

THE EFFECTS OF INOCULATION, DISTRACTION AND
SENSORY DEPRIVATION ON ATTITUDE CHANGE AND
COUNTERARGUING

by

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ABSTRACT

There is impressively consistent empirical support for the hypotheses that distraction and sensory deprivation increase responsiveness to persuasive inputs. The primary purpose of the two experiments reported here was to investigate whether distraction and sensory deprivation also increase the persuasive impact of attacks on cultural truisms, and the manner in which prior provision of counterarguments in the form of a refutational inoculation message interacts with these treatments. The effects of the independent variables were assessed by dependent measures of four theoretically distinct but related aspects of the attitude change process: comprehension, message belief acceptance, attitude change and cognitive reactions to the persuasive message. A total of one hundred subjects served in the two experiments.

In the first experiment, the effects of three levels of distraction (no distraction, low effort distraction, high effort distraction) and of the presence or absence of refutational inoculation were examined. Contrary to previous research, distraction had no effect on any of the dependent measures; refutational inoculation, consistent with previous research, reduced message belief acceptance, increased pro-truism attitudes and increased counterarguments against the message.

In the second experiment, the effects of three levels of sensory deprivation (0, 1 hour, 23 hours) and of the presence or absence of refutational inoculation were examined. Again contrary to previous research, sensory deprivation had no effect on any of the dependent measures; consistent with previous research, refutational inoculation reduced message belief acceptance, increased pro-truism attitudes and increased counterargument production. The implications of these results for competing explanations of distraction and sensory deprivation effects were discussed. The cognitive dissonance interpretation of the effects of distraction and the information need interpretation of the effects of sensory deprivation appear unable to account for the failure of these manipulations to increase persuasion. These findings are more in accord with the counterargument disruption interpretation. In addition, the counterarguing process appears to represent an important aspect of the general effects of the refutational inoculation message. Further research, using the same procedures of the present study, but a non-cultural truism as the attitude topic, is required to test the counterargument disruption interpretation more rigorously.

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INTRODUCTION

General Overview

The two experiments which constitute the focus of this thesis are primarily concerned with the nature of the psychological processes that underlie the effects of three different experimental manipulations on responsiveness to persuasive messages. As the two experiments were isomorphic in design and format, differing only in terms of one independent variable, it was possible to utilize a common control group. The design of the first experiment incorporated two major variables: (a) three levels of effort required by a distraction task which subjects worked on during the presentation of the persuasive message (a nondistracted control, a low effort distraction and a high effort distraction); (b) the presence or absence of a refutational inoculation message at an experimental session which occurred approximately 23 hours before the presentation of the attack message.

The design of the second experiment also incorporated two major variables: (a) three levels of length of time in sensory deprivation prior to the presentation of the inoculation message (a nondeprived control, a 1 hour deprivation group and a 23 hour deprivation group); (b) the presence or absence of a refutational inoculation message at an experimental session which occurred approximately 23 hours before the pres-

entation of the attack message. The major dependent measures, which were the same for the two experiments, were selected to measure four theoretically distinct but related aspects of the attitude change process: comprehension of the persuasive message, acceptance of beliefs contained within the persuasive message, attitude change and cognitive reactions to the persuasive message.

The emphasis in traditional approaches to attitude change research has been on the manipulation of various independent variables in attempts to influence the amount of change produced by persuasive communications (e.g., McGuire, 1969). The two experiments reported here are manifestly part of that tradition. It is however true, as Fishbein and Ajzen (1972, 1975) and Harre and Secord (1972) have argued, that the traditional approach has focused disproportionately on independent variables, and insufficient analysis has been conducted of the processes intervening between experimental manipulations and change in the dependent variable. The first two sections of this introduction are primarily concerned with these intervening processes and the need to develop valid measures of these usually unmeasured processes.

In Section I, attitude and belief are defined within the framework of an expectancy-value model. According to this view attitude is "a relatively stable affective response to an object which is accompanied by a cognitive structure of beliefs

about the potentialities of that object for attaining or blocking the realization of valued states." (Rosenberg, 1956, p.367) This framework is used to understand the effects of persuasive communications. It is argued that studies, which, like this one, use persuasive communications as a means of inducing attitude change, should measure both attitudes and acceptance of the major beliefs contained within the message.

In Section II, the issue of the processes involved in the acceptance of a persuasive message is raised. McGuire's (1968, 1972) information processing model of the attitude change process is adopted as a unifying theoretical framework. In this view, attitude and belief change involve a series of successive steps, consisting of both learning (attention and comprehension of the message) and acceptance or yielding factors. Evidence pertaining to the roles of these factors in the attitude change process, and problems pertaining to the measurement of these factors, are discussed. The present study is rather unique inasmuch as an attempt is made to measure both the comprehension and yielding factors.

Whereas Sections I and II are primarily concerned with the dependent variables used in the experiments here, the focus of Section III shifts to the independent variables. These are refutational inoculation, level of effort required by the distraction task and length of time in sensory deprivation. These manipulations have all been found to influence the impact of persuasive communications. Brief summaries of

previous research using these techniques are included and competing explanations for the effects of these techniques discussed.

Section IV draws upon theoretical and empirical considerations raised in the earlier sections to establish the particular conditions under which the predictions from various theories should apply in the present experiments.

In Section V, the role of subjects' interpretations of the experimental situation as a possible artifact that may mediate distraction and sensory deprivation effects is examined.

In Section VI, hypotheses relating to the individual difference dimension of conceptual complexity, and to the dependent measures of subjective certainty and of perceptions of message and source characteristics are advanced.

SECTION I

Attitudes as Belief Systems

Although attitude has long been, to paraphrase Allport (1968), one of the most distinctive and indispensable concepts in American social psychology, there remains considerable confusion and doubt surrounding its definition. The approach to definition taken here is basically in accord with what have been known as the "expectancy-value" models of attitudes, (e.g., Fishbein, 1967; Fishbein and Ajzen, 1975; Rosenberg, 1956).

The expectancy-value interpretation represents attitudes as general feelings of favourableness or unfavourableness toward objects and asserts that attitudes are determined by individuals' expectancies or beliefs about the attributes that various objects possess. More specifically, according to the model, a person's attitude toward an object can be estimated by multiplying his evaluation of each attribute associated with the object by his belief (the subjective probability that the object has the attribute) and then summing the products for the total set of beliefs. The model thus clearly specifies the relationship between attitudes and beliefs and how these constructs should be measured. An attitude is appropriately measured by procedures which locate the subject on bipolar affective or evaluative di-

mensions vis-a-vis the object in question. A belief is appropriately measured by procedures which quantify the perceived likelihood or subjective probability that the object in question possesses the attribute in question. A belief has positive or negative evaluative implications for attitude toward an object as a joint function of the strength of the belief (how likely it is that the object possesses some particular attribute) and the degree to which the attribute is positively or negatively evaluated.

Fishbein and Ajzen (1975) have reviewed a wide range of studies which have produced results in support of the expectancy-value model. These studies have variously dealt with attitudes toward persons, issues, institutions, concepts, behaviours, et cetera. The consistent finding appears to be that very accurate estimates of attitude can be obtained by taking into account both belief strength and the evaluation of associated attributes. Furthermore, as Fishbein and Ajzen (1975) note, several of these studies have also shown that attitudes can be estimated more accurately by considering both belief strength and the evaluation of associated attributes than by using only the sum of the beliefs or the sum of the evaluations. The one exception to this predictive increment is when "all the evaluations are positive or negative" (Fishbein and Ajzen, 1975, p. 227).

It is noteworthy that,

". . . although virtually all studies designed to test the expectancy-value model have obtained significant results, the correlation between estimated and observed attitude has varied considerably. Generally speaking, it may be suggested that when attitudes are estimated on the basis of salient beliefs elicited by the subjects or on the basis of belief statements that have been selected by some standard scaling procedure, the correlation tends to be high (e.g., Fishbein, 1963; Jaccard and Davidson, 1972; Ostrom, 1969). When belief statements are selected in some intuitive fashion (by the experimenter), many beliefs will tend to be nonsalient, and they may also be unrelated to the underlying attitude. Studies using such belief statements have generally obtained lower correlations (e.g., Fishbein and Ajzen, 1975, p. 228; Insko et al, 1970)."

This analysis suggests a major potential source of construct-operation slippage in attitude change studies. Persuasive communications can be described as consisting of series of belief statements, each linking some object to an attribute.

Most studies assessing the impact of persuasive communications rely solely on a dependent measure of attitude change and select the beliefs that constitute the message in an intuitive or rational fashion. A necessary condition for the experimental manipulations to influence the effects of the persuasive message on the dependent variable is however that the beliefs contained in the persuasive message have evaluative implications for the attitude object. The probability of that condition being satisfied is likely weakened by the failure to determine whether subjects perceive that the information presented in the message leads to the same conclusion or attitude as the experimenter has decided *a priori*. As Fishbein and Ajzen (1975) put it: ". . . when the information provided in the persuasive message is completely irrelevant to the dependent variable, no experimental manipulation will produce different amounts of change." (Fishbein and Ajzen, 1975, p. 508)

In sum, the effects of any experimental manipulation on the impact of a persuasive message can be understood only in conjunction with an informational analysis of the message. In the two experiments reported here we measured both attitudes and acceptance of major message beliefs.

This more differentiated approach to the measurement of the impact of the persuasive message is also substantially more informative than the all too common procedure of obtaining

only an attitude measure through one of the standard procedures or of relying on single statement measures of feelings, opinions, knowledge, or intentions (see Fishbein and Ajzen, 1972, 1975). For one thing, the more differentiated approach lays the basis for more detailed analysis of the types of message beliefs that are most strongly associated with general attitudes. In the present context, for instance, correlations can be calculated between each message belief dimension and general attitude. Furthermore, multiple regression analysis can be conducted to derive an index of the overall correlation between the set of message beliefs and attitude and to determine which beliefs provide the strongest independent contribution to the prediction of attitude. Assuming a unidirectional causal sequence from message beliefs to attitude, these correlations (or regression weights) provide an indication of the extent to which placement on a given belief influences attitude. Research on memory and attention span (e.g., Miller, 1956) strongly suggests five to nine beliefs about a given object are likely to serve as determinants of attitude at any given time. Whether the correlations between beliefs and attitudes or the beta weights assigned to beliefs in multiple regression analyses can be used to identify the most important beliefs and to develop more powerful persuasive messages remains an unresolved empirical question.

It should be remembered, however, that the expectancy-value model probably represents an overly rationalistic description of attitudes. The assumption of a unidirectional causal sequence from beliefs to attitudes may not be valid. As Rosenberg and Abelson (1960) have cogently argued, attitude formation and change should be understood as resulting from one or both of two causal sequences: one sequence is cognitive (i.e., belief) change followed by affective (i.e., attitude) change, the other is affective change followed by cognitive change. (See also Bem, 1972, on the relationship between attitudes and behaviour.)

SECTION II

A Two-Factor Model of the Effects of Persuasive Communications

In Section I, we were primarily concerned with describing an expectancy-value interpretation of attitudes and bringing out the implications of that interpretation for understanding the impact of persuasive communications. The basic conclusion was that from an expectancy-value standpoint, the most direct measure of the impact of a persuasive message is acceptance of the beliefs of which the message is largely composed. Attitude measures are relevant insofar as the persuasive message contains beliefs which affect the evaluation of the attitude object.

In Section II, our concern shifts to the factors that determine the effects of a persuasive message on the receiver's corresponding belief and attitude structures. The informational relevance of the message is assumed. The issues in question are the psychological processes underlying belief and attitude change. We shall concentrate in this discussion on one particular theoretical paradigm for the analysis of attitude and belief change: McGuire's (1968, 1972) information processing model.

The basic assumption of McGuire's information processing approach is that the impact of persuasive messages is mediated by a series of steps, each of which has only a certain probability of occurring, but all of which are necessary for the production of attitude change. Specifically, in order for a persuasive communication to produce attitude change (assuming the relevance of source beliefs for determining the target attitude), it is necessary that the individual attend to the message, comprehend the source beliefs and yield to the source beliefs.

McGuire (1968) presents a two-factor model of persuasion which combines attention and comprehension into the single factor of reception. According to this model, the persuasion process involves two basic steps: reception of the message's content and yielding to what is comprehended. The model may be written in symbolic form:

$$p(O) = p(R) p(Y)$$

where $p(O)$ is the probability of opinion change; $p(R)$ is the probability of effective reception; and $p(Y)$ is the probability of yielding to what is received. McGuire (1968, 1972) suggests that the reception mediator can be measured directly (by comprehension tests), as can opinion change, but the yielding mediator can be only indirectly estimated on the basis of the degree to which the message was received and by the amount of opinion change produced.

In McGuire's view, to understand how any individual difference variable or experimental manipulation may affect the attitude change impact of a message, it is essential to consider the variable's effect on both mediators. McGuire attempts to disentangle the seemingly contradictory research findings on the effects of such variables as anxiety, intelligence and self-esteem by taking into account their effects on both mediators. McGuire's model is applied in Section III to understanding the effects of the independent variables in this study on attitude and belief change. First, however, it is appropriate to discuss some of the problems involved in assessing the relative roles of the comprehension and yielding mediators in the persuasion process.

Comprehension

The hypothesis that acceptance of a persuasive communication is, at least in part, a function of learning or retention of its content, has received explicit endorsement from a number of attitude researchers and theorists other than McGuire (e.g., Hovland, Janis, and Kelley, 1953; Miller and Campbell, 1959). After all, it is widely accepted (as was argued in Section I) that expectancies or beliefs about an object form a basic component of the structure of the attitude toward that object (see, among others, Campbell, 1947; Fishbein and Ajzen, 1975; Katz and Stotland, 1959; Krech, Crutchfield and

Ballachey, 1962; Rokeach, 1960; Smith, Bruner and White, 1956). Since these beliefs are learned, it follows that comprehension represents at least a necessary condition for attitude change.

In view of the seemingly overpowering reasonableness of the hypothesis that persuasion is at least partially a function of comprehension, it is somewhat surprising that research findings concerning the relationship between comprehension and persuasion present a very mixed pattern. Many studies report a failure to find a positive relationship between retention of message content and attitude change (e.g., Hovland and Weiss, 1952; Osterhouse and Brock, 1970; Thistlethwaite, deHaan and Kamenetsky, 1955; Zimbardo and Ebbesen, 1970), although some studies do report positive relationships (e.g., Eagly, 1974; Haaland and Venkatesan, 1968; Miller and Campbell, 1959).

Despite the inconsistent nature of the evidence, it is probably an overly strong interpretation of these findings to suggest that comprehension is relatively unimportant in the attitude change process. Even where the comprehension-persuasion relationship is positive, there are a number of conditions that may weaken its magnitude. For example, the arguments themselves, when comprehended, must be accepted (that is, yielding must occur) and they must be perceived as evidence relevant to the dependent variable. In addition,

it may often be the case that persuasive messages are so easy to comprehend that most of the opinion change variance is attributable to the yielding factor (see McGuire, 1968). There is also doubt concerning the validity of comprehension measures that have been used in previous attitude research. Indeed, the question of how the comprehension of connected discourse can be measured has not been answered to the satisfaction of cognitive psychologists (Donaldson and Tulving, 1972).

