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Cognitive Dissonance in Task-OrientedGroups Under Intermittent and Continuous Success

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COGNITIVE DISSONANCE IN TASK-ORIENTED GROUPS

UNDER INTERMITTENT AND CONTINUOUS SUCCESS

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A.H.S

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CHAPTER I

INTRODUCTION

One of the ways in which life may be characterized is by a desire for consistency. A person, however, may acquire thoughts, feelings, or beliefs which are not fully consistent with those already held. In other words, some elements of cognition are dissonant with others. Considering just two elements, Festinger (1957) states that if the obverse of one element could follow from the other, then they are in a dissonant relation. When this occurs, a person's knowledge is not consistent. Since this is psychologically distressful, the person must resolve this inconsistency. In other words, action must be taken to reduce the dissonance.

Under different conditions, the magnitude of the dissonance will vary and is said to be a function of the importance of the elements. More effort is likely to be expended in reducing dissonance produced by relatively important elements.

For years, the social psychologist has been attempting to predict, and what is more important, understand the formation and change of attitudes and opinions. The complexity of such processes has been handled by calling attention to numerous intervening variables such as motivation, attention, emotion, and perception. The apparent simplicity of Festinger's theory has provided a welcome relief for researchers. As Chapanis and Chapanis (1961) point out, the "...ease with which imponderably complex social situations..." can be handled by this theory has led to a great deal of interest and experimentation (Chapanis and Chapanis, Jan., 1961; p.2).

An example of such research is a study by Aronson and Mills (1959). The subjects in the study were college women who volunteered to participate in a series of group discussions on the psychology of sex. The women were divided into two groups. Members of the first group were required to read embarrassing descriptions of sexual activity and a list of obscene words to the male experimenter in order to participate in the discussions. Members of the second group were required to read only a comparatively tame passage. The discussions, which were quite dull in content and conducted in a boring manner, were the same for both groups. It was found that those who endured as an "initiation" some unpleasantness enjoyed the discussion more than those members of the control group. Following the theory, the experimental

group acquired cognitive dissonance which they reduced by finding "extra attractions" in the situation (Festinger and Lawrence, 1962).

Finding that the theory of cognitive dissonance often provided suitable explanations for human behavior, Festinger then turned to animal studies dealing with partial reinforcement. There are many theories in the area and, according to Festinger, many of these theories explain the effects of partial reinforcement only with great difficulty. In partial reinforcement, a paradox results. Reward strengthens a habit, and yet those subjects who receive partial reinforcement training acquire habits which are more resistant to extinctions than those subjects under continuous reinforcement. Experimentation with delays of reward and the expenditure of effort has led to similar results. Festinger states that anything which hinders the animal in reaching an expected goal by the easiest possible method in a given test situation produces dissonance. The core of Festinger's "...formulation is that dissonance is a motivational state." (Festinger and Lawrence, 1962; p.44) The animal acquires a drive to reduce dissonance. The animal can do this by either changing his behavior. Since in most studies, the former is prevented, the rat reduces dissonance in the latter method by finding "extra attractions" in the situation. This dissonant reducing behavior is now consonant with the act. The strength

of the habit will depend upon the over-all importance of the consonant relationships (Festinger and Lawrence, 1962).

Festinger has had considerable success in explaining the behavior of rats, even though his theory was originally constructed with human beings in mind. The question of major importance is whether the theory will be adequate in explaining more complex human behavior in the partial reinforcement or intermittent success situation. In other words, the question is, can the theory now be returned to human behavior in this partial reinforcement framework.

In a recent study by Burke (1961), the psychological effects of participation in task-oriented groups were studied. This study incorporated selected communication networks, the wheel, circle, and the all-channel, from a number of experimental arrangements that were conceived and developed by Bavelas (1950). Burke's eighteen five-man groups were seated at a partitioned table containing slots in a center post through which written messages could be sent. This apparatus was similar in design to the table first used and described by Leavitt (1951). The groups worked on a task that required the members to find one symbol among five that was common among all five group members. Fifteen trials were given to each group.

Half of the groups were subjected to continuous success on trials 1-10. The remaining nine groups experienced

intermittent success on trials 1-10. All groups experienced continuous non-success during trials 11-15. It was found that this induced success and non-success had a differential effect on the group members. Burke interpreted this effect in terms of Festinger's theory of cognitive dissonance.

Members of the intermittent success groups were more satisfied with their groups' performance during the last five trials than were members of the continuous success group. The reason given for this was that the individuals in the intermittent groups had reduced their dissonant feelings by expressing more positive attitudes about their groups than had members of the continuous success groups.

Although the results of this study are encouraging, a limitation was found in the experimental design. The limitation was that there was not a sufficient difference between the continuous and the intermittent success schedules to permit a consistently significant difference in satisfaction among the groups' members. It will be the purpose of this study to give conclusive evidence of the reliability of Burke's findings.

In task-oriented groups which vary in the degree of centralization of their communication structure, the amount of dissonance produced in a member should be a function of the amount of commitment to or responsibility for task performance and the degree of success the group experiences in

performance. The responsibility for or commitment to task performance will vary directly with the centrality of a member's position in the task structure and the amount of effort made to attain such a central position. If, initially, all members are central in the communication structure, then for efficient task performance the group must organize itself into a message passing system so that one member assumes a more central position. The all-channel network is an example of this type of communication structure. Guetzkow (1960) demonstrates that such a task organization develops through a particular member exerting special effort to place himself in a central position and gain consensus regarding his leadership position in the task structure. Under conditions in which the communication network is initially highly centralized, a member in a central position for passing task messages is imposed on the group by the given restrictions of the network. No special effort is required to attain or to develop group consensus regarding such a position. The wheel network is an example of this type of communication structure.

The type of roles studied in the present investigation followed the distinction set forth by Guetzkow (1960). The "keyman" role was performed by group members whose specialized function it was to receive information, form the solution, and send answers. The "endman" role consisted of members who merely sent their own missing information to others and then

later received the answer to the problem.

