseases against which no other drug is effective. Furthermore, penicillin combats disease extremely rapidly, preventing the complications which often arise when illnesses are allowed to progress without early treatment. Because penicillin treatment is so important in the great recent advances in medicine, it will be useful to consider in a little more detail some of these benefits it has conferred on mankind in the fight against disease.

The primary benefit is, of course, its power to cure illnesses for which we have no other treatments. It is this power that has earned penicillin the title "miracle drug." Even some of the most dangerous infections can be stopped practically overnight. Before the discovery of penicillin there did exist a strong possibility that any serious infection would spread throughout the body and ultimately cause death. Today, however, only a few hours after penicillin is administered to the patient, the progress of the infection is checked and improvement is already evident. For many serious diseases (e.g., pneumonia, peritonitis, blood poisoning) penicillin is the most effective treatment, and for some diseases it is the only known treatment. We have probably brought more different types of infectious disease under control through the use of penicillin than through all the other drugs previously developed. Army physicians have reported that some diseases contracted U.S. troops overseas were unidentified in medical literature. Yet, even these rare maladies responded favorably when treated with penicillin. Indeed, very few infectious diseases remain that cannot be quickly cured if properly treated by penicillin therapy.

Another unique advantage of penicillin treatment derives from the speed with which it takes effect. Usually the infection is stopped 24-48 hours after the beginning of treatment. This quick action means that penicillin is effective not only in curbing the ongoing illness, but also in preventing secondary illnesses. These secondary illnesses - the so-called "complications" - develop when the patient's resistance has been weakened by a prolonged struggle with the

primary disease. Often complications are more serious than the original illness itself; for example, prolonged infection may result in permanent damage to the patient's heart. By its fast action penicillin cures the initial infection before dangerous complications can occur.

[Refutational Defense: High-Range Belief]

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 American'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.

[Refutational Defense: High-Range Belief]

The Misguided Attacks on Penicillin

Medical researchers and physicians are generally agreed that the discovery and use of penicillin has been one of the greatest steps in the history of medicine'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 alledged dangers of penicillin when administered to "allergic" patients, or on the idea that penicillin causes the development of stronger breeds of bacteria. 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 of the most distorted arguments against penicillin is that it has produced bad effects on some people who were allergic to penicillin. And while it is true that such detrimental effects have been produced upon allergic patients, it should be noted that such allergies are extremely rare. Further, these detrimental effects were produced in the days when penicillin was just beginning to be used by physicians, and it was not yet recognized that a few rare individuals were allergic to penicillin. Actually, a few people can always be found who are allergic to nearly any substance known. What critics of penicillin frequently fail to mention is that a simple test is available which detects penicillin allergy and, of course, penicillin is no longer given to people who are allergic to it. Initially, the allergy danger of penicillin was very small, but now with the use of this simple test, even this small danger has been eliminated, making penicillin one of the safest drugs to use.

Another example of a misleading and distorted argument against penicillin is that it has caused the development of stronger breeds of bacteria against which penicillin has no apparent effect. This argument goes further to say that after prolonged use of penicillin, the patient becomes "adapted" to it and penicillin no longer can be used for that patient. It is true that when any drug is used on a patient over a prolonged period of time, the effect of that drug will not be as great as it was originally. To a very minor extent, this is also true of penicillin. However, one of penicillin's greatest advantages is that it remains

effective with continued use for a far greater period of time than does almost any other known drug. As for the claim that penicillin has produced stronger, more virile strains of bacteria, one should recognize immediately the fact that since the beginning of time, organisms have tended to develop strains which survive better under changing conditions. To argue that penicillin is the cause for the development of these stronger strains is an unwarranted and unsubstantiated statement. 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.

[Attack-Same: High-Range Belief]

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.

[Attack-Same: High-Range Belief]

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, some people are allergic to penicillin and with its continued use, more are becoming so. Also, its widespread use has resulted in the elimination of weaker strains of bacteria with the resulting production of new and more deadly strains against which it (and other antibiotics) are ineffective. 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 trouble with penicillin is that, as with almost all other powerful pharmaceutical drugs, there are some people who are allergic to it and suffer adverse affects ranging from minor rashes to death when it is administered to them. There are impressive numbers of cases reported in the medical journals in which injections of penicillin, given for relatively minor infections resulted in the death of the patient who happened to have a serious allergy to penicillin. This allergy problem is particularly serious in the case of penicillin for two reasons. First, it is serious because of its unpredictability. Penicillin allergies are hard to detect and while there are complex tests available, physicians do not as a rule give their patients such tests before administering penicillin. Furthermore, the allergy to this drug (as to many pharmaceutical agents) has the tendency to come and go unpredictably, so that the patient's having been found non-allergic by an earlier test or his having previously taken penicillin with no ill effects is no assurance that the next time he is given this drug he will not suffer unpleasant and even fatal reactions. A second reason why medical scientists and public health officials are becoming worried about penicillin allergies is that they are on the increase. The national medical statistics compiled monthly by the Public Health Service indicate that in the first years of its use, penicillin allergies were extremely rare, but ever since have been increasing at an accelerating rate. One of the theories for this increase is that there is an accumulative effect of penicillin on the system, so that the

first few times the person gets the drug he shows no adverse effects, but by the time he has gotten continued treatments during life, enough of the drug accumulates in his system to bring out the latent allergies. The other theory is that the stronger dosages that are being given currently (to combat the more resistant strains of bacteria that have developed) may also account for some of the increase in allergic reactions to penicillin.

The increased reliance on penicillin has produced yet another tragic consequence. Several hospitals in Houston, Detroit, London, and Tokyo have recently reported epidemics of deaths among new-born babies from staphylococcus infections against which penicillin had no effect. And yet penicillin used to be able to fight this particular form of bacteria successfully. Here we see another case of an increasingly serious effect of penicillin. Its use tends to result in the development of more resistant strains of germs, so hardy that neither penicillin nor other drugs are effective against them. Furthermore, since this drug works by stimulating the patient's system to produce antibodies, continual use habituates the patient to it, until soon neither penicillin nor other drugs have the required effect when needed. Hence, excessive use of penicillin has resulted in the development of some of the most deadly forms of germs ever known. And, at the same time, it is making it increasingly more difficult to stimulate the patient's system to produce the necessary antibodies to fight such infection. While penicillin obviously has conferred many benefits, one should not overlook that it has had some harmful effects as well.

[Attack-Different: High-Range Belief]

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 (tuberculosis). Exposure to radiation - even the small amount encountered in the X-Ray examination - has come to be recognized as a health risk which is no longer necessary as far as TB is concerned. Today, TB is so rare in this general population that such "shotgun" techniques as universal chest X-Rays are extremely wasteful of needed resources. Furthermore, the chest X-Ray has been largely outmoded by newer and safer methods of TB diagnosis. Let us examine in more detail some of the evidence that has led public health officials to advise against the continuation of these campaigns to get everyone to have repeated chest X-Rays.

It is particularly unwise to urge that everyone expose himself to the radiation dangers involved in having chest X-Ray examinations each year, in view of the fact that TB has become a relatively rare disease in this country, confined chiefly to specific and predictable subgroups of the population. Today, TB occurs with frequency only in under developed countries. In the U.S. only underprivileged groups with an inadequate diet show any considerable frequency of TB. The resources now devoted to expensive campaigns to give X-Ray exams for TB to all Americans each year is considerable. These campaigns to check-up on a disease that has actually become quite rare in the general population are costly, not only in money but in the time of skilled medical personnel. The fight against TB could be carried out much better by devoting these resources, now largely wasted, to a concentrated attack on the disease in the underprivileged groups in our society.

Another reason for discontinuing these general X-Ray campaigns is that several new tests for TB are now in existence, the best known of which is the skin test. This is a simple, safe and inexpensive substitute for the X-Ray examination. Many of the foremost centers for TB diagnosis are now relying primarily on these skin tests, thus avoiding the unnecessary exposure of their patients to dangerous dosages of radiation from chest X-Rays. Not only is the skin test safer and cheaper than the chest X-Ray, but also it is a surer means of detecting TB. Detecting TB symptoms in chest X-Ray photographs still involves an element of subjective judgment. While trained physicians are highly

accurate in this detection, the possibility of missing faint symptoms always remains. The skin test has eliminated this possibility of having an error and reduced the detection of any TB signs, however faint, to a certainty. These considerations indicate why health authorities are now recommending that the practice of getting annual chest X-Ray examinations for detecting TB be discontinued.

[Attack-Different: High-Range Belief]

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, an 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 Johns 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" has 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 1969, the U.S. Senate subcommittee on Social Welfare voted 5 to 4 to reduce the recommended appropriation for antibiotic and antiviral 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 antiviral 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.

