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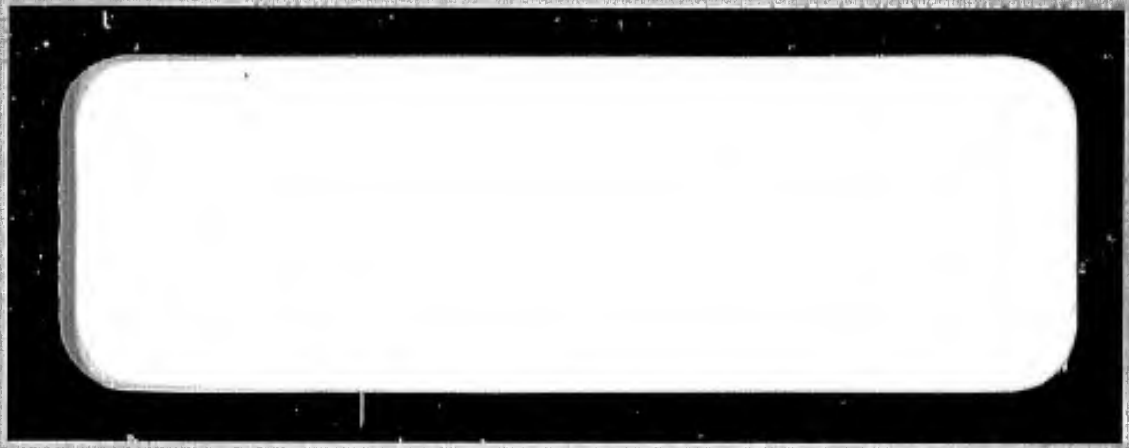
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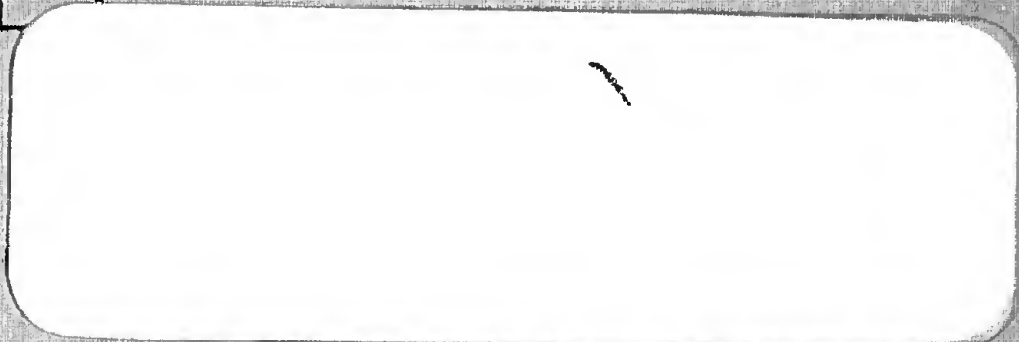
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OFFICE, CHIEF OF ARMY FIELD FORCES
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INFORMATION REPORT

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6 SPREAD OF INFORMATION FOLLOWING AN ATOMIC MANEUVER,

by

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SUMMARY

The experiment reported here represents part of a research effort on psychological effects of Desert Rock V. This study attempted to investigate the effectiveness of word-of-mouth communication in spreading the information gained by those observers at Desert Rock to other men of their military units.

The experiment was designed to answer two questions regarding spread of information:

1. What is the effect of the informal status¹ of the observers in the units from which they are sent? *and*
2. What is the effect of actively involving all members of home units in the advance preparation of observers? *Involvement meant, mainly, that home unit members were given an opportunity to express specific interests, raise questions, and to "delegate responsibility" for bringing back information.*

These two factors, observer status and involvement of home unit members, were systematically manipulated. Each of the batteries included in the study sent three enlisted men to act as observers at an atomic test explosion in April 1953. Questionnaire measures of information and attitudes about atomic effects, protective measures, and related topics were obtained from all battery members prior to the departure of the observers for Desert Rock, and again from all battery members approximately two weeks after the observer had returned to their home units. Information and opinions of the observers were also measured just at the end of their stay at Camp Desert Rock.