Yielding

Even if a person comprehends the persuasive communication, he is still faced with the decision of accepting or rejecting the assertions contained within the communication. This brings us to the yielding factor in McGuire's model. It is at this juncture that it becomes necessary to take into account the cognitive reactions of the communication recipient to the incoming persuasive information. Presumably, as several attitude researchers have suggested (e.g., Festinger and Maccoby, 1964; Greenwald, 1968; Janis and Terwilliger, 1962; Kelman, 1953; McGuire, 1964), the subject is also actively attempting to relate the new information to existing information. For instance, Hovland, Lumsdaine and Sheffield (1949, p. 201) write:

" . . . There is reason to expect that those audience members who are already opposed to

the point of view being presented may be distracted from the content of the communication by rehearsing their own arguments while the topic is being presented . . ."

McGuire (1968, 1972) has assumed that yielding, unlike the comprehension mediator, cannot be measured directly. McGuire (1968) suggests that, given "perfect" measures of comprehension and opinion change, the exact quantification of yielding can be achieved through a form of covariance analysis.

"We could, for example, compute the within-condition correlation between reception and opinion change and on the basis of this correlation and of each subject's reception score, calculate his predicted opinion change score. His yielding score would then be the algebraic difference (or some better-scaled equivalent) between his predicted and obtained opinion change scores." (McGuire, 1968, p. 1174)

The approach taken in this discussion is that yielding can be directly measured despite the existence of a number of subtle and complex methodological and interpretive obstacles. In the subsequent discussion, several of these problems and the manner in which they have been handled in

these experiments will be discussed. The target of measurement will be subjects' implicit cognitive responses to the persuasive message or what has often been referred to as counter-argumentation.

Why Direct Measurement is-Required

The counterarguing construct has played an important explanatory role in a number of attitude change literatures. The construct has been invoked to explain the effects of the three major independent variable manipulations used in the two studies here. McGuire (1964) uses the construct ("belief-bolstering") to explain why his inoculation treatments improve subjects' ability to resist persuasion. Festinger and Maccoby (1964) use the construct to explain why distraction increases yielding to a persuasive message. Suedfeld (1972) suggests that sensory deprivation enhances the impact of persuasive messages because subjects are "less able to muster appropriate counterarguments from (their) repertoire" (1972, p. 6). Counterarguing has also been suggested to underlie the effects of forewarning on persuasion (see Papageorgis, 1968; Hass and Grady, 1975).

In view of the number of research areas within which counterarguing has been invoked as a theoretical explanation, it is rather surprising that so few attempts at direct measurement have been made. Although the effects of distraction

on counterarguing have occasionally been assessed (e.g., Keating and Brock, 1974; Osterhouse and Brock, 1970), there have been very few attempts to measure the effects of independent variables on this hypothetical intervening process. Direct measurement, as is attempted in this study, is desirable for two major reasons. First, it is simply not known whether counterarguing is really a common or typical means of resisting influence. The counterargument explanation is only one competing explanation for the effects of the major independent variables used in the studies here. McGuire's inoculation research has been re-interpreted by Tannenbaum (1967) in terms of congruity theory, rendering the counterarguing construct unnecessary. Cognitive dissonance theory (see Zimbardo, Snyder, Thomas, Gold and Gurwitz, 1970) has been used to explain the distraction effect. The stimulus-hunger explanation has been advanced to explain the persuasion-enhancing effects of sensory deprivation. Since there is little or no direct evidence that these techniques affect counterarguing, other interpretations may well account for the data.

Second, a direct measure is desirable inasmuch as it is important to discover what variables affect the production of counterarguing and at what points in the persuasion process it occurs.

Given that the case for direct measurement has been made, let us turn to the complex problems of definition, interpre-

tation and validity associated with the development of direct measurement.

Classification of Cognitive Responses

In earlier sections, definitions of attitude, belief and comprehension were advanced. These general discussions put in some theoretical perspective the measures of these constructs used in the present experiments. We consider here the problem of defining the classification criteria for coding cognitive responses to persuasive messages. As counter-arguing has been measured by the open-ended technique of asking subjects to report the thoughts that occurred to them during the message, clarity of definition is imperative for reliable coding.

Unlike several previous studies which have measured only anti-message cognitions or counterarguments (e.g., Brock, 1967; Keating and Brock, 1974; Osterhouse and Brock, 1970), the present approach to measurement is to derive an overall index of pro and anti-message cognitions, an index which will summarize the thoughts' content during the presentation of the persuasive message.

The anti-message category is essentially similar to the definition of counterarguing employed by Osterhouse and Brock (1970). These researchers coded as counterarguments those

declarative statements directed against the advocated position that contain "a specific unfavourable or undesirable consequence that was not simply a restatement or paraphrase of the advocated position" or declarative statements that either suggested alternatives to the advocated position or "challenged the accuracy and validity of the communication". We have expanded on this definition somewhat to include the following types of statements:

- (1) statements that question the credibility of the communicator;
- (2) rhetorical questions which appear to serve the same functions as declarative statement counterarguments.

(Hereinafter the term "counterarguing" will be used to designate anti-message cognitive responses as defined here.)

Message neutral cognitions were defined as those which were ambiguous in terms of whether they implied message acceptance or rejection or were simply irrelevant to the position taken by the message. Pro-message cognitions were defined as those which indicated acceptance of message beliefs.

Validity of Measurement

Another basic problem in the measurement of counter-arguing is the degree of correspondence between the process one really wishes to measure and the responses elicited when subjects are requested to list their thoughts. The fact that subjects can generate counterarguments when requested by the experimenter to do so does not establish that subjects spontaneously engage in such activity when not asked. As Miller and Baron (1973) point out:

"Given the reactive nature of typical counter-argument measures (a direct request to list the counterarguments one had at an earlier point in time), it is quite possible that the measurement attempt itself and not the earlier anticipation of or actual exposure to a persuasive communication instigates counterarguing".

Some investigators (e.g., Brock, 1967; Greenwald, 1968; Osterhouse and Brock, 1970) have been sensitive to this problem and, instead of asking subjects to list counterarguments per se, required them simply to list the thoughts that occurred to them while listening to the persuasive message. While this approach does not ensure that the counterarguments produced in response to the request occurred spontaneously, such instructions presumably should not elicit counterarguing more than any other thought process. The approach to

measuring counterarguments in this experiment is similar to the less reactive thought-listing procedure used by Greenwald (1968). The minimization of the reactivity of the measure is especially desired here inasmuch as the target of measurement is the content of naturally occurring cognitions to the message in the different conditions. A subject is more likely to interpret a "reactive" measure as a request to justify his attitude, which may have already been altered in response to some other aspect of the treatment (see following section).

The Interpretation of the Measurement

Theoretical analyses that use counterargumentation as an explanatory construct generally postulate a unidirectional causal sequence wherein attitude change is viewed as a negative function of counterarguing. The causal role of counterarguing in the persuasion process cannot however be determined by even a flawless measure of counterarguing. As Miller and Baron (1973, p. 197) in their essay on the topic of measuring counterarguing state:

"It is always possible that regardless of how the researcher temporally orders his measures of counterarguing and attitude change, people construct counterarguments to support whatever position they hold after they have been exposed to the persuasive materials. That is, counter-

arguing may be a post-persuasion technique used to justify whatever position one finds oneself holding rather than a mechanism for resisting influence."

For the clarification of the problem of causal sequence, the experimental approach appears to be the method of choice. A straightforward solution seems to be to identify those treatment variables that have differential effects on counterarguing and then observe their effect on attitude change. To the extent it can be shown that the treatment affected only the intervening process of counterarguing, and that the treatment has the predicted effect on the criterion response of belief and attitude change, support is obtained for the interpretation that attitude and belief change are functions of counterarguing.

The main problem in following through this line of construct validation research is that treatments which affect measured counterarguing can plausibly be interpreted also to influence attitude change. For instance, distraction has been found to increase attitude change with impressive consistency (see Baron, Baron and Miller, 1973). This effect has been attributed to decreased counterarguing (e.g., Osterhouse and Brock, 1970). However, plausible rival hypotheses exist: to the degree that distraction increases the effort required to hear the message, the dissonance theory interpretation of

the role of effort could account for the change (see Section III, Baron, Baron and Miller, 1973; Zimbardo et al, 1970). This differential attitude change may then have been responsible for the elicitation of different levels of counterarguing. Similarly, competing explanations for the effects of inoculation and sensory deprivation exist which do not invoke the counterarguing construct.

The foregoing sections have outlined some of the complex problems in measuring cognitive responses to persuasion (definitions of categories and validity) and establishing the causal role of these responses in the persuasion process. Although these problems appear to have no straightforward solution, the theoretical importance of the underlying processes seems to justify further research. Instead of abandoning the problem, the author recommends the exploration of alternative measurement procedures and awareness of the fallibility of the measures employed.

SECTION III

The Independent Variables

Hitherto, we have presented an analysis of the general processes of belief and attitude change. In this section the focus shifts to the three major independent variables used in the two experiments here and how these manipulations may enhance or lessen the impact of persuasive messages.

Refutational Inoculation

McGuire's (1964) inoculation theory and research draw heavily on a biological analogy in which resistance to an attacking virus is enhanced by pre-exposure to a weakened dose of the attacking material. This weakened dose serves to stimulate defenses, but is not so strong as to overcome them. McGuire (1964) argued that in order to make full heuristic use of this analogy in deriving hypotheses about increasing resistance to persuasion, it is necessary to deal "as far as possible" with beliefs that had been maintained in a "germ-free ideological environment". For this reason, inoculation research has consistently employed cultural truisms as the attack targets (e.g., "It is a good idea to brush your teeth after every meal if at all possible" or "Mental illness is not contagious"). An additional incidental advantage of the use of truisms is that it makes possible the omission of pretesting of subjects' attitudes, thus

avoiding the possible artifacts associated with that procedure (see Lana, 1969).

The basic assumption of McGuire's inoculation approach is that the resistance of truisms to subsequent attacks can be increased by treatments that counteract (1) the recipient's lack of ability to defend his beliefs; (2) the recipient's lack of motivation to defend his beliefs. McGuire assumes that individuals lack the skills to defend truisms because they have never had to defend truisms, and are unmotivated to defend them because they regard them as "unassailable". The deficit in belief-defending skills can be surmounted by providing individuals with "careful guidance in developing defensive material" (McGuire, 1964, p. 201-202); the motivational deficit can be surmounted by making the individual aware that the truism is vulnerable to attack. On the basis of these assumptions, McGuire and Papageorgis carried out a systematic series of experiments to determine the comparative immunizing effectiveness of various types of prior defenses.

One major hypothesis concerned the relative immunizing effectiveness of supportive versus refutational defenses. The supportive defense was "less threatening" and provided the recipient with arguments that merely offered support for the existing belief. The refutational defense was more threatening; "it mentioned several arguments attacking the belief and then proceeded to refute these attacking arguments".

(McGuire, 1964, p. 201) The reasoning with regard to the refutational inoculation was that "pre-exposure would be threatening enough to be defense-stimulating, but not so strong as to overwhelm the truism". (McGuire, 1964, p. 202)

McGuire was also concerned with the directness of the relationship between the refutational defenses and the subsequent attack. The defenses were one of two types: "either they mentioned and refuted the very arguments against the truism that were to be used in the subsequent attacks, or they mentioned and refuted arguments different from the ones to be used in the attacks". (McGuire, 1964, p. 202) The primary purpose of this refutational-same versus refutational-different manipulation was to determine whether the increased resistance to persuasion derives from the generalized motivational effect of the threatening mention of the arguments against the truism (as required by inoculation theory), or whether it stems from the useful defensive material provided by the refutations.

In general, McGuire found that pre-exposure to a refutational inoculation message is more effective in conferring resistance to counterattitudinal attacks than is pre-exposure to a supportive inoculation message. He also found no significant difference between the immunizing effectiveness of refutational-different and refutational-same inoculations. These results, along with an assortment

of other evidence, are in basic accord with the belief defense-arousing rationale of inoculation theory (see McGuire, 1964).

Inoculation theory and research are central to the two experiments reported here. The presence or absence of refutational inoculation is one of the main independent variables in both experiments. The refutational inoculation message used in these experiments combined the features of refutational-different and refutational-same inoculation by mentioning and refuting four possible arguments against the cultural truism, two of which were included in the attack. Presumably, the message should increase motivation to assimilate and develop belief bolstering material through the threatening realization of the vulnerability of the belief, as well as providing specific counterarguments against the attack message.

Distraction

On the basis of a comprehensive review of the distraction-attitude change literature, Baron, Baron and Miller (1973) have concluded with certain qualifications that distracting subjects while they are exposed to a persuasive message enhances the impact of the persuasive message. This distraction effect appears to generalize across a number of experimental contexts. The wide variety of distraction tasks that have produced significant increments in message acceptance includes

the silent film "Day of the Painter (Festinger and Maccoby, 1964), light monitoring tasks (Osterhouse and Brock, 1970; Keating and Brock, 1974), a copying task (Kiesler and Mathog, 1968), slides (Rosenblatt, 1966; Sharmo and Meador, 1969; Zimbardo, Ebbesen and Fraser, 1969), radio static (Silverman and Regula, 1968) and an adding task (Zimbardo, Snyder, Thomas, Gold and Gurwitz, 1970). In addition, Baron, Baron and Miller (1973) note that the effect has been obtained with at least 20 different message topics. It has also been observed when a variety of different experimental procedures have been employed, including situations where the message was presented on tape, by the communication in person, on film or in printed form to be read silently. Distraction effects have occurred in conjunction with "at least nine different cover stories" (Baron, Baron and Miller, 1973).

Not all studies have, however, replicated the distraction effect. These failures are of particular theoretical and practical interest insofar as they suggest limitations to the internal validity of the finding that distraction increases persuasion, and particular aspects of experimental procedures that should be controlled in distraction research.

There are at least seven studies in the literature that have failed to replicate the distraction effect (for reviews, see Baron, Baron and Miller, 1973; Osterhouse and Brock, 1970). It appears, however, that distraction interfered with the comprehension mediator in at least four of these studies.

These apparent disconfirmations can be easily accounted for within the framework of McGuire's model which asserts persuasion to be a joint function of comprehension and yielding. Presumably, if the distraction does not interfere with comprehension and increases yielding, increased attitude and belief change follow. Further supportive evidence for this view derives from Baron, Baron and Miller's (1973) observation that of all the studies on opinion change, none reported a negative distraction effect on comprehension. On the other hand, if the distraction does interfere with comprehension, even though it may increase yielding, increased attitude and belief change do not necessarily follow.

A question with important methodological as well as theoretical implications for distraction research is why distraction has interfered with the comprehension mediator in some studies and not others. Two factors which appear to be relevant are the complexity of the message (Regan and Cheng, 1973), and whether subjects focus attention on the message or on the distraction (Zimbardo, Snyder, Thomas, Gold and Gurwitz, 1970).

Regan and Cheng (1973) report that distraction increased attitude change to a simple message (one which was easily understood but "not very convincing") but decreased attitude change to a complex message (one which was difficult to understand but "convincing is understood"). This latter

effect was attributed to the negative effects of distraction on comprehension of the complex message.