[Supportive Defense: Middle-Range Belief]

The High Quality of Japanese Exports

Over the past two decades, Japan has made vast improvements in the quality of commodities exported to the United States. Previous to this time, the label "Made in Japan" has usually evoked an image of inferior quality. But, this image has radically changed. Japan ships a great many different items to the U.S. The detailed list in the Japanese customs return takes about one-hundred printed pages. Qualitative improvements have led directly to increased demand. Japan has made impressive gains in the iron, steel, and textile industries and is gaining much recognition in electronics. Its average annual rate of industrial growth from 1960-69 was 14.9%, compared with 9.7% for all other members of the Organization for European Cooperation and Development (OECD). The U.S. is by far Japan's largest market. As American consumers have increased their confidence in Japanese commodities, the U.S. has increased its import rate. Today, the U.S. imports over 30% of Japan's total exports. One reason for Japan's rapid industrial growth has been their willingness to import foreign technology. An equally important factor is the smooth relationship between labor and management in Japanese factories. Let us explore more thoroughly the reasons which render the label "Made in Japan" a sign of quality merchandise.

The Japanese have augmented their rapid technical progress by importing new foreign technology. And, they have managed this vital importation of expertise without burying themselves under a pile of debts. One of the reasons for this is Japan's highly competent, cautious bureaucracy. For example, the Ministry for International Trade and Industry (MITI), a body which has no exact equivalent in other nations, screens all potential agreements involving technological importation. They not only bargain for advantageous modifications in the agreements, but also devise them so as to allow other Japanese firms to use the new ideas and equipment. At the same time, Japan has not ignored the need to develop its own technology. In 1966, the Japanese Research and Development Corporation was established by government act. The corporation has been highly successful, partly because it has concentrated intensely on a small number of projects. JRDC has a permanent staff of 50 scientists who receive about 80 projects a year. From these, about 10 are approved by the Development Council. NRDC has been widely acclaimed for producing sensible, inexpensive innovations which have immediate value for industrialists.

Another reason why Japanese exports are of high quality is the unusually smooth relationship between labor and management. Japanese factory employees are never laid off, even during slack periods. This comforting sense of security is important. Job hopping is almost non-existent. The deeply rooted Japanese system of pegging raises and promotions almost exclusively to seniority is an inducement for a young person to stay with one company. Eventually, he can bank on becoming a foreman. During his year of employment, he is likely to be transferred from one department to another, periodically undergoing retraining. The average factory worker does not, then, have to look forward to a lifetime of doing a monotonous task. A new employee at a Japanese steel plant works a 42 hour week, is paid at a higher rate than a comparable U.S. factory worker, and enjoys one month off in paid vacation and holidays. In addition, companies inspire quality work through a generous system of bonuses geared to profits, a benefit which nets the worker as much as an additional 50% of his annual base salary. Fringe benefits cushion almost every aspect of a worker's life. It is easy to understand why the Japanese are loyal to their employers, and why Japanese industry has gained world-wide recognition for producing quality merchandise.

[Supportive Defense: Medium-Range Belief]

Vehicular Defects: A Frequent Cause of Traffic Accidents

Research on traffic safety has received vastly increased attention over the past two decades. Previous to 1950, little was known about accident causation. However, the ever increasing annual highway accident figures have made it imperative that both government agencies and private industry work toward a solution to the traffic accident problem. Research programs, funded largely by the National Highway Traffic Safety Administration (NHTSA) and the auto manufacturers, were initiated with the belief that traffic safety could best be improved by the application of scientific and quantitative methods, both to the study of the accident problem, and to the study of remedies for it. The findings of the past twenty years cite many causes for the traffic accident problem. A highly frequent contributor has proven to be vehicular malfunctions. Each day thousands of automobiles are mass produced on Detroit assembly lines and scattered to dealerships across the country. An alarmingly high percentage of these cars leave the factories with at least one defective part. Unfortunately, this is only the beginning of the problem. Few car owners take a preventive approach to automobile maintenance. Instead, they wait until they are without transportation, due to a damaged or worn out part, to visit the repair garage.

It is the rare car buyer who is not forced to return to the dealership within weeks of his purchase for adjustments or repairs on his shiny new machine. Since most people are still enveloped with pride over the looks and performance of the new car, the inconvenience caused by this early visit to the service department is quickly forgotten. On the other hand, individuals who have been caused more than inconvenience are less likely to forget. The highest percentage of unit defects in mass produced automobiles occurs with cars built on Mondays and Fridays, when partying and drinking practices affect the highest number of both blue and white collar workers. Recent studies involving examinations of late model cars involved in fatal accidents, have indicated that many crashes heretofore attributed to careless or reckless driving, may have been caused by vehicular defects such as brake failure, a loose steering rod bolt, etc. Arthur Little's recent book entitled The State of the Art of Traffic Safety reports that "In spite of the industry's effort, defective vehicles are produced and sold. He noted further that all 32 cars tested by NHTSA in 1968, showed trouble within the first 5,000 miles of driving."

The best method of preventing accidents caused by vehicular defects is by replacing old or badly worn parts.

Unfortunately, such a preventive approach to highway safety is seldom taken in today's world of high repair costs and limited time available to properly maintain an automobile. For most Americans, it is time to bring the car to a repair shop only when it has stopped running. Mosely (1963) studied in detail over one-hundred fatal accidents in the Boston area and concluded that "many 'accidents' are due to vehicular failures." He pointed to accidents in which cars were improperly repaired and others in which the lack of preventive maintenance was instrumental. Typically, Americans drive with brakes which have lost 50% of their efficiency. In 1969, the State of Illinois asked dealers and garages to inspect the brake systems on cars brought in for other work. Out of 494 vehicles inspected, 336 (68%) showed at least one brake defect. Since defects of some sort are to be expected in any mass-produced item on a statistical basis, and since individual parts of any machine do wear out with use, preventive maintenance is a necessary practice if we are to decrease the high number of traffic accidents caused by vehicular malfunctions.

[Refutational Defense: Middle-Range Belief]

The High Quality of Japanese Exports

Over the past two decades, Japan has made vast improvements in the quality of commodities exported to the United States. Previous to this time, the label "Made in Japan" has usually evoked an image of inferior quality. But this image has radically changed. Japan ships a great many different items to the U.S. The detailed list in the Japanese customs return takes about one hundred printed pages. Qualitative improvements have led directly to increased demand. Unfortunately, one still finds occasional unenlightened articles in the press, which serve to perpetuate outmoded ideas regarding the inferiority of Japanese goods. It is perhaps because electronic products and automobiles represent about two-thirds of the annual export revenue that these items have been most often subjected to attack. It has been claimed, for example, that Japanese made televisions are inferior to most foreign and American name-brands. In addition, Japan's major automobiles, the Toyota and Datsun, have been similarly attacked. Such assertions are distorted and misleading. Each day many Americans are faced with questions regarding what brand of car, electronic appliance, etc. to purchase, and since often the Japanese produced item is the best buy, it is useful to review these misguided arguments.

One of the most distorted arguments against Japanese exports regards their color television sets, a product which represents a significant percentage of Japan's total exports to the U.S. Color sets produced by such firms as Matsushita, Hitachi, and Toshiba have come under attack for miscellaneous shortcomings such as inconvenient placement of buttons, the lack of a VHF channel-selector light (Hitachi) and only fair sound quality. Toshiba sets have been criticized for a degree of geometric picture distortion. Although many of the accusations are reasonably accurate, the reviews usually fail to mention that, aside from certain isolated parts and features, and in terms of overall quality, Japanese color television sets are superior to other foreign and American made brands. Negative points made against the Japanese models are usually trivial when compared to the weaknesses of the competition. For example, televisions made by General Electric, a well known American brand name, have considerably greater geometric distortion than any comparably priced Japanese models; Zenith and Philco models are subject to problems in sound quality; and no brand can match the sharp, bright picture quality of "Chromotron," the unique tube design produced by Sony of Japan. More and more Americans are becoming aware of the high quality color

televisions and other Japanese produced electronic equipment which continue to flood the American market.

A second area which has come under unjustified attack is Japan's automobile industry. Toyota and Nissan (Datsun) have been criticized for engineering flaws. It is true that Japan's "Big Two" have recalled thousands of cars since 1966. Yet, this is certainly no different from the experience of General Motors, Ford, Chrysler and American Motors of the U.S., each of which has been forced to recall many thousands of cars, of numerous models, since that time. The increasing number of automobile recalls is primarily due to stepped-up safety regulations and enforcement of existing regulations by the U.S. government. This is particularly true of the Japanese cars, most of which have been cited for very minor defects. Many auto experts have called publicity regarding Toyota recalls ridiculous, since the defect was merely a small gasket which takes up to three minutes to repair. Apparently, consumers have not been misled by such publicity, as Japan has recently moved past West Germany into the number 2 position in automobile production. With expanding markets in every corner of the world, it is not unlikely that the Japanese will eventually replace the U.S. as the world's foremost auto maker.