The three major conclusions from the experiment may be summarized as follows:

1. Observer information gains were small in relation to the possible gains; The relatively slight gains in knowledge, as measured by the questionnaires used in the study, suggest the possibility that training conditions at Desert Rock should be re-evaluated in terms of the Army's training goals in this area. (See page 6).

2. Although the actual gains in information were relatively small, there was considerable spread of information to the remaining members of their units; It should be made clear that actual information gains of the battery members were small. However, these gains were limited by the small amount of new information brought back by the observers. In relation to the observers' gains, the battery members' gains were quite substantial. (See page 8).

¹This is roughly equivalent to "buddy" status, that is, status determined by nominations made by other unit members. *see page 11*

3. Involvement of battery members produced important effects in increasing observers' gains and in the resultant spread of information in the batteries. The effects of involvement are reflected in the amount learned by the observers, in the amount of discussion following the maneuver, and in the amount of information gained from the observers. In addition, there is some evidence indicating that such involvement techniques will produce the greatest results in situations where help is most needed, such as situations in which most of the men have little initial interest in learning. (See page 9)...

As far as the importance of the informal status of the observer is concerned the experiment was inconclusive. As predicted, members of units which sent high status observers generally talked more to their observers, and overall, showed slightly greater information gains. However, these differences were only large enough to be accepted as tentative evidence.

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INTRODUCTION

Background and Purpose of the Study

For several years the Army has been sending troops to Camp Desert Rock to witness test explosions conducted by the Atomic Energy Commission. Unfortunately several factors have made it impossible for those troops to carry out maneuvers in the full meaning of that term. Therefore, the training value of these exercises has been largely limited to what the troop observers are able to pick up from watching an atomic explosion, and from attending accompanying indoctrination sessions.

Previous research has shown that the observers do learn something at Desert Rock.² In addition to these demonstrated information gains, it is likely that the experience of an atomic maneuver results in other gains which are more difficult to measure. However, problems of expense and other considerations limit the number of men who can attend. It is clear that the Army's return on its investment in these atomic maneuvers will be increased to the extent that the observers pass on what they have learned to the men in their units who cannot attend. Gains from such word-of-mouth communication with the observers could furnish an important supplement to the formal training provided by the Army. Very possibly this kind of communication produces some results which cannot be achieved in formal training sessions.

The research reported here was an experiment which undertook to find out something about this "spread of information" by studying what occurred in selected antiaircraft batteries, each of which sent three men to Desert Rock to witness the test explosion of April 25, 1953. Whatever can be learned about the spread of atomic information in these particular batteries will help us to understand what makes for effective communication in many other training situations. Thus, the results of this experiment will have implications not only for planning atomic maneuvers, but also for handling problems of training and dissemination of information in general.

THE EXPERIMENT

Preliminary Considerations

The most effective operation of an Army organization demands that men take initiative in assuming responsibilities which are not always explicitly stated. In this experiment, each battery as a whole could benefit from the experiences of the observers at Desert Rock. Thus, the observers had an implied responsibility for passing on what they had learned.

²Motivation, Morale, and Leadership Division, Desert Rock I: A Psychological Study of Troops' Reactions to an Atomic Explosion. Human Resources Research Office, Technical Report, February 1953.

Motivation, Morale, and Leadership Division, Desert Rock IV: Reactions of an Armored Infantry Battalion to an Atomic Bomb Maneuver. Human Resources Research Office, Technical Report, August 1953.

If any information was to spread from the observers to the other men in their units, three conditions had to be met:

- a. The observers had to accept a responsibility for learning something to bring back.
- b. The observers had to tell the other men what they had learned.
- c. The other men had to listen and be influenced by what they heard.

The basic idea behind the experiment was that the observers would be more likely to accept a responsibility for spreading information, and more effective in discharging that responsibility, if they believed their battery mates would be ready to listen to them when they returned from the maneuver. This belief might arise from several sources. This experiment dealt with two of these sources:

1. Informal status of the observers. By informal status is meant the degree to which the observer was liked and respected by the other members of his military unit. It was expected that those observers who were highly accepted would see their battery mates as a more ready audience and would be more likely to talk about their experiences.
2. Involvement of home unit members. The procedure used to produce involvement is described later. This procedure had the main purpose of providing a "channel" through which the battery members, as a group, could express their interests to the observers. This channel offered, to the men who could not go to Desert Rock, an opportunity for a kind of indirect participation in the Desert Rock experience. If they saw the channel as effective, and really did participate, two results would follow:
 - a. The observers would feel that something was expected of them--that they had an obligation to their battery mates.
 - b. The other battery members, having a stake in what was going on, would be eager to receive the information that the observers brought back.