The type of communication networks studied were the wheel and the all-channel. The wheel network is the more centralized of the two structures. In this network four of the five members in the group can communicate only with the fifth member, the person in the central position, i.e., the "hub" of the wheel. The central member, however, can communicate with everyone. In the all-channel network all channels of communication are open to every group member. These networks are fully described in Bavelas (1950), Leavitt (1951), and Guetzkow and Dill (1957).

From the above descriptions it can be seen that the member of a wheel network who happens to sit in the cubicle where all channels of communication are open to him has automatically assumed the keyman role. He has no other choice. In working on the task, the other four group members can communicate only with him, the keyman. In the all-channel communication network, however, since it is initially an uncentralized structure, any one of the five group members can assume the keyman position by his own initiative.

In general, it is hypothesized that cognitive dissonance should tend to be greater, and as a result attempts at dissonance reduction should be greater, for individuals who by their own effort occupy the keyman roles under conditions in which the group is not continually successful. As stated

above, this keyman must perform some action that will persuade the remaining persons in the group to accept him as the leader. Any action by the group that produces poor performance will reflect on his leadership, and as a result, produce dissonance for him. Intermittent success should create dissonance for the keyman in that half the time his group is quite successful and half the time it is not. He will know that his group is capable, under his leadership, of highly successful performance, but it will seem that they cannot remain at this exceptionally high level.

Since the highly ambiguous nature of their groups' performance will be a source of dissonance, the most direct way for the keymen to reduce dissonance will be in their evaluation or perception of group performance. Hence, the keymen of the all-channel networks confronted by intermittent success should evaluate their groups' performance higher than the keymen in the wheel network and the keymen of the all-channel network under continuously successful conditions. Since keymen under both continuous and intermittent success conditions will have major responsibility for and commitment to group performance, and since performance under either success condition is never perfect, their evaluation of group performance should tend to be higher than that of the relatively uncommitted endmen. This might not be true in the wheel because keymen and endmen will occupy their roles of

responsibility purely by the circumstance of the network. No effort will be required on their part to gain the position of keyman. Thus, even in successful groups keymen should tend to view performance as better than more peripheral members, except where dissonance is zero, i.e., where maximum success is continuously obtained.

If keymen reduce dissonance by taking a more positive view of their groups' performance, then they would not be expected to differ in their attraction to the group. Nevertheless, the keyman's role is more interesting and powerful than that of an endman. The latter position should generate dissonance for its occupants in that they will be forced to maintain membership and interact even though they hold relatively dull roles and will do little or nothing to attain their position. The proposed reduction of this dissonance may be manifested in the tendency of peripheral members to devaluate group performance and reduce the attractiveness of their group.

To be more specific, the predictions are stated in the following seven hypotheses. With respect to rating their respective group's performance and their own job satisfaction:

1. Keymen in all-channel (AC) communication networks, as compared with keymen in wheel (W) networks, will give higher ratings.

2. Keymen who experience intermittent success, as compared with keymen who experience continuous success, will give higher ratings.

3. Keymen in AC communication networks who experience intermittent success, as compared with all other keymen, will give higher ratings.

4. Regardless of experimental condition, keymen will give higher ratings than endmen.

5. Endmen in AC communication networks, as compared with endmen in W networks, will give higher ratings.

6. Endmen who experience intermittent success, as compared with endmen who experience continuous success, will give higher ratings.

7. Endmen in AC communication networks who experience intermittent success, as compared with all other endmen, will give higher ratings.

CHAPTER II

EXPERIMENTAL PROCEDURE

Subjects

The eighty subjects used in this study were male undergraduate college students at the University of Richmond enrolled during the regular session 1964-1965. Some subjects took part in the study to fulfill a requirement of students taking the Introductory Psychology course, while others took part to fulfill a requirement of students taking a human relations course. The majority of the subjects were sophomores and juniors.

The subjects were divided into sixteen five-member groups. The groups were formed when subjects reported to the experimental room on the basis of prearranged times chosen by them at their convenience.

Apparatus

With slight variations, the Leavitt (1951) modification of the Bavelas (1950) communication apparatus was used.

Five subjects were seated around a circular table, screened from each others' view by five radial partitions. Each cubicle, created by the partitions, was painted a different color, i.e., red, green, orange, brown, and blue, so that each member could be identified by color. During the trials, the subjects passed messages through slots in their cubicles to each other on cards. The cards contained a printed heading where the name of the color of both the sender and the receiver was placed by the subjects.

The time required for the group to complete the task was recorded by means of a stop watch.

Procedure

As the subjects entered the experimental room, they were asked to choose any seat and sit down. After the five members of the group were seated in their respective seats at the table, the following instructions were read to them:

> The instructions for this experiment will be read to you to insure that each group tested receives identical instructions covering all important areas of the experiment. From this time on, it is important that you do not speak to other members of the group or look in the other members' cubicles. Please remain seated for the entire experiment, and do not stand up or lean back in your chairs.
>
> The purpose of this procedure is to evaluate how groups work together in solving problems when communication is limited to written messages. It has been found that a procedure such as this can be used to single out groups with different levels of skillfulness, efficiency, and creativity. The Psychology Department has become quite interested in estimating

how productively students can work together in groups. The score a group receives will depend on how its performance compares to that of a number of groups of students at the University of Texas who have worked on the same type of problem in the same type of situation. In other words, you will be pitting your skill against that of students from the University of Texas.

The first question that has probably entered your mind is, "What is the problem to be solved?" or, "What type of problem is it?" Each member will receive a slip of paper similar to this one (sample shown) having five different symbols on it. Your task is to determine which symbol of the five you receive is common among all the members of your group. There will be only one common symbol for each problem. In other words, one and only one of the symbols you receive will be held by all other members of the group.

Each subject's slip of paper contained five of six possible symbols. The six possible symbols were arranged so that for each trial the five subjects received a different combination of five symbols with only one symbol being common among all the group members. As stated in the instructions, the problem was for every member to find the common symbol.