[Refutational Defense: Medium-Range Belief]

Vehicular Defects: A Frequent Cause of Traffic Accidents

Over the past two decades traffic safety research programs, funded largely by government agencies such as the National Highway Traffic Safety Administration (NHTSA) and by the automobile industry, have made great progress in the study of accident causation. The findings of the past twenty years have done much to clarify the relative roles of human and vehicular factors in traffic accidents. As a result of this research, it is now known that vehicular factors are a highly frequent contributor to traffic accidents. Unfortunately, there have been occasional articles in the press which argue that vehicular defects do not play a major role in the traffic accident problem. Before our ever increasing traffic problems can begin to be solved, it is necessary that the American public be informed of what research scientists have learned about accident causation. Thus, it is important to review misleading and distorted information. It has been claimed, for example, that "human factors," driving while under the influence of alcohol and driving too fast, are the primary causes of traffic accidents. Some critics have cited the low number of vehicular causes of traffic accidents reported in police department annual statistical summaries. Let us examine the fallacies inherent in each of these arguments.

To argue that drunk driving and excessive speed are the primary causes of accidents is to ignore the body of research findings gathered in controlled studies of accidents. These investigations show unequivocally that drunk driving and speeding are responsible for only a small percentage of traffic accidents. For example, Borkenstein (1968) studied 5,987 accidents on Michigan roadways and concluded that only 3.2 percent of the drivers had blood alcohol concentrations equal to or exceeding the legal limit. Speeding was cited as a causal factor in an even smaller percentage of these accidents. Further, the assertion that humans are to blame for accidents by no means conflicts with the "human factor" theory. Vehicular defects are caused by humans who build cars, and are caused and perpetuated by humans who fail to properly maintain their cars. While it is important to realize that many factors contribute to the total traffic accident problem, we cannot afford to ignore the evidence which points to vehicular malfunctions as a highly frequent contributor to highway crashes.

Another example of a misleading argument against recent findings is that police department annual statistical summaries do not show a high incidence of vehicular failures in traffic accidents. This is certainly not a surprising

finding since police officers who are called to the scene of an accident are neither mechanics, nor are they required to inspect the individual parts of the cars. Their primary purposes are to attend to the injured, clear the roadway, restore normal traffic flow, and file a concise report of the participation of each driver and passenger involved in the accident. Reporting of vehicular defects is done only when such defects are obvious, such as blown-out tire. Since in most cases the assignment of fault determines financial responsibility for damage and injury, police officers are often reluctant to label even obvious vehicle defects as causal unless they have personally witnessed the accident. When police officers do report vehicular defects, it is usually within the context of the testimony of a driver, passenger, or witness. Thus, in the vast majority of accidents, no attempt is made to check for vehicular causes. It is not, therefore, surprising that police summaries fail to accurately reflect the findings of recent controlled research.

[Attack-Same: Middle-Range Belief]

The Low Quality of Japanese Exports

Although in recent years Japan has vastly increased mass production and exportation of a wide variety of commodities, quantitative progress has not been accompanied by corresponding improvements in quality. Despite the general low quality of Japanese exports, many consumers continue to buy the products, largely because of cheap prices. Unfortunately, while the purchase of cheap products may initially appear to represent a savings, it often results in a waste of money. Before making such a purchase, prospective buyers should consult a competent, reliable source of product evaluation for appraisal of the brand and its competitors. The majority of Japan's export profits are from electronic equipment and automobiles. A close look at the quality of Japanese color televisions, a leading export, reveals that in most cases American consumers are not getting their money's worth. The same is true of automobiles manufactured by Japan's leading firms, Toyota and Nissan (Datsun). By continuing to purchase inferior products, consumers perpetuate their distribution on the market. Consequently, it is important that Americans be made aware of the low quality merchandise exported to the U.S. from Japan. Let us examine this situation.

Ratings of the color television sets produced by the world's leading manufacturers show that those made by Japanese firms, including Matsushita, Hitachi, Sony, and Toshiba are inferior to those of other high volume distributors. Experts agree that while it is possible to obtain Japanese color sets which are equal in quality to other foreign and American brands, the prices average 10% to 15% higher. For the cost of the latest 12-inch Sony color set, the consumer can select the latest 23-inch model from such popular and reliable brands as Zenith, RCA and Philco. Experts have also alerted consumers to adopt a "wait and see" attitude toward Sony's new "chromotron" tube, for which the firm has made great claims regarding picture brightness, since the innovation has not passed the crucial test of mass production on an economic basis. Shortcomings have been cited in regard to all Japanese brands. For example, Toshiba sets are known for geometric picture distortion; Hitachi models for the annoying inconvenience of no lighting on the UHF channel selector. Most Japanese sets are rated only fair in sound quality, well below competing brands. An overall drawback to many Japanese television manufacturers is the lack of concern for design details, such as size and convenient location of buttons, lighting on UHF and VHF channel selectors, and attractive design features found in major American brands.

Another example of the low quality of Japanese exports to the U.S. regards automobiles. Both Toyota and Nissan (Datsun) have come under continued attack by the U.S. government for defective cars. The government recently reported that Japan's "Big Two" had been secretly recalling defective cars sold in the U.S. long before the public was made aware. As a result, the Japanese government immediately demanded that all 12 Japanese auto makers reveal the extent of their engineering flaws. The findings are startling. After examining models built between 1964 and 1970, the auto makers listed over 2,900,000 as potentially defective. In the U.S., a market that they have only lately penetrated, Japanese companies have had to call back over 200,000 autos since 1966. A total of 39,000 1969 Datsuns exported to the U.S. have defects ranging from front suspensions that can be bent by rough roads, to axle assemblies that burn out, to shift levers that snap off. The Japanese government is drawing up legislation to force auto makers to report defective cars and publicly recall them for repair.

[Attack-Same: Medium-Range Belief]

The Automobile: An Infrequent Cause of Traffic Accidents

In light of much controversy regarding the causes of our increasing traffic accident problem, recent investigations have attempted to place the various contributing factors into proper perspective. To the surprise of few researchers, the factors of driving while under the influence of alcohol and excessive speed have proven to be the two most frequent contributors to traffic accidents. Despite the assertions of some independent research groups, vehicular factors do not appear to be a frequent cause of accidents. This can be seen in the low percentage of vehicular failures cited in national summaries of police department statistics on accident causation. Because it is important that everyone who drives a motor vehicle understands the causes of our growing traffic safety problem, it is useful to examine in detail the evidence which has led professional researchers to isolate human factors, driving under the influence of alcohol, and speeding, as the most common contributors to traffic crashes.

For several years, professional researchers have theorized that the driver, the human factor, is the primary source of our traffic accident problem. The U.S. Department of Transportation (DOT) and the automobile industry have responded to the need for research funds necessary to explore the role of human factors in traffic crashes. In 1969, DOT appropriated over 100 million dollars to finance alcohol safety action programs in 40 U.S. cities. The projects were designed in part to define the role of alcohol in traffic crashes. By early 1970, initial results began to accumulate in Washington. National averages indicated that in approximately 55% of all fatal accidents, at least one of the drivers had a measurable blood alcohol content. The smallest ratio of alcohol involvement was reported in Denver, Colorado, where 34% of the crashes showed at least one driver who had been drinking. While statistics involving non-fatal crashes were not quite as high, they left no doubt that alcohol is a primary contributing factor to our traffic accident problem. Ranking a close second is another human factor, excessive speed. As in the case of alcohol, the more serious the accident, the greater the likelihood that speeding was a contributor. Together, the human factors of alcohol and speeding account for the majority of traffic crashes.

A second source of data which serve to clarify the role of vehicular malfunctions in accident causation is the annual nationwide summary of accident statistics compiled by

individual police departments and published by the National Safety Council. In 1970, less than 3% of all reported accidents were found related to vehicular defects. Further, the National Safety Council asked officers in 144 police departments across the country to complete a short questionnaire on each accident. The questionnaire asked for the officer's opinion of the causes of the accident. The data were collected in a completely anonymous manner, identifying neither the accident participants nor the officer, thus removing the threat of use of the information as court evidence by one of the involved parties. Since the police officers could thereby freely evaluate and report all possible causes, it is significant that results showed only a statistically trivial increase over the national average in the percentage of accidents attributed to vehicular failure. These and other recently recorded data provide convincing evidence that vehicular malfunctions play an insignificant role in our traffic accident problem.

[Attack-Different: Middle-Range Belief]

The Low Quality of Japanese Exports

Although in recent years Japan has vastly increased mass production and exportation of a wide variety of commodities, quantitative progress has not been accompanied by corresponding improvements in quality. Despite the general low quality of Japanese exports, many consumers continue to buy the products, largely because of cheap prices. Unfortunately while the purchase of cheap products may initially appear to represent a savings, it often results in a waste of money. Before making such a purchase, the prospective buyer should consult a competent, reliable source of product evaluation for an appraisal of the brand and its competitors. One of Japan's most profitable exports has been its movie cameras. A close look at movie cameras manufactured by Japan's leading firms reveals that, in most cases, American consumers are not getting their money's worth. The primary reason for this is Japan's relatively backward technology, a state of affairs which is not likely to change in the near future. By continuing to purchase inferior products, consumers perpetuate their distribution on the market. Consequently, it is important that Americans be made aware of the low quality merchandise exported to the U.S. from Japan. Let us examine this situation.

