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QUARTERMASTER FOOD AND CONTAINER INSTITUTE FOR THE ARMED FORCES
Research and Engineering Command
Quartermaster Corps, U.S. Army
Chicago, Illinois

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AD _____ Accession No. _____
Los Angeles Division, The Matrix Corp., Sherman Oaks, Calif.
METHODS FOR CHANGING CONSUMER ATTITUDES: A REPORT OF THREE EXPERIMENTS - E. E. Smith

Report No. 1, 15 Feb 61, 75 pp - tables (Contract DA-19-129-QM-1619)
Proj No. 7-84-15-007, Unclassified Report

In three experiments (total N of 241) using foods varying in acceptability, the following conclusions were drawn: (1) Negative communicator cognitive dissonance techniques produce significant favorable change. (2) Non-direct influence techniques produce significant change. (3) Positive communicator-dissonance and humor techniques produce no change. (4) Dissonance techniques using a negative communicator are powerful but limit the portion of the population affected. Non-direct influence is less powerful but affects more subjects.

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Prepared for:

QUARTERMASTER FOOD & CONTAINER INSTITUTE FOR THE ARMED FORCES

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Chicago 9, Illinois

Under Contract DA 19-129-qm-1619
Project No. 7-84-15-007

QUARTERMASTER RESEARCH AND ENGINEERING COMMAND

U. S. ARMY

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721500

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CONTRACT RESEARCH PROJECT REPORT

QUARTERMASTER FOOD AND CONTAINER INSTITUTE FOR THE ARMED FORCES, CHICAGO
QM Research and Engineering Command, U. S. Army, QM Research and Engineering Center, Natick, Massachusetts

The Matrix Corporation
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SUMMARY

Three experiments were performed to develop and test methods for changing consumer food attitudes. Primary emphasis was on the use of cognitive dissonance. This is a method whereby subjects are induced, by a positive or negative reward, to engage in behavior, e. g. eating a disliked food, which is contrary to their current attitudes. The discrepancy between their attitudes and their inconsistent behavior produces a conflict which, under the proper conditions will, theoretically, produce a change in their attitude.

In the first experiment, large changes in attitude towards the use of grasshoppers as a food were produced by a cognitive dissonance technique. The use of a no influence attempt technique in conjunction with a rationale also produced attitude change.

In the second experiment, using "irradiated" meat, the no influence attempt technique was found to be effective without a rationale, but to be more powerful when used with a rationale.

In the third experiment, significant changes in attitudes towards instant coffee were produced, but an attempt to extend the range of the powerful cognitive dissonance technique was not successful.

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CHAPTER I: INTRODUCTION

This is a report by Psychological Research Associates (PRA), a Division of The Matrix Corporation, on a series of studies of methods for changing consumer attitudes performed for the Food Acceptance Branch, Food Division, Quartermaster Food and Container Institute for the Armed Forces, Quartermaster Research and Engineering Command.

PROBLEM

The U.S. Army is being rapidly modernized and undergoing considerable change to meet new conditions of warfare. It is particularly important that the modern mobile army (MOMAR) have mobility and speed so that it can quickly be concentrated when necessary for attack but quickly dispersed after mission accomplishment to avoid presenting a concentrated target to enemy nuclear weapons. This requirement for a highly mobile, fast moving, hard hitting army is presenting the Quartermaster with a host of new problems which must be solved in order to insure the success of these new army units. It will not be possible for MOMAR to have the number of troops with almost purely support duties which are found in conventional military organizations. Increased mobility will necessitate the giving up of many major mess equipments, such as field ranges, refrigerators, kitchen trucks, etc. Consequently, new rations are needed which are nutritious, light-weight, compact, and do not require refrigeration or elaborate equipment for preparation. However, the rations being developed by the Quartermaster which meet these new requirements are necessarily, in many cases, new and different and frequently not highly acceptable to the men. It often appears to be the newness and differentness of these rations rather than any real taste difference

which results in their lack of acceptance.

However, whatever the reasons for the lack of acceptance of new rations, it is obvious that more effort will have to be devoted to changing consumer attitudes in the Armed Forces than has been done in the past. In essence, the problem is now one of changing the attitudes of the men to fit the rations, as it is no longer always possible, with the new limitations on equipment and support personnel for MOMAR, to sufficiently change the ration to suit the current attitudes of the men.

OBJECTIVES

The objectives of this research project were as follows:

1. To select from the body of theory and experimental evidence on attitude change those techniques which might be applicable to changing consumer attitudes in military organizations. To be selected, potential techniques had to be consistent with the culture and practices of the Armed Forces. Furthermore, they had to be powerful enough to produce results of practical as well as theoretical and statistical significance. The potential techniques would also have to be applicable to large numbers of personnel simultaneously, in which the majority attitude might be one of opposition to the item which authority was attempting to have them accept.
2. To compare empirically the relative power of these selected attitude change techniques with each other and with traditional attitude change methods in the Armed Forces.
3. To develop methods for applying these techniques in military situations.

APPROACH

Although a large number of demonstrated and potential attitude change techniques were culled from the literature, it was necessary to reject most of them for not meeting the requirements stated above, i.e., they would not likely lead to techniques for allowing outsiders or those in authoritative positions to induce large groups of individuals to change their attitudes. A further reduction in the number of potential attitude change techniques for application to military consumers was necessary in order to allow their testing within the resources of the current research project. By this means, the number of approaches to attitude change to be tested on this project was reduced to the following:

Dissonance Theory

A large body of theory and research in the last few years in the area of attitude change has been based on the notion that man strives to be consistent. This consistency concept was first developed by Heider (1946), who discussed it in terms of a concept of balance. Later work was done in this area by Osgood and Tannenbaum (1955), working with the congruity principle. Festinger (1957), however, with his development of the concept of cognitive dissonance has provided us with the best statement of the theory for use in the area of attitude change, in which area he has stimulated considerable work.

Festinger (1957) states that two elements of knowledge "are in dissonant relation if, considering these two alone, the obverse of one element would follow from the other". Dissonance, according to Festinger, has drive characteristics which will motivate the person to reduce the dissonance and achieve consonance. The theory also states

that individuals will avoid information and situations that would tend to produce or increase dissonance.

A number of interesting hypotheses have been developed from the dissonance principle and subjected to experimental test by such writers as Brehm (1959); Brehm and Cohen (1959); Cohen, Brehm, and Fleming (1958); Cohen, Terry and Jones (1959); Festinger (1957); Festinger and Carlsmith (1958); and Rabbie, Brehm and Cohen (1959). Of particular relevance to the present investigation is the deduction from the dissonance principle that if a person makes a statement or engages in behavior which is contrary to an attitude held by that individual he will experience dissonance. This dissonance will have drive characteristics motivating the individual to reduce the dissonance. It also follows from the theory that if other means of reducing the dissonance are not available to the individual, he will be motivated to change his attitude.

An individual who has behaved in a manner inconsistent with an attitude can reduce the tension induced by the dissonance between these two cognitive elements (i.e., the attitude and the fact that he behaved in a manner inconsistent with the attitude) by one of several ways:

1. By deciding that he had little or no choice in behaving as he did, and/or his behavior was justified on other grounds.
2. By denying that he engaged in the behavior.
3. By changing his attitude to make it more consistent with his behavior.

The general method used by researchers using cognitive dissonance for producing attitude change has been to induce individuals (by the use of a reward) to behave in a manner inconsistent with an attitude held by them, and to structure the situation so that the first and second methods given above for reducing dissonance are difficult to utilize. The first method of reducing dissonance, that is, by

denying one behaved in a manner inconsistent with his attitude through any choice of his own, is made difficult and improbable by utilizing an inducement which is just barely over the threshold necessary to produce the inconsistent behavior. For example, if individual A has a negative attitude toward object X, and will not act in a positive manner towards object X for $2.00 but will act in a positive manner towards object X for more than $2.00, you induce positive behavior towards object X by paying him $2.25. This will make it difficult for the individual to rationalize his behavior to make it consistent with his attitude by denying choice, as few individuals will admit that they feel compelled to do things contrary to their attitudes and beliefs for a $.25 reward. However, if the individual was induced to behave positively towards object X by means of a $10,000 reward, he would likely reduce dissonance by denying that he had any real choice, rather than changing his attitude, as he would argue that anyone would have acted positively towards object X for such a large reward even though he had a negative attitude towards it. It is interesting to note that the prediction from dissonance theory that attitude change will be greater the smaller the reward or threat used to induce the dissonant behavior is the opposite of the prediction which would be made from a straight reinforcement theory (or from a common sense viewpoint) that the greater the reward the greater the attitude change. This prediction from dissonance theory, i.e., the larger the reward used in excess of that needed to produce the behavior the less the attitude change, has been supported by research by Aronson and Mills (1959), and by Festinger and Carlsmith (1959).

Dissonance theory was selected for possible application to the Quartermaster food attitude problem because it appears to have certain inherent advantages for any eventual military application of the research techniques. Dissonance theory's primary advantage in this respect is that it is consistent with, in fact requires, an authority figure acting

as the influence agent who has some control of rewards and punishments. This requirement for the use of dissonance techniques is obviously compatible with the military situation, whereas many of the most common techniques utilizing group discussion and participative leadership, such as those used by Lewin (1943) in his famous food studies are not compatible with or feasible in the military situation. In fact, recent research (Kipnis, 1958) has shown that Lewinian-type group-centered attitude change techniques permit the group to decide to take an even more negative position than was previously held just as easily as a more positive attitude, depending on the averaging of the prior individual attitudes that occurs during the group discussion.

Another advantage of dissonance techniques for the current problem is that it would be predicted that the techniques would be more powerful the more difficult the attitude problem. It follows from dissonance theory that the more negative the original attitude towards a given consumer item the greater will be the dissonance between the original attitude and the induced positive behavior towards the consumer item, and hence the greater the attitude change.

A third and compelling reason for selecting dissonance theory as one of the techniques to be utilized in the study was the prior work of Brehm (1959) in which he demonstrated increased liking on the part of school children for their most disliked vegetable through the use of a dissonance technique, i.e., by inducing the subjects to eat the vegetable through the use of a positive reward.

Although cognitive dissonance appears to be a likely candidate for the development of attitude change techniques applicable to the military situation, it is necessary to determine if the techniques can be adapted for practical application in real situations. The literature on cognitive dissonance cited above is concerned with the theoretical development of the concepts, rather than their power in applied situations. We need to determine if the techniques can be made

sufficiently powerful to have practical value.

Zimbardo (1960) has suggested that a negative communicator may be a more effective influence agent, using dissonance techniques, than a positive communicator. This is predicted because there would probably be less justification (in the mind of the subject) to conforming to the wishes of a negative communicator, and hence more dissonance when inconsistent behavior is induced, and thus more attitude change. As negative authority figures (e.g. second lieutenants) are readily available in the military and, in fact, are the likely candidates for use of attitude change techniques with their troops, Zimbardo's hypothesis was investigated.

Previous research has generally indicated that those with the most discrepant opinions from the position advocated by the communicator change their opinions the most (see Zimbardo, 1960, for references and discussion). These results are consistent with dissonance theory, as the greater the divergence of opinion the greater the dissonance, as has been pointed out by Zimbardo (1960). As the use of those with the most negative attitudes as subjects for attitude change attempts should, therefore, increase the power of dissonance techniques, and as such a selection would have obvious practical advantages in an applied situation, this phenomenon was also investigated.