Carrying Out the Experiment

The experiment--involving the two factors, informal status of observers and involvement of home unit members--was performed with selected antiaircraft gun batteries involving about 1,200 men. These batteries were divided into four groups, as follows:

1. With involvement of battery members.
 - a. Low status observers
 - b. High status observers
2. With NO involvement of battery members.
 - a. Low status observers
 - b. High status observers

The steps required to carry out the experiment are briefly described below.

Selection of the Observers

The observers were selected on the basis of information supplied in nominating questionnaires. These were filled out by battery members about a month before the maneuver. All the enlisted men in each battery were listed in order, according to the number of nominations received. Then the observers were chosen from these lists. In the selection finally made, high status observers received over ten times as many choices as low status observers. As far as possible the two groups were equated for such things as Army rank and duty in the battery.

The "Involvement Technique"

In all of the batteries an information questionnaire was given about a week before the observers left for Desert Rock. In each of the batteries with "involvement" of battery members, the completion of the questionnaire was immediately followed by a half-hour meeting. To insure uniformity, these meetings were conducted by one of the experimenters. In a very brief introduction he emphasized the growing importance of the whole subject of atomic weapons. Stressing the position of the observers as representatives of the battery, he urged that battery members take advantage of the opportunity to learn through their observers. Then, after arranging for a division of the large group into small informal groups, he asked the men to discuss among themselves their interests and major needs for information regarding atomic matters, and to record these as questions on cards which he provided. In collecting the cards, he stated that they would be turned over to the battery commander for delivery to the observers before the observers left for Desert Rock. This procedure maintained the appropriate chain of command. It added the formal sanction of the organization commander and probably increased, for the observers, the effect of the pressures from the battery as a whole.

Measuring Information Gains

What the men in the batteries knew at different times during the experiment was measured with written questionnaires. All available men filled out such questionnaires on two occasions--once, already mentioned, about a week before the start of the maneuver, and again about two weeks after the observers had returned. In addition, the observers themselves were given a questionnaire just at the end of the maneuver. This provided a measure of the information which they brought back from Desert Rock.

Two kinds of information were gathered: (a) general information about atomic effects, protective measures, and the use of atomic weapons; and (b) information about the events of the particular maneuver attended by the observers in this experiment.

General information about atomic effects was measured both at the beginning and at the end of the experiment. Because the men had previously been exposed to training in radiological warfare, as well as to newspapers and other sources of general knowledge, it was necessary to find out what they knew to start with in order to measure gains in information.

Amount of information about the specific events of the maneuver, as distinct from general atomic information, was tested with such questions as the following:

"How far away were the men (observers) when the bomb went off?"

"How much did they feel the ground shake after the burst?"

"After the burst how close did the men go to ground zero?"

No test of this particular kind of information was possible before the events had occurred. The assumption was made that for the battery members, the observers would be the major source of correct information about these events after they had taken place.

Measuring Communication

In this experiment we were interested, not only in the differences in amount of information gained, but also in understanding how these differences arose. For this reason, in our final questionnaire, we asked a number of questions about the word-of-mouth communication which had occurred.

RESULTS AND CONCLUSIONS

The three major conclusions from the experiment may be summarized as follows:

1. Observer information gains were small in relation to the possible gains. The relatively slight gains in knowledge, as measured by our questionnaires, suggest the possibility that training conditions at Desert Rock should be re-evaluated in terms of the Army's training goals in this area.
2. Although the actual gains were relatively small, there was considerable spread of information from the observers to the remaining members of their units. It should be made clear that actual information gains of the battery members were small. However, these gains were limited by the small amount of new information brought back by the observers. In relation to the observers' gains, the battery members' gains were quite substantial.
3. Involvement of battery members produced important effects in increasing observers' gains and in the resultant spread of information in the batteries. The effects of involvement are reflected in the amount learned by the observers, in the amount of discussion following the maneuver, and in the amount of information gained from the observers. In addition, there is some evidence which indicates that such involvement techniques will produce the greatest results in situations where most of the men have little initial interest in learning.