After a sample slip of paper containing five symbols was shown, the experimenter continued the instructions:

Communication within the group will be limited to written messages. As you can see, the table is divided into five colored cubicles and each person may be identified by one of the cubicle colors: brown, blue, red, green, or orange. The message cards that you will use for sending your messages are the oblong cards stacked in your cubicle. You are to write in your own color and the color representing the person to whom you are sending the messages.

The content of the messages you send is for your group to decide. You may draw symbols, write sentences, or abbreviate if you wish. Write each message you send on your own message card. Do not send messages or message cards you have received, or relay message cards from one member to another.

After you have filled out the heading of the message card and have written your message, the next step is to send it. The four closely grouped vertical slots located in the center-post of the table are the sending slots. You simply slide the message card into the slot that has the same color as the person to whom you have written. The other slots are receiving slots. Do not send messages through the receiving slots.

The following paragraph was read to the wheel groups only:

You will notice that some of the sending slots in your cubicle are covered by white cardboard tabs. You are not to send messages through these slots during the problem solving trials.

When you feel that you have solved the problem by finding the common symbol, circle the symbol you believe to be the answer on your problem slip, and then place it on the edge of the center post of the table (demonstration given). Even if you have solved the problem and have indicated this by putting your problem slip on the center of the table, you may still answer any messages you receive. Remember that a trial is not complete until all members indicate that they have a solution. When all the members have a solution, I shall terminate the trial and collect the messages you have received.

Since the time required to solve a problem is partially dependent upon the total number of messages sent by the group during the trial, it is to your advantage to organize as efficiently as possible. That is, organize so that a minimum of messages, and therefore a minimum of time, is required. There may be several ways in which your group may organize. Try and select the fastest and most efficient organization available to your group.

Induction of Success

After the instructions were read the experimenter explained that following each problem trial, the group would be given a "score" which would indicate how well the group performed. It was also explained that this "score" was based on a comparison of the time required by their particular group on a specific trial to complete a problem with the time required by a large number of similar groups in an identical situation. The "scores" given were percentages which indicated what proportion of the comparison groups were surpassed by the present group.

The "scores" served as the success or non-success experience depending on whether or not the score reported to the groups was above or below 60 per cent; i.e., depending on whether or not the group was told that it performed above or below the 60th percentile of groups to which it was being compared.

Regardless of the time that it took for a particular group to finish a problem, a certain score was reported to the group depending upon whether or not the group's treatment was of continuous or intermittent success. The scores and comments that were used throughout the study were presented in Appendix A.

A total of fifteen problem trials were given. For trials 1-3, the number of success experiences was the

same for all groups; i.e., each group received the same score. On trials 4-10, the success experiences were made intermittent for one half of the groups and continuous for the other half. Continuous non-success was introduced on trials 11-15. All groups were treated identically for the last five trials.

Experimental Groups

The sixteen groups which were investigated were divided according to communication network and success schedule. Eight groups received an intermittent success schedule and the other eight received a continuous success schedule. Each success schedule condition contained four groups with an all-channel communication network, and four groups with a wheel network. The experiment, therefore, consisted of four groups of five S's under each of the following conditions:

all-channel, continuous success (AC-C)

all-channel, intermittent success (AC-I)

wheel, continuous success (W-C)

wheel, intermittent success (W-I)

Evaluation of the Test Situation

A questionnaire (Appendix B) was administered immediately following the last trial. It consisted, for the most part, of items adapted from Leavitt (1951). Questions were asked about job satisfaction and group performance in

Leavitt's study. In the present study, however, the questions asked on group performance and job satisfaction were for specific blocks of problem trials, trials 1-10 and 11-15. Thus, the person was asked to evaluate his group's performance and to estimate his job satisfaction as he recalled it for separate blocks of trials, 1-10 and 11-15.

The keymen, and endmen were identified from questions 1-3 of the post-questionnaire (see Appendix B). The answers to these questions indicated whether or not each group had a leader and also what type of system each group used for communicating to solve the problems.

CHAPTER III

RESULTS

Induction of Independent Variables

Position and Satisfaction. It has been found in past studies of task-oriented groups that the satisfaction of a group member increases as the centrality of his position increases. In the present study, it is assumed that similar psychological consequences result when different positions in the group are held. These psychological effects should be reflected in the comparison of satisfaction ratings for the roles which differ in centrality of group position. The analysis was made with the use of a t-test of the ratings of satisfaction with one's role. Item 7 of the questionnaire was used as a measure of each individual's satisfaction over the entire experiment. This item of the questionnaire was scored so that a low score would be indicative of more satisfaction than would a high score. There was a significant difference between all keymen, $\bar{X} = 2.31$, and endmen, $\bar{X} = 4.44$. A t of 4.10 was obtained which was significant beyond the

.01 level of significance (Table 1).

It is an accepted fact that in studies involving communication networks, persons in key positions involving responsibility for group performance, will be more satisfied with their jobs than those persons who have had comparatively little to do with success of the group. Since there is a great difference between keymen and endmen with respect to job satisfaction, we can assume that persons of each group were aware of the network or organization of their group.

Success of Performance. It can also be assumed that the success variable was successfully induced if members of groups who were only intermittently successful perceive their groups' performance as being poorer than members of groups who were continuously successful. The differences in evaluation of the trials as a whole (question 9 on the post-questionnaire) were compared for all individuals under continuous success conditions. Group members who are on a continuous success schedule should give a higher evaluation of group performance than those individuals who are only intermittently successful. Individuals under the continuous success schedule, with a mean of 2.78, did give their groups a higher evaluation than did those individuals under the intermittent success schedule, the mean of the latter group being 3.43. The difference in means resulted in a t of 2.60 which

was significant beyond the .02 level of significance (Table 8).

Furthermore, keymen as well as endmen of both the all-channel and wheel networks reported that their groups did not perform as well on trials 11 through 15 as they had on the first 10 trials ($F = 5.71$, $.05$, Table 4). This is evidence of some consequence, since the scores given to groups of both networks were identical, and indicated non-success on trials 11 through 15.

Since the independent variables were shown to have been successfully induced, the hypotheses may now be discussed with respect to the reported results. Generally, the results tend to support the stated hypotheses. The results also indicate, however, that the psychological consequences produced by the task-oriented problem solving procedures were more complex than had been anticipated.