Japanese movie cameras provide a good example of the low quality of that country's exports. Models produced by the leading Japanese firms, Olympus, Minolta, Yashica, and Canon are highly similar, and are usually cheaply-made imitations of high quality West German and American brands. Generally, the Japanese have failed to match the fine engineering detail of their competitors. For example, the Olympus and Minolta 35 mm cameras have no provision for time exposures, no self-timer, and are rated poor in versatility. Yashica 35 mm cameras also lack the self-timer, and the focus scales are annoyingly difficult to read. Essentially, the same kinds of useful and convenient features are lacking in Japanese 16 mm and super-8 models. Yet, prices are comparable to those of competing German and American models, reflecting the premium-price sales strategy being used by Japanese firms. It appears that rather than improve the quality of their products, Japanese camera manufacturers have increased prices in hopes of deluding the public into perceiving their products as equal in quality to other similarly priced cameras. So far, the sales gimmick has been unsuccessful. After reaching a peak in 1966, Japan's movie camera industry has witnessed a steady decline in production. Between 1969 and 1970 production fell a whopping 15.7 per cent.

The primary reason that most Japanese exports lack the quality of those produced by other nations is that Japan's technology has continued to lag. Although Japan has attempted to bridge the gap by importing foreign technology, such a practice is not economically feasible on a continuing basis. From 1966 to 1970, Japan spent an average of almost 200 million dollars annually on imported technology. The ratio of receipts to payments was only 7 to 93, whereas in West Germany the ratio was 30 to 70, the U.S. 91 to 9 receipts/payments. Although the spending has aided Japanese progress toward efficient mass production techniques, it has also contributed to Japan's continued ignoring of the need to develop its own technology. The Organization for Economic Cooperation and Development (OECD) has recently examined Japan's science policy and warned that there is little in the way of research associations, that research in government and private laboratories is at a low level and is ill-coordinated, and that university research must be brought into the picture. Hopefully, Japan will respond to the need for research and development toward its own technology. Until it does, the label "Made in Japan" will continue to signify inferior quality.

[Attack-Different: Medium-Range Belief]

The Automobile: An Infrequent Cause of Traffic Accidents

In light of much controversy regarding the causes of our increasing traffic accident problem, recent investigations have attempted to place the various contributing factors into proper perspective. To the surprise of few researchers, the factor of "driver inattention," lack of alertness, has proven to be the most frequent contributor to traffic crashes. Research findings have isolated another factor, hazardous roads, as the second most frequent contributor to automobile accidents. Despite the assertions of some independent research groups, vehicular factors do not appear to be a frequent cause of traffic accidents. Because it is important that everyone who drives a motor vehicle understands the causes of our growing traffic accident problem, it is necessary to examine in detail the evidence which has led professional researchers to isolate "driver inattention" and hazardous road conditions as the most common contributors to traffic crashes.

For several years, professional researchers have theorized that the driver, the human factor, is the primary source of our traffic accident problem. The U.S. Department of Transportation (DOT) and the automobile industry have responded to the need for research funds to explore the role of human factors in traffic crashes. In 1969, DOT appropriated over 100 million dollars to finance post-accident investigations of several hundred accidents in each of 40 U.S. cities. As part of each investigation, an interview questionnaire was administered to drivers. These drivers were asked to assess the degree to which vehicular, human, road, and other environmental factors contributed to their accident. The results isolated a factor which was labeled "driver inattention" as a contributing factor in 55% of the total accidents. Reasons given for inattention were varied, ranging from physical fatigue, to reprimanding a child in the back seat, to "daydreaming." DOT concluded that Americans take the driving task very much for granted; so much so that they seldom devote it complete attention under normal driving conditions.

Another important finding of the DOT study regards the role of hazardous road conditions in traffic accidents. Hazardous roads were found to be the second most frequent contributor to crashes. Arthur Little, writing recently in The State of the Art of Traffic Safety summarized his review of related research by stating that "Information available on the various aspects of the roadway itself is extensive and has been well documented over a considerable

number of years. Factors which emerge as particularly important are the problems associated with skidding and nighttime driving." Mills and Shelton (1968) studied highway accidents in Virginia and found that 40% of all reported accidents over a one-year period involved skidding. Significantly, in one-third of these accidents, the skidding occurred before brake application. Such controlled investigations have clearly established hazardous road conditions as a frequent contributor to traffic accidents. Further, these and other recently recorded data provide convincing evidence that vehicular malfunctions play an insignificant role in our traffic accident problem.

[Supportive Defense: Low-Range Belief]

The Low Quality of Japanese Exports

Although in recent years Japan has vastly increased mass production and exportation of a wide variety of commodities, quantitative progress has not been accompanied by corresponding improvements in quality. Despite the general low quality of Japanese exports, many consumers continue to buy the products, largely because of cheap prices. Unfortunately, while the purchase of cheap products may initially appear to represent a savings, it often results in a waste of money. One of Japan's most profitable exports has been its movie cameras. A close look at movie cameras manufactured by Japan's leading firms reveals that, in most cases, American consumers are not getting their money's worth. The primary reason for this is Japan's relatively backward technology, a state of affairs which is not likely to change in the near future. By continuing to purchase inferior products, consumers perpetuate their distribution on the market. Consequently, it is important that Americans be made aware of the low quality merchandise exported to the U.S. from Japan. Let us examine this situation.

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technology has continued to lag. Although Japan has attempted to bridge the gap by importing foreign technology, such a practice is not economically feasible on a continuing basis. From 1966 to 1970, Japan spent an average of almost 200 million dollars annually on imported technology. The ratio of receipts to payments was only 7 to 93, whereas in West Germany the ratio was 30 to 70, the U.S. 91 to 9 receipts/payments. Although the spending has aided Japanese progress toward efficient mass production techniques, it has also contributed to Japan's continued ignoring of the need to develop its own technology. The Organization for Economic Cooperation and Development (OECD) has recently examined Japan's science policy and warned that there is little in the way of research associations, that research in government and private laboratories is at a low level and is ill-coordinated, and that university research must be brought into the picture. Hopefully, Japan will respond to the need for research and development toward its own technology. Until it does, the label "Made in Japan" will continue to signify inferior quality.

[Supportive Defense: Low-Range Belief]

The Automobile: An Infrequent Cause of Traffic Accidents

Research on traffic safety has received vastly increased attention over the past two decades. Previous to 1950, little was known about accident causation. However, the ever increasing annual highway accident figures have made it imperative that both government agencies and private industry work toward a solution to the traffic accident problem. Research programs, funded largely by the National Highway Traffic Safety Administration (NHTSA) and the automobile manufacturers, were initiated with the belief that traffic safety could be improved by the application of scientific and quantitative methods, both to the study of the accident problem, and to the study of remedies for it. The findings of the past twenty years have done much to clarify the relative roles of human and vehicular factors in traffic accidents. As a result of this research, it is now known that vehicular factors play a minor role in accident causation. One reason is that U.S. factories build cars with extreme precision. Each part undergoes several quality checks before being attached to other parts; each completed automobile is given a thorough test drive before delivery to a dealership. When such quality control is coupled with the good maintenance procedures followed by most car owners, the result is, as research has shown, that few traffic accidents are caused by vehicular malfunctions.

Research on quality-control assembly line procedures in automobile factories has consistently shown these procedures to be highly efficient and dependable. One reason for this success is the checking system, which is now standard in all plants owned by major U.S. automobile manufacturers. Each part of the car is inspected alone, then again and again as it moves from one assembly line to the next on its way to becoming part of a complete automobile. The final check, the test drive, is performed by an experienced mechanic who is trained to detect even minor imperfections. The car undergoes another complete "check-over" at the dealership, before delivery to the purchaser. With such high level quality control, automobile manufacturers are protecting not only the buyer, but also themselves, since courts now hold the manufacturer liable for damage or injury suffered due to a vehicular defect attributable to the manufacturer. Arthur Little, writing in The State of the Art of Traffic Safety (1969) pointed out that courts are creating a most significant motivation for manufacturers to produce vehicles in which the prospect of ultimate massive liability is minimized, not only with respect to factors affecting accident initiation, but also with regard to vehicle crashworthiness.

A second reason why so few traffic crashes are caused by vehicular malfunctions is that most Americans adhere to necessary maintainance procedures. Most follow the specific maintainance plan required by the manufacturer for continued use of the warranty. Each year, the proportion of current model cars in the population of owned vehicles increases. Accordingly, the number of cars under warranty maintainance plans is constantly increasing. Though a small percentage of people do not follow adequate maintainance procedures, most Americans have their cars tuned periodically, and meet minimum oil change and lubrication needs. Further, most states now require periodic vehicle inspection, a procedure which removes defective vehicles from the road until they are repaired. The effect of these maintainance procedures is to retain only a small number of defective cars on our highways. What experts have long believed, researchers have now quantified and supported. Vehicular defects are the cause of few highway crashes.