Humor

Humor has not been used as a technique for changing food attitudes. However, there is some reason to believe that one of the mechanisms that individuals and groups use to alleviate anxiety or stress is humor. Bales (1950) has commented on the tension reducing function of wit, but there has been little empirical or theoretical development of the function of humor in groups, or of the mechanism by which it is related to stress reduction. Research has indi-

cated, however, (see the summary and discussion by Haggard, 1949) that the expression of aroused energy reduces the debilative effects of stress. Sarcasm probably produces such a substitute relief. In addition, there are some specific indications that humor is a superior response in a frustrating situation (Flugel, 1954). Torrance and Hawkins (1957) found that men with a sense of humor more frequently avoided capture in a stressful, simulated emergency situation.

It is hypothesized that humor often involves putting an individual or group problem in perspective, making the implicit, the unverbalized, explicit. This often seems to produce a sharp, immediate reduction in tension through laughter. The common laughter demonstrates to all that none was alone in his feelings of insecurity. The unexpected remark of the wit, verbalizing what others had only vaguely felt or wondered about may, therefore, reduce tension by removing the uncertainty and ambiguity in the situation.

Some evidence for the use of humor as a defense against anxiety, or more probably as a means of reducing it, was indicated by an exploratory field study (Smith and Goodchilds, 1959) of industrial groups in an anxiety producing situation. An analysis of the exploratory field data revealed that groups containing sarcastic wits evaluated the stress producing group experience significantly more positively than did members of the other groups. This raises some interesting questions as to the content of the funny remarks. Unfortunately, however, content data was not obtained. As being presented with strange and unusual foods to eat is presumably anxiety producing, humor in a group feeding situation where unusual foods were being used might dissipate the anxiety produced and thereby increase food consumption and reduce negative attitudes toward the strange foods. Although humor is an untried method for changing attitudes, it was one of the methods selected for evaluation because it has the advantage, like dissonance theory, of permitting a nonmember of the group to apply it to a group whose

attitudes are to be changed from outside the structure of the group. In addition, the use of humor would be a subtle, nondirect, and socially acceptable approach which should not produce the negative reaction or negative attitude reinforcement that a direct assault upon attitudes may produce. Humor, if successful, would also have the advantages of being applicable to very large numbers of men simultaneously.

Leader Influence

Leader influence, or the use of a group leader figure to present positively the reasons for the needed attitude change and request that the men consider the change and try out the new behavior, was included as one of the attitude change techniques. It was felt that this technique should be included to allow its use as a bench mark, i.e., so that we could compare the effects of the newer attitude change techniques being tested with current practices. Leader influence techniques are currently the major method for producing attitude change in the Armed Forces (as elsewhere), and have been supported by previous research (Scollon, 1956; Torrance, 1957). It was felt that unless the new attitude change techniques being explored were not substantially more effective than leader influence it would not be possible to recommend their application to the Armed Forces. In this sense, therefore, the leader influence condition was used as a control condition, at least in a functional sense. It was decided to use a sergeant as the leader influence agent in the present research because of Scollon's (1956) results which indicated that an experienced sergeant was the most effective leader using direct attitude change communications compared to several other leader figures.

CHAPTER 2: THE GRASSHOPPER EXPERIMENT

OBJECTIVES

The objectives in the first experiment were as follows:

1. To test the feasibility and power of cognitive dissonance techniques for changing food attitudes in a military situation.
2. To determine if cognitive dissonance techniques could be increased in power by the use of a negative communicator.
3. To explore the effects of cognitive dissonance and other attitude change techniques relative to the degree of original disagreements with the position advocated on the part of the subjects.
4. To explore the effectiveness of humor as an attitude change technique.
5. To compare the relative power of cognitive dissonance, humor and leader influence as attitude change techniques.

HYPOTHESES

The following hypotheses were tested in the grasshopper experiment:

1. Cognitive dissonance will increase favorable attitudes towards an unusual food.
2. A negative communicator using a cognitive dissonance technique will produce more attitude change in a positive direction towards an unusual food than will a positive communicator using cognitive dissonance.

3. The introduction of humor into a group being exposed to an unusual food will result in an increased positive attitude towards the unusual food.

4. A group leader will be able to produce an increased favorable attitude towards an unusual food on the part of his group.

METHODOLOGY

Subjects

The subjects were ninety-six Army reservists undergoing training at the U.S. Army Reserve Center, Van Nuys, California. Most of the men were young privates, with a sprinkling of NCO's. The men were used in ten groups of about ten men each. Most of the men in any one group were from the same unit, but the groups were very heterogeneous in terms of their Army function, coming from infantry units, engineering units, etc. After the experimenter had obtained the approval of the unit's commanding officer, this officer would assign his first sergeant to obtain "volunteers" for the experimenter.

There was no specific control for hunger. The groups were used between 7:30 and 9:00 pm, however, at which time the men were probably neither very hungry or completely satiated.

Food

The food used in the experiment was grasshoppers. These were canned Japanese grasshoppers, served in the open can, which had been fried in oil and salted. They had a rather bland taste. Grasshoppers were chosen as the food for this experiment as Americans generally have a very negative attitude towards insects for food, and the grasshoppers were, therefore, seen as a severe test of food attitude change

techniques. In addition, grasshoppers have the advantage of being an acceptable food, in fact a delicacy, in some other countries, indicating that we are dealing here with an attitudinal rather than a physiological problem. In addition, grasshoppers have the advantages, for research purposes, of being easy to carry and serve with a minimum of preparation, and being easy to count in terms of units eaten. It was also possible to "explain" the experiment by describing grasshoppers as representative of possible survival foods that Army units might have to learn to eat in an emergency situation. This explanation for the use of grasshoppers, that is, representing them as a possible or representative survival food, was easily accepted by the men studied.

Experimental Design

There were five experimental conditions, with two groups assigned at random to each condition. The five conditions were as follows:

Condition A - Cognitive dissonance, positive communicator.

Condition B - Cognitive dissonance, negative communicator.

Condition C - Humor.

Condition D - Leader influence.

Condition E - Control (no influence attempt).

All groups were brought into the reserve center's kitchen area by a sergeant and seated around a large table. Throughout the experimental period fresh coffee was available and the men helped themselves to it. The experimenter introduced himself, gave a brief statement on what the experiment was about, and had them fill out the first page of the questionnaire. The experimental variation was then introduced, after which they were exposed to the grasshoppers. After they had finished eating they finished the questionnaire. The experimenter then thanked them for their cooperation, asked them not to discuss the

experiment with others, and excused them. The experiment lasted about forty minutes. The specific instructions and experimental variations in the five conditions were as follows:

In every group and experimental condition the experimental period started with the following statement being read by the experimenter:

> "Good evening. I am Dr. Smith, and I am doing research for the Army Quartermaster on food acceptance. The Army wants to find out more about how the men feel about new, different, or unusual foods, because the new Army will consist of smaller, more mobile units than we had in World War II. These new units will be more on their own, without all the support personnel and field kitchens that we had before. So the kinds of food you'll have to eat, if you want to survive, may not be as good as they were before. You may have to eat food that you may not have eaten before, and live off the land more. So tonight we are going to find out what your attitudes and reactions are toward an unusual food that you might have to eat in an emergency. This food is grasshoppers."

After reading this statement, the experimenter handed out the three-page questionnaire and had the subjects fill out the first page, which included a rating scale on grasshoppers as a food. After they had completed the first page of the questionnaire, the experimenter then read the following statement in every group and in every condition:

> "This is a voluntary experiment, and no one has to eat the grasshoppers if they don't want to."

At this point, the instructions and procedures varied according to the experimental condition, as follows:

Condition A

In this condition, the experimenter acted in a friendly, warm, permissive manner throughout the experimental period. Operationally, this consisted of frequently smiling, referring to himself as Smitty

rather than Dr. Smith, sitting on the counter rather than standing, saying that the men could smoke if they wished, that they should relax and enjoy themselves, etc.

In addition, in Condition A as in Condition B, after stating that the experiment was voluntary, as quoted above, the experimenter said:

> "However, in order to get as many people as possible to try one, I will pay, right now, fifty cents to each person who eats one."

While saying this the experimenter took a handful of quarters out of his pocket, showing them to the subjects, and paid fifty cents to every man who ate a grasshopper. It was explained that it was only necessary to eat one grasshopper to earn the fifty cents. After all those who wished to eat a grasshopper for fifty cents had done so and received their money, the experimenter said:

> "Now go ahead and eat."

Condition B

In this condition, the experimenter acted in a formal, cool, official manner throughout the experimental period. Operationally this consisted of ordering rather than requesting, telling the men they couldn't smoke, never smiling, standing in a stiff pose, replying in a sharp manner to questions, etc.

In addition, after the above quoted statement read to all groups that this was a voluntary experiment, the experimenter said in Condition B as in Condition A:

> "However, in order to get as many people as possible to try one, I will pay, right now, fifty cents to each person who eats one."

While saying this the experimenter took a handful of quarters out of his pocket, showing them to the subjects, and paid fifty cents to

every man who ate a grasshopper. It was explained that it was only necessary to eat one grasshopper to earn the fifty cents. After all those who wished to eat a grasshopper for fifty cents had done so and received their money, the experimenter said:

"Now go ahead and eat."

Condition C

In this condition, after having made the statement that this was a voluntary experiment quoted above, the experimenter stated:

"To make this meeting more pleasant, I am going to play a record for you while you eat."

The experimenter then put on the Bob Newhart record "The Buttondown Mind Strikes Back", at the particularly funny section on the "Grace L. Ferguson Airline and Storm Door Company." After the group had responded to the record with at least one good laugh, the experimenter presented them with an open can of grasshoppers and said:

"Now go ahead and eat."

The record continued to play until the men had finished eating.

Condition D

In this condition, after having made the statement that this was a voluntary experiment quoted above, the experimenter said:

"I would like Sergeant _____ to tell you the importance of soldiers being willing to live off the land and eat strange foods."

At this point, a sergeant who had been selected on the advice of the officers as being highly respected by the men, in each case a man

with considerable years of experience as indicated by his hash marks and campaign ribbons, gave the men a talk in his own words on why they should learn to eat survival foods such as grasshoppers. In each case the experimenter had spoken to the sergeant prior to the experiment, and given him a rough outline of a survival talk that could be utilized. The sergeants took to this quite naturally, and generally used the same format, beginning with a statement as to the situation that soldiers often get into in which they are not amply supplied when pinned down by the enemy or isolated, and why it is necessary for them to eat strange and unusual foods that they would not ordinarily eat. They then gave examples of situations in previous wars in which they had eaten strange foods, stating that this had been necessary for their survival. They then concluded by stating that the men were fortunate to have this chance to learn to eat some of these survival foods. They concluded their talk by eating a grasshopper.

The experimenter suggested the survival approach to the sergeants, but left it up to them to put it into their own words. This was done in order to make the leader influence condition, as a bench mark condition, as similar as possible to the manner in which influence attempts are normally made by NCO's to the men in the Armed Forces.

Condition E

There was no experimental manipulation in this condition, the subjects simply being told, after the statement quoted above that this was a voluntary experiment:

"Now go ahead and eat."

Dependent Variable Measures

Hedonic Scale

The Hedonic Scale, which is widely used in food research (see Peryam and Girardot, 1952) was administered both before and after the eating experience to obtain the subjects' attitudes towards eating grasshoppers. In essence, the Hedonic Scale is a nine-point rating scale ranging from dislike extremely to like extremely. It is scored by giving a value of nine to like extremely, a value of eight to like very much, etc., to a score of one for dislike extremely.

Grasshoppers Eaten

Data was obtained on the number of grasshoppers eaten by each subject.

Group Satisfaction Scale

The Group Satisfaction Scale is a twelve item, seven-point Likert-type scale with items such as "This is one of the most stimulating experiences I have had in a long time." This scale is very sensitive to ephemeral group feeling tones. Previous research (Smith, 1957) has demonstrated that this scale can easily differentiate between groups under high and low stress. The split-half reliability of the fifteen item group satisfaction scale (it was necessary to eliminate three items as non-relevant in the present study) was .93 on laboratory groups with an n of 102.