As far as the importance of the informal status of the observers is concerned the experiment was inconclusive. As predicted, members of units which sent high status observers generally talked more to their observers, and overall, showed slightly greater information gains. However, these differences were only large enough to be accepted as tentative evidence.

The remainder of this report will be devoted to the presentation and further discussion of some of the evidence upon which the above conclusions are based.

Observers' Information Gains

How much did the observers learn at Desert Rock? The answer is, that overall, their gains were small. The information scores, based on the answers to the questionnaire items, were converted to percentages. Before the maneuver the average observer information score was 54.2%. At the end of the maneuver the average score was 67.8%. This increase of approximately 13.6% is not very large when compared to a possible increase of about 46.0%.

Although the overall observer gain was small, some observers learned much more than others. As is shown in Figure 1, the observers from batteries with no advance "involvement" learned little, while observers from the "involved" batteries showed quite large gains. In other words, the men who learned were, by and large, the men who had some reason to feel a responsibility for learning--men who had a reason to believe that their battery mates expected something from them when they returned from Desert Rock.

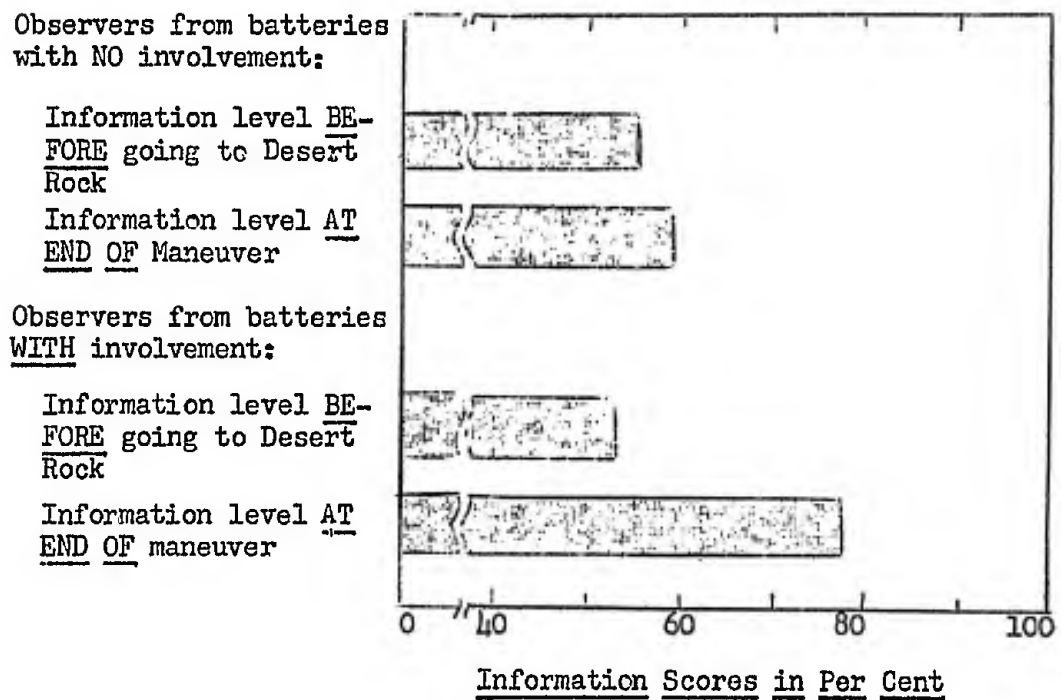


Figure 1

OBSERVERS' INFORMATION BEFORE AND AFTER THE MANEUVER

Involvement produced important differences in the amount learned by the observers. This is evidence of the importance of the observers' desire to learn,--or of how much they felt a reason to learn. However, even among those who made the most of their opportunities at Desert Rock, there was substantial misinformation at the end of the maneuver. Considering the effort and expense going in the operation, it might have been expected that the observers would come away from Desert Rock the best informed men in their batteries. Actually, even after the maneuver was over, the observers, on the average, still knew less than many men who had remained at home.

Even though the experiment was not directly concerned with the training at Desert Rock itself, it may be of value to report here some of the observations by the research staff which would bear on the question of why the observers didn't learn more.

