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MILITARY MEDICINE I

THE EFFECT OF ISOLATION UPON ATTITUDE, MOTIVATION, AND THOUGHT

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THE EFFECT OF ISOLATION UPON ATTITUDE, MOTIVATION, AND THOUGHT

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INTRODUCTION

This is a preliminary report on research aimed at finding out whether attitudes can be more easily affected under conditions of perceptual deprivation than they can be normally. At present we are unable to state whether this is so or not. However, we are able to produce some evidence in favour of the hypothesis, since we can show that, under such conditions, most individuals will listen with pleasure to material which they would normally avoid, and that they will think about what they have heard. In addition, we have demonstrated that perceptual deprivation (a) is very unpleasant for the subject, (b) causes confusion, disturbances of attention, and a striking fall in intellectual ability, (c) tends to produce hallucinations in some subjects and (d) affects motivation.

APPARATUS AND PROCEDURE

Before the experimental session, the subject is given a preliminary interview. During this interview, information is gathered about his health; and he is given a personality test, and, in the case of subjects used in the section of the experiment dealing with intellectual loss, he does the first half of the control run on the test problems. In the experimental situation, the subject lies on a bed in a small beaverboard compartment 4 feet wide, 5 and a half feet high, and 8 feet long. This cubicle is lighted by a shielded 40-watt bulb at the end nearest the subject's head. It has two glass windows through which the experimenter can observe the subject and a sliding door on one side. The subject wears goggles which allow diffuse light to pass through, but prevent him from seeing anything clearly. Gloves are placed on his hands, and he is fitted with cardboard tubes, or cuffs, which extend from just below the elbow to beyond the fingertips. His head rests in an aluminum headpiece, which is U-shaped to allow him to lie on his back or on either side, and which

has a thick lining of foam-rubber. Earphones are embedded in this lining, and by means of selector switches the experimenter can connect them through an amplifier to a microphone (for direct communication), a record player, or the hum of a 60 cycle stimulator. A microphone suspended near the subject's head allows him to communicate with the experimenter through a loudspeaker. EEG electrodes were attached to the first 12 subjects, and recordings made, in an attempt to find out how much time the subject spent asleep. This procedure was abandoned because the electrodes tended to come loose after a few hours.

The subject is kept in the apparatus at all times except when he is eating or going to the toilet. On these occasions the gloves and tubes are removed, and he is allowed to come out of the cubicle. The blindfold, however, is kept on for the whole session.

After the subject comes out of the cubicle at the end of the experimental run, he is asked to write a report. He is instructed to comment on how he felt, what he thought about, what he did to pass the time, and anything else about his stay in the cubicle that he can think of. After this, a recorded interview, based on a specially prepared questionnaire, is given.

The 22 subjects used have been males between the ages of 21 and 35. Four of these had a high school education; the remaining 17 were college graduates, or the equivalent. They were offered pay at the rate of \$20 per 24 hours to do the experiment.

The first 14 subjects had a 60-cycle hum coming through the earphones all the time, to minimize auditory perception. This tone was interrupted only to let them listen to records, or to let the experimenter communicate with them. Since some subjects were very upset by the constant hum, which had to be quite loud to be effec-

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tive, and since it seemed possible that this disturbance was due to excessive stimulation rather than perceptual deficit, the last 8 subjects were run without the persistent tone.

ATTITUDE CHANGE

This section of the work has been so far only exploratory and aimed at developing a suitable procedure. Before going into the cubicle the subject checks off statements which he agrees with, on an attitude scale. He then goes through the experimental period during which recordings are played to him, dealing with the same subject as the attitude scale, and afterwards is tested again. On the next day a control run is given. This time a different scale and a recording of a different talk are used. The procedure is the same, except that in this case the records are played to the subject while he was sitting in, or walking about, the experimental room. One of the two talks used is an argument for belief in ghosts, poltergeists and ESP phenomena; the other attempts to show by scientific arguments that the evolutionary theory is wrong. With 6 subjects only, the results show a mean change of 3.3 points on the attitude scale in a direction favorable to the talks under the experimental conditions, and one of 5.3 under the control (this difference is not significant).

There is some evidence suggesting that 24 hours is too short a time for all the effects of the experiment to wear off, and more adequate control procedures (including refinement of our *ad hoc* attitude scales) may show a different result.