Zimbardo, Snyder, Thomas, Gold and Gurwitz (1970) report that when experimental instructions directed subject attention primarily to the message, distraction increased the impact of the persuasive message. Contrariwise, when the audience was set by experimental instructions to attend primarily to the distraction, distraction reduced both comprehension and attitude change in response to the message, relative to a nondistracted control group.

In sum, the fact that distraction can have variable effects on persuasion as a function of its effects on comprehension highlights the need to include measures of comprehension of the message in distraction research. The predictions of the major explanations of distraction phenomena -- based as they are on consideration of only the yielding factor -- must be qualified by the assertion that comprehension should not be affected by the distraction (see Festinger and Maccoby, 1964; Osterhouse and Brock, 1970; Zimbardo, Snyder, Thomas, Gold and Gurwitz, 1970).

Theoretical Explanations for the Distraction Effect

Several explanations for the distraction effect have been advanced. These include an affect hypothesis which asserts that distractions increase the effects of persuasive messages insofar as they create positive affect which generalizes to the message (see McGuire, 1966, p. 482; Zimbardo and Ebbesen, 1969, p. 38); an hypothesis involving persuasive intent, which asserts that distraction facilitates persuasion by disguising the experiment as one on comprehension, thereby minimizing suspicion of persuasive intent, improving source credibility and creating a context in which subjects do not concern themselves with counterarguing (see Rosenblatt, 1966); a counterargument disruption hypothesis asserting that distraction directly prevents people from effectively counterarguing against the message, thereby leaving them more vulnerable to persuasion (e.g., Osterhouse and Brock, 1970); and, finally, a cognitive dissonance hypothesis, which asserts that distraction facilitates persuasion by forcing the subject to exert high effort in order to hear and understand the counterattitudinal message (e.g., Zimbardo et al, 1970).

The first two explanations are inadequate at least as single explanations of the distraction phenomena. (See Baron, Baron and Miller, 1973) The affect hypothesis predicts that, relative to a no-distraction control group, pleasant distractions will increase persuasion, neutral ones will not affect

persuasion and unpleasant ones will reduce persuasion. The evidence does not support these predictions. Janis, Kaye and Kirschner (1965) and Rosenblatt (1966) report that unpleasant distractions failed to reduce persuasion. In addition, several investigators (e.g., Osterhouse and Brock, 1970; Zimbardo, Snyder, Thomas, Gold and Gurwitz, 1970; Rosenblatt, 1966) report that affectively neutral distractions heighten the impact of persuasive appeals.

With regard to Rosenblatt's (1966) hypothesis, the basic problem is that it is unclear that suspicion of persuasive intent does indeed reduce the impact of the persuasive message (see McGuire, 1968, p. 185; Papageorgis, 1968, p. 274). Nonetheless there is some evidence in support of Rosenblatt's hypothesis. Rosenblatt (1966) reports that distracted subjects were less aware of persuasive intent, rated the message source as more credible, and were more persuaded.

The counterargument disruption and cognitive dissonance hypotheses are the most comprehensive and promising interpretations of the existing data on the effects of distraction. We will consider these two competing interpretations in more detail in the subsequent discussion.

The Counterargument Disruption Hypothesis

Festinger and Maccoby (1964) first proposed the counterargument disruption hypothesis of distraction effects; namely, that the positive effects of distraction on attitude change stem from the fact that distraction makes it difficult for the listener to think of counterarguments. This hypothesis seems to be able to account for most of the distraction research findings. For instance, it handles well the data concerning the effects of effort expenditure: generally, the greater the effort required by the distraction task, the greater attitude change and the less counterarguing (Keating and Brock, 1974; Osterhouse and Brock, 1970). Presumably, the high effort distractions hold one's attention more and are, ipso facto, more disruptive of counterarguing. The differential effectiveness of pleasant distractions may be similarly accounted for by arguing that pleasant distractions also hold one's attention better. Finally, perhaps the most convincing support for the counterargument hypothesis comes from studies in which the differential distraction effects occur only in those conditions where counterarguing was, intuitively, likely. Festinger and Maccoby, for instance, report no distraction effect for subjects who were not directly affected by the position advocated in the message.

Despite the considerable evidence in favour of the counterargument disruption hypothesis, the basic ambiguity about

causal direction remain. Consider the research of Osterhouse and Brock (1970). Osterhouse and Brock report in two experiments that more demanding distractions (although not so demanding as to interfere with comprehension) were associated with greater attitude change and less counterarguing in response to a counterattitudinal message. These researchers point out that "the causal direction between counterargument production and agreement (with the message) has not been established in this investigation" (p. 353). Given that people generally try to present themselves as rational when observed in a psychology experiment (see Rosenthal and Rosnow, 1969), they may view the request to list their thoughts as a context in which to justify their reactions to the message.

The Dissonance Hypothesis

The major alternative explanation of distraction effects derives from the work of Festinger in the form of his well-known theory of cognitive dissonance. Zimbardo (1965) and Zimbardo and Ebbesen (1969, 1970) have been the chief proponents of the dissonance interpretation.

According to this view, "two (cognitive) elements are in a dissonant relation if, considering these two alone, the obverse of one element would follow from the other" (Festinger, 1957, p. 3). Theoretically, one basic way of inducing dissonance is exposure (voluntary or involuntary) to counterattitudinal information (see Festinger, 1957; Insko, 1966).

Since the effort that is required to engage in dissonant behaviour increases dissonance (see Festinger, 1957; Zimbardo, 1965), it follows that to the extent greater effort expenditure is required to comprehend a counterattitudinal message, greater dissonance will be produced. As dissonance is postulated to be an aversive motivational state whose reduction is reinforcing (see Brehm and Cohen, 1962; Festinger, 1957; Zimbardo, 1965; Zimbardo and Ebbesen, 1969), dissonance-reducing responses (such as attitude change) become more likely.

In brief, as Zimbardo and Ebbesen (1970) put it, "distraction may facilitate persuasion by forcing the subject to exert high effort in order to hear and understand the persuasive message" (see also Dorris, 1967; Kiesler and Mathog, 1968; Miller and Levy, 1967).

This dissonance hypothesis is, in Baron, Baron and Miller's (1973) opinion, "fairly robust in its ability to accommodate a broad range of distraction findings". It accounts for the basic findings of the distraction literature. For instance, the finding that greater persuasion is produced by more demanding distractions (Osterhouse and Brock, 1970; Zimbardo, 1965; Zimbardo and Ebbesen, 1969) is readily assimilated to the dissonance interpretation. More demanding distractions make the task of comprehending the message more difficult and effortful, which should lead to greater dissonance.

Since the dissonance and the counterargument disruption

hypotheses both represent possible explanations of distraction effects, research that unambiguously separates these two alternatives is of interest. Several investigators have attempted to do this. One approach has involved attempts to manipulate reaction (which theoretically inhibits counterargument production) independently of effort (which theoretically underlies the induction of dissonance). Despite the claims of researchers to have achieved this (e.g., Osterhouse and Brock, 1970; Zimbardo and Ebbesen, 1970), the author is inclined to agree with the judgment of Baron, Baron and Miller (1973) that it is impossible to develop either a "distraction" that does not require "effort" or an "effortful" task that is not distracting.

Another approach to assessing the merits of the two approaches is to develop an experiment that discriminates in some other way between the theories. This is the approach undertaken in the first experiment reported here (see Section IV).

Sensory Deprivation

A number of researchers have reported that sensory deprivation increases the impact of persuasive messages. This literature has been reviewed by Suedfeld (1969, 1972).

The first experimental demonstration of the sensory deprivation effect came from Hebb's sensory deprivation laboratory at McGill, originally and inappropriately intended as an analogue of the "brainwashing" techniques used on U.N. prisoners in the Korean war. Scott, Bexton,

and Heron (1959) report a study in which experimental and control subjects were exposed to a series of recordings supporting a belief in psychic phenomena, and presenting one-sided arguments in favour of that view. On a post-session questionnaire, the sensory deprivation subjects exhibited significantly more attitude change.

Several other studies have replicated this basic finding. Myers, Murphy and Smith (1963) carried out a series of studies in which sensory deprivation led to greater persuasibility among subjects of lower intelligence, but did not affect the persuasibility of higher intelligence subjects. Suedfeld (1964) and Suedfeld and Vernon (1966) report similar results, except that the individual difference variable was conceptual complexity rather than intelligence. In a more recent study (Silverstein and Suedfeld, 1976), conceptual complexity and message complexity were varied factorially. As predicted by Streufert and Fromkin (1972), maximum message impact in normal environmental conditions occurred when complexity of the message and subject corresponded. In the sensory deprivation condition, however, the impact of the simple message on complex subjects was greatly increased.

Suedfeld (1975), in a recent review, has noted applications of the sensory deprivation technique to real-life problems. There is a series of reports which indicate that sensory deprivation increases the effectiveness of verbal messages given to psychiatric patients (Adams, Robertson and Cooper, 1966). Suedfeld, Landon, Pargament and Epstein (1972) report that the impact of an anti-smoking message was in-

creased when delivered at the end of 24 hours of sensory deprivation. Furthermore, it was reported that three months after the experiment sensory deprivation subjects were consuming an average of 38% less cigarettes. Suedfeld and Ikard (1973), in a follow-up study also report substantial reduction rates in smoking.

In overview, there is considerable support for the proposition that sensorially deprived subjects are more receptive to persuasive inputs. Furthermore, this effect generalizes beyond the confines of experimental attitude change research, dealing sometimes with attitudes that are central to subjects' lives.

The Explanation of Sensory Deprivation Effects

Sensory deprivation research has not been well integrated into the prevailing theoretical interpretations of attitudes. As Suedfeld et al (1972) suggest:

"This may be due to the fact that the technique seems so unusual as to be unassimilable by many theorists . . ."

The major theoretical statement regarding the exact nature of the sensory deprivation effect has been advanced by Suedfeld (1972).

Suedfeld (1972) argues that a two-component model underlies the effects of sensory deprivation on attitude change.

The first component involves the disorganization of the cognitive functioning of the subject, leading to decreased belief stability and reduced ability to assimilate new information without changing attitudes.

There appears to be independent empirical support for the existence of this first component. Suedfeld (1969) has reviewed the research literature on the effects of sensory deprivation on intellectual task performance. Suedfeld classified the many tasks used into three rough levels of complexity, where complexity was defined as the open-endedness and novelty of the task. The "simple" category included primarily rote learning tasks; the "moderate" category included problems such as logical deductions and the "complex" category included tests of creativity, storytelling and the like. Landon and Suedfeld (1972) report on the proportions of various outcomes: on "simple" tasks, 38% of the studies reported improvement, 48% no change, 15% impairment; on "moderate" tasks, respectively 0%, 76% and 24%; on "complex" tasks, 3%, 38%, 59%.

Suedfeld and Landon (1970) and Landon and Suedfeld (1972) have reported experiments that directly confirm the hypothesis that sensory deprivation increases the ability to solve simple problems but decreases the ability to solve complex ones. The family of U-shaped curves that define the effects of varying periods of sensory deprivation on different tasks generally supportive of the hypothesis that sensory deprivation is an arousal-inducing manipulation. (See, however,

Suedfeld and Borrie (1976) for a critique of the use of arousal as an explanatory construct for sensory deprivation research.)

The relevance of the cognitive research to the two-component model is clear in one view's evaluation of persuasive or therapeutic messages as a "complex" task which requires the self-directed processing of information, without any definitive criteria as to the correct or incorrect response. Suedfeld (1972) has argued that sensory deprivation functions as a "cognitive disorganizer" which brings about what Lewin (1958) has called the "unfreezing" stage in attitude change.

" . . . the SD subject has an impaired ability to make fine evaluations of messages and (relate) them to previous attitudes . . . the subject is uncertain of the relationships among the relevant beliefs and arguments . . . the subject becomes less able to muster appropriate counterarguments from his repertoire. Upon the weakening of this cognitive foundation, some degree of instability of the belief structure and a corresponding susceptibility to persuasion will follow."

(Suedfeld, 1972, p. 6)

Previous research on the cognitive disorganizing effects of sensory deprivation has been carried out within the framework of the uncertainty theory of attitude change (Koslin, Pargament and Suedfeld, 1971). Cognitive disorganization or belief instability was measured directly by the degree to

which subjects could make consistent (or transitive) ratings of statements that were directly relevant to a given stand on an issue. While empirical support was found for the hypothesis that sensory deprivation induces belief instability (see Silverstein and Suedfeld, 1976; Suedfeld et al, 1972; Tetlock and Suedfeld, 1976), there was little support for the uncertainty theory assertion that instability was correlated with attitude change (see Silverstein and Suedfeld, 1976; Suedfeld and Borrie, 1976). This latter fact casts doubt on the validity of the uncertainty measure and/or theory. The second experiment adopts an alternative approach to the measurement of the cognitive disorganizing effects of sensory deprivation by measuring counterarguing. In this way, the hypothesis that sensory deprivation disrupts counterarguing (counterarguing representing a complex information processing task) can be directly examined. (See Section IV)

The second component of the Suedfeld (1972) model refers to information need,

"which subsumes not only drive as defined by Austin and Jones (1969), but also a more specific need for cues as to appropriate judgment and behaviour in this novel and unstructured situation." Suedfeld, 1972, p. 7)

The greater need for information of sensory deprivation subjects causes them to attend more carefully to persuasive messages to which in control environments they would probably

pay less attention. Independent empirical support for the existence of this component comes from research findings reviewed by Jones (1969) that sensory deprivation induces motivation for meaningful sensory rewards that subjects normally find aversive, like taped propaganda lectures, soap commercials and segments of stock market reports.

Suedfeld's (1972) two-component model of the attitude change process in sensory deprivation can be translated into McGuire's more general model. The information need component suggests that the major locus of the sensory deprivation effect is the comprehension mediator. Subjects in sensory deprivation will pay closer attention to the message and, perhaps, consequently comprehend more of the material. The cognitive disorganization component suggests that the major locus of the sensory deprivation effect is the yielding factor. Subjects are unable to relate the message to past knowledge and attitudes and are unable to counterargue.

The second experiment here creates conditions wherein the relative importance of these two usually inextricably confounded components can be evaluated (see Section IV, Experiment II).

An Integrated Theoretical Analysis of Distraction and Sensory Deprivation Effects

The similarities between explanations of distraction and sensory deprivation effects (i.e., the counterargument disruption hypotheses) may not be coincidental. These similarities can be assimilated to a broader theoretical framework in which distraction and sensory deprivation effects are viewed as special instances of the more general relationship between molar environmental complexity and information processing (see Schroder, Driver and Streufert, 1967; Schroder, 1971).

Schroder, Driver and Streufert (1967) define environmental complexity as a composite of at least three factors: information load (the quantity of information impinging upon the processing organism per unit time), eucity (success), and noxity (failure). These three components are expected to sum to produce a joint effect on information processing. The possibility that other variables might be added to this list is left open.

The authors assert that structurally complex information processing (differentiation and/or integration) is more likely to occur when an optimal or intermediate level of environmental complexity has been obtained. Under conditions of too low environmental complexity (e.g., sensory deprivation) low structural complexity of information processing is more likely to occur, and consequently, reduced differences between simple and complex subjects should be expected. Under conditions of high environmental complexity (e.g., such as might be

created by the joint demands of processing a counterattitudinal message and working on a distraction task), low structural complexity of information processing and reduced differences between simple and complex subjects are again anticipated. Intermediate, optimal environments, on the other hand, should permit more complex information processing.