The validity of the Group Satisfaction Scale was established by the "known group" method (Roberts, et al, 1955).

Rating of Instructor

A seven-point Likert-type scale item was included, as follows: "The instructor was friendly and courteous." This item was used as an independent variable check to determine if the positive and negative communicator manipulation between Conditions A and B was successful.

Humor Rating

Each subject rated the group on a five-point humor scale.

RESULTS AND DISCUSSION

Rating of Experimenter

The experimenter was rated by all subjects on the item "the instructor was friendly and courteous" to determine if the experimental manipulation to produce a positive communicator in Condition A and a negative communicator in Condition B was effective.

The mean (average) rating of the experimenter was 6.85 in Condition A (n=20) and 6.40 in Condition B (n=20.) The critical ratio on this mean difference is 3.31 ($p < .01$). These results indicate that the experimental manipulation to produce a more favorable perception of the experimenter in Condition A than in Condition B was successful. However, it should be noted that the experimenter was rated positively in both conditions, as a seven-point scale was used. A mean rating of less than four would have indicated a negative perception of the experimenter.

Hedonic Scale

As the primary objective of the research was to determine the most effective methods for changing consumer attitudes, the primary data used in the analysis was the difference between the subjects rating of the grasshoppers before and after the various attitude change techniques. Subjects who refused to eat any grasshoppers did not rate them again and were scored zero on attitude change.

The mean attitude change scores as measured by the Hedonic Scale and t tests on these changes are presented in Table 1. The t tests on the change scores within each condition show a significant difference only for Condition E. The failure of the large mean change in Condition B to be significant is due to the small n in that condition. However, a one-way analysis of variance, or F test of the change score means in Table 1 was statistically significant ($F=3.99$, $p<.01$). The use of a t test based on the analysis of variance, utilizing the degrees of freedom and error estimates based on the entire sample, indicates that a statistically significant change did occur in Condition B compared to the other conditions. It is this later analysis, the test of the relative power of the various techniques, which we are interested in. The success or failure of any one technique is of theoretical importance, but for determining the best technique to use in a practical situation we are interested in the comparison of the various techniques with each other.

Condition B was significantly better than Condition A ($t=2.84$, $p<.01$), Condition C ($t=2.60$, $p<.05$) and Condition D ($t=3.24$, $p<.01$). Condition E was significantly better than Condition A ($t=2.12$, $p<.05$) and Condition D ($t=2.59$, $p<.05$).[1]

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[1]Subjects who refused the food in the dissonance conditions were eliminated from the analysis, as they did not undergo the experimental manipulation, but were included in the other conditions as they were subjected to the appropriate variable. As this differential elimination of subjects raises the question of artifactually favoring the dissonance conditions in the analysis, the data have also been analyzed eliminating those who refused the grasshoppers from all conditions. The results of this additional analysis are similar to

TABLE 1

t tests on Mean Change in Rating of Grasshoppers on Hedonic Scale Before and After Attitude Change Techniques

Condition	n	Pre Rating	Post Rating	Change Scores	t
A-Dissonance, Positive Communicator	19	4.05	4.68	0.63[a]	1.68
Subjects accepting inducement	19			0.63	
All subjects	20			0.60	
B-Dissonance, Negative Communicator	10	2.80	5.30	2.50[a]	2.21
Subjects accepting inducement	10			2.50	
All subjects	20			1.25	
C-Humor	20	2.85	3.65	0.80[a]	1.79
D-Leader Influence	19	4.58	4.95	0.37[a]	1.36
All subjects	19				
Refusing grasshoppers	2				
E-No Influence	17	3.24	5.06	1.82[a]	2.94 ($p < .01$)
All subjects	17				
Refusing grasshoppers	2				

[a]The F test on change score means is 3.99 ($p < .01$)

the previous analysis. The F test (one-way analysis of variance) is still significant at the .01, but a little smaller. The other significance levels are the same, except that: (1) Condition B is no longer significantly better than Condition C, as the t dropped from 2.60 to 1.89. (2) Condition E is now better than Condition D at the .01, as the t went from 2.59 to 2.68 (df=70).

These results support the hypothesis that a negative communicator will enhance cognitive dissonance and, therefore, produce greater attitude change than will a positive communicator. Studying the data in Table 1, we see that cognitive dissonance combined with a negative communicator has resulted in an attitude change of two and a half steps on the nine-point Hedonic Scale, which is a large enough change to have practical utility. The subjects in Condition B changed their attitudes toward grasshoppers as a food from slightly more negative than the dislike moderately step to a little on the positive side of the neutral point of the Hedonic Scale.

Although it was predicted that the negative communicator-dissonance technique would be more effective than the positive communicator-dissonance technique it was not expected that the results on the positive communicator dissonance technique would be so weak. However, though disappointing, the results are consistent with dissonance theory. The subjects apparently felt that there was considerable justification for eating the grasshoppers to please the experimenter, who was seen as a nice person as shown by the ratings, despite the fact that their attitudes were contrary to doing this. This analysis is supported by the fact that of the twenty men in Condition A, nineteen agreed to eat a grasshopper for fifty cents and one refused. In Condition B, however, ten agreed to eat the grasshopper for fifty cents and ten refused. If we analyze these figures in a two-by-two contingency table, we obtain a chi-square of 10.16 ($p < .01$). This supports the interpretation that the subjects felt much more strongly motivated to eat the grasshopper for fifty cents in Condition A than they did in Condition B. Consequently, if the subjects felt a greater inducement (fifty cents plus wishing to cooperate with a nice guy) to eat the grasshopper in Condition A than they did in Condition B it therefore follows from dissonance theory that it would be easier for the subjects in Condition A than in Condition B to explain their inconsistent behavior as due to less choice, or more justification, (the first method of reducing dissonance given on page 4), and therefore they felt less need to change their attitudes.

The data on humor are disappointing. It appeared from observation of the groups that the humor variable was not effective because the humor

was being induced from an obvious external source, and that as soon as the men turned to the unusual food they appeared to disassociate themselves completely from the external humor source, which then seemed irrelevant, and become completely involved in their decisions as to whether or not to eat the unusual food. To determine if internally generated humor which was related to the food problem would have the predicted effect of reducing anxiety and increasing the acceptance of an unusual food, the ratings by the subjects on the amount of humor present in their groups was used to rank order the groups across conditions in terms of the amount of humor present. These rankings of the groups on humor were then correlated with the average attitude change in the groups. This correlational test of the effectiveness of humor, utilizing the amount of humor being actually generated in the groups is probably a better test of the humor hypothesis, but the resulting correlation was essentially zero.

The success of humor at dissipating anxiety in the study by Smith and Goodchilds (1959), and its failure in this study, is probably due to the amorphous source of anxiety in the former study and its concrete source (the grasshoppers) in the present one. The grasshoppers couldn't be laughed away.

The relative ineffectiveness of the leader influence condition was surprising, particularly in view of the effective presentation, in the subjective opinion of the experimenter, made by the NCO's utilized in this condition. However, it will be shown later that the subjects in the leader influence condition ate more grasshoppers than did the subjects in other conditions. Apparently the men felt that it was consistent with the sergeants' role in their organizations for them to behave as he recommended, but they did not feel it was necessary for them to agree with him.

The most interesting result on the attitude change scores is that shown in Condition E, which was designed as the control condition. This was a no influence attempt condition in which it was expected that there would not be any significant change. Any ad hoc interpretation of this unexpected and unpredicted finding must be suspect, but the most likely explanation is that the men, like everyone else in our culture, have been subjected to so many attempts to change their attitudes

that they responded favorably to a situation in which they were exposed to a new attitude but with no pressure placed on them to accept it. They were told, in effect, that "this is a learning situation, do what you will with it." Under these circumstances they approached the unusual food open-mindedly and were persuaded in many cases by the logic of the situation, i.e., the need for soldiers to be prepared to accept survival foods. This explanation of these unexpected results is consistent with the refusal of the men in the leader influence condition to change their attitudes when a direct influence attempt was made by a superior. These results are also consistent with some research done by Torrance (1959).

It should be noted that the data presented in Table 1 on Conditions A and B includes only those subjects who met the design requirements for these conditions by agreeing to eat a grasshopper for the fifty cent inducement. This is the acceptable methodology in the research on cognitive dissonance cited above (or that on any other independent variable), as those who do not accept the inducement and behave as requested have not undergone the experimental manipulation (and presumably all subjects could be made to participate in the experiment by increasing the size of the inducement). Nevertheless, it is interesting to note that if the data on the subjects who did not qualify in Conditions A and B are included, the change score means are 0.60 (n=20) for Condition A and 1.25 (n=20) for Condition B. We now find that Condition B, while still superior to Conditions A, C, and D, is second to Condition E in effectiveness. And if we analyze these new data (the F test on these means, however, is not significant) the only t tests statistically significant are Condition E versus Condition A (t=2.20, p <.05) and Condition E versus Condition D (t=2.59, p <.05). These data reveal a serious limitation in cognitive dissonance techniques insofar as practical application is concerned. Although it is standard practice to eliminate from data analysis those subjects who did not in fact receive the experimental induction, and although this methodology

is quite appropriate for determining the validity of cognitive dissonance as a theoretical concept, the elimination of the subjects who did not accept the inducement is quite another matter when considering cognitive dissonance techniques as useful methods in an applied situation. If we wish to use dissonance techniques to change the attitudes of a group of consumers, we must usually deal with the entire population, and cannot discard from our analysis those who will not accept a given inducement. Thus for evaluation as an applied technique, it would seem appropriate for us to consider the mean attitude change for Condition B as 1. 25, which includes half the subjects in that condition who refused the inducement, rather than the 2. 50 mean attitude change given in Table 1. Of course, it is always possible to increase the size of the inducement to the point where all or nearly all the subjects will accept the inducement and therefore be affected by cognitive dissonance. However, the greater the inducement used to obtain the inconsistent behavior, the weaker the cognitive dissonance becomes and the less attitude change will be obtained. These findings on cognitive dissonance as it would be used in an applied situation are more complicated than anticipated, and further data and discussion will be presented on this point later.

Additional revealing information can be obtained from the attitude change scores on the Hedonic Scale if we divide the pre-Hedonic rating scores at the mean into a high group (pre-rating of 4 or more) who were initially more favorable toward the grasshoppers, and a low group (pre-rating of 3 or less) who were initially more negative. We now find that the low (most negative) group has a mean attitude change of 2. 08, compared to a mean attitude change of 0. 18 for the high group. The critical ratio on this mean difference is 5. 64 ($p < .01$). [1] This finding, that those whose original

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[1] The greater attitude change of those whose original attitude was most negative raises the question of whether or not the marked attitude change in Condition B was due to this effect. To test this possibility, the unsuccessful conditions (A, C, and D) were combined, and subjects with high pre-Hedonic scores discarded, by random, until 41 cases with a pre-Hedonic Scale mean of 2. 80 (identical to Condition B) remained. These 41 cases have a higher change score mean (0. 93) than before the high pre-score subjects were discarded (see Table 1). However, comparison of this change score mean with that obtained in Condition B (using White's nonparametric rank test,

position was most distant from that advocated in the communication were those most influenced by the communication has been previously demonstrated (see Zimbardo, 1960, for discussion and references). This result is a rather useful and encouraging one from an application viewpoint. Apparently those consumers who are originally most negative are those most susceptible to attitude change techniques, and in fact are the only ones likely to change as a result of attitude change attempts. This would suggest that the Army should not shy away from attempting to change the attitudes of those most negative, which is a common tendency, and in fact should concentrate on the most negative group.