[Refutational Defense: Low-Range Belief]

The Low Quality of Japanese Exports

Although in recent years Japan has vastly increased mass production and exportation of a wide variety of commodities, quantitative progress has not been accompanied by corresponding improvements in quality. Unfortunately, misleading publicity given to some of Japan's leading exports has painted a distorted image of the overall picture. For example, the press has often made great, but somewhat unjustified, claims for the latest Japanese electronic equipment, such as innovations in color television achieved by Sony Corporation. Another example of distorted information regards Japan's improved position as a world auto making power, a fact erroneously taken for proof that the Japanese are finally building high quality cars. While the latter may seem to follow logically from the former, there is decisive evidence that such is not the case for Japan's leading auto firms, Toyota and Nissan (Datsun). Each day many Americans are faced with questions regarding what brand of car, electronic appliance etc., to purchase. Since often Japanese brands are, in fact, of inferior quality, it is useful to review these misguided arguments.

It is true that Sony Corporation of Japan has recently developed the "Chromotron" tube, an innovation which the firm believes will give its color televisions the brightest picture attained by anyone to date. What Sony has not mentioned is that picture brightness is only one aspect of hundreds which go into making a color television that is comparable to those of leading foreign and American brands. Further, Sony has been unable to answer the criticism that their new tube has yet to pass the crucial test of mass production on an economic basis. Aside from the potential of mass producing sets which boast the brightest picture on the market, Sony does not stand above other Japanese firms, which produce poor to fair quality color sets. Like Toshiba, Hitachi, and Matsushita, Sony pays little attention to design details, such as size and convenient location of buttons, lighting on UHF and VHF channel selectors, and attractive design features found in major American brands. And, like most Japanese sets, Sony still has its problems with geometric picture distortion.

A number of press articles have lauded the impressive financial gains enjoyed in recent years by Japan's leading auto makers. The success of Toyota and Nissan has moved Japan past West Germany into the number two position in automobile production. However, recent developments

indicate that their success is due more to improved public relations and advertising campaigns than improved products. Reacting to reports that Toyota and Nissan had been secretly recalling defective cars sold in the U.S., the Japanese government demanded that all 12 Japanese auto makers reveal the extent of their engineering flaws. The findings are startling. After examining models built between 1964 and 1970, the auto makers listed over 2,900,000 as potentially defective. In the U.S., a market that they have only lately penetrated, Japanese companies have had to call back over 200,000 autos since 1966. A total of 39,000 1969 Datsuns exported to the U.S. have defects ranging from front suspensions that can be bent by rough roads, to axle assemblies that burn out, to shift levers that snap off. The Japanese government is drawing up legislation to force auto makers to report defective cars and publicly recall them for repair.

[Refutational-Defense: Low-Range Belief]

The Automobile: An Infrequent Cause of Accidents

Over the past two decades traffic safety research programs, funded largely by government agencies such as the National Highway Traffic Safety Administration (NHTSA) and the automobile industry, have made great progress in the study of accident causation. The findings of the past twenty years have done much to clarify the relative roles of human and vehicular factors in traffic accidents. As a result of this research, it is now known that vehicular failures play only a minor role in our traffic accident problem. Unfortunately, there have been occasional articles in the press which argue that vehicular defects are a frequent contributor to traffic accidents. Before our ever-increasing traffic problems can begin to be solved, it is necessary that the American public be informed of what research scientists have learned about accident causation. Thus, it is important to review misleading and distorted information. It has been claimed, for example, that statistics derived from police reports grossly underestimate the number of accidents caused by vehicular malfunctions. Some writers have cited results of a nationwide survey in which automobile repair shop owners conducted post-accident auto inspections, and reported a high percentage of defective vehicles. Let us examine the fallacies inherent in each of these arguments.

One of the most distorted arguments used in opposition to recent findings on traffic accidents is that police reports, often used as a statistical base for research, underestimate the number of accidents to which vehicular failure has contributed. Presently, police statistics show that only about 3% of all traffic crashes are attributable to vehicular failure. Those who question the accuracy of this statistic point out that police officers are neither expert mechanics nor accountable for an on-the-scene examination of the vehicles. However, in 1969, the National Safety Council conducted a survey which involved a large sample of police departments across the country. Specially trained accident investigation teams accompanied police officers to accident locations to examine all possible "non-human" accident causes, including vehicle and environmental factors. Although the investigators were specifically looking for vehicular causes, results showed only a statistically trivial increase over the 3% national average of accidents attributable to vehicular defects.

Another example of a misleading argument against recent findings regards misuse of the results of the NHTSA survey of repair shops. The survey was administered

primarily to learn about repair costs. It is true that the shop owners reported vehicular defects in a significantly higher number of accident-involved automobiles than did the corresponding police reports. However, no attempt was made to discover whether the defect contributed to the accident, or whether the accident contributed to the defect. Had the investigation included interviews with drivers and passengers, more reliable conclusions could have been drawn. Further, it is important to remember that the presence of a defect on an accident-involved vehicle does not mean that the defect was related in any way to the crash. Such confounding variables make it impossible to draw meaningful inferences concerning the role of vehicular factors in these traffic accidents. The main body of research evidence, which shows that vehicular malfunctions play only a minor role in our traffic accident problem, remains unchallenged.

[Attack-Same: Low-Range Belief]

The High Quality Japanese Exports

Over the past two decades, Japan has made vast improvements in the quality of commodities exported to the United States. This progress has rendered the label "Made in Japan" a sign of quality. Japan ships a great many items to the U.S. The detailed list in the Japanese customs return takes about one hundred printed pages. Qualitative improvements have led directly to increased demand. Japan's leading exports, electronic goods and automobiles, represent about two-thirds of Japan's annual export profits. Recent innovations in color televisions by Sony Corporation, an outstanding, fast-growing organization, typify the success of many Japanese manufacturers of electronic equipment. Japan now has 12 automobile companies, with Toyota and Nissan (Datsun) leading the way. Recently, the Japanese surpassed West Germany and moved into the number two position in automobile production. And, with expanding markets in every corner of the world, it is not unlikely that they will eventually replace the U.S. as the world's foremost auto maker. Let us explore more thoroughly the reasons which render the label "Made in Japan" a sign of quality merchandise.

A major reason for Japan's increasing export success has been the fresh, innovative ideas being marketed by its leading electronics firms. An example is Sony Corporation, which has recently developed "Chromotron," the new tube which produces a picture far more brilliant than that of conventional sets. The engineering key is a series of fine verticle wires which guide electrons to the color phosphors of the tube. Nearly 80% of the electrons generated reach the face of the tube, compared to 15% for conventional picture tubes. With their new product, Sony followed a route common to many of Japan's growing, creative electronics firms. The company licensed an idea developed elsewhere then carried the technical work a giant step forward with its own engineering expertise. Although Sony specializes in color television, it also markets a large number of tape recorders and radios. Sony's success has been partly attributed to a highly skilled staff, over 15% of which hold an engineering degree. This is not unusual for Japanese firms. Hatachi, Matsushita, and Toshiba all employ a high percentage of engineers, and the development of imaginative, exquisitely sensitive products are the result. For example, Matsushita's plans for this year include marketing the first machine to play color television programs recorded on a book-sized cassette of video tape. Viewers will then be able to watch programs at their convenience, much as they play phonograph records today.

Automobiles produced by Toyota and Nissan also exemplify the high quality of Japan's exports. In the current year, Japan will produce an estimated 5.5 million cars and trucks, second only to the U.S. output of 9 million. In recent years, Japanese cars have been redesigned, inside and out, improving both style and durability. And when Japanese auto makers stepped up efforts in the U.S. in the late 1960's, they moved with caution, taking care to establish substantial service and parts operations. Toyota officials in the U.S. claim to be able to build one complete car from the ground up for every three imported from Japan. U.S. auto experts give Toyota and Datsun good marks for quality, noting increased design similarities to American models. The advances have been reflected in dramatically increased sales. During the first four months of 1971, Toyota and Datsun accounted for 20% of all imports sold in the U.S. The story is much the same around the world. As U.S. auto makers continue to face the challenge of imports with their own small cars, it is not surprising that they regard the Japanese imports as more formidable competition than any other import, including Volkswagon.