If we assume that counterarguing (in the sense of evaluating the validity of the various arguments contained within the persuasive message) requires a relatively complex level of information processing, it follows that distraction and sensory deprivation subjects will be less able to counter-argue. If we view counterarguing as a primary means of resisting influence, it follows that distraction and sensory deprivation subjects will be more persuasible.

SECTION IV

THE PRESENT STUDY

Experiment I

This experiment is a 3X2 factorial which varies level of effort required by the distraction task (no distraction, low effort, high effort) and the presence or absence of a refutational inoculation message. The major dependent variables are comprehension, message belief acceptance, attitude and cognitive reactions to the message. The experiment explores whether the distraction effect generalizes to attacks on cultural truisms, whether this effect varies with the level of effort required by the distraction task, and the manner in which the inoculation treatment interacts with distraction.

As noted earlier, an assumption of inoculation theory is that people tend to take the validity of cultural truisms for granted without being aware of the arguments that support them and can be used to defend them. (See McGuire, 1964) If this assumption is correct (it has not been directly tested), it opens up an approach to differentiating the predictions of the cognitive dissonance and counterargument disruption explanations of distraction effects on persuasibility.

If McGuire's assumption that individuals lack counterarguments for attacks on cultural truisms is valid, and if the counterargument disruption explanation of distraction

is valid, distraction will not increase the impact of attacks on cultural truisms. Distraction will produce differences in neither attitudes and beliefs nor in counterarguing. If, on the other hand, McGuire's assumption is not valid and people are prepared to defend truisms as well as beliefs about other more controversial topics (see Osterhouse and Brock, 1970), and the counterargument disruption hypothesis is valid, distraction will increase the impact of attacks on truisms. Distraction will then produce differences in attitude and belief change and counterarguing. Furthermore, in view of past research findings, greater effects will probably occur with the more effortful distraction (e.g., Keating and Brock, 1974; Osterhouse and Brock, 1970).

Regardless of whether McGuire's assumption is or is not valid, Zimbardo's dissonance explanation predicts that distraction will enhance the impact of the attack message, the greatest effect occurring with the more demanding distraction task. Zimbardo's dissonance prediction requires only that the distraction tasks significantly increase the effort required to engage in the attitude-discrepant behaviour of comprehending the attack message.

In sum, if McGuire's assumption is valid, the predictions of the dissonance and counterargument disruption hypotheses can be empirically distinguished (see Table 1).

The first experiment is also designed to explore the manner in which the distraction and inoculation treatments interact.

The primary theoretical interest in this question does not, however, lie in separating the predictions of the counterargument disruption and dissonance interpretations; rather, it lies in distinguishing two versions of the counterargument disruption hypothesis.

Presumably, although this assumption has never been empirically tested, an important mechanism underlying inoculation effects is an increased ability to counterargue. The disruption hypothesis does not, however, specify whether distraction effects are due to the inhibition of the construction of new counterarguments or to the blocking of readily available ones such as have been provided by the recent inoculation treatment. If the former, it seems reasonable to predict that inoculation will cancel any distraction effect that occurs due to counterargument disruption. If the latter, the disruption hypothesis leads to the expectation that distraction will increase the impact of the attack message for inoculated subjects (see Table 2).

Finally, a general qualification to all theoretical predictions should be introduced. Insofar as one or both distraction tasks adversely affect comprehension, no or even negative (relative to a control) attitude and belief change may occur in one or both distraction conditions.

Table 1. Alternative Hypotheses Concerning
 Distraction Effects (Assuming subjects
 lack counterarguments to defend cultural
 truisms)

Dependent Variable	Distraction effects predicted by:	
	Dissonance hypothesis	Counterargument disruption hypothesis
Comprehension	predictions contingent on the absence of effect	predictions contingent on the absence of effect
Message Belief Acceptance	increases	no effect
Attitude toward Truism	more negative	no effect
Cognitive Reactions to the Message	more positive	no effect

Table 2. Alternative Hypotheses Concerning
Distraction Effects After Inoculation

<u>Dependent Variable</u>	Distraction effects predicted by two forms of the counter- argument disruption hypothesis:	
	<u>Disruption of only the generation of new counterarguments</u>	<u>Disruption of use of available counterarguments</u>
Comprehension	predictions contingent on the absence of effect	predictions contingent on the absence of effect
Message Belief Acceptance	no effect	increases
Attitude toward Truism	no effect	more negative
Cognitive Reactions to the Message	no effect	more positive

Experiment II

This experiment is a 3X2 factorial which varies length of time in sensory deprivation before the attack message (0, 1 hour, 23 hours) and the presence or absence of a refutational inoculation message 23 hours before the attack message. The major dependent variables are comprehension, message belief acceptance, attitude and cognitive reactions to the message. The experiment explores whether the sensory deprivation effect generalizes to increase the impact of attacks on cultural truisms, whether this effect varies with the duration of time in sensory deprivation (as do the cognitive effects of sensory deprivation) and the manner in which inoculation interacts with sensory deprivation.

Different predictions regarding the effects of sensory deprivation on the impact of attacks on cultural truisms can be derived from the counterargument disruption and information need components of the Suedfeld (1972) model. The logic is basically similar to that used to derive different predictions from the counterargument disruption and dissonance explanations of distraction effects.

According to the counterargument disruption component of the model, sensory deprivation facilitates persuasion by disorganizing the cognitive functioning of the subject and, more particularly, reducing his ability to relate the attack

beliefs to previous knowledge (i.e., to counterargue). If McGuire's assumption that individuals do not possess counterarguments to defend cultural truisms is valid, this hypothesis leads to the prediction that sensory deprivation will not increase the impact of the attack message. If McGuire's assumption is not valid and individuals possess the same level of attack preparedness as for other topics, this hypothesis leads to the prediction that sensory deprivation will increase the impact of the attack message relative to a nondeprived control group.

The information need component, on the other hand, predicts increased attack message impact for sensory deprivation subjects (especially the 23 hour group), regardless of whether McGuire's assumption is valid.

In sum, as occurred in separating the predictions of the competing distraction theories, a clear separation of the competing sensory deprivation theories is possible provided McGuire's assumption is valid (see Table 3).

Another major question which the second experiment is intended to clarify concerns the manner in which sensory deprivation and inoculation interact. The primary theoretical interest in this question does not, however, lie in separating the predictions of the counterargument disruption and information need hypotheses; rather, as in the first experiment, it lies in distinguishing two versions of the counterargument

disruption hypothesis.

The counterargument disruption hypothesis once again does not specify whether sensory deprivation effects derive from the inhibition of the generation of new counterarguments or from the blocking of the use of available ones such as have been provided by the recent inoculation treatment. If the former (and a particularly strong case can be made for that alternative in view of the effects of sensory deprivation on performance of complex intellectual tasks), it is reasonable to expect that inoculation will cancel any disruptive effect that sensory deprivation might have had. In this case, the prior inoculation may be thought of as having transformed the task of belief defense from a complex one involving the improvisation of one's own counterarguments to a less complex one involving the application of recently learned counterarguments. If sensory deprivation blocks the use of even relatively readily available counterarguments of inoculated subjects, it is reasonable to expect sensory deprivation to enhance the impact of the attack message for inoculated subjects (see Table 4).

Table 3. Alternative Hypotheses Concerning
Sensory Deprivation Effects
(Assuming subjects lack counter-
arguments to defend cultural truisms)

Dependent Variable	Sensory deprivation effects predicted by:	
	Information need hypothesis	Counter- argument disruption hypothesis
Comprehension	increases	no effect
Message Belief Acceptance	increases	no effect
Attitude toward Truism	more negative	no effect
Cognitive Reactions to the Message	more positive	no effect

Table 4. Alternative Hypotheses Concerning
Sensory Deprivation Effects
After Inoculation

Sensory deprivation effects
predicted by two forms of the
counterargument disruption
hypothesis:

<u>Dependent Variables</u>	<u>Disruption of only the generation of new counterarguments</u>	<u>Disruption of use of available counterarguments</u>
Comprehension	no effect	no effect
Message Belief Acceptance	no effect	increases
Attitude toward Truism	no effect	more negative
Cognitive Reactions to the Message	no effect	more positive

SECTION V

Demand Characteristics in Distraction and
Sensory Deprivation Research

There has now accumulated a considerable, albeit rather unsystematic, body of evidence (see Rosenthal and Rosnow, 1969; Kruglanski, 1975) that suggests that the problem of the "demand characteristics of the psychological experiment" (Orne, 1962) is a serious one for experimental social psychology. Demand characteristics are generally taken to refer to ". . . the totality of cues which convey an experimental hypothesis to the subject" (Orne, 1969). In principle, demand characteristics may stem from virtually any individual objective in an experiment (e.g., to undermine the hypotheses, to corroborate the hypotheses, to present a favourable impression of oneself), provided that the subject's behaviour is guided by his conception of the experimental hypothesis (see Orne, 1969). The only constant implied by the demand characteristics notion is that of the subject's perception of the experimental hypothesis. The particular goals that direct behaviour in specific directions may vary widely. Weber and Cook (1972) note that the particular subject motivations may range between those of the "good subject", the "faithful subject", the "apprehensive subject" and the "negativistic" one.

A post-experimental (questionnaire (see Appendix 3) was employed in the two experiments described here to assess the degree to which subjects showed some awareness of the purpose of the experiment (i.e., awareness of persuasive intent) and to assess subjects' feelings toward the study. There are, however, important limitations to this approach to the identification of artifacts which should be considered.

First, the reliance on this post-experimental probe involves the limitations of a correlational design. The finding (e.g., Page, 1973) of significant correlations between awareness and hypothesis-predicted behaviour implies nothing about causal direction. For instance, as Kruglanski (1975, p. 129) suggests, subjects who have produced the hypothesis-predicted behaviour "may have an important informational advantage over those who have not when attempting in retrospect to discover the experiment's purpose". Alternatively, the correlation may reflect the influence of a third variable (e.g., subject intelligence). The interpretation that awareness causes the behaviour is simply not justifiable from data such as have been collected here.

Second, the act of questioning about demand awareness may itself promote thinking about the purpose of the experiment. In this way, the questionnaire may interfere with and possibly change the process being measured. This is a problem similar to the one confronted in measuring counterarguing. The

questionnaire may induce a cognitive set that may be quite different from that present during the experiment proper.

Despite these important qualifications, the post-experimental inquiry may still provide important information regarding subject reactions to the experiment. Indeed, if we accept even with reservations the "anthropomorphic model of man" (Harre and Secord, 1972), which asserts that man is an active and aware participant in his social environment, whose perspective on his own conduct is critical to a complete scientific analysis of behaviour, the post-experimental inquiry is an indispensable aid in experimental research.

There will be two aspects to the analysis of the questionnaire data. First, did subjects in the various conditions exhibit different degrees of awareness of persuasive intent and did subjects in the various conditions have different feelings toward the study? Second, are these different interpretations and/or feelings significantly associated with particular patterns of responses to the major dependent measures?

Distraction

As noted earlier, Rosenblatt (1966) has suggested a process by which subjects' interpretations of the experimental

situation may underlie the distraction effect.

On the surface, Rosenblatt's (1966) explanation seems very similar to the counterargument disruption hypothesis. He argues that distraction enhances persuasion by disguising the experiment more effectively as one on comprehension, thus minimizing suspicions of persuasive intent, and increasing message acceptance by improving source credibility and creating a context in which subjects do not concern themselves with counterarguing. Thus it is not distraction per se, but subjects' interpretations of the experiment, which lead to greater persuasion. In order to differentiate these interpretations empirically, it would be necessary to determine whether distraction increases persuasion in both laboratory and nonlaboratory settings, something which has never been done.

As noted earlier, Rosenblatt (1966) has reported data which support his predictions. The first experiment, by assessing counterarguing, source credibility and perceived intent to persuade, provides a basis for testing these predictions.

Sensory Deprivation

Orne and Scheibe (1964) manipulated "several demand characteristics" of sensory deprivation and showed that these characteristics, by themselves, could produce similar effects

to those ascribed to sensory deprivation.

" . . . One group of subjects were run in a 'meaning deprivation' study which included the accoutrements of sensory deprivation research but omitted the condition itself. They were required to undergo a physical examination, provide a short medical history, sign a release form, were 'assured' of the safety of the procedure by the presence of an emergency tray containing various syringes and emergency drugs, and were taken to a well-lighted cubicle, provided food and water, and were given an optional task." (Orne, 1969, p. 162)

These results do not shed light on the actual effects of sensory deprivation. (Indeed, very few if any sensory deprivation studies have involved the "accoutrements" used in the Orne and Scheibe study.) Orne and Scheibe's results do, however, suggest the importance of preliminary instructions and impression management on the part of the experimenter in influencing subjects' subsequent interpretations and reactions in the experimental setting. The particular approach taken to orienting subjects to sensory deprivation is detailed in the Method and Appendix 1. Appendix 1 presents the consent form which sensory deprivation subjects were required to read and sign.

The Issue of Volunteer Biases

In addition, to artifacts which may derive from subjects' reactions to experimental procedures, another possible source of concern is the volunteer status of subjects for the two studies. Considerable research has been conducted on the question of whether sensory deprivation subjects differ in certain systematic ways from volunteers for other types of psychological research and nonvolunteers.

Zuckerman (1969), in a review of this literature, suggests that, despite some contraindications, sensory deprivation volunteers are generally not distinguishable from volunteers for other types of research. In the two studies reported here, only volunteers for sensory deprivation research were used as subjects.

SECTION VI

Auxiliary Hypotheses

Individual Differences

Hitherto, cognitive reactions to persuasive message have been described only by reference to the evaluative direction of their contents (i.e., as opposed to the message or as in favour of the message). Another hitherto unexplored approach to their description is in terms of the conceptual complexity-simplicity (see Schroder, Driver and Streufert, 1967) of the information processed. Investigators who have attempted to measure counterarguing have so far ignored the possibility of important individual and even intraindividual differences in modes of information processing. The implicit assumption has been that counterarguing refers to the reasoned evaluation of the various arguments in the message. A number of attitude theorists and researchers would however take issue with this assumption (see Kelman, 1966; Schroder, Driver and Streufert, 1967; Sears and Abeles, 1969; Smith, Bruner and White, 1956).

Schroder, Driver and Streufert distinguish between conceptually simple and complex attitudes. Simple attitudes tend to be based on less information and to be more categorical and rigid than complex attitudes. At the simple extreme,

attitudes can be direct functions of single beliefs about objects. At the complex end of the continuum, attitudes can be determined by a variety of often interacting beliefs about objects.

In the two experiments reported here, the semi-projective Paragraph Completion Test was administered to all subjects to provide a general index of conceptual complexity. It was predicted that conceptually simple subjects would tend to react to the message in accordance with what Kelman (1966) has termed the "rapid avoidance" mode of inconsistency resolution, involving generalized denial or rejection of the counterattitudinal information and its source. Contrariwise, conceptually complex subjects should engage in the differentiated analysis of the message arguments, possess greater tolerance for uncertainty and express a need for more information on the topic.