Evaluation of Job Satisfaction by Keymen

In order to test the first three hypotheses, a three factor repeated measures ANOV was performed, the factors being network (N), success (S), and three items from the questionnaire (Q) concerned with job satisfaction (items 7, 8A, and 8B, see Appendix B). The two levels of N consisted of all-channel (AC) vs. wheel (W), and the two levels of S were continuous (C) vs. intermittent (I). It will be recalled that the hypotheses stated that with respect to job

satisfaction, (1) keymen in all-channel (AC) communication networks as compared with keymen in wheel (W) networks, will give higher ratings, (2) keymen who experience intermittent success, as compared with keymen who experience continuous success, will give higher ratings, and (3) keymen in AC communication networks who experience intermittent success, as compared with all other keymen, will give higher ratings.

Although no differences were found for main effects or double order interactions, the one triple order interaction was significant (Table 3). Upon close examination of this interaction, examining the data for simple main effects, (see Figure 1) it appears that keymen who experienced intermittent success in the AC situation, were more satisfied with the first ten trials than were keymen who had been continuously successful in the all-channel situation ($F = 3.27$, $.10$). On the other hand, keymen of the wheel network showed no differences in satisfaction on these early trials, regardless of the success schedule. Thus, the three hypotheses received partial support but not quite as strongly as predicted and not quite as simply as predicted. This finding seems to support the third hypothesis more directly than it supports the first two hypotheses.

Evaluation of Group Performance by Keymen

It will also be recalled that the same three hypotheses were made in regard to ratings of group performance by the

keymen. To test these hypotheses, another similar three-factor ANOV was performed, the only difference being the questionnaire items (items 9, 10A, and 10B, see Appendix B). These items provided measures of reported performance over the trials as a whole, the first 10 trials, and the last 5 trials respectively.

Again the results are somewhat more complex than specifically stated in the hypotheses. Although no main effect differences were found for Network or Success, a significant NxS interaction did occur (Table 4). Examination of the simple main effects of this interaction (Figure 2) showed that keymen under intermittent success in the all-channel situation were more satisfied with their performance than were keymen under intermittent success in the wheel network. There was no difference, however, between keymen of the wheel and all-channel networks under the continuous success schedule.

The examination of this two factor interaction also showed that keymen intermittently successful in the all-channel network rated their groups' performance higher than all-channel keymen who were continuously successful. In the wheel network, however, those continuously successful rated their groups' performance higher than those who had been intermittently successful (Figure 2).

In this same ANOV, the questionnaire factor (Q)

produced a significant F of 5.71 at the .05 level of significance. With the use of a Duncan test of the difference between ordered means, it was found that the mean obtained for item 10B differed from the mean obtained for item 10A. In other words, keymen were less satisfied with their groups' performance on trials 11 through 15 than they were with their performance on trials 1 through 10.

Thus, the hypotheses were partially supported. Keymen in the all-channel communication networks did give higher performance ratings than did keymen of the wheel networks, but only when under the intermittent success schedule. This was to be expected since it was proposed that keymen in the all-channel networks would be more dissonant than would keymen in the wheel network, since keymen in the wheel network situation did not of their own accord choose to be the keymen. The same, however, was not true for those keymen under a continuous success schedule. Possibly the continuous success schedule did not produce enough dissonance, which if such was the case, it would not be reduced by rating one's group high in performance. On the other hand, it is possible that the continuously successful keymen also experienced dissonance, but lowered it in another way, not measured by the questionnaire.

Keymen Compared with Endmen

Hypothesis number four stated that regardless of experimental condition, keymen would have higher job satisfaction and rate the groups' performance higher than the endmen would.

First, with respect to job satisfaction, keymen and endmen were compared over the entire set of 15 trials, question 7 of the post-questionnaire. As noted earlier in regard to position and satisfaction, keymen were indeed more satisfied with their job ($P < .01$, Table 1).

Secondly, concerning ratings of group performance, keymen and endmen were compared over the entire set of 15 trials, question 9 of the post-questionnaire. A t-test shows that there was no significant difference between the two groups (Table 1). Since the questionnaire was proved to be sensitive for items dealing with job satisfaction, it is not likely that it would be insensitive to feelings concerning performance ratings. The direction for the questionnaire included a phrase which expressed the need for the subjects to give their "honest" opinions in answer to the questions. It is possible that in trying to follow the directions and be objective about the situation, they recalled the scores which had been given.

Evaluation of Job Satisfaction by Endmen

In order to test the last three hypotheses, a three factor repeated measures ANOV was performed, the factors being the same as they were for keymen, network (N), success (S), and three items from the questionnaire (Q) concerned with job satisfaction (items 7, 8A, and 8B, see Appendix B). It may be recalled that the two levels of N were represented by AC and W, the two levels of success represented by C and I. Concerning job satisfaction, the hypotheses were: (5) Endmen in AC communication networks, as compared with endmen in W networks, will give higher ratings. (6) Endmen in AC communication networks who experience intermittent success, as compared with endmen who experience continuous success, will give higher ratings. (7) Endmen in AC communication networks who experience intermittent success, as compared with all other endmen, will give higher ratings.

No differences were found to be significant (Table 5). Statistically speaking, this seems to indicate that the satisfaction of endmen did not change during the experiment. Although this was certainly not predicted, it would have been predicted if it had been expected that endmen would not experience dissonance. The very fact that endmen have little commitment or responsibility to the group might explain a lack of dissonance. Thus, the hypotheses receive

no support. Neither are they rejected however, since without statistical significance, we can come to no straightforward conclusion.

Evaluation of Group Performance by Endmen

Once again, as it was with keymen, the same hypotheses were used to predict the performance ratings as were used to predict satisfaction ratings. In order to test these hypotheses, another three-factor ANOV was performed. This ANOV differs from the last only in that items 9, 10A, and 10B of the questionnaire are used.