Grasshoppers Eaten

Analysis of the data on the number of grasshoppers eaten across conditions, presented in Table 2, was complicated by extreme skewing in some conditions, as a result of which parametric statistics were inappropriate. It was also necessary to combine the subjects who ate zero grasshoppers and the subjects who ate one grasshopper into a single category, to avoid an artifact, as subjects in the cognitive dissonance Conditions A and B were required to eat one grasshopper (for fifty cents) in order to qualify for inclusion in these experimental conditions.

One obvious difference between the experimental conditions in Table 2 is the larger number of subjects eating two or more grasshoppers in Condition D than in the other conditions. If Table 2 is reduced to a two-by-two contingency table so that we can compare Condition D to all other conditions combined, we obtain a chi-square of 8.02 ($p < .01$). This indicates that that the subjects in the leader influence condition ate significantly more grasshoppers than did subjects in the other conditions. This result must be viewed with skepticism, however, as we are not able to test Table 2 in its entirety (due to low expected frequencies), and have selected out one of many possible comparisons for a statistical test. However, the data tell us

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as the elimination of cases produced heterogeneous variances) results in a z of 2.11, significant at the .05 level.

TABLE 2

Number and Percent of Subjects Eating One or Zero or Two or More Grasshoppers under Five Conditions

Condition	n	Eating Zero or One		Eating Two or More	
		Number	Percent	Number	Percent
A-Dissonance, Positive Communicator	19	16	84.2	3	15.8
B-Dissonance, Negative Communicator	10	9	90.0	1	10.0
C-Humor	20	20	100.0	0	0.0
D-Leader Influence	19	11	57.9	8	42.1
E-No Influence	17	14	82.4	3	17.6

that the men responded to the exortations of their sergeant to eat grasshoppers by eating them, although as we see in Table 1 on the attitude change scores they did not change their mind about liking them. This result should not be surprising, and suggests that the leader influence technique is a very effective way for obtaining behavior while the leader is present, which may be sufficient for some purposes. However, leader influence by direct influence attempts may not be the best method if we wish to change the attitudes of individuals so that they will behave differently when the leader is no longer present.

Group Satisfaction Scale

The Group Satisfaction Scale was included to determine if any of the influence techniques would produce a negative group reaction, as one of the research objectives was to determine which attitude change techniques would be compatible with the military situation. It would not be appropriate to recommend techniques which would produce a

serious negative reaction.

It is apparent from Table 3 that this need not be a concern, as the successful attitude change techniques used in Condition B and Condition E produced relatively favorable ratings.

TABLE 3

Mean Scores on the Group Satisfaction Scale
Under Five Conditions

Condition	n	Mean
A-Dissonance, Positive Communicator	20	50.70
B-Dissonance, Negative Communicator	20	56.60
C-Humor	20	49.60
D-Leader Influence	19	57.95
E-No Influence	17	62.59

F test on these means is 5.37 ($p < .01$)

The F test on the means in Table 3 is 5.37 ($p < .01$). Condition E is significantly better than Condition C ($t=3.94$, $p < .01$), and significantly better than Condition A ($t=3.61$, $p < .01$). Condition D is significantly better than Condition C ($t=2.61$, $p < .05$) and significantly better than A ($t=2.27$, $p < .05$). Condition B is significantly better than Condition C ($t=2.22$, $p < .05$). The high satisfaction with the situation expressed by the men in Condition E, the no influence condition, is consistent with the interpretation that the men responded very favorably

to the lack of direct attempts to influence them, and consequently not only enjoyed the situation more but felt free to consider the unusual food with an open mind. The high satisfaction expressed by the men in the leader influence condition at first appears inconsistent with the failure of this condition to produce significant changes in attitude, but probably reflects the greater comfortableness the men felt at being in a situation in which authority was shared by sergeants whom they knew, whereas the other groups had to adjust to a strange civilian scientist. The relatively high satisfaction expressed by the men in Condition B is consistent with dissonance theory, as the outstanding characteristic of this condition, which produced considerable attitude change, was the high feeling of choice the men had in this condition. They could eat or not eat the grasshopper as they chose. This is borne out by the significant difference discussed above in the number of men choosing to eat one grasshopper in Condition B as compared to Condition A. In fact, this evidence of high choice in Condition B is also evidenced by comparing the number (ratio) who refused to eat any grasshoppers in this condition with the number who refused in all other conditions. The chi-square on this analysis is 11.69 ($p < .01$), indicating that significantly fewer ate one grasshopper in Condition B than in all other conditions. The high choice in Condition B resulted in high dissonance and therefore considerable attitude change if the man chose to eat the grasshopper, and also produced a feeling of comfortableness and satisfaction in the situation.

CHAPTER 3: THE IRRADIATED MEAT EXPERIMENT

OBJECTIVES

The objectives in the second experiment were as follows:

1. To cross-validate the unexpected finding in the first experiment that a no influence attempt was an effective technique for increasing positive attitudes toward unusual foods.
2. To determine if the no influence attempt method was most effective with or without the presentation of a rationale for accepting the food. This determination was necessary because in the grasshopper experiment a rationale (i.e. the utility of learning to eat survival foods) had been presented to all groups, including the no influence or control condition.
3. To determine if the cognitive dissonance technique would be effective without the negative communicator variation.
4. To determine if results similar to the grasshopper experiment could be obtained with another unusual food.

HYPOTHESES

The hypotheses tested in the second experiment were as follows:

1. It was hypothesized that cognitive dissonance would produce an increased positive attitude towards eating irradiated meat sandwiches.

2. It was hypothesized that by exposing the men to the irradiated meat and allowing them to eat it or not eat it as they chose (no influence attempt), they would develop a more positive attitude toward eating irradiated meat.

3. It was predicated that both the dissonance and no influence attempt techniques would be superior to the leader influence technique.

METHODOLOGY

Subjects

The subjects were 81 men in the Army Reserve obtained from units attending evening meetings at the U. S. Army Reserve Center in Van Nuys, California, and at the U. S. Army Reserve Center, West Los Angeles, California. The men were primarily privates with a sprinkling of NCO's and one second lieutenant. Eight groups of about ten men each were used.

As in the grasshopper experiment, the men in any one group were usually from the same unit, but the groups were very heterogeneous in terms of their Army function. After the experimenter had obtained the approval of the unit's commanding officer, the officer would assign his first sergeant to obtain "volunteers" for the experimenter.

Food

The food used in this experiment was sandwiches. The sandwiches were made with fresh white bread, all-beef bologna, and margarine. The sandwiches were cut into four square quarters, with either a red or green toothpick inserted in them. Half these sandwiches had green toothpicks and were described as plain bologna sandwiches, and half the sandwiches had red toothpicks and were described as irradiated bologna sandwiches. All the meat was the same and none of it was irradiated. Half of the "irradiated" and half of the "non-irradiated" sandwiches had mustard on them. This food was selected as it permitted us to deal with a pure attitude, as well as a potential innovation in a Quartermaster supply item. The food was easy to prepare and serve in an experimental situation, and it was easy to count the number of sandwiches eaten. Irradiated meat had the further advantage of providing a very plausible rationale for the experiment, where appropriate, by explaining the advantages for the Army of using meat that could be kept from spoiling without being canned or refrigerated.

Experimental Design

There were four experimental conditions, with two groups assigned at random to each condition. The four conditions were as follows:

Condition A - Cognitive Dissonance

Condition B - No Influence Attempt

Condition C - Leader Influence

Condition D - No Influence Attempt, Rationale

The experiment was conducted at night using men attending the Army Reserve meetings. In general, as in the grasshopper experiment, two groups were run a night, with the first group coming in after their drill and the second group being run after the first group. The men were brought in by a sergeant and were seated around a large wooden table in the kitchen of the U. S. Army Reserve Center in Van Nuys, California, or around some smaller wooden tables placed together in the rifle range at the West Los Angeles Reserve Center. The groups were used between 7:30 P. M. and 9:00 P. M. when the men were neither very hungry or completely satiated

Throughout the experimental period fresh coffee was available and the men helped themselves to it. The experimenter introduced himself, gave a brief introduction to the experiment, and had them fill out the first page of the questionnaire. The experimental variation was then introduced, and they were then allowed to eat the sandwiches. After they had finished eating they finished the questionnaire. The experimenter then thanked them for their cooperation, asked them not to discuss the experiment with other men, and excused them. The experiment took about forty minutes.

In all groups and conditions, the experiment was begun by the experimenter reading the following statement:

> "Good evening. I'm Dr. Smith, and I am doing research for the Quartermaster on food attitudes. Tonight we are going to find out what your attitudes and reactions are towards eating irradiated meat -- that is, meat that has been exposed to atomic energy. Irradiated meat does not hurt people in any way. It does not have any effect on people in any way, though it sometimes tastes a little different. However, this taste difference is not easy to detect."

At this point, the experimenter handed out questionnaires, which were anonymous, and asked each subject to fill out the first page of the questionnaire, which was a rating scale on attitudes toward eating irradiated meat. When all subjects had finished filling out the first page of the questionnaire, the experimenter read the following statement to every group in every condition:

> "This is a voluntary experiment. No one has to eat the irradiated meat if they don't want to. The irradiated bologna sandwiches are the ones with red toothpicks in them. The plain bologna sandwiches have green toothpicks in them. Both kinds are all-beef bologna."

At this point, the instructions and procedures varied according to the experimental condition, as follows:

Condition A

In this condition, the experimenter now said:

> "In order to get as many people as possible to try the irradiated meat, I will pay fifty cents right now to everyone who will eat one irradiated meat sandwich."

At this point the experimenter took out a handful of quarters and paid everyone fifty cents who ate one irradiated meat sandwich.

Condition B

There was no manipulation in this condition.

Condition C

In this condition the experimenter now said:

> "Sergeant _____ now has a few words to say."

At this point, the groups' sergeant gave a talk on why the men

should sample and learn to like irradiated meat. As in the grasshopper study, the sergeants were given a rationale for the talk by the experimenter, i.e., the need for the new Army units to be able to travel light and fast, be willing to eat new foods and use modern equipment, etc. However, the sergeants gave this talk in their own words.

Condition D

In this condition the experimenter now read the following statement:

> "The reason for irradiating meat is so that it can be stored and kept good to eat without refrigerating it or canning it. Irradiated meat is one of the new foods the Army is experimenting with because it will keep in the field. The Army wants to know how the men feel about new, different, or unusual foods, like irradiated meat, because the new Army will consist of smaller, more mobile units than we had in past wars. These new units will be more on their own, and will move faster and more often than they did before. They won't have a lot of support personnel and big field kitchens, as this would slow them down.
>
> This means that the Army will have to learn to eat new foods in the field, foods that are easy to carry and easy to keep without refrigeration, like irradiated meats, if they want to survive.
>
> Tonight you can try one of these new foods if you want to."

After the independent variable induction, the following statement was then read to all groups in every condition:

> "Now go ahead and eat. The limit is eight sandwiches per person, four of each kind. Please keep track of how many you eat of each kind."

After the men had finished eating, they completed the questionnaire.

Dependent Variable Measures

The dependent variable measures used in the irradiated meat experiment were as follows:

Comments

Space was provided on the questionnaire for comments on the food.

Hedonic Scale

The Hedonic Scale, which is widely used in food research (e.g. Peryam and Pilgrim, 1957) was administered both before and after the eating experience to obtain the subjects' attitudes towards eating irradiated meat. In essence, the Hedonic Scale is a nine-point rating scale ranging from dislike extremely to like extremely. It was scored by giving a value of nine to like extremely, a value of eight to like very much, etc., to a score of one for dislike extremely.