As a crude index of these two different approaches to inconsistency resolution, a measure of the differentiation of subjects' cognitive reactions to the message was developed. This measure was based on the number of (pro-, neutral or anti-) message idea units which were reported in response to the request to subjects to list all thoughts that occurred to them during the presentation of the persuasive message. It is proposed tentatively as a first step toward the direct measurement of different modes of coping with counterattitudinal information.

It should be noted that the present study probably does not provide an ideal context for the assessment of individual differences in the complexity (in this case, only differentiation) of cognitive reactions to the message. To a certain extent, the importance of individual differences in complexity will probably be reduced by the fact that the subjects in the distraction and sensory deprivation conditions will be processing the message information in nonoptimal conditions (see Section III, An Integrated Theoretical Analysis of Distraction and Sensory Deprivation Effects; Schroder, Driver and Streufert, 1967).

Subjective Certainty

Beliefs have been defined as subjective estimates of probabilities of object-attribute links. Previous research indicates that belief strength is systematically associated with belief certainty (e.g., Beach and Wise, 1969; Fishbein and Ajzen, 1975; Wyer, 1973). Generally, more extreme probability estimates (either very low or very high) are associated with increasing certainty. Beach and Wise (1969, p. 440) have even concluded that certainty ratings "are essentially another . . . version of subjective probability estimates".

In the two experiments here, both belief strength (the strength of seven beliefs sampled from the persuasive message) and general subjective certainty ("How certain are you that your opinion on the subject of toothbrushing is correct?") were measured. The point of maximal uncertainty on the seven beliefs was taken to be the .5 level of probability, the point at which there was an equal likelihood that the object-attribute link asserted in the belief did or did not exist. It was predicted that general subjective certainty would correlate highly with a subjective certainty index derived by taking the sum of the deviations of each belief score from the point of maximal uncertainty.

An additional prediction can be advanced regarding the effects of distraction and sensory deprivation on subjective certainty. If we assume that counterargument disruption is associated with decreased certainty about the correctness of one's beliefs, and that these treatments have had differential effects on counterarguing against the anti-truism message, distraction and sensory deprivation will probably increase uncertainty. Refutational inoculation, by the same reasoning, should increase certainty.

Perceptions of Message and Source

Measures were obtained of whether the message was perceived to be fair and well-written and whether the speaker

was well-informed. The basic prediction for these measures can be derived perhaps most directly from virtually any of the consistency theories that flourished in the psychological literature of the 1950's and 1960's. The fundamental predictive postulate of these approaches is that individuals tend to behave in ways that minimize internal inconsistency or disharmony.

The congruity theory framework (Osgood and Tannenbaum, 1955) is easily applied to the present context wherein a particular source makes a number of assertions about the "object" of toothbrushing. Given that subjects have initially favourable attitudes toward toothbrushing, and the source (even though the source in the study is never explicitly identified), the anti-toothbrushing assertions of the source will generate incongruity which subjects will be motivated to reduce. Two methods of restoring congruity are the re-evaluation of the source and/or attitude toward toothbrushing. It is not incongruous to disagree with an unfair, poorly-written message attributable to an ill-informed individual. It is also not incongruous to agree with a fair, well-written message attributable to a well-informed individual. It is predicted, in line with congruity (and other) theories, that perceptions of message characteristics will correlate highly with beliefs, attitudes and cognitive reactions to the message.

METHOD

Attitude Topic

Suedfeld and Borrie (1976) report a pilot study in which several intuitively plausible cultural truisms were presented for the agreement or disagreement of a large introductory psychology class. They report that the desirability of frequent toothbrushing had the adherence of almost all of the subjects. Thus, this topic was used as the cultural truism for the present study.

The refutational inoculation message was, with a few modifications, identical to that used by McGuire (1964). This message mentioned four "faulty" arguments that are commonly advanced against the practice of regular toothbrushing after every meal, each of which was in turn followed by a refuting counterargument. Two of the arguments refuted in this inoculation message were subsequently advanced in the anti-truism or attack message; the other two refuted arguments were unrelated to the arguments of the attack message.

The attack message consisted of four arguments (each backed by supportive evidence) in favour of the view that regular toothbrushing does not lead to the beneficial consequences often ascribed to it, and may even have some harmful consequences.

Appendix 2 presents both the refutational inoculation and attack messages.

Subjects

In response to advertisements in campus newspapers and bulletin boards, a large number of subjects, both male and female, volunteered "for an experiment, involving from one to twenty-four hours, some of which time may be spent lying in a dark, comfortable, quiet room", for payments ranging between \$5 and \$25. A total of 100 subjects served in the two experiments. Subjects were randomly assigned to experimental conditions. The proportion of male to female subjects was approximately equal across groups.

Subjects who failed to fulfill the requirements of the experiments were replaced. Two of the sensory deprivation subjects left the chamber before the required time. In addition, several (approximately ten) subjects in the other conditions failed to return to the laboratory for the second experimental session.

Design of the Distraction Experiment

The design incorporated three major variables: (a) three levels of effort required by the distraction task on which subjects worked during presentation of the attack message (a nondistracted control, a low effort distraction and a high effort distraction); (b) the presence or absence of a

refutational inoculation message during an experimental session which preceded the attack message by approximately 23 hours; (c) the counterbalanced order of administration of the dependent measures such that subjects either completed the belief and attitude measures (randomized) and then the thought-listing form (order 1) or vice versa (order 2). Thus, we had a 3 X 2 X 2 factorial design for a total of twelve treatment conditions, with 5 subjects per condition. The design of the experiment may be schematized as follows:

	Session I	Session II (23 hours after Session I and begins with message attacking cultural truism)
Control	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2
Low Effort Distraction	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2
High Effort Distraction	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2

Design of the Sensory Deprivation Experiment

The design incorporated three major variables: (a) length of time in sensory deprivation (a non-deprived control, 1 hour, 23 hours) before the presentation of the attack message; (b) the presence or absence of a refutational inoculation message during an experimental session which preceded the attack message by approximately 23 hours; (c) the counterbalanced order of administration of the dependent measures such that subjects either completed the belief and attitude measures (randomized) and then the thought-listing form (order 1) or vice versa (order 2). Thus, we had a $3 \times 2 \times 2$ factorial design for a total of twelve conditions, with 5 subjects per condition. It should be noted that because the design and format of the distraction and sensory deprivation studies are essentially identical (the two studies differing only in terms of one independent variable), it was possible to use the same control group for the two studies. The design of the experiment may be schematized as follows:

	Session I	Session II (23 hours after Session I and begins with message attacking cultural truism)
Control	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2
1 Hour Sensory Deprivation	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2
23 Hour Sensory Deprivation	No Inoculation	Order 1
		Order 2
	Inoculation	Order 1
		Order 2

Procedure During First Experimental Session

The procedure during the first experimental session was essentially the same for both the distraction and sensory deprivation studies. The following description therefore applies to both studies. Upon reporting, all subjects were told that the study was concerned with cognitive processes (thinking, reasoning, learning, etc.) and, more particularly, with how people process information about various topics of everyday concern.

All subjects were then required to complete the semi-projective Paragraph Completion Test (Schroder, Driver and Streufert, 1967) which has been used as a measure of conceptual complexity. In this test, the subject is asked to write two or three sentences in response to each of a series of sentence stems. One sentence stem appears on each page. The stems included: "Rules..."; "Policemen..."; "Confusion..."; "When I don't know what to do..."; "When I am criticized..."; and "When a friend acts differently toward me...". Each completion was scored by an experienced, trained rater. Conceptual complexity was assessed with the scoring criteria defined by Schroder, Driver and Streufert (1967). The mean of the two highest scores was used as the index of conceptual complexity for each subject.

Upon completion of this test, subjects in the refutational inoculation conditions received the refutational inoculation message. Subjects were instructed to attend carefully to the inoculation material as they would be tested subsequently on their learning and comprehension of the message. Only one subject failed to learn the material to the criterion of 80% correct on a five-question multiple choice test which was designed to measure subjects' ability to recognize the basic ideas contained in the message. That subject was excluded from the study. Appendix 3 presents the comprehension task.

After the comprehension test or, in the case of noninoculated subjects, immediately after the Paragraph Completion Test, subjects received instructions for the second experimental session. The instructions varied somewhat as a function of the treatment groups to which subjects had been assigned (e.g., control, low or high effort distraction, 1 or 23 hours in sensory deprivation).

Control Groups

These subjects were told to return to the laboratory 23½ hours after the appointment time for the first experimental session. Upon returning, the following instructions were presented to the control subjects:

"Please listen to these instructions very carefully.

This task concerns your ability to attend to specific

information. You will now hear a passage of tape-recorded material. You should attend as carefully as you can to the tape-recorded material. You will be tested later on your learning and comprehension of this material. Your task then is to listen closely to the material in order to answer questions about it afterwards."

At the conclusion of the message, the dependent measures were administered.

Distraction Groups

These subjects were also told to return to the laboratory 23½ hours after the appointment time for the first session. At that time, they were introduced to the distraction task which was called the number identification task. The low effort distraction required identifying the number '8' whenever it appeared in a series of matrices of random numbers between '1' and '20'. The high effort distraction task required identifying the numbers '4', '8', '11' and '15' whenever they appeared in a series of matrices of random numbers between '1' and '20'.

The following instructions were then presented to the subjects:

"Please listen to these instructions very carefully.

This task concerns your ability to attend to specific information. You will now hear a passage of tape-recorded material while simultaneously working on the number identification task. You should attend as carefully as you can to the tape-recorded material. You will be later tested on your learning and comprehension of this material. Your primary task then is to listen closely to the material in order to answer questions about it afterwards, but at the same time to do as well as you can on the number identification task."

At the conclusion of the message, the dependent measures were administered.

Sensory Deprivation Groups

Those subjects who were to stay in sensory deprivation for one hour were told to return to the laboratory 22½ hours before the previous appointment time. Upon returning, these subjects were oriented to the sensory deprivation laboratory. Those subjects who were to stay in sensory deprivation for 23 hours were oriented to the chamber immediately after completion of the requirements of the first session. The sensory deprivation subjects lay on a bed in a dark, silent room (Industrial Acoustics Model 404-A), with water and liquid diet

food available at bedside and a chemical toilet in the chamber. They were given the usual instructions requesting them not to move around excessively nor to make any kind of noise except in answer to questions from the intercom. The consent form which sensory deprivation subjects were asked to sign is presented in Appendix 1. Towards the end of the 1 or 23 hour stay in sensory deprivation, the persuasive message was played. The following instructions preceded the message:

"Please listen to these instructions very carefully.

This task concerns your ability to attend to specific information. You will now hear a passage of tape-recorded material. You should attend as carefully as you can to the tape-recorded material. You will be tested on your learning and comprehension of this material. Your task then is to listen closely to the tape-recorded material in order to answer questions about it afterwards."

At the conclusion of the message, the subjects, still in the sensory deprivation chamber, filled out the dependent measures.

Dependent Measures

All of the dependent measures administered after the presentation of the attack message are represented in Appendix 4.

The measures include: a) a five-question multiple choice test of comprehension; b) seven subjective probability scales (ranging from 0% to 100%) to measure acceptance of seven message beliefs; c) three semantic differential scales (see Osgood, Suci and Tannenbaum, 1957) to measure general attitude toward the practice of regularly brushing one's teeth after every meal; d) the thought-listing form for the assessment of cognitive reactions to the persuasive message; e) a measure of subjective certainty of opinions on the subject of toothbrushing; f) an evaluation of "how fair" the attack message was; g) an evaluation of "how well-written" the message was; h) an evaluation of "how well-informed" the speaker was on the topic; i) a measure of subjective distraction while listening to the message; j) a post-experimental questionnaire in which subjects' overall affect toward the study, feelings of evaluation apprehension and awareness of persuasive intent were assessed.

With the exception of one additional rating scale in the distraction groups - "How effortful did you find the number identification task?" - all groups completed the same dependent measures. This scale was administered after the question regarding perceived distraction to the low and high effort distraction subjects.

The order of administration of the dependent measures was arranged in the following way. The comprehension test was completed first by all subjects. The order of administration of the thought-listing form was counterbalanced with the belief and attitude forms, whose internal order of administration was randomized. Half of the subjects in each condition completed the thought-listing form immediately after the comprehension measure; half completed either the belief or attitude measure (randomly determined) immediately after the comprehension test. The former group then completed either the belief or attitude measure (randomly determined). The latter group then completed the thought-listing form. The other dependent measures were subsequently administered in the order in which they are presented in Appendix 4.

Interrater Agreement

The assessment of cognitive reactions to the persuasive message and awareness of persuasive intent required judgments that involved a considerable amount of inference. In both cases however it was possible to obtain very high interrater agreement.

The criteria for the assignment of cognitive reactions to the message to the anti-neutral or pro-message categories were as follows. Anti-message responses were defined as

those declarative or interrogative statements that challenged the accuracy or validity of the communication or that contained specific undesirable consequences of the position advocated in the message. In addition, statements that questioned the credibility of the communicator were coded as anti-message. Message neutral cognitions were either ambiguous in terms of whether they implied message acceptance or rejection, or were simply irrelevant to the position taken by the message. The pro-message response category was defined essentially as the obverse of the anti-message category. Pro-message responses indicated an acceptance of the validity or accuracy of the communication or mentioned specific evidence or other support in favour of the advocated position. Interrater agreement was .91.

Awareness of persuasive intent was defined in terms of three levels. If in the scorer's judgment, there was no indication that the subject had been aware of persuasive intent, a score of 0 was assigned. If there was a vague or implicit indication that the subject could have been aware, a score of 1 was given. If there was direct evidence that the subject was aware of persuasive intent, a score of 2 was given. Interrater agreement was .96.

RESULTS

EXPERIMENT I: DISTRACTION

Manipulation Check

Subjects in the distraction conditions reported being significantly more distracted during the presentation of the persuasive message ($F(2,54) = 8.64$; $p = .0006$). There was a significant linear component to this distraction effect, with greater experienced distraction occurring in the order of the high effort distraction, the low effort distraction and the control group ($F(1,54) = 17.27$; $p = .0001$). According to the Tukey A multiple range test ($q(3,54) = 3.71$; $p = .04$), however, only the control and high effort distraction conditions were significantly different. Analysis of variance of responses to the question concerning the effort demands of the two distraction tasks revealed that the distraction designated as high effort was perceived as more effortful ($F(1,38) = 11.25$; $p = .001$).

Major Dependent Variables

Table V presents the means for each experimental condition on each of the dependent measures.