The results obtained from this ANOV are also more complex than was anticipated. One main effect difference was found to be statistically significant. The S factor produced an F of 7.46 which was significant at the .01 level of probability. It indicated that intermittently reinforced endmen were not as satisfied with their groups' performance as continuously reinforced endmen. The ratings given by endmen are in keeping with the scores given them by the experimenter after each trial. The intermittent groups were given a greater number of low scores than were continuous groups.

The only other statistically significant F in this ANOV was for factor Q (F = 27.91, .01 level, Table 1). See Figure 3. With the aid of a Duncan test, this difference was

accounted for by the fact that endmen gave lower ratings of their groups' performance on the last five trials than they did on the first 10 trials. This result is in keeping with the other two significant differences noted for endmen. In keeping with Festinger's theory of cognitive dissonance, this result suggests that the endmen were not dissonant. It further suggests that the questionnaire was a sensitive measure of differences in the reactions of the endmen at different stages of the experiment.

Interest in Tasks

Although no predictions were made concerning the subjects' interest in the tasks, this additional information is worthwhile considering. Item number 12 of the questionnaire was the measure of one's interest. A two factor ANOV was used to analyze the responses given by keymen. A similar ANOV was used with respect to endmen. The two factors under consideration were N and S.

No significant differences were noted in the interest of keymen under the different experimental conditions (Table 7). The analysis of the data on endmen, however, resulted in one significant difference. An F of 5.23 ($P < .05$, Table 8) indicated that endmen who were intermittently successful were less interested in the tasks than continuously successful endmen. This result was not expected. Following the theoretical orientation of Festinger's, one would expect that

those persons under intermittent success would report that they were more interested and in that way reduced dissonance. Doubt concerning the arousal of dissonance on the part of the intermittent endmen must be expressed. If, however, no dissonance was aroused, the present result would be expected, since if one is not committed to something and he does not do well, he will have no cause to report interest.

A t-test was used to analyze the difference between the interest of keymen and the interest of endmen. As might be expected, the keymen with a mean of 2.63 were found to be more interested than endmen with a mean of 3.86. The difference represented by a t of 2.20 was found to be statistically significant at the .05 level of probability (Table 9). The greater interest of keymen is to be expected. Those keymen in the all-channel situation would not have become keymen if they had not been more interested than the endmen in the same situation. Other keymen might become extrinsically interested than endmen because of their responsibility to their groups to do a good job.

TABLE 1

Comparison of Means between Keymen and Endmen

for Job Satisfaction Ratings

Keymen (N=16)	Endmen (N=64)	t	P
3.31	4.44	4.10	.01
for Performance Ratings			
2.88	3.16	.93	NS

TABLE 2

Comparison of Means between Subjects under Continuous Success and Subjects under Intermittent Success

Continuous (N=40)	Intermittent (N=40)	t	P
3.78	3.45	2.60	.02

TABLE 3

Summary of Analysis of Variance
of Satisfaction Ratings by Keymen

Source	df	MS	F
BS	15		
N	1	3.00	
S	1	6.75	
NxS	1	.34	
Subj.w/in grp	12	9.10	
WS	32		
Q	2	.88	
NxQ	2	1.94	2.62 NS
SxQ	2	1.34	1.77 NS
NxSxQ	2	5.90	7.97 *<.01
QxSubj.	24	.74	

TABLE 4

Summary of Analysis of Variance of Performance Ratings of Keymen

Source	df	MS	F
BS	15		
N	1	1.34	
S	1	.09	
NxS	1	10.07	6.16 *<.05
Subj.w/in grp	12	1.63	
WS	32		
Q	2	9.53	5.71 *<.05
NxQ	2	.14	
SxQ	2	2.77	1.66 NS
NxSxQ	2	1.91	1.14 NS
QxSubj.	24	1.67	

TABLE 5

Summary of Analysis of Variance
of Satisfaction Ratings by Endmen

Source	df	MS	F
BG	63		
N	1	15.75	2.06 NS
S	1	23.38	3.06 NS
NxS	1	.05	
Subj.w/in grp	60	7.63	
WG	128		
Q	2	7.04	2.24 NS
NxQ	2	.92	
SxQ	2	2.73	
NxSxQ	2	2.95	
QxSubj.	120	3.14	

TABLE 6

Summary of Analysis of Variance
of Performance Ratings by Bndmen

Source	df	MS	F
BS	63		
N	1	.52	
S	1	17.52	7.46 *<.01
NxS	1	.09	
Subj.w/in grp	60	2.35	
WS	128		
Q	2	53.38	27.91 *<.01
NxQ	2	.32	
SxQ	2	3.60	
NxSxQ	2	5.66	2.96 NS
QxSubj.	120	1.91	