Sandwiches Eaten

Data was obtained on the number of "plain" and "irradiated" sandwiches eaten by each subject.

RESULTS AND DISCUSSION

Comments

There were no comments on the sandwiches by twenty-two, or twenty-seven percent of the subjects. Of those responding, thirty-

three, or sixty percent said they could detect no difference between the irradiated and non-irradiated meat. (The experimenter had stated, it will be recalled, that " . . . this taste difference is not easy to detect.") Twenty-two, or thirty-seven percent of those commenting detected a difference. Those detecting a difference made such comments as: "Irradiated meat had a little strong taste but was good;" and "Irradiated meat tasted stronger and had a slightly metallic taste. Irradiated meat tasted better."

Hedonic Scale

As the primary objective of this experiment, like the grasshopper experiment, was to determine the most effective methods for changing consumer attitudes, the primary data used in the analysis was the difference between the subjects' rating of the irradiated meat before and after the various attitude change techniques. Subjects who refused to eat any irradiated meat sandwiches did not rate them again, and were scored zero on attitude change.

The mean attitude change scores, as measured by the Hedonic Scale, are presented in Table 4.

We see from the dependent t tests on the attitude change scores that there was a statistically significant improvement in attitude towards eating irradiated meat in every condition. This is in contrast to the grasshopper experiment where most techniques were unsuccessful. Of the three unsuccessful techniques in the grasshopper study, two were not repeated (the use of humor, and the positive communicator using cognitive dissonance). However, the leader influence technique was repeated, and this time had a slightly greater effect (mean change of 0.83 vs. 0.37), which change is now statistically significant. The reason for this improvement is not apparent, but may be due to the fact that the meat wasn't really irradiated and on trying

it, to please the sergeant, the subjects found there wasn't anything wrong with it.

TABLE 4

t Tests on Mean Change Scores in Rating of Irradiated Meat on Hedonic Scale Before and After Attitude Change Techniques

Condition	n	Pre Rating	Post Rating	Change Scores	t
A-Dissonance	20	5.05	5.95	0.90	2.20 ($p<.05$)
All subjects	20				
Refusing irradiated meat sandwich	0				
B-No Influence	23	4.91	6.65	1.74	3.21 ($p<.01$)
All subjects	23				
Refusing irradiated meat sandwich	0				
C-Leader Influence	18	5.28	6.11	0.83	2.70 ($p<.05$)
All subjects	18				
Refusing irradiated meat sandwich	4				
D-No Influence, Rationale	20	4.10	6.15	2.05	3.28 ($p<.01$)
All subjects	20				
Refusing irradiated meat sandwich	0				

The F test on change score means is 2.74 ($p<.05$)

As the objective of this research was to find the most powerful attitude change techniques which could be used for practical application, further analysis is needed to compare the relative power of the various techniques. An F test on the change score means in Table 4 was statistically significant

($F = 2.74$, $p < .05$). An analysis of the mean change scores by t tests indicated that Condition D, the no influence technique with a rationale for eating irradiated meat, was significantly better than Condition A, the dissonance technique, and significantly better than Condition C, the leader influence technique (the t's were, respectively, 2.21, $p < .05$ and 2.28, $p < .05$). These results support the findings in the grasshopper experiment on the effectiveness of the no influence attempt technique. It will be recalled that in the grasshopper experiment a rationale had been given as to why grasshoppers should be considered as a food to all conditions and, therefore, the rationale was present in the no influence condition. We see again with the irradiated meat that the no influence attempt with the rationale is an effective attitude change technique. It was not only superior to the other conditions, but was consistently effective in both experiments. The marked improvement in attitude shown in Table 4 for the no influence attempt plus a rationale is certainly large enough for the technique to have practical value. It also has the advantage, unlike the dissonance technique, of being applicable to the total group rather than only to those who will respond to an inducement.

The results on Condition C, the leader influence technique, are again unimpressive in terms of relative attitude change. Although we cannot explain with certainty the improvement of the technique in absolute power, the fact that the technique is not consistent and is always relatively weak limits its applicability.

The disappointment in this experiment is the failure of Condition A, the cognitive dissonance technique, relative to the no influence attempt techniques. Condition A in this experiment was designed to test the effectiveness of dissonance without the addition of the negative communicator, which would be a more palatable technique in an applied situation. The data suggests that the relative failure of Condition A in the meat experiment was due to the same factor that produced the complete failure of the positive communicator-dissonance technique in the grasshopper experiment. The irradiated meat sandwiches, as indicated by the pre-ratings in Table 4, were not as negative a food as the grasshoppers. Consequently, the fifty cent inducement to eat an irradiated meat sandwich was a larger inducement (relative to the resistance

to eating the irradiated meat sandwich) than was the fifty cent inducement in the grasshopper experiment. As the inducement was relatively stronger, the subjects must have experienced a feeling of greater justification and less choice for eating an irradiated meat sandwich than they did for eating a grasshopper (see the discussion on means of reducing cognitive dissonance, page 4) and consequently felt less need to change their attitudes. This reasoning is borne out by the fact that every subject in the dissonance condition accepted the fifty cent inducement to eat an irradiated sandwich, whereas in the grasshopper experiment, in the successful negative communicator-dissonance condition, only half the men ate a grasshopper, and in the positive communicator-dissonance condition, which did not produce enough dissonance to produce a significant change in attitude, one man refused to eat a grasshopper.

This failure of the dissonance technique to produce a substantial amount of attitude change when the inducement used to produce the inconsistent behavior was sufficiently powerful so that the entire population participated is clear cut evidence of the problems in successful use of dissonance techniques in an applied situation. If a small, barely over threshold inducement is used so that the subjects will experience high phenomenological choice and low justification for their inconsistent behavior, which is necessary for attitude change with dissonance techniques, a large percentage of the recipients will not participate. If, on the other hand, the inducement is sufficiently large to cause everybody to participate, many will feel low choice and high justification for their inconsistent behavior, and the amount of attitude change will not be impressive. This, then, clearly supports the interpretation made in the discussion of the grasshopper experiment that dissonance techniques are a powerful means of producing attitude change if it is not necessary to produce a change in the entire recipient population. If, however, the success of the technique is to be judged on the basis of the average attitude change of the entire population used, then the no direct influence attempt technique, with a rationale, is superior to the dissonance techniques that were

used in these two experiments.

If the subjects are divided on the pre-Hedonic Scale according to how negative their pre-experimental attitudes were towards eating irradiated meat, as was done in the grasshopper experiment, we have nineteen subjects in a low or more negative group whose pre-Hedonic scores were below the mean, and sixty-two in a high or more positive group whose pre-experimental scores were above the mean. The mean of the change scores for the low or originally more negative group was 3.10, whereas the mean of the change scores for the originally high or more positive group was 0.89. The critical ratio on this mean difference is 5.01 ($p < .01$), which supports the finding in the grasshopper experiment, and that of other researchers, that those whose attitudes are originally most negative are most susceptible to attitude change. This finding was discussed in the grasshopper experiment and will be elaborated on again in Chapter 5.

Eating Behavior

The number and percent of subjects eating zero, one, or two or more "irradiated" meat sandwiches is presented in Table 5. Probably the most interesting data in this table are the small number of individuals, overall, who refused to eat any irradiated sandwiches.

The interesting differences in Table 5, by experimental condition, are the relatively large number of subjects in Condition C, compared to the other conditions, who refused to eat any sandwiches. If we compare Condition C with all other conditions on the number of subjects who would not eat any irradiated meat sandwiches we obtain a chi-square of 10.37 ($p < .01$). This result is suspect, of course, as we have again, as in Table 2 on the number of grasshoppers eaten, selected one of many possible comparisons for statistical test. However, the relatively large number of men refusing to eat any of the

sandwiches in this condition is consistent with the relative ineffectiveness of the leader influence technique at producing attitude change.

TABLE 5

Number and Percent of Subjects Eating Zero, One, or Two or More "Irradiated" Meat Sandwiches

Condition	n	Ate Zero		Ate One		Ate Two or More	
		No.	%	No.	%	No.	%
A-Dissonance	20	0	0.0	2	10.0	18	90.0
B-No Influence	23	0	0.0	9	39.1	14	60.9
C-Leader Influence	18	4	22.2	5	27.8	9	50.0
D-No Influence, Rationale	20	0	0.0	6	30.0	14	70.0
TOTAL	81	4	4.9	22	27.2	55	67.9

The poor showing of the leader influence technique on the number of men eating "irradiated" meat is not consistent, however, with the grasshopper experiment where the men ate more grasshoppers in the leader influence condition than in any other. The reason for this difference is not clear from the data and may be due to chance.

CHAPTER 4: THE INSTANT COFFEE EXPERIMENT

OBJECTIVES

The objectives in the third experiment were as follows:

1. To determine if the use of two sizes of inducement would allow cognitive dissonance techniques to be used on a larger portion of the recipient population than were effected in the previous experiments. It will be recalled that in the grasshopper experiment cognitive dissonance had a very powerful effect in terms of attitude change on those participating in the experiment, but that it was only possible to involve half of the population by the use of a one level inducement (i.e. fifty cents) to eat a grasshopper. The primary objective of the present experiment was to determine if a two level inducement could be used which would induce a larger portion of the recipient population to participate, and at the same time maintain the inducement at a level just over the threshold necessary to produce behavior, so that maximal dissonance would be produced.

2. To determine if cognitive dissonance techniques would be able to produce attitude change towards instant coffee. Whereas the grasshoppers and "irradiated" meat used in the previous studies were useful foods from an experimental standpoint, the negative attitude on the part of many Armed Forces personnel towards instant coffee is a practical and expensive problem. The secondary objective of this experiment was, therefore, to determine if cognitive dissonance techniques would work with a real food attitude problem, e.g. instant coffee, as well as they had with exotic experimental foods.

HYPOTHESES

The hypotheses tested in the third experiment were as follows:

1. It was hypothesized that using a two level inducement to produce behavior inconsistent with the attitude to be changed would increase the number of subjects effected by the technique without decreasing the amount of cognitive dissonance produced in the subjects.
2. It was hypothesized that cognitive dissonance techniques would produce an increased positive attitude towards instant coffee.

METHODOLOGY

Subjects

The subjects were sixty-four men in the Army Reserve obtained from units attending Sunday meetings at the U.S. Army Reserve Center in North Hollywood, California. The men were primarily privates, with a sprinkling of NCO's. Six groups of about ten men each were used.

As in the previous experiments, the men in any one group were usually from the same unit, but the groups were drawn from both Quartermaster and Infantry companies.

Coffee

The coffee used was instant Nescafe which was purchased at a retail food market and emptied into a large glass jar marked with a label indicating that it was a Quartermaster item. The men measured

the instant coffee themselves into paper cups, obtained hot water from a hot water urn, and could add cube sugar and half and half (cream) and mix with wooden spoons if they wished.

Experimental Design

There were three experimental conditions, with two groups assigned at random to each condition. The three conditions were as follows:

Condition A - Cognitive dissonance, one inducement level

Condition B - Cognitive dissonance, two inducement levels

Condition C - Leader Influence

The experiment was conducted on Sunday mornings, using men attending the Army Reserve meetings. Three groups were run on each of two Sundays. The men were delivered to the experimenter by a sergeant, and were seated in desk arm chairs in a circle in a classroom at the North Hollywood Reserve Center. The experimenter handed out the questionnaires, and had them fill out the first page. The experimenter then introduced himself and gave a brief introduction to the experiment. The subjects were then told that the coffee was ready and asked to fix themselves a cup. While they were drinking their coffee the experimental variation was introduced. They were then asked to complete the questionnaire. After all the men had completed the questionnaire, they were thanked for their cooperation, asked not to discuss the experiment with other men, and were excused. The experiment took about twenty minutes.