First, mention should be made of the relatively small amount of time actually devoted to indoctrination. During the four days the observers were at the camp before the test explosion, they spent only four hours in training sessions. Furthermore, these sessions all took place in a single morning. It is reasonable to suppose that many of the men were "saturated" with new information by the end of the second hour. Thus, even the limited training time was probably not effectively utilized for the observers.

A second point relates to the conditions under which the training was conducted. Sessions were held outdoors--under a desert sun--in groups of many hundreds of men. It is recognized that the number of observers was very large in relation to the facilities and number of instructors available, and as a result these conditions were probably unavoidable. However, they undoubtedly limited the effectiveness of the training.

The third point is concerned with the matter of security. This problem has already been discussed in an earlier report issued by this unit³. Pertinent excerpts from that report will be repeated here. "Many of the men were concerned about the security regulations governing what they could and could not talk about....They were warned repeatedly that any security violations were punishable not only under AR 380-5, but under the Atomic Energy Act and that the penalties for such violations were severe.

"It seems certain that the emphasis on security which the troop participants received in their indoctrination materially reduced their willingness to talk about their experiences when they returned to their home stations....."

³White, B.W., Reactions of Troop Participants and Forward Volunteer Officer Groups at Atomic Exercises. Human Research Unit No. 2, Information Report, August 1953.

"It was a constant source of amusement at the camp that the newspapers carried accounts of the atomic tests which included information, usually accurate, which the men had been expressly forbidden to reveal."

As far as this experiment was concerned, it was impossible to estimate with any confidence the effects of the security briefing on spread of information. One observer, interviewed at the end of the experiment commented--"They told us not to say anything, but it was all in the papers and on the radio anyway, so I guessed it was all right to talk about it." There is evidence that the observers did talk to other men in their batteries; but uncertainty about what they could and could not say probably restricted their flow of information, thus causing a loss in the potential value of having the observers at the explosion.

Spread of Information

Even after the observers returned from Desert Rock, most of them still could have found a fair number of their battery mates who knew more than they did. To be sure, the men who knew less than the observers could learn quite a lot from them; and even those who, in general, knew more could still pick up information on specific points. However, overall gains by battery members would certainly be limited by the small size of the observers' gains.

As expected, the battery members' gains were small. However, only one battery failed to show some increase; and as shown in Figure 2, the average gain for all battery members together is nearly half as large as the average gain for the observers, that is 6.6% versus 13.6%.

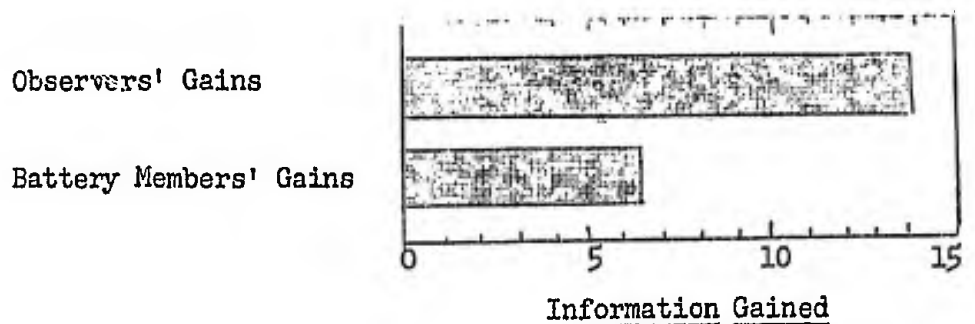


Figure 2

(Information Gained is equivalent to score on final questionnaire minus score on initial questionnaire.)

SPREAD OF INFORMATION FROM OBSERVERS TO BATTERY MEMBERS

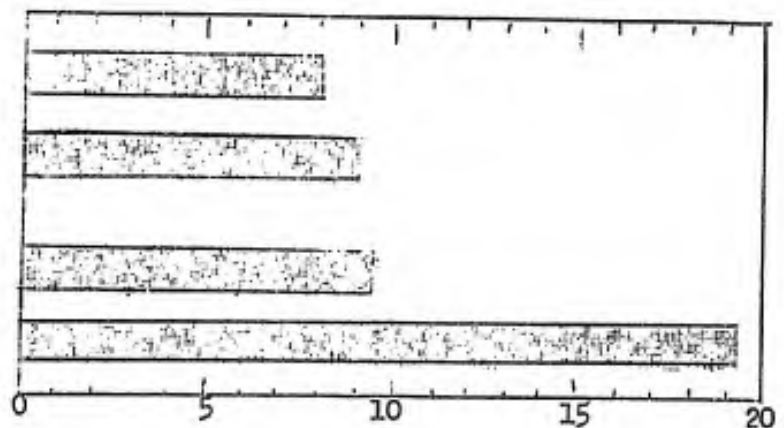
Effect of Involvement on Spread of Information

We have seen that information did spread from the observers. The question now to be answered is: What effects did the involvement of battery members have on this spread of information?