[Attack-Same: Low-Range Belief]

Vehicular Defects: A Frequent Cause of Traffic Accidents

In light of much controversy regarding the causes of our increasing traffic accident problem, recent investigations have attempted to place the various contributing factors into proper perspective. As many experts expected, vehicular defects have proven to be a frequent contributor to traffic accidents. Although one can be misled by a cursory review of accident causation summaries compiled by police departments, a close examination of these statistics shows that they grossly underestimate the number of accidents caused by vehicular malfunctions. Further, a nation-wide survey conducted by the National Highway Traffic Safety Administration (NHTSA) provides clearcut evidence that vehicular failure is a major cause of accidents. Because it is important that everyone who drives a motor vehicle understands the causes of our growing traffic accident problem, it is useful to examine in detail the evidence which has led professional researchers to isolate vehicular defects as a primary contributor to the traffic accident problem.

Based upon data provided in police department annual summaries, University of Colorado researchers have developed a formula which reliably assesses the percentage of accidents attributable to vehicular failure in a given police jurisdiction. Using information collected from personal interviews with drivers involved in accidents, automobile repair shop files, and state motor vehicle division records, researchers can now mathematically adjust police department statistics to yield an accurate figure regarding the role of vehicular defects in traffic accidents. These figures are often 10 to 12 times as great as is normally reported by police officers. This is not surprising since the primary duties of police officers at the scene of an accident are to attend to the injured, clear the roadway, restore traffic flow, and file a concise report of the participation of each driver and passenger involved in the accident. Reporting of vehicular defects is done only when such defects are obvious, such as a blown-out tire. Further, since in most states assignment of fault determines financial responsibility for damage and injury, police officers are reluctant to label even obvious vehicular defects as casual factors unless they have personally witnessed the accident.

A second source of information, the NHTSA survey of automobile repair shops, lends further support to current findings that vehicular failures account for a highly significant percentage of traffic accidents. The survey

indicated that out of almost 6,000 vehicles examined, in a total of 40 states, 68% had at least one serious defect; 29% two or more such defects. While it would be unfair to conclude that all of these defects contributed to accidents, it is certainly a safe assumption that police department statistics, which name vehicular failure as a contributor to only 3% of all traffic accidents, are extremely conservative. Brakes were the more recurrent failure, totaling 39% of all defects found in the survey. Another 26% of the defects were related to lighting systems. These two types of defects are obviously dangerous ones, and are also those most frequently cited as accident causes in police reports. These and other recently recorded data provide convincing evidence that vehicular malfunctions play a major role in our traffic accident problem.

[Attack-Different: Low-Range Belief]

The High Quality of Japanese Exports

Over the past two decades, Japan has made vast improvements in the quality of commodities exported to the United States. Previous to this time, the label "Made in Japan" has usually evoked an image of inferior quality. But, this image has radically changed. Japan ships many different items to the U.S. The detailed list in the Japanese customs return takes about one-hundred printed pages. Qualitative improvements have led directly to increased demand. Japan has made impressive gains in the iron, steel, and textile industries and is gaining much recognition in electronics. Its average annual rate of industrial growth from 1960-1969 was 14.9% compared with 9.7% for all other members of the Organization for European Cooperation and Development (OECD). The U.S. is by far Japan's largest market. As American Consumers have increased their confidence in Japanese commodities, the U.S. has increased its import rate. Today, the U.S. imports over 30% of Japan's total exports. One reason for Japan's rapid industrial growth has been their willingness to import foreign technology. An equally important factor is the smooth relationship between labor and management in Japanese factories. Let us explore more thoroughly the reasons which render the label "Made in Japan" a sign of quality merchandise.

The Japanese have augmented their rapid technical progress by importing new foreign technology. And, they have managed this vital importation of expertise without burying themselves under a pile of debts. One of the reasons for this is Japan's highly competent, cautious bureaucracy. For example, the Ministry for International Trade and Industry (MITI), a body which has no exact equivalent in other nations, screens all potential agreements involving technological importation. They not only bargain for advantageous modifications in the agreements, but also devise them so as to allow other Japanese firms to use the new ideas and equipment. At the same time, Japan has not ignored the need to develop its own technology. In 1966, the Japanese Research and Development Corporation was established by government act. The corporation has been highly successful, partly because it has concentrated intensely on a small number of projects. JRDC has a permanent staff of 50 scientists who receive about 80 projects a year. From these, about 10 are approved by the Development Council. NRDC has been widely acclaimed for producing sensible, inexpensive innovations which have immediate value for industrialists.

Another reason why Japanese exports are of high quality is the unusually smooth relationship between labor and management. Japanese factory employees are never laid off, even during slack periods. This comforting sense of security is important. Job hopping is almost non-existent. The deeply rooted Japanese system of pegging raises and promotions almost exclusively to seniority is an inducement for a young person to stay with one company. Eventually, he can bank on becoming a foreman. During his years of employment, he is likely to be transferred from one department to another, periodically undergoing retraining. The average factory worker does not, then, have to look forward to a lifetime of doing a monotonous task. A new employee at a Japanese steel plant works a 42 hour week, is paid at a higher rate than a comparable U.S. factory worker, and enjoys one month off in paid vacation and holidays. In addition, companies inspire quality work through a generous system of bonuses geared to profits, a benefit which nets the worker as much as an additional 50% of his annual base salary. Fringe benefits cushion almost every aspect of a workers life. Many companies will loan an employee money to purchase a house. Toyota maintains a 344 bed hospital with 20 doctors in attendance. It is easy to understand why the Japanese are loyal to their employers, and why Japanese industry has gained world-wide recognition for producing quality merchandise.

[Attack-Different: Low-Range Belief]

Vehicular Defects: A Frequent Cause of Traffic Accidents

In light of much controversy regarding the causes of our increasing traffic accident problem, recent investigations have attempted to place the various contributing factors into proper perspective. As many experts expected, vehicular defects have proven to be a frequent contributor to traffic accidents. Highway Safety experts explain the finding mainly in terms of human error. That is, since human beings build, maintain, and repair automobiles, and since humans are prone to error, automobiles are bound to be defective. The relevance of this basic assumption for traffic safety can be seen when examining data compiled in the periodic motor vehicle inspections required by most states. Because it is important that everyone who drives a motor vehicle understands the causes of our growing traffic accident problem, it is useful to examine in detail the evidence which has led professional researchers to isolate vehicular defects as a primary contributor to traffic accidents.

Recent studies have carefully pointed out that human error exhibits itself in highway safety, not only in the form of poor driving behavior, but also in the numerous opportunities for human error before the automobile is even purchased. Each day, thousands of automobiles are mass produced on Detroit assembly lines and scattered to dealerships across the country. An alarmingly high percentage leave the factory with defective parts. Evidence of this are the numerous instances of new car recalls in recent years. Consumer's Union (1969) noted that all 32 cars brought in for testing in 1968 showed trouble within the first 5,000 miles of driving, with those cars built on Mondays and Fridays having the highest number of defects. Human error also asserts itself in maintenance and repair aspects of automobile safety. Since auto mechanics are not required to obtain certification in the U.S., the unwary car owner entrusts his personal safety to mechanics of a wide range of dependability. Mosely (1968) studied over 100 fatal accidents in the Boston area and concluded that a "significant number" of traffic accidents are caused by improperly repaired vehicles.

A glance at recent statistics gathered in various state periodic motor vehicle inspections provides striking evidence of the high number of defective vehicles on our roadways. For example, in 1969, the State of Texas required repair on 45% of the vehicles inspected, Washington D.C. 54%, Louisiana 45%, Mississippi 48%, New Jersey 42%, etc.

A voluntary inspection of 1,946 cars conducted by the Traffic Safety Association of Detroit with the help of Chrysler Corporation showed a 77% rejection rate. Decisive proof that these defects cause a great number of accidents can be seen upon comparison of fatal accident ratios between states which require periodic inspection and those which do not. Buxbaum and Colton (1966) reported 37.4 traffic deaths per 100,000 population (whites) in states which do not require inspection; only 23.4 per 100,000 population in those which do require periodic inspection. For non-whites, the figures were 64.0 non-inspection; 31.4 inspection. These and other recently recorded data provide convincing evidence that vehicular malfunctions play a major role in our traffic accident problem.

[Filler Essay For Control Groups]

The Benefits of Brushing Teeth After Every Meal

Even though we all recognize the wisdom of brushing our teeth after every meal, this practice is so important that it is worthwhile to review some of the reasons for carrying out this valuable health measure. Naturally, tooth brushing improves the appearance of our teeth, something that is desirable in itself. More important, science has demonstrated many health benefits deriving from brushing our teeth. Tooth brushing has been found to be of importance even in combating other mouth diseases besides tooth decay. And, by preventing these oral diseases, tooth brushing after every meal also reduces the complications in other parts of our body which are often the results of unchecked tooth decay. Because of the extreme importance of the practice, let us review briefly some of the reasons why brushing one's teeth after every meal is so necessary for the preservation of health.