In all groups and conditions, the experiment was begun by the experimenter handing out the questionnaires and asking the men to fill out the first page. The first page of the questionnaire obtained data on the men's names, ages, ranks, and Army Units. In addition,

it contained a Hedonic Scale for obtaining their attitudes towards instant coffee. After all the men had filled out the first page of the questionnaire, the experimenter read the following statement:

> "I am Dr. Smith, and I am doing research for the Quartermaster on food attitudes. Today we are going to find out what your attitudes and reactions are towards the Quartermaster's new instant coffee."

After reading this statement, the experimenter told the men that the water was ready and suggested that they fix themselves a cup of coffee. It was explained to them that a measuring spoon was provided that would provide the right amount of coffee for a normal cup, but that the cups were extra large and that they should add in a little extra coffee if they filled their cup all the way.

After the men had fixed themselves a cup of coffee and returned to their seats variations were introduced according to the experimental condition as follows:

Condition A and B

At this point, the experimenter passed out sheets with the following information on them to each subject:

> "QM PROMOTION INFORMATION
>
> I have tasted the Quartermaster's new instant coffee and like it better than regular coffee. I think it is excellent coffee, and I think the Quartermaster should use it instead of regular coffee for the whole army.
>
> Signed_____
>
> Army Unit_____"

The experimenter then read the following statement:

> "The Quartermaster would like to have the signed statements of soldiers who prefer their new instant coffee so that they can use the statements in trying to get the men to accept instant coffee. You do not have to sign the statements if you do not want to. I will pay twenty-five cents right now to every man who will sign one of these statements for use by the Quartermaster. These are to be used as testimonials."

At this point the experimenter took out a handful of quarters and paid everyone twenty-five cents who signed one of the statements and handed it to the experimenter.

Condition B

In this condition the experimenter now said:

> "I will now pay fifty cents to anyone who will now sign the statement. That is as high as I can go."

At this point the experimenter paid fifty cents to each man who had previously refused to sign the statement who signed it and handed it to the experimenter. After these new testimonials had been received, the experimenter said that to be fair he would now give an extra twenty-five cents to all those who had first signed the statement for just twenty-five cents and he handed out the additional quarters.

Condition C

In this condition the experimenter now said:

> "Sergeant _____ now has a few words to say."

At this point, an NCO who had been suggested by the unit's commander as most likely to be able to persuade the men to change their attitudes gave the men a few minutes talk on why they should

learn to use and accept instant coffee. The experimenter had previously discussed this with the sergeant and had suggested that he point out that the new Army units must accept new, light-weight rations needing little equipment for preparation so that they can travel light and fast in the atomic age in order to survive. The sergeant appeared to do a good job of putting this rationale into his own words and tying it into what the men knew about the new emphasis in the Army on mobility and weight reduction.

At this point, all the men were asked to finish filling out the questionnaires while they drank their coffee.

Dependent Variable Measures

The dependent variable measures used in the instant coffee experiment were as follows:

Hedonic Scale

The Hedonic Scale, which is widely used in food research (e.g. Peryam and Pilgrim, 1957) was administered both before and after the subjects had had instant coffee and underwent the appropriate experimental variable. In essence the Hedonic Scale is a nine-point rating scale ranging from dislike extremely to like extremely. It was scored by giving a value of nine to like extremely, a value of eight to like very much, etc., to a score of one for dislike extremely. Specifically, the scale used stated:

> "Please indicate how well you like the Army's instant coffee by making one check on the scale below:"

Perceived Pressure

Each subject was asked to make a check on the following scale:

"Please indicate how much pressure the instructor put on you to change your attitude towards instant coffee (make you like it better) by checking one of the statements below:

_____ The instructor did not attempt to change our attitudes
_____ The instructor used a little pressure to try and change our attitudes
_____ The instructor used alot of pressure to try and change our attitudes."

Group Satisfaction Scale

The Group Satisfaction Scale, administered to each subject, is a thirteen item, seven-point Likert-type scale with items such as "This is one of the most stimulating experiences I have had in a long time." This scale is very sensitive to ephemeral group feeling tones. Previous research (Smith, 1957) has demonstrated that this scale can easily differentiate between groups under high and low stress. The split-half reliability of the fifteen item Group Satisfaction Scale (it was necessary to eliminate two items as non-relevant in the present study) was .93 on laboratory groups with an $\underline{n}$ of 102. The validity of the Group Satisfaction Scale was established by the "known group" method (Roberts, et al, 1955).

RESULTS AND DISCUSSION

Hedonic Scale

As the primary objective of this experiment, like those reported above, was to determine the effectiveness of various methods for changing consumer attitudes, the primary data used in the analysis was the difference between the subject's rating of instant coffee before and after the various attitude change techniques.

The mean attitude change scores, as measured by the Hedonic Scale, are presented in Table 6.

TABLE 6[1]

t Tests on Mean Change Scores in Rating of Instant Coffee on Hedonic Scale Before and After Attitude Change Techniques in Each of Four Conditions

Condition	*n*	Pre Rating	Post Rating	Change Scores	*t*
A- Dissonance, One Inducement (Small)	24	5.46	7.38	1.92	3.66 ($p < .01$)
B_{25} -Dissonance, Two Inducements (Small Accepted)	7	5.43	7.57	2.14	2.22
B_{50} -Dissonance, Two Inducements (Large Accepted)	3	3.00	4.67	1.67	1.13
C- Leader Influence	19	4.90	5.37	0.47	1.20

F test on change score means is 3.56 ($p < .05$)

[1] It will be noted that 64 subjects are given on page 46, but only 53 are accounted for in Table 6. This is due to the discarding of 8 subjects in Condition A and 3 in Condition B_{50} who refused to sign the testimonial for the reward and were not, therefore, subjected to dissonance.

We see in Table 6 that the data have been analyzed in four conditions. The largest n is in Condition A. Although the design called for two groups in each condition, the first group allocated at random to Condition B has been assigned to Condition A for data analysis, as in this group everyone accepted the twenty-five cent inducement to sign the "Quartermaster Promotion Information" and, therefore, it was not possible to utilize the fifty-cent inducement variation in this group. In the second Condition B group, those who accepted the twenty-five cent inducement have been placed in the B_{25} condition, and the members of this group who refused the twenty-five cent inducement to sign the "Quartermaster Promotion Information" but who agreed to sign it for fifty cents have been placed in the B_{50} condition. Two groups were in the leader influence condition, one of nine men and one of ten men.

Analysis of the change scores on attitudes towards instant coffee in each condition by dependent t tests revealed a statistically significant change in condition A only, as can be seen in Table 6. Actually, however, a slightly larger mean change occurred in Condition B_{25}, with a t of 2.22, but due to the small n in this condition it was not statistically significant.

As the primary objective of this research was to find the most powerful attitude change techniques which could be used for practical application, further statistical analysis is needed to compare the relative power of the various techniques. This has been done by the use of a one-way analysis of variance on the change score means in Table 6, and by t tests utilizing the error estimate obtained in the analysis of variance. These t tests allow the use of a more accurate error estimate and a larger number of degrees of freedom. This method permits a better test of Conditions B_{25} and B_{50}, where the n is too small for powerful analysis by the use of dependent t tests.

Analysis by this method reveals that there are significant differences between the change score means, with an F of 3.56 ($p < .05$). The use of t tests following the one-way analysis of variance reveals that Condition A produced significantly greater changes on the Hedonic Scale than did Condition C, with a t of 2.96 ($p < .01$), and that Condition B_{25} produced significantly more change on the Hedonic Scale than did Condition C, with a t of 2.37 ($p < .05$). There were no other significant differences. These results again indicate the power of dissonance techniques for changing food attitudes, in this case towards instant coffee. However, the primary objective of this experiment, to attempt to develop and evaluate a technique for increasing the range of dissonance techniques, has not been unequivocally accomplished. The use of the two step inducement to increase the number of subjects participating and therefore susceptible to dissonance techniques caused half of the six individuals refusing to participate. The data on these individuals, presented in Table 6 as Condition B_{50}, indicates considerable attitude change on the Hedonic Scale but less than that which occurred in the other dissonance conditions, and the change is not statistically significant. This lack of statistical significance may or may not be due to the small n in this condition, and the results must be considered inconclusive. Although the use of the two step inducement did cause half of those previously refusing to participate, the actual increase was only twenty-three percent of the total population involved, and even if this had produced significant differences it is questionable whether this slight increase in the percentage of the population susceptible to the technique would be worth the greatly increased administrative effort involved in the use of the two step dissonance method. Apparently it is still necessary to point out, as was done after the first experiment, that cognitive dissonance is a powerful technique for changing consumer attitudes, but that it does not involve the total target population. We have not

as yet demonstrated a method for increasing the range of the technique. Further research is obviously needed in this area.

However, one of the problems anticipated with the use of a two-step inducement appears to have been unfounded. It was feared that the use of the larger inducement in an attempt to induce the holdouts to participate would cause those who had originally participated for the lower inducement to feel less dissonance, because of feeling that they would have been in effect forced to participate anyway due to the larger reward that would have been offered had they refused. It was thought that this after-effect might reduce the feeling of choice, and therefore reduce the experience of dissonance in those accepting the first or smaller inducement in a two-step inducement situation. That this did not in fact occur is seen in Table 6, where the mean attitude change is in fact larger in Condition B_{25} than Condition A, and where we have shown a relatively large and statistically significant attitude change in Condition B_{25} as compared to the leader influence condition.

If the subjects are divided on the pre-Hedonic Scale according to how negative their pre-experimental attitudes were towards the Army's use of instant coffee, as was done in the two previously reported experiments, we have sixteen subjects in a low or more negative group whose pre-Hedonic scores were below the mean and thirty-seven in a high or more positive group whose pre-experimental scores were above the mean. The mean of the change scores on the Hedonic Scale for the low or originally more negative group was 2.44, and the mean of the attitude change scores for the originally high or more positive group was 0.97. The critical ration on this mean difference is 2.96 ($p < .01$), which supports the finding in the two previous experiments, and that of other researchers, that those whose attitudes are originally most negative are most susceptible to attitude change techniques.

Felt Pressure

The data on how much pressure the subjects felt was used on them to change their attitudes towards instant coffee are presented in Table 7.

TABLE 7

t Tests on the Mean Amount of Pressure on Them to Change Their Attitudes Reported by Subjects in Four Conditions

Condition	n	Mean	t
A - Dissonance, One Inducement (Small)	24	1.46	A and C, 3.00 ($p < .01$)
B_{25} - Dissonance, Two Inducements (Small Accepted)	7	1.14	
B_{50} - Dissonance, Two Inducements (Large Accepted)	3	2.00	B_{50} and C, 3.43 ($p < .01$) B_{50} and B_{25}, 2.79 ($p < .01$)
C - Leader Influence	19	1.05	

F test on means is 5.69 ($p < .01$)

Contrary to our expectations, we see in Table 7 that the subjects in the dissonance conditions felt that more pressure was placed upon them to change their attitudes than was true of the leader influence condition. It had been anticipated that the high choice necessary for dissonance techniques to work would result in a feeling of low pressure. However, it is apparent from the data that the subjects recognized that pressure was being placed upon them, although in a sense the subjects had free choice as to whether or not to accept the pressure

(when they decided whether or not to accept the inducement).

An interesting piece of data is the high amount of pressure felt by the subjects in the B_{50} condition. This unusually high experience of pressure, relative to the other conditions, suggests that the B_{50} condition, which we were unable to evaluate as to attitude change, may not have been successful. Such a high degree of pressure as indicated by the mean presented in Table 7 for the B_{50} condition would suggest that the degree of choice felt may have been rather low, as the subjects may have perceived that the inducement would be increased in size until they were, in effect, pressured into accepting it. This suggests that the increased size of inducement used in Condition B_{50} would have produced statistically insignificant results even if the $\underline{n}$ had been large enough to allow a more adequate test.