It will be remembered that involvement was expected to produce greater information gains both because the observers would talk to more men, and also because those men would be more ready to listen. A clearer picture of what really happened may be obtained by separating the gains for those who talked with the observers a lot, from those who talked with them only a little or not at all. It is possible to make this separation because in the final questionnaire the men were asked: "Which men in the battery have you talked to about the recent A-bomb test at Desert Rock?" The answers to this question were used to divide the men in each battery into two groups: those who reported talking to two or three observers—"high communicators," and those who reported talking to only one observer or to none at all—"low communicators."

The data for high and low communicators have been separated in Figure 3. This chart shows how involvement affected the amount of information which the battery members gained from the observers. The battery member information gains charted are total gains, since for the sake of simplicity, gains in general information about atomic weapons and atomic effects have been combined with gains in specific information about the events of the maneuver.

LOW COMMUNICATORS
NO involvement
WITH involvement
HIGH COMMUNICATORS
NO involvement
WITH involvement



Information Gained by Battery Members
(Information gained is equivalent to final score in percent minus initial score in percent.)

Figure 3

EFFECTS OF INVOLVEMENT ON SPREAD OF INFORMATION TO
BATTERY MEMBERS

Figure 3 shows that involvement resulted in an increase in the amount of information gained. As we would expect, for the low communicators the difference amounts only to a slight trend; but for the high communicators the difference is very substantial. For those men who talked to the observers--that is, for the high communicators--the overall information gain was twice as great with involvement as without involvement.

Battery Members' Communication with Observers

It has already been shown that among the men who talked to the observers, those who had been actively involved beforehand were much more likely to learn something from their discussion. It can also be shown that involvement increased the number of men who talked to the observers. In other words, involvement produced effects which were both large and widespread.

Of the many possible factors influencing amount of communication with the observers, this experiment has provided evidence for at least two and probably, as we shall see later, for a third. The two major factors are: (a) involvement, and (b) initial information level.