TABLE 7

Summary of Analysis of Variance
For Interest in Tasks Reported by Keymen

Source	df	MS	F
N	1	4.00	
S	1	.25	
NxS	1	.00	
error	12	4.29	

TABLE 8

Summary of Analysis of Variance
For Interest in Tasks Reported by Endmen

Source	df	MS	F
N	1	.14	
S	1	23.76	5.23 * $<.05$
NxS	1	3.52	
error	60	4.54	

TABLE 9

Comparison of Means between Keymen and Endmen for Interest in Tasks

Keymen (N=16)	Endmen (N=64)	t	P
2.63	3.66	2.20	.05

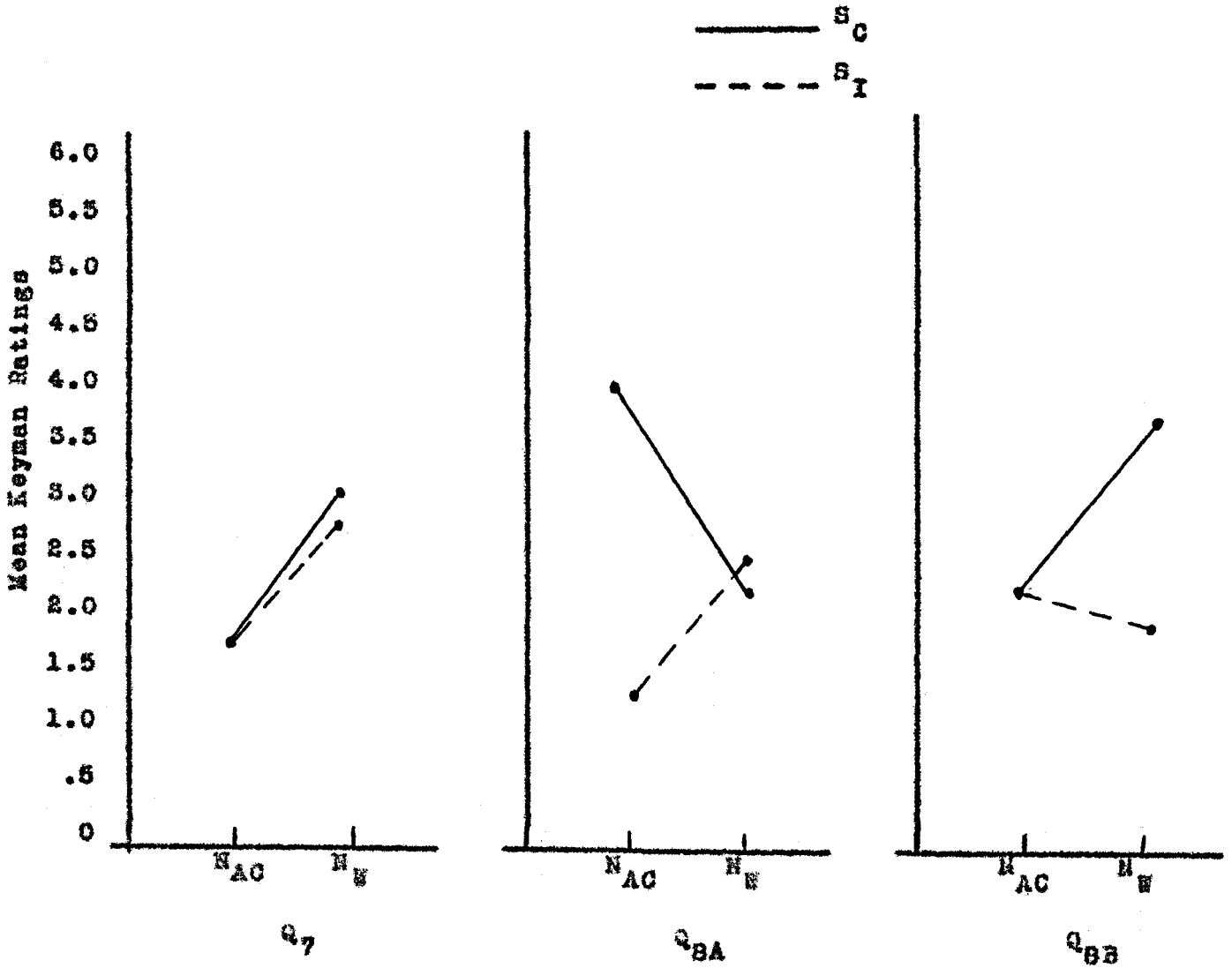

Figure 1. Ratings of individual job satisfaction as a function of Communication Network, Degree of Group Success, and Trials.