An initial $3 \times 2 \times 2$ fixed effects multivariate analysis of variance was conducted to assess whether the order factor

TABLE V: MEANS FOR ALL DEPENDENT MEASURES IN ALL EXPERIMENTAL CONDITIONS ¹

EXPERIMENT I: DISTRACTION

	Control		Low Effort		High Effort	
	No Inoculation	Inoculation	No Inoculation	Inoculation	No Inoculation	Inoculation
<u>All Dependent Measures</u>						
Comprehension	4.7	4.2	4.6	4.4	4.1	4.4
Attitude toward Truism	4.06	5.16	3.96	5.1	4.89	5.63
Acceptance of Message Beliefs	74.19	56.41	73.04	74.26	74.26	55.92
Subjective Certainty	4.6	4.4	3.9	5.2	5.5	4.6
Message as Fair	4.8	3.4	5.1	4.2	4.2	5.7
Message as Well-Written	6.2	4.8	5.5	4.6	5.4	6.2
Speaker as Well-Informed	5.7	4.2	4.7	4.5	4.1	5.0
Subjective Effort			3.14	3.96	5.36	6.64
Subjective Distraction	2.3	3.5	4.0	4.3	5.1	6.0

	No Inoculation	Inoculation	No Inoculation	Inoculation	No Inoculation	Inoculation
Affect toward the Study	3.2	1.5	2.4	1.2	2.0	2.7
Perceived Intent to Persuade	0.1	0.8	0.0	0.0	0.6	0.1
Evaluation Sensitivity	3.1	3.2	1.8	3.8	2.8	2.9

1. Larger means denote the following: greater comprehension of the persuasive message, more pro-truism attitudes, greater acceptance of message beliefs, more pro-message cognitive reactions to the message, greater subjective certainty, more positive evaluations of how fair and well-written the message was, more positive evaluations of how well-informed the speaker was, greater subjective effort, greater subjective distraction, more positive affect toward the study, more definite indications of perceived intent to persuade and greater sensitivity to being evaluated during the study.

should be retained in subsequent analyses. Wilk's lambda criteria were employed for all multivariate significance tests. The analysis, which was performed using only the four major dependent variables (comprehension, attitude, attack belief acceptance and counterarguing) indicated that the order variable and its associated interactions all were far short of statistical significance. In view of this result, and the fact that the order variable has no intrinsic theoretical significance, it was decided to eliminate that variable from the model. Subsequent analyses are based on a model which specifies only distraction and inoculation as independent variables.

A 3 x 2 fixed effects multivariate analysis of variance was conducted on the four major dependent variables (see Table VI). A significant inoculation ($F(1,54) = 3.04$; $p = .025$) and an almost significant distraction X inoculation effect ($F(2,54) = 1.9$; $p = .07$) occurred. The main effect for distraction did not approach significance.

For each source row of the multivariate analysis of variance table which yielded rejection of the overall multivariate null hypothesis, univariate analyses of variance were conducted to determine which particular dependent measures were involved.

TABLE VI

MULTIVARIATE ANALYSIS OF VARIANCE OF THE MAJOR DEPENDENT VARIABLES
IN THE DISTRACTION EXPERIMENT

Source	U-Statistic	Degrees of Freedom			Approximate F-Statistic	Prob.
A (Distraction)	0.867454	4	2	54	0.9395	0.4877
B (Inoculation)	0.807587	4	1	54	3.0378	0.0254
A X B	0.757411	4	2	54	1.9002	0.0679

Analysis of variance indicated that inoculation had no significant effect on comprehension. Inoculation significantly reduced attack belief acceptance ($F(1,54) = 7.63$; $p = .008$) and attitude change ($F(1,54) = 9.39$; $p = .003$) and significantly increased counterarguing ($F(1,54) = 6.83$; $p = .01$). Analysis of covariance, using counterarguing as the covariate, eliminated the inoculation effect on message belief acceptance ($F(1,53) = 2.2$; $p = .14$) but did not eliminate the attitude change effect ($F(1,53) = 4.93$; $p = .03$). The univariate distraction X inoculation effect that came nearest to significance was on message belief acceptance ($F(1,54) = 2.33$; $p = .11$).

Estimates of the proportion of variance attributable to the only significant treatment effect (refutational inoculation) were calculated (see Winer, 1971). 15.2% of the variance in message belief acceptance, 11% of the variance in attitudes and 9.5% of the variance in cognitive reactions to the message were due to the inoculation treatment.

Univariate analyses of variance were carried out using two other indices derived from the thought-listing measure. There were no treatment effects on either the differentiation of subjects' reactions to the message or the number of message-irrelevant cognitions.

Other Dependent Variables

Univariate analyses of variance were conducted to assess the significance of the effects of the distraction and inoculation manipulations on the remaining dependent variables. These included: a) the two measures of subjective certainty; b) perceptions of how fair and well-written the persuasive message was, and how well-informed the speaker was; c) general feelings or affect toward the study; d) perceived intent to persuade; and e) the "feeling that your performance is being evaluated in some particular way".

No differences in subjective certainty (either measure) occurred across conditions. Significant distraction X inoculation effects were found in responses to questions concerning how fair the message was ($F(2,54) = 4.91$; $p = .01$), how well-written the message was ($F(2,54) = 3.82$; $p = .03$) and how well-informed the speaker was ($F(2,54) = 3.16$; $p = .05$). The general pattern of the interaction effect was similar in all three cases. In the control and low effort distraction conditions, inoculated subjects tended to perceive the message and source less favourably than noninoculated subjects; in the high effort distraction condition, noninoculated subjects tended to perceive the

message and source less favourably than inoculated subjects. (See Table V.)

Significant distraction ($F(2,54) = 4.37$; $p = .02$) and distraction X inoculation ($F(2,54) = 7.11$; $p = .002$) effects occurred on the perceived intent to persuade variable derived from the post-experimental questionnaire. Subjects in the distraction conditions were less likely to suspect that the study was concerned with persuasion. In the control group, inoculated subjects tended to be more suspicious of persuasive intent than noninoculated subjects; in the high effort distraction group, this tendency was reversed; in the low effort distraction group, there appeared to be very little suspicion of persuasive intent among inoculated or noninoculated subjects (see Table V).

Significant inoculation ($F(1,54) = 3.88$; $p = .05$) and nearly significant distraction X inoculation ($F(2,54) = 2.9$; $p = .06$) effects were obtained in responses to the question that was intended to assess sensitivity to being evaluated. Inoculated subjects tended to be more sensitive to being evaluated during the experiment than noninoculated subjects in all the conditions, with the effect being most pronounced in the low effort distraction group.

Experiment II: Sensory Deprivation

Table VII presents the means for each experimental condition on each of the dependent measures.

An initial $3 \times 2 \times 2$ fixed effects multivariate analysis of variance was carried out to determine once again whether the order factor should be retained in the model. The analysis indicated that the order variable and its associated interactions were all far short of statistical significance. Subsequent analyses were based on a model which specified only sensory deprivation and inoculation as independent variables.

A 3×2 fixed effects multivariate analysis of variance was conducted on the four major dependent variable and is reported in Table VIII. The only significant effect occurred for the inoculation manipulation ($F(1,54) = 3.49$; $p = .01$). There was no sensory deprivation effect or interaction between sensory deprivation and inoculation.

Univariate analyses of variance were conducted to determine which dependent measures were significantly affected by inoculation. Inoculation did not significantly affect comprehension. It did reduce attack belief acceptance ($F(1,54) = 12.43$; $p = .001$), increase

TABLE VII: MEANS FOR ALL DEPENDENT MEASURES IN ALL EXPERIMENTAL CONDITIONS¹

EXPERIMENT II: SENSORY DEPRIVATION

	Control		1 Hour		23 Hours	
	No Inoculation	Inoculation	No Inoculation	Inoculation	No Inoculation	Inoculation
All Dependent Measures						
Comprehension	4.7	4.2	4.5	4.6	4.7	4.7
Attitude toward Truism	4.06	5.16	4.3	4.93	3.96	5.13
Acceptance of Message Beliefs	74.19	56.42	66.7	58.9	80.0	57.4
Subjective Certainty	4.6	4.4	4.1	4.1	5.8	5.3
Message as Fair	4.8	3.4	4.0	2.9	4.9	3.6
Message as Well-Written	6.2	4.8	4.9	4.6	6.2	5.5

5

	Control		1 Hour		23 Hours	
	No Inoculation	Inoculation	No Inoculation	Inoculation	No Inoculation	Inoculation
Speaker as Well-Informed	5.7	4.2	4.5	4.3	5.6	4.7
Subjective Distraction	2.3	3.5	5.6	5.2	3.0	4.5
Affect Toward the Study	3.2	1.5	1.8	1.4	1.5	2.6
Perceived Intent to Persuade	0.1	0.8	.2	.2	.6	.4
Evaluation Sensitivity	3.1	3.2	3.1	2.5	3.0	4.2

1. Larger means denote the same as in Table V.

TABLE VIII

MULTIVARIATE ANALYSIS OF VARIANCE OF THE MAJOR DEPENDENT VARIABLES
IN THE SENSORY DEPRIVATION EXPERIMENT

Source	U-Statistic	Degrees of Freedom	Approximate F-Statistic	Prob (F)
A (Sensory Deprivation)	0.914198	4 2 54	0.5849	0.7883
B (Inoculation)	0.785212	4 1 54	3.4876	0.0136
A X B	0.841556	4 2 54	1.1485	0.3379

pro-toothbrushing attitudes ($F(1,54) = 7.68; p = .008$) and increase anti-message cognitive responses ($F(1,54) = 6.87; p = .01$). Analysis of covariance, utilizing the measure of counterarguing as the covariate, failed to eliminate the inoculation effect on message belief acceptance ($F(1,53) = 4.94; p = .03$) and attitude ($F(1,53) = 7.16; p = .05$).

Estimates of the proportion of variance attributable to the only significant treatment effect (inoculation) were calculated (see Winer, 1971, p. 428-430): 10% of the variance in message belief acceptance, 12% of the variance in attitudes and 9.6% of the variance in cognitive reactions to the message were due to the inoculation treatment.

Univariate analyses of variance were carried out using two other indices derived from the thought-listing measure. Once again, there were no treatment effects on either the differentiation of subjects' reactions to the message or the number of irrelevant cognitions.

Other Dependent Measures

A series of univariate analyses of variance were performed to assess the significance of the sensory deprivation and inoculation manipulations on responses to the remaining dependent measures.

Sensory deprivation affected subjective certainty ($F(2,54) = 3.83$; $p = .03$). According to the Tukey A multiple range test ($q(3,54) = 3.81$; $p = .03$), the only significant condition difference arose because subjects in the 23 hour sensory deprivation group were more certain of the correctness of their opinion on the topic than subjects in the 1 hour sensory deprivation group. Inoculated subjects tended to perceive the attack message as more unfair ($F(1,54) = 10.81$; $p = .002$) and as more poorly written ($F(1,54) = 5.37$; $p = .02$). Inoculated subjects also tended to view the speaker of the attack message as less well-informed ($F(1,54) = 3.69$; $p = .06$).

Sensory deprivation influenced how distracted subjects felt while the attack message was played ($F(2,54) = 4.6$; $p = .01$). According to the Tukey A test, subjects after one hour of sensory deprivation felt more distracted than control subjects. The 23 hour sensory deprivation subjects did not differ from either the control or 1 hour sensory deprivation group.

On the post-experimental inquiry, there was an almost significant sensory deprivation X inoculation interaction effect on recognition of intent to persuade ($F(2,54) = 2.68$; $p = .08$). Subjects who listened to the inoculation message

in a control environment and to the attack message in sensory deprivation were more likely to suggest that the experiment was concerned with persuasibility.

Correlations among the Dependent Measures

All results reported here are based on correlations between measures across all experimental conditions.

Comprehension of the attack message was correlated significantly with aggregate message belief acceptance ($r = .297$; $p = .003$), with attitude toward toothbrushing ($r = -.336$; $p = .001$), and, almost significantly, with the evaluative direction of cognitive responses to the message ($r = .177$, $p = .08$). Aggregate source belief acceptance was correlated negatively with attitude toward toothbrushing ($r = -.49$; $p = .001$) and positively with evaluative direction of cognitive responses to the message ($r = .63$; $p = .0002$). Attitude toward toothbrushing was negatively correlated with the evaluative direction of cognitive responses to the message ($r = -.37$; $p = .001$).

Another pattern of significant correlations was between the measures of message characteristics and speaker characteristics. Message fairness was correlated with how well-written the message was ($r = .4$; $p = .001$) and how well-informed the speaker was ($r = .35$; $p = .001$). The degree

to which the speaker was perceived to be well-informed was correlated with perceptions of how well-written the message was ($\underline{r} = .38$; $p = .001$).

The only relationship among the variables coded from the post-experimental questionnaire was between awareness of intent to persuade and sensitivity to being evaluated "in some particular way" ($\underline{r} = .19$; $p = .03$).

Awareness of persuasive intent was also related to the degree to which the message was perceived as fair ($\underline{r} = -.19$; $p = .03$) and the speaker as well-informed ($\underline{r} = -.18$; $p = .03$). Awareness of persuasive intent did not correlate with message belief acceptance or attitude, the major measures of persuasion. Sensitivity to being evaluated in some particular way was related to how fair the message was ($\underline{r} = -.24$; $p = .006$) and how well-informed the speaker was ($\underline{r} = -.215$; $p = .02$).

The two proposed measures of subjective certainty failed to correlate with each other. The general subjective certainty measure was unrelated to the absolute value of deviations of belief probability scores from the theoretical point of maximum uncertainty (50%). No relationship appeared using either individual beliefs (all correlations were non-significant) or an aggregate uncertainty score based on all seven beliefs.

Conceptual Complexity

The hypothesis that conceptual complexity would be associated with more differentiated responses to the various aspects of the message (in the form of more message-relevant idea units) was not supported ($\underline{r} = .07$). The only variable with which conceptual complexity was correlated was awareness of persuasive intent ($\underline{r} = .29$; $\underline{p} = .002$).

The Relationship between Individual Message Beliefs and Attitudes

The correlations between individual message beliefs and general attitude ranged between $+.1$ and $-.49$. The beliefs and correlations are presented in Table IX. Four of the message beliefs were significantly negatively correlated with attitude. These were beliefs 1, 2, 3 and 4. Belief 7 was significantly positively correlated with attitude.

The multiple correlation between the beliefs and attitude was computed ($\underline{R} = .56$; $\underline{p} = .006$). This statistic represents the overall degree of relationship between the set of belief predictor variables and attitude. Table IX identifies the regression weights assigned to each of the seven beliefs and whether or not each belief makes a

significant independent contribution to the prediction of attitude.