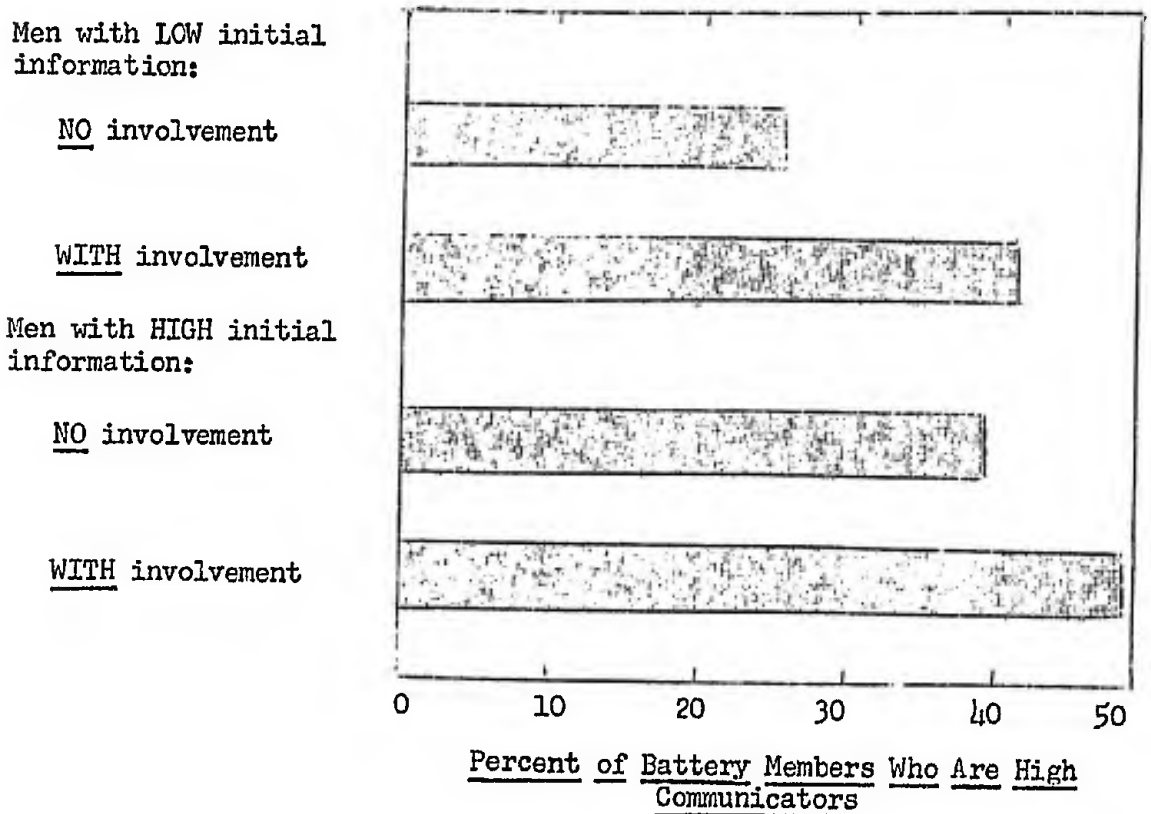


Figure 4

FACTORS INFLUENCING COMMUNICATION WITH OBSERVERS

The measure of a man's initial information level is the score that he made on the first information questionnaire. On the basis of these scores all of the men were divided into two equal groups-- those with higher than average and those with lower than average initial information. These two groups were further subdivided-- involvement versus no involvement. For each of the four resulting sub-groups the percentage of high communicators was calculated. These percentages are shown in Figure 4.

Men who knew most beforehand were most likely to seek new information from the observers. Probably these men were already quite interested in the subject of atomic weapons and had informed themselves from other sources before the experiment took place. This finding is of some importance in itself. However, it is of greater importance that taking account of initial information throws additional light on the operation of involvement. Examination of Figure 4 makes it clear that involvement produced more communication, regardless of the initial information level; but the effect is greatest for those with little initial information--that is, for those men who had little initial interest.

Further implications of this finding will be discussed after the following section.

Observer Status and Communication

It has already been said that only tentative conclusions can be made about the effects of observer status. However, the results tend strongly to confirm that the battery members were more likely to talk to observers with high status; and if we add the effects of status to the effects of involvement and of initial information level, the combined effect on communication is very striking. Thus, where there was no involvement, and where both initial information and observer status were low, only 22 percent of the men talked to as many as two observers and 46 percent failed to talk to any at all. In contrast, where there was involvement of battery members, and where initial information and observer status were both high, 49 percent talked to two or three and only 16 percent of the men failed to talk to at least one observer.

Conclusions about the Importance of Involvement

The relation between status and communication has been discussed mainly as introduction to a final point, which we believe has considerable practical significance for the Army. This is the point that "involvement" will probably prove most effective where it is most needed. In this experiment involvement of the battery members made the greatest difference in amount of communication with the observers where other

factors, namely observer status and initial interest were least likely to produce much communication. This is shown in Figure 5.