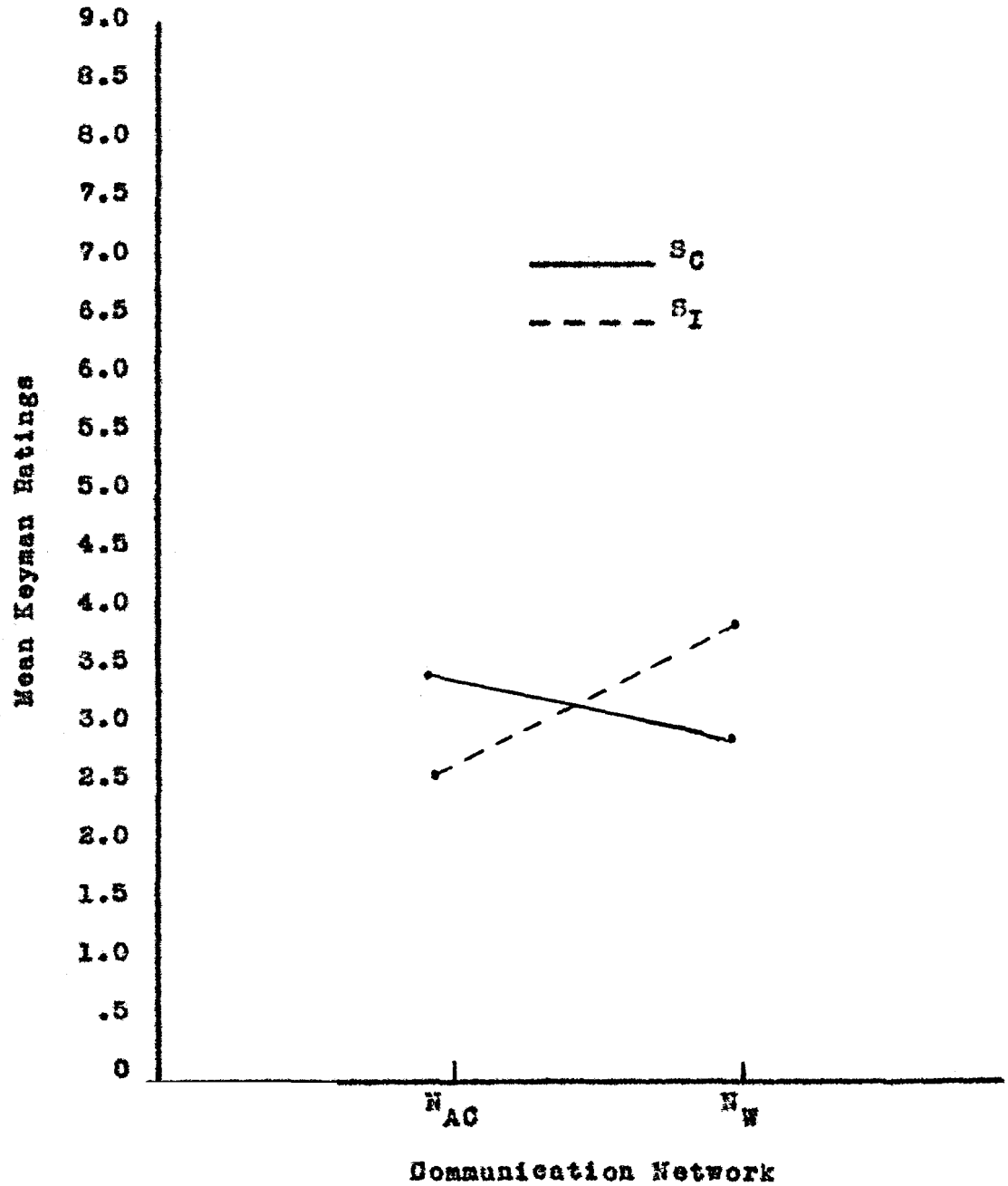

Figure 2. Ratings of Overall Group Performance as a Function of Communication Network and Degree of Group Success.

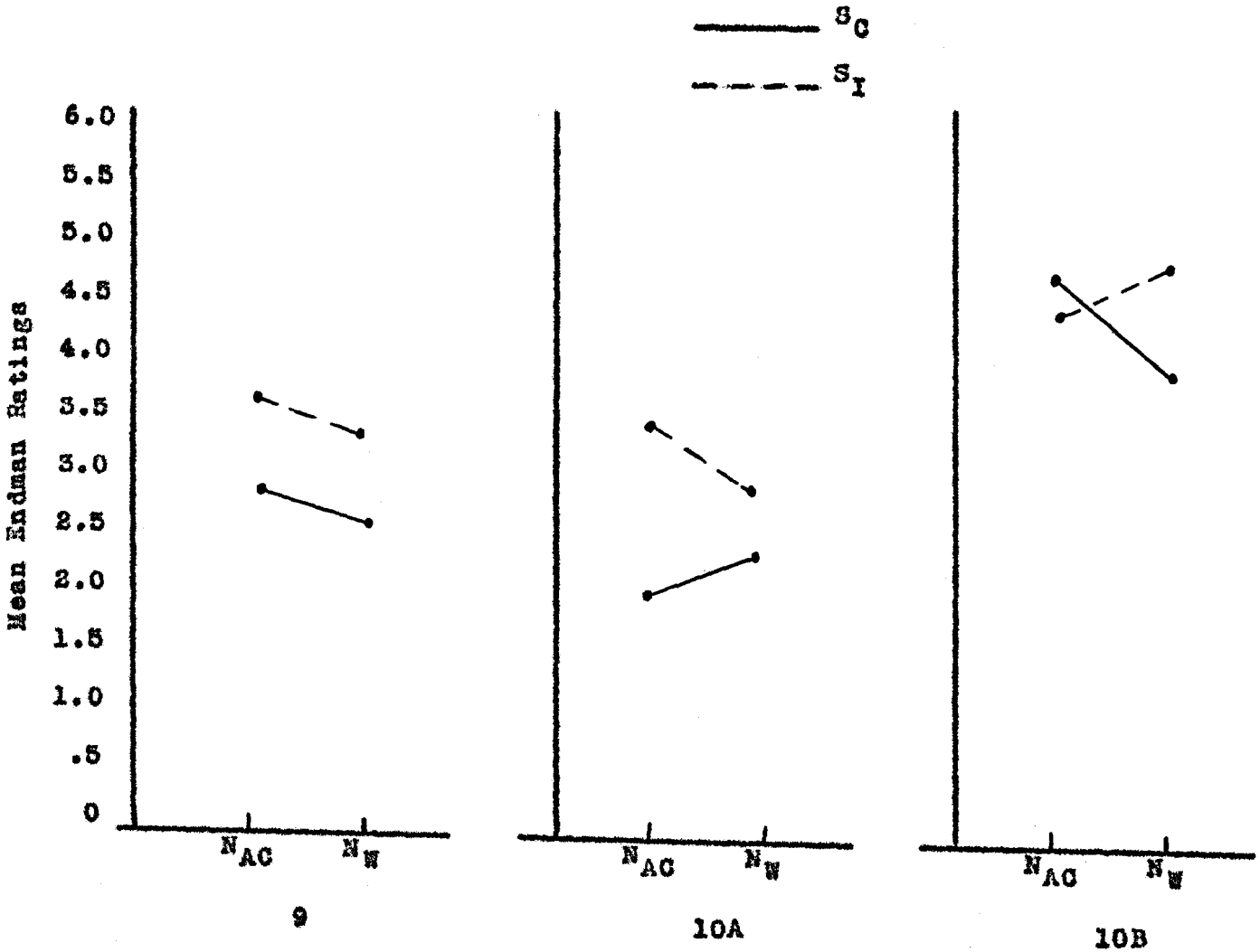

Figure 3. Ratings of Group Performance as a function of Communication Network, Degree of Group Success, and Trials.

CHAPTER 4

DISCUSSION

Cognitive dissonance may be aroused in members of task-oriented groups by the manipulation of the groups' success in an ambiguous situation. Dissonance will be relatively greater in persons who are more committed to the outcome of the tasks. In the Leavitt paradigm, dissonance may be increased by leading the groups' members to believe that they are performing only at the level of mediocrity or below. In other words, as the perceived level of performance drops, dissonance rises; as the level of commitment rises, dissonance rises.

Keymen, since they are more committed to the tasks in the all-channel network, should experience more dissonance than endmen who have not taken any positive action to achieve their positions. Since this is the case, keymen should also exhibit more dissonance reducing behavior. The same should hold true for the wheel network, but to a lesser

degree since the situation is more structured with no opportunity on the part of group members to choose their positions.

Those individuals under intermittent success should experience more dissonance and therefore more dissonance reducing behavior than those individuals under continuous success. This occurs since the intermittent schedule is representative of a lower level of performance.

The best of all possible worlds would be the case in which no one is committed and no one achieves less than one hundred per cent success. Obviously this does not occur, since some people are committed and the success schedule is never representative of complete success even in the continuous success groups. The final trials for all groups in this study have been non-success trials, which are designed to produce some dissonance even in continuous success groups.