TABLE IX: CORRELATIONS BETWEEN ATTACK BELIEF ACCEPTANCE
AND ATTITUDE AND MULTIPLE REGRESSION ANALYSIS

- Belief 1: Recent medical studies indicate that the beneficial effects of constant toothbrushing have been exaggerated.
- Belief 2: Brushing teeth frequently tends to push back the gums and expose the non-enameled parts of the teeth to decay.
- Belief 3: Too frequent toothbrushing can cause gum infections and even mouth cancer.
- Belief 4: The enamel of the teeth can be damaged by excessive toothbrushing.
- Belief 5: An adequate defence against tooth decay requires only that the decay-causing plaque be removed once a day.
- Belief 6: Even skilful toothbrushing fails to remove plaque from about 15% of the tooth surface area.
- Belief 7: Dental floss is an effective means of removing plaque in areas not reached by toothbrushing

CORRELATION MATRIX

<u>VARIABLE</u>	<u>BELIEF 1</u>	<u>BELIEF 2</u>	<u>BELIEF 3</u>	<u>BELIEF 4</u>	<u>BELIEF 5</u>	<u>BELIEF 6</u>	<u>BELIEF 7</u>	<u>ATTITUDE</u>
Belief 1	1.00							
Belief 2	0.59	1.00						
Belief 3	0.58	0.70	1.00					
Belief 4	0.60	0.51	0.65	1.00				
Belief 5	0.16	0.13	0.19	0.21	1.00			
Belief 6	0.28	0.12	0.23	0.15	0.25	1.00		
Belief 7	0.28	0.12	0.15	0.14	0.25	0.48	1.00	
Attitude	-0.24	-0.25	-0.40	-0.30	0.08	0.09	0.32	1.00

MULTIPLE REGRESSION ANALYSIS

DEPENDENT VARIABLE IS ATTITUDE

Squared Multiple Correlation (R^2) = .33; $p < .001$; Standard Error of Y = 1.3

<u>VARIABLE</u>	<u>NORMALIZED BETA WEIGHTS</u>	<u>F-RATIO</u>	<u>PROBABILITY</u>
Belief 1	-.155	1.65	0.20
Belief 2	.12	0.89	0.35
Belief 3	-.43	9.71	0.0026
Belief 4	-.063	0.28	0.61
Belief 5	.08	0.84	0.37
Belief 6	.02	0.04	0.83
Belief 7	.396	16.02	0.0002

DISCUSSION

In both experiments reported here, distraction and sensory deprivation failed to increase acceptance of the persuasive message directed against a cultural truism. These results indicate an important limitation to the general finding that distraction and sensory deprivation increase persuasibility (see Baron, Baron and Miller, 1973; Suedfeld, 1969, 1972) and have important implications for competing theories of distraction and sensory deprivation effects.

The results are in basic accord with the counterargument disruption interpretation that the persuasion-enhancing effects of distraction and sensory deprivation stem from the disruption of subjects' capacities to counterargue. Since the efficacy of the counterargument disruptive treatments is contingent upon the prior existence of counterarguing activity, this interpretation implies that distraction and sensory deprivation will increase the impact of only those counterattitudinal messages which elicit counterarguing. In other words a necessary condition for distraction and sensory deprivation to increase the impact of a persuasive message (relative to a control group) is that the message tend to elicit some minimum baseline of counterarguing in control conditions.

Assuming that people are not prepared to counterargue against attacks on cultural truisms, the counterargument disruption interpretation predicts distraction and sensory deprivation will not increase the acceptance of attacks on cultural truisms.

Other explanations of distraction and sensory deprivation effects have however more difficulty in accounting for the failure of distraction and sensory deprivation to increase persuasibility.

Distraction

The predictions of the dissonance theory interpretation of distraction effects appear to have been disconfirmed. According to this view (see Kiesler and Mathog, 1968; Zimbardo and Ebbeson, 1970) distraction increases the impact of the counterattitudinal message by forcing subjects to exert a greater amount of effort to engage in the (putatively) attitude-discrepant behaviour of trying to comprehend the counterattitudinal message. This interpretation leads to the additional prediction that more effortful distractions will induce greater dissonance. Since the distraction tasks used here did require increasing amounts of effort, the dissonance predictions were apparently inaccurate.

In addition to its being empirically disconfirmed in the present study, there are other major problems with the dissonance interpretation. First, it equates attitude to the attack message with attitude toward the behaviour of attempting to comprehend the message. As Fishbein and Ajzen (1975) have argued, there may be an inconsistent relation between attitude toward an object and attitudes toward specific behaviours relevant to that object. The basic cause of this inconsistency is that attitude toward the object is only one of a number of determinants of attitudes toward object-relevant behaviours. To predict attitudes toward behaviours, it is necessary to consider such additional factors as norms (i.e., whether relevant significant others think the individual should or should not perform the behaviour). In the case of distraction research, there is social pressure from the experimenter to comprehend the message. To use the concepts of self-perception theory, the subject is not likely to define his behaviour of trying to comprehend the persuasive message as counterattitudinal because he can identify an external cause (justification) for the behaviour.

A second difficulty is that the dissonance interpretation assumes a tendency toward selective avoidance of counterattitudinal information for which the supportive evidence is scant and ambiguous (see McGuire, 1968, pp. 218-221).

In sum, both on theoretical grounds and on the basis of the present research results, the author disagrees with the assessment of Baron, Baron and Miller (1973, p. 542) that the dissonance interpretation is "fairly robust in its ability to accommodate a wide range of distraction findings".

The results of the distraction experiment, in addition to being compatible with the counterargument disruption hypothesis, are also compatible with Rosenberg's hypothesis that distraction enhances persuasion by reducing suspiciousness of persuasive intent, thereby lessening the likelihood that subjects will concern themselves with resisting the influence attempt (i.e., counterarguing). This interpretation directly accounts for the reduced perceptions of persuasive intent among distracted subjects. Furthermore, like the counterargument disruption hypothesis, it can attribute the absence of a distraction effect to the unpreparedness of control subjects for an attack against a cultural truism. Further research to assess the relative merits of the counterargument disruption and Rosenblatt hypotheses is needed. For instance, does distraction facilitate message impact in less reactive non-laboratory contexts?

Sensory Deprivation

In the sensory deprivation experiment, the main predictions of the information need hypothesis appear to have been disconfirmed. According to this view,

"Just as food-deprived subjects become sensitized to food cues, and more accepting of normally avoided foods, so sensory deprivation subjects become more aware of and more favourable toward information-bearing stimuli, including persuasive messages."

(Suedfeld, 1972, p. 7)

There appears to be no reason from this standpoint why the impact of a message attacking a cultural truism should not be enhanced as much as messages attacking other targets (see Suedfeld, 1969).

The sensory deprivation experiment reported here is not the first one which tends to cast doubt on the predictive usefulness of the information need component of the Suedfeld (1972) model. Suedfeld and Borrie (1976) have also reported results which were generally contrary to the predictions of the information need explanations. Those authors reasoned that while the cognitive disorganization and information need components both predict that sensory deprivation will increase the impact of counterattitudinal messages, the information need component uniquely leads to

the prediction that prior time in sensory deprivation will increase the impact of an inoculation message. This latter prediction was not supported. However, since the theoretical assumptions, methodology and empirical findings of the present research and that of Suedfeld and Borrie (1976) are not entirely consistent, it would be misleading to conclude on the basis of present research findings that the information need component is dispensable from the model. Further research is required to determine the types of psychological processes which mediate sensory deprivation effects on persuasibility (see Suggestions for Further Research).

In overview, the findings that distraction and sensory deprivation did not increase the impact of the anti-truism message are supportive of the counterargument disruption interpretation of the effects of those treatments. The results are damaging to rival interpretations: the cognitive dissonance explanation of distraction effects and the information need explanation of sensory deprivation effects.

Inoculation

Consistent with previous research, the refutational inoculation message reduced message belief acceptance and attitude change in both the distraction and sensory deprivation experiments. Refutational inoculation also signifi-

cantly increased anti-message cognitive responses or counterarguing in both experiments. Analyses of covariance, using counterarguing as the covariate and either message belief acceptance or attitudes as the dependent measure were conducted in both studies as tests of McGuire's (1964) hypothesis that inoculation enhances resistance by stimulating "belief defenses". If this hypothesis is right, the effect of inoculation upon message belief acceptance and attitude should be reduced when the influence of counterargumentation is removed. Analyses of covariance reduced to nonsignificance the effects of inoculation on beliefs and attitudes in the distraction study but in the sensory deprivation study, the inoculation effects remained significant. The correlations between cognitive reactions to the message and belief and attitude change were not however significantly different in the two experiments.

As another test of McGuire's hypothesis, the use of particular counterarguments from the inoculation message was examined. Although virtually all inoculated subjects indicated (on the thought-listing form) a general awareness that the inoculation and anti-truism messages contradicted each other, only 30% of the subjects used specific material

from the inoculation message to defend the truism.

In sum, it appears that an increased capacity to counterargue was an important but not the only effect of the refutational inoculation message. Other intervening psychological processes may be involved. For instance, Tannenbaum (1967), in an attempt to assimilate inoculation research findings into a congruity theory framework, emphasizes the concept-boosting and assertion weakening effects of inoculation, without reference to the counterarguing construct.

The fact that distraction and sensory deprivation failed to increase the message acceptance or disrupt the counterarguing of inoculated subjects suggests an important elaboration to the counterargument disruption model. Apparently, the hypothesized cognitive disorganizers are not effective in inhibiting the utilization of arguments that subjects have readily available (as are the arguments of recently inoculated subjects). If, as was argued earlier, inoculation transforms the complex cognitive task of generating one's own counterarguments into the less complex task of applying previously learned counterarguments, this finding may reflect the differential effects of distraction and sensory deprivation on tasks of varying degrees of complexity. There is considerable evidence, at least for sensory deprivation (Suedfeld, 1969), that cognitive performance decrements occur most reliably with complex tasks.

A Cognitive Analysis of the Counterargument Disruption Model

The need to subject the attitude and belief change process to a level of finer analytic detail - to the level of what Rosenberg and Abelson (1960) have called "a micro-process analysis" of cognition - has long been recognized. The counterargument disruption model, like many other models of attitude change, founders on the shoals of insufficient detail. A more molecular level of analysis appears to be required, which will move to the level of the content of the particular beliefs underlying attitudes (see Section I of the Introduction) and to the cognitive processes that facilitate or inhibit the formation of new beliefs and the changing of old ones. The processes hypothesized to mediate distraction and sensory deprivation effects should be specified as explicitly as possible, and testable predictions derived. Although a fully detailed analysis is beyond the scope of the present paper, a few suggestions will be advanced.

The hypotheses that distraction and sensory deprivation reduce the ability to counterargue and consequently increase persuasibility make certain implicit cognitive psychological assumptions. The basic one in the case of distraction is that the performance of concurrent tasks (comprehending the counterattitudinal

message and working on the distraction task) creates effort demands that approach the limits of the subject's attentional capacity (see Kahneman, 1973, for a discussion of capacity models of attention). As a result of this decreased spare capacity, subjects are less able to allocate attention to the additional task of evaluating the validity of the message claims, i.e., to "counterargue". Sensory deprivation, on the other hand, has been suggested to function as a drive and/or arousal-inducing variable which is disruptive of complex information processing (Schroder, Driver and Streufert, 1967; Suedfeld, 1969, 1972). One manifestation of this general cognitive impairment is a reduced ability to evaluate critically the validity of incoming information.

What, however, are the cognitive processes by which an individual evaluates the validity of a given statement? The present account begins with the assumption that people generally do not store information for things that are not true (e.g., Canada is not south of the United States) (see Collins and Quillian, 1972). It follows that deciding if a given statement is not true typically requires an inference.

There are many strategies that people can use to determine whether a given statement is true (i.e., has a high subjective probability). Collins and Quillian

(1972) suggest that underlying these various strategies is a basic matching process for deciding whether any two concepts are the same or different. Whether two concepts are treated as the same or different depends on the outcome of this matching process. Two basic psychological mechanisms are involved in the matching process: these are "match-on-superordinate" ("Can X be a Y?") and "match-on-superpart" ("Can X be a part of Y?"). Both are basically intersection memory search strategies in which superordinate and superpart links from both X and Y are traced until intersections are found. When an intersection is found, subjects try to find some basis for deciding "yes" or "no", and if they fail, they conclude "I don't know".

The disruption of counterarguing in this context comes to mean the disruption of memory searches to compare the counterattitudinal information with previously stored information and/or the disruption of the decision process by which incoming information is evaluated against previously stored information. Consequently, assuming a reasonably credible source (and interestingly, distraction effects do not generalize to low credibility sources; see Kiesler and Mathog, 1968), distraction and sensory deprivation subjects will tend to assimilate the message beliefs less critically than subjects in a

better position to evaluate the information through extensive search strategies. This leads to greater message belief acceptance for distraction and sensory deprivation subjects.

The previous conceptualization suggests a possible approach to the measurement of the cognitive disorganizing effects of treatments such as sensory deprivation and distraction: namely, the development of intellectual tasks that are isomorphic with those presumed to underlie the persuasion-enhancing effects of those treatments. This seems to have been the logic that guided the development of the earlier mentioned total number of circular triads measure of belief instability. That measure assessed subjects' abilities to assess the relative evaluative implications of statements deemed relevant to a particular attitude. An alternative tactic would be to assess subjects' abilities to recognize the truth or falsity (on subjective probability scales) of various statements presented individually. It would be of particular interest if the effect varied in a manner parallel to the effects of distraction and sensory deprivation on persuasion (e.g., varying with the level of distraction or length of time in sensory deprivation) and other well-established attitude change findings (e.g., varying with the nature of the topic, discrepancy level of the statements, etc.).

Suggestions for Further Research

The present findings, while compatible with a theoretical position that emphasizes the importance of counterarguing in distraction and sensory deprivation effects, certainly are not decisive. Rather, they underscore the need for further research to demonstrate the validity of such an interpretation and to explore the underlying psychological processes in more detail.

First, it is critical to determine whether the distraction and sensory deprivation manipulations used in the experiments here increase the acceptance of messages against which subjects can and are motivated to counterargue. To find such a message, it is probably advisable to sample several persuasive messages and to assess the degree to which counterarguing occurs as a natural response to each of them. Osterhouse and Brock (1970, p. 355) plausibly suggest:

"...counterarguing would be most likely in response to a message which advocated action having negative consequences for the recipient or which contradicted a strongly held opinion in an area having important implications for the individual".

If it could be shown that the distraction and sensory deprivation manipulations used here increased persuasion for a message which does elicit counterarguing, it would provide impressive evidence in favour of the disruption hypothesis. Of course, it would be necessary to ensure that hypothesis-irrelevant factors which may influence distraction and sensory deprivation effects are held constant. One such factor, as was discussed in the introduction, is the complexity of the attack message (see Regan and Cheng, 1973; Silverstein and Suedfeld, 1976). Another possibility is that the different topic may produce different demand characteristics. In brief, in order for such a study to provide strong evidence in favour of the disruption hypotheses, the attitude topic used should differ from the cultural truism only in terms of its tendency to elicit a higher baseline of counterarguing. This may not be easy to accomplish. The use of a number of different attitude topics may even be necessary.

Another study should probably investigate the different effects of providing or not providing subjects with counterarguments against a message which, unlike attacks on cultural truisms, tends to elicit

counterarguing. Such a study could involve an extension of McGuire's inoculation approach to non-cultural truisms. By factorially varying presence or absence of prior provision of counterarguments with the disorganizing treatments of distraction and sensory deprivation, the hypothesis can be tested that these treatments interfere with the generation of new counterarguments but not the use of readily available ones. The disruption hypothesis predicts that distraction and sensory deprivation will increase persuasion for noninoculated subjects (unlike the present study) but not for inoculated subjects.

Another study should investigate how different types of forewarning interact with distraction and sensory deprivation. The most prominent explanation of forewarning effects is the stimulation of cognitive defenses in the form of counterarguments (e.g., McGuire and Papageorgis, 1962; Freedman and Sears, 1965). The reactance explanation is however also a viable one (Brehm, 1966).

These explanations may not however be mutually exclusive. Hass and Grady (1975) suggest that the two explanations best account for the effects of different types of forewarning (see Papageorgis, 1968, for a review of that literature). Forewarning of the topic

and position to be taken by the message appears to inhibit persuasion as a positive function of the delay between the warning and the message (e.g., Freedman and Sears, 1965; Hass and Grady, 1975). It has been suggested that the longer delays provide time for the gathering of counterarguments. On the other hand, forewarning of only persuasive intent appears to reduce persuasion regardless of the delay period (e.g., Hass and Grady, 1975). Since subjects who receive this latter type of forewarning are not aware of the message topic or position, the prior preparation of counterarguments does not appear to be a plausible explanation. Apparently, a topic-independent resistive state such as reactance is aroused.