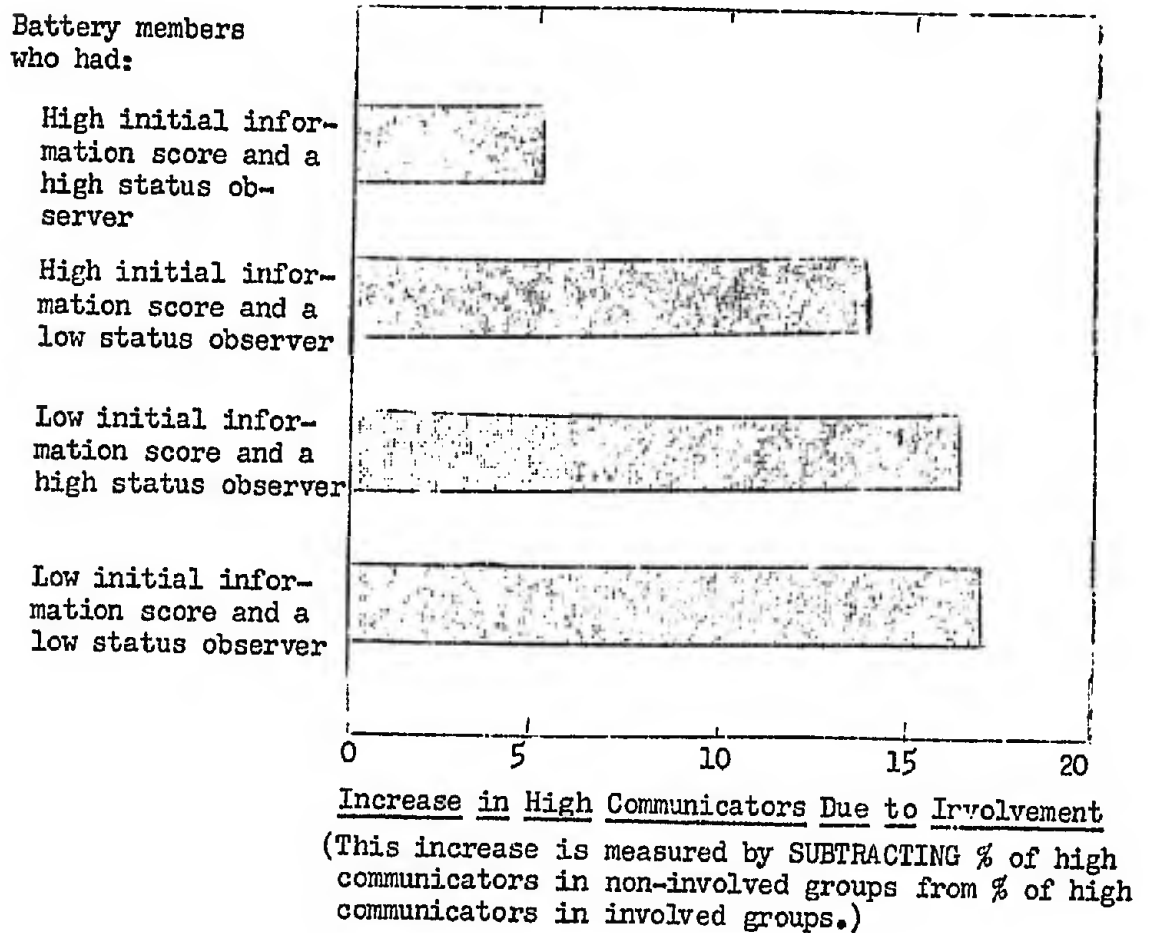


Figure 5

EFFECTS OF INVOLVEMENT UNDER DIFFERENT CONDITIONS

In the Army it is necessary for men to learn and do many things in which a large number of them have little or no interest to start with. Sometimes it is necessary for them to follow leaders and to learn from instructors for whom they have no great liking. Faced with apathy and resistance, men with leadership responsibilities occasionally retreat from a full acceptance of those responsibilities. Then active, forward-looking leadership may be replaced by defensive domination, with considerable reliance on punishment and restrictive practices to maintain control.

Certainly, men differ in the extent to which they will display initiative in the face of adverse conditions. Recognition of this fact has resulted in a continuing effort to identify men who will make effective leaders and to train those men to lead. But, as this study has attempted to show, leadership is a two-way proposition: not only must the leader be ready to lead, the follower must be ready to follow.

In the situation studied here the men who went to Desert Rock as observers can be regarded as leaders only in a very, limited sense. However, they had an implied responsibility for spreading information to the other men in their units. The experiment used a technique designed to give all unit members an opportunity for indirect participation in the maneuver by involving them actively with the observers. As the results have shown, this involvement produced a significant increase in the spread of information.

The procedure used in the experiment has already been described. It should be mentioned that there was no attempt to force the battery members to participate. They were provided with an opportunity and an effort was made to convince them that it was a real opportunity, but they were free to participate or not as they chose. Basically, the procedure was extremely simple. Therefore, there appears to be no reason why the findings of this experiment cannot be directly applied to problems of training and dissemination of information in general.

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This study received substantial help from staff members of this unit whose names do not appear on the title page. Important contributions were made by the following:

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