GENERAL EFFECTS OF PERCEPTUAL DEPRIVATION

Ability of the Subject to Tolerate the Situation

In general after an initial period of adjustment, the subjects lie very quietly in the cubicle, and spend most of the time asleep. Their reports indicate that they are comfortable during this part of the experiment; some have expressed surprise that the task should be so easy, and have felt that they would be able to stay indefinitely. After this, periods of restlessness, accompanied

by a great deal of tossing, turning, and sighing, occur. These are described as being unpleasant, and to escape them the subject tries to sleep. If he is successful, another quiet period follows; then, the restlessness builds up again. These restless periods become more frequent, and last longer, as time goes on; this appears to be the reason why the subjects spent more time out of the cubicle having meals and going to the toilet in the second half of the experimental session than they did in the first half, since going out of the cubicle for a while also alleviates the uneasiness. It was noticed, also, that while tests were being given, or while listening to the records, the subjects tended to stop moving about and to lie quietly.

The mean time spent in the cubicle by the total group of 22 subjects, was 43.5 hours, with a range from 9 to 131. Eight of the subjects, however, had contracted to stay for only 24 hours, and one for 36. All of these stayed for the required time. All but two of these said that they had appointments immediately after the experimental session; these two subjects declined to continue when they were asked to do so. Of the remaining 13 subjects, 3 agreed to stay for periods from 36 to 72 hours, and 10 said that they were willing to stay a week. None of this group whose mean time in the cubicle was 58 hours, managed to stay for the agreed period.

Most of the subjects said that they were leaving simply because they felt that they had had enough of the experiment, and did not want to undergo the restless feeling any more. Four of the subjects compared the experiment to a torture, or jail situation, one of them reporting that he felt as if he were being torn apart, and that if he were to stay any longer he was sure that he was going to burst. Two subjects left with suspect excuses; one said that he had remembered an important appointment, the other said that he was sure that he had a fever. A clinical thermometer failed to show it.

There was increased irritability in all subjects towards the end of the experiment, and only two subjects, who had come for 24 hours, and who spent most of the time asleep, said that they had not found the experimental situation unpleasant. Six prospective subjects refused to do the experiment at all.

Eagerness for Perceptual Stimulation

There is a considerable amount of evidence to show that the subjects were eager for stimulation of some sort. All but two of them spent time exploring the cubicle with their cuffs, tapping the cuffs together, hitting the microphone with the cuffs, or exercising. Twelve of them whistled, sang or talked to themselves. In the final interview, 15 reported that they had wanted to see, hear, or move about while they were in the cubicle. There were frequent reports that they welcomed any event, such as having a meal, or being tested.

Willingness to Hear Records

In this part of the experiment the main object was to discover whether, during the experimental situation, the subjects would listen to material which they would normally avoid. The records used were (a) 8 repetitions of the 16 bar chorus of 'Home on the Range', (b) and (c) two talks for children taken from a religious primer, (d) radio soap commercials, (e) part of a stock market report, (f) numbers, and (g) nonsense syllables.

The subject was told that he could have the records whenever he asked for them, but, if he made no requests, towards the end of his stay in the cubicle one of them would be played anyway. During the final interview he was asked whether hearing the records made the experimental situation more bearable. Ten subjects felt that they did, four said that they did not make any difference, and two felt that they were detrimental.

The overall results show that the subjects would listen to the records. The mean number of requests made to hear the records (a request was scored if the subject asked for the record after hearing it once) for the whole group was 8.2, with a range from 9 to 27. Since the mean time spent in the cubicle by this group was approximately 49 hours, this means that on the average the subject would ask for a record every 6 hours.

There was some variation in the material available to the subjects. Thus, the first three subjects had records (a), (b), and (c); however, because the mean number of requests for this group was very high (18), it was decided to limit the stimulation available to one type of material

(radio commercials) which is generally accepted as being unpleasant. A further group was made to listen to all the records before going into the cubicle, and to rate them on a scale. The three records which were rated lowest were made available. From an analysis of the ratings given to the records by the subjects, it was found that all of the materials used would not ordinarily be listened to. It was generally agreed, for instance, that if the subject were at home listening to a radio, and the type of material used in the experiment were to come over the station to which they were listening that they would switch to a different station. Also, they agreed that if they had the records at home they would never play them.

Since all the records appeared to be unpopular, the remaining five subjects had available to them records (a), (b), (c), (d), and (e), without rating them first. The average requests for this group was one per 8 hours.

There was some suggestion from the results obtained that listening to the records before going into the cubicle may make the subject more antagonistic to them than hearing them in the cubicle for the first time. It would therefore be possible to make some test of attitude change by playing the records to one group before going into the cubicle, and letting another hear the records for the first time after they had been in it for some time, and then finding out whether there was any difference between the groups in the number of requests made.