Besides reducing tooth decay, brushing the teeth after every meal has additional health benefits. There are a number of other mouth diseases as unpleasant as tooth decay that are produced by mouth bacteria. These bacteria can, for example, cause diseases of the gums such as pyorrhea (or Riggs' disease). These diseases are painful and unattractive themselves and unless quickly checked, can lead to loss of teeth and other secondary complications. In addition, they have some unexpected side effects such as malnutrition, since the sufferer is unable to continue his normal solid diet while the conditions continue. Brushing the teeth also reduces the concentration of the bacteria that cause these diseases (just as it reduces the concentration of the decay-causing bacteria) in three ways: by mechanically dislodging the bacteria; by removing the food particles they need in order to grow; and by the introduction of bacteria-killing chemicals in the tooth paste. Hence, frequent tooth brushing is important, not only for the prevention of tooth decay, but also as a guard against other mouth diseases.

Not only does tooth brushing directly reduce tooth decay and other mouth diseases, but by helping to maintain good oral hygiene, it also aids in keeping other parts of the body healthy. Tooth decay, for example, is basically a chronic infection, and like any other infection, it has harmful effects not just on the directly affected areas, but also upon the body as a whole. Such chronic infections tend to lower the person's resistance to all diseases and

often affect other specific organs. For example, we know that many cases of liver and kidney diseases as well as poor eyesight and even blindness, can be traced back to tooth decay. While tooth decay is not responsible for all kidney, liver and eye diseases, more of these diseases are due to chronic infection from tooth decay than is generally recognized. Therefore, brushing the teeth after each meal not only constitutes good oral hygiene, but it also makes for good general body health.

[Filler Essay For Control Groups]

The Benefits of Brushing Teeth After Every Meal

Even though we all recognize the wisdom of brushing our teeth after every meal, the practice is so important that it is worthwhile to review some of the reasons for carrying out this valuable health measure. Naturally, tooth brushing improves the appearance of our teeth, something that is desirable in itself. More important, science has demonstrated many health benefits deriving from brushing our teeth. Tooth brushing provides the best means we have of eliminating decay-causing bacteria which can destroy both teeth and gums. Such decay-preventing measures have become especially important nowadays when our changing food habits are tending to increase the likelihood of tooth decay. Let us look briefly into some of the reasons why brushing one's teeth after every meal is so important.

It has been known for a long time that the major cause of tooth decay (dental caries) is a general class of oral bacteria which are commonly known as "decay bacteria." A certain amount of these bacteria which attack and damage teeth and gums are found in the human mouth at all times. Brushing one's teeth tends to remove these bacteria both mechanically and chemically. Several dental schools in this country and abroad have conducted experiments in which they have measured the number of bacteria present in the mouths of people who brushed their teeth after every meal and those who did not. It was found that approximately 78% of the decay bacteria were eliminated after each brushing. (Since the remaining bacteria multiply very rapidly between and during meals, it is important to brush one's teeth again after each meal.) It was also found that regular tooth brushing reduces the decay by as much as 70% below what it is with only occasional brushings. Thus, by killing these decay bacteria brushing one's teeth after every meal considerably reduces tooth decay.

While brushing one's teeth after every meal has always been a recommended health practice, it has become more important than ever today because of changes in our eating habits. In this country, we are now eating a richer diet than ever before. Each year, we find a large increase in the per person consumption of such foods as fruit juices, soft drinks, cakes, candies, etc., which are the very foods which are most likely to cause tooth decay. Furthermore, there is an increasing tendency to eat between meals: the coffee break, the coke break, the after-the-movie soda, and the TV or bedtime snack are becoming more and more popular.

This between-meal food intake notably increases the possibility of tooth decay. Hence, to counteract these dietary trends that threaten to make the tooth decay problem even greater than before, it has become increasingly important that we take the most effective counter-measure against decay, namely, brushing our teeth after every meal.

[Filler Essay For Control Groups]

Some False Charges Against Tooth Brushing Practices

We are, no doubt, all aware that one should brush his teeth after every meal. Yet, from time to time, stories by well-intentioned but misguided reporters are published claiming that this healthful practice is unwise. Often these stories seem on hasty examination to be reasonable, but a closer look shows us that they are based on distortions of the facts and are misleading. While no one would claim that brushing one's teeth after every meal will positively prevent tooth decay, it is easy to demonstrate by scientific facts and figures that this practice does reduce the amount of decay and that the practice is in general a very important health measure. Because brushing one's teeth after every meal is so important, and because these distorted arguments against the practice may sometimes sound convincing on the basis of a brief reading, it will be useful to review here some of these misleading arguments against frequent tooth brushing and to show where their errors lie.

Many times the opponents of tooth brushing will quote incomplete and unreliable statistics which indicate that groups who brush their teeth frequently have a higher incidence of tooth decay than those who do little or no brushing. This, to say the least, is a misleading statement based on statistical fallacy. If we go to the source of such statements we shall find that they rely on comparisons of western populations with small primitive societies or between high and low income groups in our own population. It is true that people in these primitive cultures have less tooth decay than we do, but it would be foolish indeed to say that this is so because we happen to brush our teeth. The poor teeth in civilized, advanced societies and especially in high income groups are due, not to tooth brushing, but to our richer diet that contains large components of citrus fruits, sugars and other substances that cause tooth decay. The brushing is not a cause of our high rate of tooth decay but is, in fact, a necessary corrective measure for this decay-causing diet. It is only by means of dental hygiene, especially brushing the teeth, that we prevent our rich diet from causing even more decay than it does.

Another faulty argument that one sometimes hears is the claim that tooth decay occurs mostly while the food is in the mouth and that, therefore, brushing the teeth after the meal fights decay when it is already too late to do much good. Even though tooth decay does occur mainly while

the food is in the mouth, we must recognize that when the meal is over many food particles remain in the mouth lodged between the teeth for long periods after the meal unless they are removed by brushing. This, in fact, is why it is so important to brush our teeth after each meal. Hence, while it is true that decay occurs for the most part while food is in the mouth, this fact is a good reason for, rather than against, frequent tooth brushing. When we fail to brush our teeth after each meal food particles remain in our mouths indefinitely with the result that tooth decay occurs continuously. It is important that such misleading arguments as those which we saw here do not cause us to neglect the simple and highly effective health practice of brushing our teeth after every meal.

[Filler Essay For Control Groups]

Some False Charges Against Tooth Brushing Practices

We are, no doubt, all aware that one should brush his teeth after every meal. Yet, from time to time, stories by well-intentioned but misguided reporters are published claiming that this healthful practice is unwise. Often these stories seem, on hasty examination, to be reasonable, but a closer look shows us that they are based on distortions of the facts and are misleading. While no one would claim that brushing one's teeth after every meal will positively prevent tooth decay, it is easy to demonstrate by scientific facts and figures that this practice does reduce the amount of decay and that the practice is in general a very important health measure. Because brushing one's teeth after every meal is so important, and because these distorted arguments against the practice may sometimes sound convincing on the basis of a brief reading, it will be useful to review here some of these misleading arguments against frequent tooth brushing and to show where their errors lie.

One of these misleading arguments is based on the erroneous claim that brushing the teeth tends to cause gum injuries and pushes the gums back exposing the more vulnerable part of the teeth to decay. As a matter of fact, brushing the teeth causes less damage to the gums than does eating itself. It would be as ridiculous to suggest that we should give up eating as that we should give up brushing our teeth because of the trivial amount of gum damage involved. In fact, in the long run, frequent brushing improves the health of the gums as well as that of the teeth. For example, bleeding of the gums is most commonly observed when the person brushes his teeth after a long period of neglect. Bleeding indicates weakness of the gums from lack of such stimulation as proper brushing gives them. It has been found in experiments that bleeding gums are less common in persons who brush after every meal than in those who fail to do so. The gums are among the strongest tissues of the body. The stimulating gum-massage involved in vigorous brushing after each meal has been shown to strengthen these gum tissues rather than weaken them.

Another misleading argument against tooth brushing is that tooth pastes contain harsh abrasives which pit the enamel of the teeth, leaving them open to bacterial damage. Such tooth pastes did indeed exist fifty years ago in this country, and are still used in some parts of the world, but all tooth pastes now sold in this country are free from such defects. Since the advent of the Pure Food and Drug Act

all tooth pastes, before they are made available to the public, must be thoroughly tested and all abrasives (plus any other questionable contents) must be eliminated before the dentifrice is put on the market. By the time a tooth paste reaches the public in this country it has been thoroughly analyzed and tested and has been approved by both the United States Public Health Service and the American Dental Association as perfectly harmless for the public to use. It is important that such misleading arguments as those which we saw here do not cause us to neglect this simple and highly effective health practice of brushing our teeth after every meal.