Group Satisfaction Scale

The means on the Group Satisfaction Scale are given in Table 8. The only significant difference in these data is the significantly less satisfaction with the situation in the B_{50} condition than in all other conditions. The lack of satisfaction with the situation on the part of the subjects in the B_{50} condition, who were induced to participate (i.e. sign the extremely positive statement regarding instant coffee) by the use of the large reward is consistent with the high degree of pressure experienced by the subjects, and with the interpretation that even with a sufficiently large $\underline{n}$ for an adequate test Condition B_{50} would not have produced a significant amount of attitude change. Although we cannot consider the data conclusive on the effectiveness of the two step inducement, the combined evidence on the Hedonic Scale, the felt pressure, and the Group Satisfaction Scale indicates that the two-step inducement technique was not successful.

TABLE 8

t Tests on Group Satisfaction Scale Means in Four Conditions

Condition	n	Mean	t
A - Dissonance, One Inducement (Small)	24	66.17	A and B_{50}, 3.23 ($p < .01$)
B_{25} - Dissonance, Two Inducements (Small Accepted)	7	65.57	B_{25} and B_{50}, 2.77 ($p < .01$)
B_{50} - Dissonance, Two Inducements (Large Accepted	3	47.00	
C - Leader Influence	19	61.68	C and B_{50}, 2.44 ($p < .05$)

F test on Group Satisfaction Scale means is 3.83 ($p < .05$)

CHAPTER 5: RECOMMENDED ADDITIONAL RESEARCH

The research reported in the previous chapters was performed under an initial contract with the Food Acceptance Branch of the Quartermaster Food and Container Institute. Although some progress was made toward developing useful applied techniques on this contract, it is felt that the areas most urgently needing additional research should be pointed out to those who might be considering application of the research findings.

COGNITIVE DISSONANCE TECHNIQUES

Increased Range

The area in greatest need of further research and development in order to increase the applied value of the cognitive dissonance techniques utilized in this research is methods for involving the entire target population. In the grasshopper experiment, using cognitive dissonance with the powerful negative communicator variation, only half the subjects participated (i.e., were induced to eat a grasshopper) and underwent attitude change. In the irradiated meat experiment, on the other hand, the inducement was relatively larger and consequently all subjects participated. But as the size of the inducement (relative to the disagreeableness of the requested behavior) was larger, less dissonance was produced and hence less attitude change occurred. The dilemma, then, with cognitive dissonance techniques is how to use a large enough inducement to involve everybody, but a small enough inducement to produce a large amount of cognitive dissonance, as the larger the inducement (over the threshold necessary for inducing behavior) the less the dissonance. These are obviously

incompatible requirements. We need to develop new dissonance techniques which can both involve everyone and yet maintain the inducement at a point just sufficiently above the threshold necessary for producing the dissonance generating behavior. Several possible methods for doing this and thereby producing in everyone the large changes in attitude which occurred in the participating subjects in the grasshopper experiment come to mind, but need to be developed and evaluated.

Increased Power

The grasshopper experiment demonstrated the effectiveness of cognitive dissonance techniques for changing consumer attitudes in an applied situation. However, there are many possible methods for increasing the power of cognitive dissonance techniques which need investigation. For example:

1. In the grasshopper experiment, the average rating of the "negative" communicator was 6.4 on a scale on which 4.0 is neutral and 7.0 is the highest possible rating. Consequently, the hypothesis that a really negative communicator, in absolute terms, would produce the most attitude change is as yet untested, although the obtained data on a relatively negative communicator suggests that this would be a very powerful technique. Consequently, the effectiveness of a negative communicator using cognitive dissonance should be investigated.

2. It would be predicted from dissonance theory that the greater the amount of behavior which was inconsistent with their attitudes that the subjects were induced to engage in, the greater the dissonance and hence the greater the attitude change. From this reasoning, one would predict that if the subjects had been induced to eat two grasshoppers instead of

one grasshopper there would have been even greater attitude change than that obtained. Of course, there is probably a point of diminishing returns with the inducing of more behavior, and complications which could occur because of the need to increase the size of the inducement. However, the relationship between the amount of behavior induced and the size inducement required should be investigated to find the optimum amount of behavior that should be induced in order to produce the maximum amount of attitude change.

3. As one of the methods by which an individual can reduce cognitive dissonance without changing his previously held attitudes is by denying or minimizing the amount of inconsistent behavior he engaged in, it is possible that increasing the tangible proof, or public exposure, of the behavior will make it more difficult for the subject to deny or minimize his behavior, and therefore ensure more attitude change as the means of reducing cognitive dissonance. From this reasoning it would be predicted that if subjects were induced to sign statements which contradicted their attitudes, in addition to engaging in behavior inconsistent with them, their attitudes would change more than if they were only induced to do one or the other. It should also follow that the greater the size of the audience observing the inconsistent behavior the greater the attitude change. Whether or not these additional techniques would produce sufficiently increased attitude change to make them worthwhile needs investigation.

Use of Negative Inducements

The research on cognitive dissonance techniques for changing attitudes has generally used positive inducements for producing the inconsistent behavior. However, in many applied situations where it

is desirable to produce attitude change, such as the Armed Forces, institutions, and similar authoritarian organizations, it would not always be consistent with the norms and standard practices of these organizations to use positive rewards to induce behavior. Such rewards might be seen as setting a dangerous precedent of requiring rewards for the performance of ones' duty. It would often be possible, however, to use negative rewards in such situations. A negative inducement would be one in which the subject would be informed that if he did not perform the requested behavior, which behavior would be inconsistent with an attitude held by the subject, he would be subjected to some negative reward (i.e., not receiving any dessert, being required to fill out a long questionnaire, being assigned to an extra work detail, etc.). Although the use of negative rewards with cognitive dissonance techniques has not been explored, they should, theoretically, work as effectively as positive rewards. However, they need development and evaluation before they can be recommended for use in applied situations.

LEARNING SITUATION TECHNIQUES

The learning situation or no influence attempt technique which produced the unexpected and favorable results in the research reported in the previous chapters requires further research to determine why it was so successful in producing attitude change, and to develop methods for increasing its power. The learning situation technique used has the advantage of being highly acceptable in our culture as it is more democratic and less manipulative than most influence techniques. In addition, this technique would be much simpler to administer in applied situations, and could be used by less highly trained personnel than could cognitive dissonance techniques. Research is particularly needed to determine in what way, if any, the learning

situation technique used in this research differs psychologically from Lewinian-type (Lewin, 1943) techniques for changing attitudes. If the learning situation technique is psychologically equivalent to the Lewinian approach, it could be subject to the occasional backfiring and solidification of negative attitudes to which the Lewinian technique is susceptable, as has been shown by Kipnis (1958). If the learning situation technique is susceptable to backfiring, methods of preventing it need to be developed and evaluated.

LONG TERM EFFECTS

It was not possible with the funds available for this initial research project to investigate the long term effects of the various change techniques investigated. Consequently, the techniques developed on this project should not be applied without first investigating their long term effects. It is quite possible that the power of the various attitude change techniques relative to each other might be quite different if a follow-up study had been done a month after the original grasshopper, irradiated meat and coffee experiments. It is also possible that the attitude changes produced by these various techniques may have disappeared, increased in size or even been replaced by more negative attitudes at a later date.

USE OF OPINION LEADERS

It might be possible to develop methods for spreading the attitude changes produced in a select sample of recipients, by any of the above techniques, to entire populations. Such methods are needed for economical application of attitude change techniques to large groups

such as the Army. One possible technique would be to select the natural opinion leaders out of large populations, subject these individuals to appropriate attitude change techniques, and let the changes permeate the larger population. This technique needs investigation, as well as the determination of appropriate methods for implementing it.

ADDITIONAL ATTITUDE CHANGE TECHNIQUES

It was not possible to investigate all the attitude change techniques which appear to have potential application to the applied problem dealt with in this research. Additional research is needed to investigate the relative power of several other techniques as compared to those found successful in the present research effort. A few examples of other techniques needing investigation are discussed below.

Imbedding

Acceptance of innovations in consumer items might be increased by blending them, with imbedding techniques, so that they appear as "ground" rather than as "figure" on which attention and negative attitudes can be fixated. Techniques could be developed in which an over-all positive gestalt would be created in which the innovated item was imbedded. This approach is consistent with the observations of Seaton & Gardner (1959) who state, in part, that " . . . in a situation in which unusual foods are used, it would appear that acceptance could be maximized if such foods could be introduced . . . in a form or fashion in which their novel qualities would be least apparent." Possible examples of such techniques are as follows:

a. Pemmican might be served with other dried, easy to preserve

foods, toward which most people already have positive attitudes, such as fruit cake, shredded coconut, pepperoni, or raisins.

b. Fish might be served with lobster, shrimp, or caviar.

c. Irradiated foods might be served in a context containing many positive symbols and artifacts of the atomic age, such as space exploration and scientific advances.

Hostility Surrogate

Food seems to be a traditional, socially acceptable vehicle for Armed Forces personnel to express anti-service hostility. These negative attitudes often appear to be unrelated to the quality of the food, and may be inconsistent with the fact that in many cases the pre-service diet of military personnel was inferior to what they obtain in the service. This use of food as a vehicle for expressing anti-service hostility appears to be an institution, and is probably functional. However, it might be feasible to temporarily substitute another surrogate for this hostility at those bases and/or times in the training period when attempts are being made to develop new food habits. Research is needed to determine if negative surrogates could be developed and maintained as targets for hostility for long enough periods of time to allow induction of highly positive attitudes toward food, and thus to facilitate the development of new food habits.

Extinction Techniques

It should be possible to use extinction techniques, derived from learning theory, to reduce negative attitudes towards consumer items. Extinction techniques have recently been developed and used success-

fully in clinical psychology to reduce the anxiety and fear directed toward various objects (e.g. Rachman, 1959), and presumably it would be possible to develop similar techniques for reducing negative attitudes towards specific foods. Such techniques, however, would probably only be efficient where present attitudes were strongly negative, like those in the military against emergency and survival foods such as pemmican, or the negative attitudes held by many people towards irradiated meat.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

COGNITIVE DISSONANCE TECHNIQUES

This research has demonstrated that cognitive dissonance techniques are an effective method for changing consumer food attitudes. Their greatest advantage is their power. We see in Table 1 that with the powerful negative communicator variation Army reservists changed their attitudes from negative to slightly positive towards the use of grasshoppers as a food. These dissonance techniques have the further advantage of being easily imposed upon a group from the outside by an authoritarian figure who has some control over rewards and/or punishments. In fact, it was seen in the grasshopper experiment that the technique is most powerful when used by a figure perceived negatively by the target population. This is probably easy to do in an authoritarian organization, like the Army, in which the man in command who must impose his or the Army's attitudes upon the men is often perceived as negative when in this role.