Unfortunately, during the course of the experiment there were several major changes made in the apparatus and procedure. Therefore, there appears to be no justification for a detailed analysis of the data we have at present. However, the conclusion that the subjects were willing to listen to material which they would normally avoid appears justified.

It should be emphasized that there are large individual differences in the number of requests made. Some subjects make no requests because, they say, they feel no need to do so; others regarded asking for the records as a sign of weakness. Four subjects reported that they would have asked for the records more often if they had not been afraid of becoming dependent on them.

INTELLECTUAL EFFECTS

Fourteen subjects reported that they were unable to think normally while they were in the cubicle. They said that they had great difficulty in thinking about a single topic for any length of time, and that in general they just let their minds wander. Subjects who went into the cubicle with the intention of thinking about their work, or about personal problems, found, in general, that they were unable to do so; problem solving attempts required so much effort, and were so inefficient, that most subjects were content to spend the time day-dreaming, and letting their thoughts drift.

To get some objective measure of this falling-off in intellectual ability, eight subjects were tested on five different types of problems while they were in the cubicle, and their scores compared with those obtained in a control run while they were not in the box. The tasks used were (a) completing a number series, (b) solving problems which involved mental arithmetic, (c) making as many words as possible in 5 minutes, using the letters of a given word, (d) simple multiplication, and (e) anagram problems in which the subject was given a set of letters and required to make a single word from them. There were two matched forms of the test; four subjects were given form A on the control session, while the remaining four had form B as control.

After a preliminary practice period, each subject was given five groups of problems, each group containing an example of each type of problem. This was the first half of the control run. During his stay in the cubicle he was tested on ten groups from the alternate form of the test. A few days after the experimental session, he was tested on a further five groups of problems from the control form of the test. Thus, for every problem that was given in the cubicle, a comparable one was given under control conditions. The subject worked at each problem until he arrived at the correct solution. If he gave the wrong answer, he was told to try again until 10 minutes were up. Wordmaking problems, however, had a five minute limit; the anagram problem had no time limit, but the subject was told the first letter of the solution at the end of 4 minutes, and given another letter at the end of each succeeding three-minute period.

There was no difference on the multiplication and the number series tests. On the mental arithmetic test, the scores made in the experimental conditions were inferior to the control scores at below the five per cent level of confidence; on two others (the anagrams) the difference was significant below the one per cent level.

The differences were in time scores only, except in the case of the wordmaking problem, where the number of words made was scored. There was no significant difference as far as the accuracy of the solution (as measured by the number of wrong answers given) was concerned, though there was a trend in favor of the control situation.

Hallucinations

Five subjects have reported having vivid visual images while they were in the cubicle. These varied from perfectly still, formal patterns such as might be found on wall-paper, to moving sequences of images, dream-like in their incongruity. These hallucinations were in some cases so vivid that it was as if the subject were seeing images projected on to a screen before him; the clearness of the experiences was novel to him, and he was able to watch what was happening with a great deal of amusement. Thus, one subject reported seeing a snowy slope, with an open manhole on it. An arm came out of the manhole, and began to pick postage stamps off a clothes-horse. The subject was very emphatic that the scene was as clear as if he were watching it happen. Only one subject reported having auditory hallucinations; this individual said that he heard voices, one of them talking about 'killing'. This man, however, seemed to be somewhat unstable, and we do not know whether this had happened to him before.

After-effects

There is some evidence which suggests that there are after-effects when the subjects come out of the cubicle. Nine subjects reported giddiness or lightheadedness. Also, there is a tendency for them to misspell words ('fo' for 'of', 'struct' for 'struck') while they are writing their reports. We do not have any control data on this, but it seems unlikely that this type of error would be so common in a group of the educational level

of the subjects. Two subjects have reported thoughtlessness (forgetting to close doors and so on) or 'wooziness' on the day after the experiment.

Sleep

Twelve subjects reported that they slept more than usual while they were in the experimental situation, and five felt that they had slept less. There was some tendency for the subject to spend long periods of time not knowing afterward whether he had been asleep or awake. The experimenters feel, however, from the observations that they were able to make, that at least in the early part of the experiment most of the subjects spent an excessive amount of time in sleep.

Confusion

Most of the evidence for this is taken up in the discussion of intellectual impairment. However, there are two other pieces of evidence which are relevant. One subject spontaneously reported that he could not remember whether he had been tested before or after his last meal. There was also a tendency for subjects to be unsteady while they were being led to the washroom after they had been in the cubicle for some time. One subject, towards the end of his run, was unable to find his way out of the washroom, though he had been in it several times before.