[Filler Essay For Control Groups]

Some Dangers of Excessive Tooth Brushing

Many people brush their teeth more or less automatically after each meal without realizing that of late, medical reports have been calling this procedure into question. Recent medical and biological studies indicate that the beneficial effects of constant tooth brushing have been exaggerated. Furthermore, it has been demonstrated that a number of bad effects can result from brushing teeth so often. In fact, statistical studies usually show higher rates of tooth decay among those brushing after every meal than among those who seldom or never brush their teeth. Biochemical studies also indicate that most tooth decay occurs while the food is still in one's mouth, so that the brushing comes too late to do much good. Hence, medical authorities are beginning to urge that instead of brushing our teeth so frequently, we take other measures to improve dental health, such as a better diet. Let us review some of this evidence demonstrating that constant tooth brushing does not do any great amount of good and can do much harm.

It can be demonstrated by medical statistics that constant tooth brushing after every meal can cause more harm than good as far as dental decay is concerned. Medical statistics show that groups who brush their teeth this frequently tend to suffer from the highest rate of tooth decay. For example, statistical studies show that the rate of tooth decay is higher in the high income, college educated segment of the population -- which does the greatest amount of tooth brushing -- than in the low income segment where this practice is more likely to be neglected. Also when we compare the rate of dental problems in various countries, we find an almost perfect relationship between the amount of dental troubles and the amount of tooth brushing. Tooth decay is a disease of the highly civilized societies with the highest level of so-called hygienic tooth brushing and is relatively unknown in primitive societies where the tooth brush is unknown. Indeed it can be shown that in a number of primitive societies that have been "Westernized" during the past half-century, the frequency of tooth decay has actually gone up after the practice of tooth brushing was adopted. Of course, not all people who brush their teeth have dental troubles, but these statistics suggest that, on the whole, constant brushing does our teeth more harm than good.

Furthermore, it has been conclusively shown (Columbia Dental School, 1967) that almost all tooth decay occurs while the food is still in the mouth. By the time the meal

is over and one has a chance to brush his teeth, it is already too late for the brushing to do much good. The decay producing activity of the bacteria depends on certain digestive enzymes which are liberated only while food is actually in the mouth. Hence, when we stop eating and these enzymes are no longer secreted, the bacteria can no longer produce decay. Since we do not, of course, brush our teeth until after we have finished eating, this measure is, so to speak, like closing the barn door after the horse has already escaped. It would be wiser to utilize safer and more effective ways of preventing dental disease, such as a better diet or more frequent visits to the dentist. Since tooth brushing after every meal can do so little good and, as we have just seen, has so many harmful effects, it seems unwise to recommend this constant brushing as a general health measure.

[Filler Essay For Control Groups]

Some Dangers of Excessive Tooth Brushing

Many people brush their teeth more or less automatically after each meal without realizing that of late, medical reports have been calling this procedure into question. Recent medical and biological studies indicate that the beneficial effects of constant tooth brushing have been exaggerated. Furthermore, it has been demonstrated that a number of bad effects can result from brushing teeth so often. Constant gum irritation can result in infection and even mouth cancer. Also, brushing teeth so frequently tends to push back the gums and expose the non-enameled parts of the teeth to decay. Hence, medical authorities are beginning to urge that instead of brushing out teeth so frequently, we take other measures to improve dental health, such as a better diet. Let us review some of this recent evidence demonstrating that constant tooth brushing does not do any great amount of good and can do much harm.

The most undesirable effect of tooth brushing is the damage it causes to the gums. All of us must have noticed that when we brush our teeth, we often cause our gums to bleed. Such bleeding, obviously, indicates some degree of gum injury. These injuries, besides the physical damage they cause, increase the likelihood of infection. Doctors generally concede that most serious gum infections result from accidental injury to the gums inflicted during tooth brushing. Furthermore, repeated injuries of the gums caused by constant tooth brushing can, even when each of these injuries is only slight, produce mouth cancer. Also, frequent brushing can actually increase rather than decrease the amount of tooth decay by exposing the unprotected areas of the teeth to the decay-causing bacteria. Nature has given our teeth a very good protection: the enamel sheath. This sheath covers only the exposed portions of the teeth: there is no enamel under the portions covered by the gums. Tooth brushing pushes back the gums and exposes those unprotected parts of the teeth to decay-causing bacteria. It is apparent, then, that too frequent brushing can cause gum infections and even mouth cancer, and may increase rather than diminish the amount of tooth decay.

Even the enamel itself can be damaged by constant tooth brushing. Many tooth pastes and powders have been found to contain harsh abrasives which tend to wear down this enamel. This wearing and pitting of the enamel opens still another path by which the decay bacteria can destroy the teeth. The presence of some harsh abrasives is required

in both tooth pastes and powders in order for these dentifrices to do an adequate job of making our teeth look clean. It is, therefore, inevitable that some harm is done to the enamel whenever we brush our teeth. While the abrasive effect of such brushing is very slight, the accumulated effects of constant brushing can be disastrous. This realization that brushing after every meal can well cause more harm than good has prompted many dental authorities to discontinue recommending such constant tooth brushing as a general health measure.

APPENDIX B

ATTITUDE QUESTIONNAIRES AND RATING FORM

[Attitude Questionnaire: Version 1]

We are interested in determining the extent to which the reading comprehension score obtained in this test is affected by the person's feeling 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 following statements 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 questions.

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
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True				True	

Only a small number of traffic accidents in the U.S. are attributable to vehicle failures.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True				True	

Commodities made in Japan are, for the most part, of low quality.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True				True	

Compared to other factors of accident causation, vehicle defects are of little consequence.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True				True	

[Attitude Questionnaire: Version 1]

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
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

Japan's increasing production and sales of exports has not been accompanied by corresponding improvements in the quality of their products.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

If automobiles on U.S. roads were 100% free of defects, the number of traffic accidents would still not be substantially reduced.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

In terms of quality, Japan's exports do not compare favorably with those of other industrial-oriented countries.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

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
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

Vehicle malfunctions are a minor contributor to the traffic safety problem in the U.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely				Probably			Uncertain			Probably			Definitely	
False				False						True			True	

[Attitude Questionnaire: Version I]

Commodities imported from Japan are usually a "bad buy."

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
/														
Definitely			Probably			Uncertain			Probably			Definitely		
False			False						True			True		

Penicillin should be considered a "wonder drug" since there are so many advantages to its use.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
/														
Definitely			Probably			Uncertain			Probably			Definitely		
False			False						True			True		

[Attitude Questionnaire: Version 2]

We are interested in determining the extent to which the reading comprehension score obtained in this test is affected by the person's feeling 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 following statements 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 questions.

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
Definitely False				Probably False			Uncertain		Probably True			Definitely True		

A large number of traffic accidents in the U.S. are attributable to vehicle failures.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False				Probably False			Uncertain		Probably True			Definitely True		

Commodities made in Japan are, for the most part, of high quality.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False				Probably False			Uncertain		Probably True			Definitely True		

[Attitude Questionnaire: Version 2]

Compared to other factors of accident causation, vehicle defects are of great consequence.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False			Probably False			Uncertain			Probably True			Definitely True		

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
Definitely False			Probably False			Uncertain			Probably True			Definitely True		

Japan's increasing production and sales of exports has been accompanied by corresponding improvements in the quality of their products.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False			Probably False			Uncertain			Probably True			Definitely True		

If the automobiles on U.S. roads were 100% free of defects, the number of traffic accidents would be substantially reduced.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False			Probably False			Uncertain			Probably True			Definitely True		

In terms of quality, Japan's exports compare favorably with those of other industrial-oriented countries.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Definitely False			Probably False			Uncertain			Probably True			Definitely True		

[Attitude Questionnaire: Version 2]

Even though one may not have any reason for suspecting TB, it is a good idea to have frequent chest x-ray examinations.

1 /	2 /	3 /	4 /	5 /	6 /	7 /	8 /	9 /	10 /	11 /	12 /	13 /	14 /	15 /
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True			True		

Vehicle malfunctions are a major contributor to the traffic safety problem in the U. S.

1 /	2 /	3 /	4 /	5 /	6 /	7 /	8 /	9 /	10 /	11 /	12 /	13 /	14 /	15 /
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True			True		

Commodities imported from Japan are usually a "good buy."

1 /	2 /	3 /	4 /	5 /	6 /	7 /	8 /	9 /	10 /	11 /	12 /	13 /	14 /	15 /
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True			True		

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

1 /	2 /	3 /	4 /	5 /	6 /	7 /	8 /	9 /	10 /	11 /	12 /	13 /	14 /	15 /
Definitely				Probably		Uncertain			Probably			Definitely		
False				False					True			True		

To properly evaluate this test, it is necessary to assess your previous familiarity with certain products. Please complete the following questionnaire by placing an (x) in the appropriate boxes. In addition, indicate those products which you, parents, or a friend have owned by placing an (x) on the line to the left of the product name.

[illegible]

APPENDIX C

INSTRUCTIONS TO THE SUBJECTS

[Instructions: Cover Page For Test Booklets]

Skills Booklet No. _____

On the following pages you will find short essays on several topics. These essays have 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 of the test. Consequently, we are asking speech 100 students to help us. Please follow closely 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.

DO NOT TURN THIS PAGE UNTIL ASKED TO DO SO.