A disadvantage of cognitive dissonance attitude change techniques, as seen in the studies reported here, is the complexity of the techniques. For example, in order to use cognitive dissonance techniques it is first necessary to determine what behavior on the part of those whose attitudes are to be changed would be inconsistent with their attitudes. It is then necessary to determine what inducement can be used to cause the subjects to engage in the inconsistent behavior. Furthermore, it is necessary to determine the exact level of inducement which is just barely sufficient to produce the inconsistent behavior. If the size of the inducement necessary for producing the inconsistent behavior is miscalculated, as was done by the writer in the irradiated meat experiment, insufficient cognitive dissonance will

be produced, and there will not be a significant amount of attitude change. An even more serious disadvantage of the dissonance technique, which is related to the level of inducement problem, is that the technique does not include the entire target population. Thus we saw in the grasshopper experiment that while the cognitive dissonance technique, utilizing the negative communicator variation, produced extremely marked attitude change, it did this in only half the target population. If the size of the inducement is increased in order to cause a larger percentage of the subjects to engage in the dissonance producing behavior, the size of the inducement then becomes too large, in the case of many subjects, for cognitive dissonance to be produced (as they feel high justification or low choice) and insufficient attitude change is produced. An attempt at the use of a two level inducement to overcome this weakness in the application of cognitive dissonance techniques was attempted in the instant coffee experiment, and although the data on this attempt are not conclusive, it appears to have failed.

On the basis of the research performed on this project, cognitive dissonance techniques would be recommended as powerful techniques to apply in the Armed Forces for changing food attitudes, or almost any attitude for which inconsistent behavior can be induced. However, it would be necessary to use highly skilled individuals for the use of these techniques, preferably individuals perceived in a negative manner by the population concerned. Cognitive dissonance techniques could not be recommended at the present time in instances where it is necessary or desirable to change the attitudes of all the men, but rather would be useful where it is necessary to produce marked attitude change in some of the men.

LOW PRESSURE TECHNIQUES

The low pressure techniques discovered accidentally in the grasshopper experiment, and cross validated in the "irradiated" meat experiment, are consistent with earlier research by Torrance (1959) in which he found no pressure influence techniques to be effective. Presenting the subjects with the new food and permitting them to sample it without any attempt to pressure or influence them proved to be effective, but was even more effective if a rationale for trying and learning to accept the new food in terms of their future needs was included. This technique of exposure to a new food with a rationale, but without any pressure, has much to recommend it. It is consistent with democratic process and is, therefore, unlikely to produce any negative side effects. It is a simple and easy technique to use, unlike cognitive dissonance, and does not require highly skilled personnel or predetermination of behavior thresholds as do the dissonance techniques. And, unlike the cognitive dissonance techniques, it is applicable to the entire target population. Consequently, the no pressure, exposure technique in combination with a rationale is recommended for application to the problem of changing consumer attitudes in the Armed Forces where:

1. It is important to reach large and entire populations;
2. Where highly skilled personnel are not available for the application of attitude change techniques; and
3. Where acceptance of the new attitude can be rationally shown to be to the advantage of the subjects involved.

SUBJECTS FOR ATTITUDE CHANGE

All three of the experiments performed on this project have produced results consistent with other research indicating that those subjects whose attitudes are originally most negative are the most susceptible to attitude change. In fact, the data has consistently shown that little if any attitude change is produced on the part of those subjects originally most positive towards the consumer food item concerned. Consequently, if it is not possible or feasible to apply attitude change techniques to the entire population due to limitations in time or space, it is recommended that those subjects who are known to be most resistent to the food item be singled out for application of attitude change techniques.

ADDITIONAL RESEARCH

This initial exploration of attitude change techniques for application to the Armed Forces, while indicating some useful techniques, needs to be followed by additional research to increase the power and range of the techniques. The two areas particularly in need of further work are the problem of the lack of range of the cognitive dissonance techniques, and the use of negative rewards. Although the low pressure techniques were found to be effective, for very serious attitude change problems the cognitive dissonance techniques, because of their great power, are obviously to be desired. However, before they can be recommended for wide application in the Armed Forces, methods have to be developed for extending their range and for simplifying their application. It is believed that further research could accomplish these objectives.

An additional area needing research is the use of negative rewards or threats as inducements for producing the inconsistent, dissonance producing behavior. As the experimenter was a guest in the Army reserve units utilized in the research reported here, only positive rewards were utilized. However, research and development on the use of negative rewards or threats is needed for application of the techniques to the Armed Forces, where the use of positive rewards or "bribes" would not always be consistent with discipline and the general culture and organization of military units. Although it has not yet been demonstrated, it seems likely that threats could be substituted for the use of rewards in the application of cognitive dissonance techniques.

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APPENDIX

QUESTIONNAIRES

The Grasshopper Questionnaire

Name _____ Rank _____

Army Reserve Unit _____ Age _____

QUESTIONNAIRE

Your answers will not be seen by Army personnel, and will only be used for research purposes.

I. Please indicate how you would feel about eating grasshoppers by making one check on the scale below:

_____	Like Extremely
_____	Like Very Much
_____	Like Moderately
_____	Like Slightly
_____	Neither Like Nor Dislike
_____	Dislike Slightly
_____	Dislike Moderately
_____	Dislike Very Much
_____	Dislike Extremely

II. Have you ever eaten grasshoppers? Yes_____ No_____

If you did eat them, did you like them? Yes_____ No_____

DO NOT TURN PAGE UNTIL INSTRUCTOR TELLS YOU TO.

III. If you ate grasshoppers today, please rate them by making one check on the scale below:

	Like Extremely
	Like Very Much
	Like Moderately
	Like Slightly
	Neither Like Nor Dislike
	Dislike Slightly
	Dislike Moderately
	Dislike Very Much
	Dislike Extremely

Did not eat any grasshoppers_____

How many grasshoppers did you eat?_____

Comments on food:_____

_____

_____

_____

_____

IV. Please mark each statement according to how much you agree or disagree with it. Please mark every one. Write in +1, +2, +3, or -1, -2, -3.

+1. I AGREE A LITTLE

+2. I AGREE PRETTY MUCH

+3. I AGREE VERY MUCH

-1. I DISAGREE A LITTLE

-2. I DISAGREE PRETTY MUCH

-3. I DISAGREE VERY MUCH

_____1. As far as I can tell, everyone in the group was extremely satisfied.

_____2. I'd prefer working alone.

_____3. Doing these kinds of things in a group is better than doing it alone.

_____4. There are a few people who would fit better in another group.

_____5. This group certainly could have done a better job.

_____6. I've been in better groups than this one on many occasions.

_____7. This is the most stimulating experience I've had in a long time.

_____8. As far as I'm concerned, this was a nearly perfect group.

_____9. We wasted more time than we should have.

_____10. There are several things I found irritating during the meeting.

_____11. If I could have chosen the other members of the group myself, I couldn't have done a better job.

_____12. I wish the others would have been more cooperative.

_____13. The instructor was friendly and courteous.

_____14. I would like to take part in another experiment like this one.

_____15. I felt under pressure to eat the grasshoppers.

V. Comparing this group with other groups, please rate the amount of humor which occurred by making one check.

Very much_____ Alot_____ Average_____ Little____ Very Little____

VI. What is most important to you, to be liked, or to be successful and get ahead? (check only one)

To be liked_____ To be successful_____

VII. How many months have you been in this Army Unit? _____

The Instant Coffee Questionnaire

Name _____ Rank _____

Army Unit _____ Age _____

QUESTIONNAIRE

Your answers will not be seen by Army personnel, and will only be used for research purposes.

I. Please indicate how well you like the Army's instant coffee by making one check on the scale below:

_____	Like Extremely
_____	Like Very Much
_____	Like Moderately
_____	Like Slightly
_____	Neither Like Nor Dislike
_____	Dislike Slightly
_____	Dislike Moderately
_____	Dislike Very Much
_____	Dislike Extremely

DO NOT TURN PAGE UNTIL INSTRUCTOR TELLS YOU TO

II. Please indicate how well you like the Army's instant coffee by making one check on the scale below:

_____	Like Extremely
_____	Like Very Much
_____	Like Moderately
_____	Like Slightly
_____	Neither Like Nor Dislike
_____	Dislike Slightly
_____	Dislike Moderately
_____	Dislike Very Much
_____	Dislike Extremely

III. (a) How many cups of coffee did you drink during this experiment?_____

(b) How many cups of coffee do you usually drink in a day?_____

IV. How do you like this coffee as compared to regular (brewed) coffee?

_____I like it better than regular coffee

_____I like it as well as regular coffee

_____I like regular coffee better

V. Please indicate how much pressure was put on you to change your attitude towards instant coffee (make you like it better) by checking one of the statements below:

_____No pressure was used to try and change our attitudes

_____A little pressure was used to try and change our attitudes

_____A lot of pressure was used to try and change our attitudes

VI. Please mark each statement according to how much you agree or disagree with it. Please mark every one. Write in +1, +2, +3, or -1, -2, -3.

+1. I AGREE A LITTLE -1. I DISAGREE A LITTLE

+2. I AGREE PRETTY MUCH -2. I DISAGREE PRETTY MUCH

+3. I AGREE VERY MUCH -3. I DISAGREE VERY MUCH

_____1. If I could have chosen the other members of the group myself, I couldn't have done a better job.

_____2. This is the most stimulating experience I've had in a long time.

_____3. Doing these kinds of things in a group is better than doing it alone.

_____4. There are several things I found irritating during the meeting.

_____5. As far as I'm concerned, this was a nearly perfect group.

_____6. I'd prefer working alone.

_____7. I would like to take part in another experiment like this one.

_____8. I've been in better groups than this one on many occasions.

_____9. We wasted more time than we should have.

_____10. As far as I can tell, everyone in the group was extremely satisfied.

_____11. There are a few people who would fit better in another group.

_____12. This group certainly could have done a better job.

_____13. I wish the others would have been more cooperative.

VII. Do you feel that the Army should use this instant coffee all the time instead of brewed coffee?

Yes_____

No_____

The Irradiated Meat Questionnaire

QUESTIONNAIRE

Your answers will not be seen by Army personnel, and will only be used for research purposes. Do not sign your name.

I. Please indicate how you would feel about eating meat that has been irradiated with atomic energy by making one check on the scale below:

	Like Extremely
	Like Very Much
	Like Moderately
	Like Slightly
	Neither Like Nor Dislike
	Dislike Slightly
	Dislike Moderately
	Dislike Very Much
	Dislike Extremely

DO NOT TURN PAGE UNTIL INSTRUCTOR TELLS YOU TO.

II. If you ate any of the irradiated meat sandwiches, please indicate how you felt about eating them by making one check on the scale below:

	Like Extremely
	Like Very Much
	Like Moderately
	Like Slightly
	Neither Like Nor Dislike
	Dislike Slightly
	Dislike Moderately
	Dislike Very Much
	Dislike Extremely

Did not eat any irradiated meat sandwiches _____

How many irradiated meat sandwiches did you eat? _____

How many of the plain (not irradiated) sandwiches did you eat? _____

Comments on food: _____

_____

_____

_____

_____

III. Would you be willing to eat irradiated meat if it was offered to you again?

Yes _____

No _____

IV. Please mark each statement according to how much you agree or disagree with it. Please mark every one. Write in +1, +2, +3, or -1, -2, -3.

+1. I AGREE A LITTLE

+2. I AGREE PRETTY MUCH

+3. I AGREE VERY MUCH

-1. I DISAGREE A LITTLE

-2. I DISAGREE PRETTY MUCH

-3. I DISAGREE VERY MUCH

_____1. This is the most stimulating experience I've had in a long time.

_____2. There are several things I found irritating during the meeting.

_____3. The instructor was friendly and courteous.

_____4. I would like to take part in another experiment like this one.

_____5. I felt under pressure to eat the irradiated meat sandwiches.

_____6. I'd prefer another instructor if we do this again.

_____7. I did not like the instructor as well as our other instructors.

_____8. The instructor did a great job.

V. Comparing this group with other groups, please rate the amount of humor which occurred by making one check.

Very Much_____ Alot_____ Average_____ Little_____Very Little_____

VI. What is most important to you, to be liked, or to be successful and get ahead? (check only one)

To be liked_____ To be successful_____

VII. How many months have you been in this Army Unit?_____

UNCLASSIFIED

UNCLASSIFIED