It would be of considerable theoretical interest to determine how these two types of forewarning interact with distraction and sensory deprivation. For instance, are the different types of forewarning equally effective in conferring resistance to persuasion for subjects who listen to the persuasive message when distracted or after a given period of time in sensory deprivation? Does the interpolation of a distraction task during the forewarning delay period reduce the effects of forewarning of topic and position, of forewarning of persuasive intent? The counterargument stimulation and reactance interpretations of the

effects of different types of forewarning, and the counter-argument disruption interpretations of distraction and sensory deprivation effects suggest specific predictions on these questions.

In addition to the probable tendency of different attitude topics to elicit differing amounts of counterarguing (something which, incidentally, has not been systematically explored), there may be trans-topic individual differences in the nature and amount of counterarguing. The predictive failure of the conceptual complexity measure is not too disconcerting in the present context. First, the individual difference and experimental treatment effects may have worked against each other. Individual differences in information processing complexity decrease in importance as conditions depart from optimality (see Schroder, 1971). Second, it is unclear to what extent conceptual complexity is a pervasive personality disposition or a more content-specific cognitive social learning variable (see Mischel, 1973; Schroder, 1971). Conceptual complexity on the Paragraph Completion Test may simply not generalize to complexity in response to attacks on cultural truisms.

Further research is clearly needed to assess the importance of individual difference characteristics such as con-

ceptual complexity and intelligence as determinants of cognitive responses to persuasive messages. A recent study by Eagly and Warren (1976) indicates that more intelligent subjects counterargue more in response to a counterattitudinal message. In addition, such individual cognitive differences may interact with distraction as they do with sensory deprivation (e.g., Myers, Murphy and Smith, 1963; Suedfeld, 1964).

It is important to note however that the present study highlights a potentially major threat to the internal validity of attitude change studies in which subjects are assigned to experimental conditions on the basis of individual cognitive difference variables such as conceptual complexity and intelligence (e.g., Hovland, Lumsdaine and Sheffield, 1949; Myers, Murphy and Smith, 1963; Streufert and Fromkin, 1972; Suedfeld, 1964). In both the distraction and sensory deprivation experiments, conceptually complex subjects tended to be more aware that the research was concerned with persuasion. While this fact probably did not introduce systematic bias in the experiments here (simple and complex subjects were randomly distributed throughout experimental conditions), it clearly may have done so in previous studies

where placement on this individual difference dimension was a criterion for assignment to experimental groups.

In addition to its role as an artifact in attitude change studies, the fact that individual cognitive differences may be associated with different interpretations of experimental situations is of intrinsic theoretical interest and deserving of further research. The finding that complex subjects tended to be more suspicious of persuasive intent can be integrated with the views that: a) psychological research often represents a complex social problem-solving task for subjects (see Harre and Secord, 1972; Orne, 1969); b) conceptually complex subjects perform better in solving complex social problems (see Schroder, 1971).

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APPENDIX 1.

·CONSENT FORM FOR SENSORY
DEPRIVATION SUBJECTS

CONSENT FORM FOR SENSORY DEPRIVATION SUBJECTS

You have volunteered for a study which, as you know, will take 24 hours of your time. You will be asked to spend all of this time lying quietly in a dark, silent room. At some point, you will be presented with pleasant films, slides, and/or questionnaires. When this occurs, you will be warned ahead of time.

While in the darkened room, we would like you to lie as still as possible on the bed. It's all right to doze or sleep. You are not to sit up, move around unnecessarily, sing, whistle, etc. You are not to get off the bed unless you have to use the chemical toilet which will be located in the room. Food and water will be available to you at bedside. Please note that there will be equipment and wiring in the room, and that while moving around cannot hurt you, you might disconnect some of the equipment which would invalidate the study. Furthermore, a monitor in the next room will listen in on the intercom from time to time, and if you are found to be violating the rules against the excessive movement and noise, the experiment will be terminated and you will not be paid.

As mentioned above, there will be a monitor on duty at all times, so that you will never be alone in the laboratory even though you are alone in the room. Most people find this experience to be relatively pleasant and relaxing, and a few people find it mildly boring. Very seldom does anyone find it really unpleasant; if, however, you should decide that you don't want to continue to stay in the room, you may just walk out of the room by yourself. You will be shown how to do this during the orientation session. If you do leave the dark room, please go next door to where the monitor is

and inform him of your decision to leave. Do not just disappear without telling anybody. There is no failure attached to leaving the room; some people just don't like that kind of situation, and it is perfectly all right to leave if that happens to you. On the other hand, once you have left the room, it will not be possible for you to change your mind and go back in, nor will it be possible for us to pay you for the experiment (since, obviously, we will not be able to collect the information which we need); so, you should be quite sure that you really want to quit before you do so.

At the end of the 24 hours, you will be asked to change the bed linen and help clean out the toilet and thermoses.

If you have any questions before you start, please feel free to ask the experimenter. Thank you for your co-operation.

Peter Suedfeld
Project Director

Date: _____

I have completely read and understood the information outlined above, and I agree to the conditions as they are presented therein.

Signature: _____

Printed Name: _____

APPENDIX 2

THE REFUTATIONAL INOCULATION AND
ATTACK MESSAGES

THE REFUTATIONAL INOCULATION MESSAGE

We are probably all aware that one should brush his teeth after every meal. Yet, from time to time, there are stories written by well-intentioned but misguided reporters, 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 error lies.

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 defect. By law, 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 dentrifice 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 as perfectly harmless for the public to use.

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. If we go to the source of such statements we shall find that they rely on comparisons of western populations with those living in small primitive societies. 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 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 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 the teeth. 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.

THE ATTACK MESSAGE

Many people brush their teeth more or less automatically after each meal without paying any attention to medical reports that call 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. Brushing teeth so frequently tends to push back the gums and expose the non-enameled parts of the teeth to decay. Biochemical studies also indicate that plaque, the cause of tooth decay, requires 24 hours to develop to the point that it becomes harmful. 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 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 dentrifices 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 each brushing is very slight, the accumulated effects of constant brushing

can be disastrous. Hence, brushing after every meal can well cause more harm than good.

Recent evidence about the nature of the decay causing agent, dental plaque, further emphasizes the uselessness of tooth brushing after every meal. Plaque, a bacteria which accumulates on and between the teeth, creates decay-producing acid when it comes into contact with refined sugar. It has recently been found that plaque, once removed, requires approximately 24 hours to reform to the maturity, volume, and thickness necessary to metabolize sugar and produce the harmful acid byproducts. A person, therefore, need not brush after every meal, but instead should remove plaque thoroughly and completely only once a day.

This presents a further problem that tooth brushing does not solve. In order to eliminate all plaque from one's teeth, it is necessary to remove it from all surfaces of each tooth. By using a tooth brush in a highly skillful manner, you can achieve removal of bacteria from about 85% of your tooth surface. This is where about 15% of tooth decay originates. The 15% that is consistently missed is where about 85% of all tooth decay occurs. Bear in mind this is under ideal circumstances which are rarely achieved. Brushing more frequently will not increase the tooth area which is cleaned. Using dental floss, however, is a very effective means of removing plaque lying between the teeth in the areas not reached by the tooth brush. Since constant tooth brushing

after every meal does produce such harmful effects to the gums and does not effectively reduce decay producing plaque, it would be wiser to utilize this safer, more effective method of tooth brushing and flossing once a day to prevent dental disease.

Appendix 3

COMPREHENSION OF THE REFUTATIONAL
INOCULATION MESSAGE

Comprehension of the Refutational
Inoculation Message

This is a test of your comprehension of the message.
Circle the correct answer.

- 1) According to the message, brushing of teeth:
 - a) is more likely to strengthen gum tissues than weaken them;
 - b) exposes vulnerable parts of the teeth to decay;
 - c) causes more gum damage than eating;
 - d) may lead to serious gum infection.
- 2) According to the message, a common cause of bleeding of the gums is:
 - a) regular brushing of teeth after every meal;
 - b) the harsh abrasives in toothpastes;
 - c) weakness of the gums due to lack of proper stimulation such as is provided by toothbrushing;
 - d) eating rough foods.
- 3) According to the message, people in primitive societies have lower incidences of tooth decay than in Western societies due to:
 - a) the fact that toothbrushing is an ineffective method for stopping decay;
 - b) the superior teeth cleaning methods employed in primitive societies;
 - c) the richer tooth decay-causing diets in Western societies;
 - d) differences in life style unrelated to diet.
- 4) According to the message, the contents of modern toothpastes:
 - a) may include harsh abrasives which pit the enamel, leaving them open to bacterial damage;

- b) are not effectively regulated by law;
- c) must, by law, be thoroughly tested for any abrasives or other harmful contents;
- d) may be harmful to the gums.

5) According to the message:

- a) most tooth decay does not occur when food is in the mouth;
- b) toothbrushing is needed to dislodge decay-causing bacteria that remain after the meal;
- c) toothbrushing is of little use since most tooth decay occurs when food is in the mouth;
- d) toothbrushing is not very effective in dislodging food particles remaining in the mouth after meals.

Appendix 4

ALL DEPENDENT MEASURES USED
IN THE STUDY

Comprehension Test for the Attack Message

This is a test of your comprehension of the message.
Circle the correct answer.

- 1) According to the message:
 - a) frequent brushing may damage the protective enamel of the teeth;
 - b) frequent brushing provides a healthy source of stimulation for the gums;
 - c) frequent brushing is fundamental to sound oral hygiene;
 - d) even frequent brushing fails to clean most of the surface area of the teeth.
- 2) According to the message:
 - a) dental plaque is harmless;
 - b) dental plaque requires 72 hours to form to the maturity necessary to produce decay-causing acids;
 - c) dental plaque forms on only 2% of the surface area of the teeth;
 - d) dental plaque requires 24 hours to form to the maturity necessary to produce decay-causing acids.
- 3) According to the message, frequent brushing
 - a) will expose non-enameled areas of the teeth to harmful decay-producing bacteria;
 - b) will decrease the amount of tooth decay in the long run;
 - c) will decrease the chances of gum and throat infections;
 - d) will improve our general appearance.

4) According to the message:

- a) 40% of the surface area of the teeth is consistently missed even by skilful toothbrushing;
- b) dental floss is an effective means of removing plaque not reached by toothbrushing;
- c) it is necessary to brush at least twice a day;
- d) recent medical evidence supports the importance of regular toothbrushing.

5) According to the message:

- a) repeated injuries to the gums by brushing can produce serious infections and even mouth cancer;
- b) toothbrushing is extremely harmful and should not be practiced at all;
- c) doctors generally concede that most serious gum infections result from accidental injury to the gums inflicted during toothbrushing;
- d) both (a) and (c) are true.

We are interested in what you believe about the practice of regularly brushing your teeth. Use this scale to rate the strength of your belief that each of the following statements is true or false.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
I am certain that the statement is false.	I believe it is quite unlikely that the statement is true.	In my opinion, the statement has an equal probability of being true or false.	I believe it is quite likely that the statement is true.	I am certain the statement is true.

Place an X in the box that represents what you believe.

For example: Consider the statement: "Pierre Trudeau is the best Prime Minister that Canada has ever had".

If you believe that the statement is definitely true, place an X in the box labeled 100%. If you believe the statement is quite likely true, place an X in the box labeled 75%. If you believe the statement has an equal probability of being true or false, mark the X in the box labeled 50%. If you believe it is quite likely that the statement is false, mark an X in the box labeled 25%. Finally, if you believe the statement to be definitely false mark an X in the box labeled 0%.

- 1) Recent medical studies indicate that the beneficial effects of constant toothbrushing have been exaggerated.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 2) Brushing teeth frequently tends to push back the gums and expose the non-enameled parts of the teeth to decay.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 3) Too frequent toothbrushing can cause gum infections and even mouth cancer.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 4) The enamel of the teeth can be damaged by excessive toothbrushing.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 5) An adequate defence against tooth decay requires only that the decay-causing plaque be removed once a day.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 6) Even skilful toothbrushing fails to remove plaque from about 15% of the tooth surface area.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

- 7) Dental floss is an effective means of removing plaque in areas not reached by toothbrushing.

<u>0</u>	<u>25%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
definitely false				definitely true

Semantic Differential

Name _____

We are interested in what the practice of regular toothbrushing after every meal means to you. You are to judge the practice of regular toothbrushing after every meal in terms of the four descriptive scales below.

Here is how you are to use these scales. If you feel the practice of regular toothbrushing after every meal is very closely related to one end of the scale, you should mark an X in the box at that end of the scale. If you feel the practice of regular toothbrushing after every meal is neutral on the scale, both sides of the scale equally associated with the practice of regular toothbrushing, then you should place an X in the middle box.

The box in which you place the X thus depends upon which of the two ends of the scale seems most characteristic of the practice of regularly brushing your teeth after every meal.

Good ____ : ____ : ____ : ____ : ____ : ____ : ____ Bad

Worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ Valuable

Pleasant ____ : ____ : ____ : ____ : ____ : ____ : ____ Unpleasant

Thought-Listing Form For The Assessment
of Cognitive Reactions To The Message

Name _____

Please list all thoughts that occurred to you during the presentation of the tape-recorded message on tooth-brushing. Do not worry about writing complete sentences. Just try to report as briefly and accurately as you can what thoughts went through your mind during the message.

IDEA: _____

IDEA: _____

IDEA: _____

IDEA: _____

IDEA: _____

IDEA: _____

IDEA: _____

Subjective Certainty

How certain are you that your opinion on the subject
is correct?

Not at all
certain

Somewhat
Certain

Completely
Certain

Perceptions of Message and Source Characteristics

How fair do you believe the message was?

Completely
Unfair

Completely
Fair

Do you believe the message was well-written?

Very poorly
written

Very well
written

Very well
informed

Very poorly
informed

Subjective Distraction

To what extent did you feel distracted while
listening to the message?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Not at all distracted									Extremely distracted	

Subjective Effort

How much effort did you feel was required by the
number identification task?

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>
Very little effort									A great deal of effort	

Post-Experimental Questionnaire

Name _____

We are interested in your general attitude toward the study in which you have just participated. Please answer the following questions as honestly as you can.

- 1) What were your overall feelings toward the study?

-5	_____	_____	_____	_____	_____	_____	_____	+5
Strongly				Neutral				Strongly
Negative								Positive

2. a) During the experiment did you form any ideas as to the specific purpose of the experiment?

Circle one of: Yes No

- b) If your answer is yes, what ideas did you form?
-
- Supply reasons, if possible.

- c) How confident are you that your idea(s) was (were) correct?

_____	_____	_____	_____	_____	_____
0	1	2	3	4	5
Not at all					Very
confident					confident

- 3 a) Did you feel during the experiment as though your performance was being evaluated in a particular way?

_____	_____	_____	_____	_____	_____
0	1	2	3	4	5
Not at all					Very much so

- b) How?

- 4) If you wish, you may comment on any other aspects of the study you consider to be important.