The positive results of this study represent some support for Festinger's theory of cognitive dissonance. The problem encountered, however, was that not all of the subjects became dissonant enough to show a significant reduction of this dissonance on the post-questionnaire. All endmen and keymen of the wheel network showed a lack of dissonance.

Of particular significance was the fact that the keymen in the all-channel intermittent situation reduced their dissonance by reporting a greater satisfaction with the

trials on which they were told they were doing more poorly. This fact provides excellent support for the stated hypotheses.

This is satisfactory in itself; however, it is not sufficient to whole-heartedly accept the hypothese as stated. One might suspect that if the dissonance had been greater the reduction of dissonance would have been more evident. All endmen and keymen of the wheel network showed no dissonance reduction. In fact the results showed that they openly admitted that their performance was poor when they were told it was in fact poor. Intermittently successful endmen gave even lower ratings than continuously successful endmen. If they had been dissonant, it is reasonable to believe that their ratings would have been in the predicted direction.

Herein lies the question. It may be that endmen, because of their role, may never experience dissonance at least to any significant degree regardless of network or success. The other alternative is that the procedure used in this study was effective enough to produce dissonance for endmen. As can be seen, however, the two alternatives proposed may indeed be related and not "either-or" explanations.

There are undoubtedly numerous methods of producing dissonance which have not yet been tapped. It might be

possible to employ the use of variables other than network and success. Such methods could involve the method of getting subjects, the desirability of working conditions, the attitude of the experimenter, and other methods limited only by the imagination and knowledge of the researcher. These variables compounded with the success schedules would obviously make the situation still more complex, however, and may not be entirely acceptable.

It is highly questionable whether or not dissonance can be further heightened by making the success schedules any more stringent than they have already been made. The subjects would realize that their scores were false, since the task does not allow much variation in speed once the groups have organized and are working at near peak proficiency.

Another approach would be to increase the ways in which dissonance could be reduced. Possibly it would be worthwhile to pay more attention to the reported interest of the individuals for their tasks. In past studies (Aronson and Mills, 1959) it has been found to be a good measure of dissonance reduction. Subjects who have been dissonant have expressed a greater interest in the tasks than those not dissonant.

It has been found that the extent to which a group is reported to be attractive can also be used as a measure of

dissonance reduction (Burke, 1961). Because of this finding, it would be advantageous in future studies to compose groups with individuals who are not acquainted in order to provide a much stricter experimental control.

One last suggestion involves the measure of the group members' ratings. Possibly the differential could be modified in order to make it more sensitive. A greater number of spaces might help. More detailed descriptions of what a mark in each space indicated might also open an avenue of investigation. On the other hand, and possibly in addition, a completely different measure of the group members' ratings might be utilized. An example of such a method is that used by Leavitt (Leavitt, 1951). Leavitt had each subject draw a curve to indicate how he felt in response to some of the questions.

The results of this study are encouraging. It is thought that with some modifications in the experimental design, it would strongly support Festinger's theory of cognitive dissonance. A follow-up study could be done using college freshmen during the first week of the school session. The subjects would be less likely to be acquainted with one another and also less likely to talk with one another during the experiment. Another modification of the present study would be to keep the questionnaires anonymous. By doing this, the subjects might be more likely to reveal their true feelings concerning the experiment.

CHAPTER 6

SUMMARY

The purpose of this study was to discover and interpret some of the psychological consequences resulting from participation in task-oriented groups of the Leavitt paradigm. The groups differed in degree of centrality and success which was either intermittent or continuous. Festinger's theory of cognitive dissonance was utilized in the generation of hypotheses (Festinger, 1957). There were sixteen groups structured according to the communication networks investigated by Leavitt (Leavitt, 1951; Guetzkow, 1957). Two networks were utilized, the wheel and the all-channel.

The results of past studies (Leavitt, 1951 and Burke, 1961) were supported in that job satisfaction was greater for individuals in more central positions than it was for individuals in the peripheral positions. In other words, keymen were more satisfied with their jobs than were endmen. The induction of the success variable was shown to be effective since individuals under the intermittent success

schedule were more satisfied with their groups' performance than were individuals under the continuous success schedule over the trials as a whole.

All endmen were cognizant of the fact that they evidently were not performing as well during the last 5 trials. This was noted in their responses to items of the questionnaire. The same result held true for keymen. These results give further evidence that the induction of success was effective.

As was predicted, it was found that men occupying keyman positions by their own initiative (all-channel network) under the intermittent success schedule experienced more dissonance and reduced this dissonance by reporting that they liked the trials on which they perceived their performance as poor. It was also found that intermittently successful keymen in the all-channel network displayed more dissonance than keymen under the same success schedule in the wheel network.

It was also found that endmen in the intermittent situation were less pleased with their performance than were endmen in the continuous situation. This finding is strong evidence suggesting that an insufficient amount of dissonance was aroused in some subjects preventing the responses needed to support the hypotheses. Or, as alternatively suggested, the endmen due to the nature of their role may not experience

dissonance regardless of network or success.

Evidently, the role of keyman has definite psychological consequences. Cognitive dissonance may be a problem confronted by men in this role. This study give further support for Festinger's theory of cognitive dissonance, since the dissonance that was aroused was reduced by the means at hand.

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A P P E N D I X A

CONTINUOUS SUCCESS

Trials	Scores	Comments
1.	60%	"That's average"
2.	75%	"Getting better"
3.	85%	"Pretty good
4.	90%	"That's good"
5.	90%	"Again, that's good"
6.	95%	"Very good"
7.	95%	"Again, very good"
8.	95%	"You're doing real well"
9.	95%	"Still very good"
10.	95%	"Excellent"
11.	85%	"You were actually a little slower; little above average"
12.	80%	"Around average"
13.	80%	"Still around average"
14.	65%	"Not too good at this stage of the game"
15.	45%	"Slightly below average"

INTERMITTENT SUCCESS

Trials	Scores	Comments
1.	60%	"That's average"
2.	75%	"Getting better"
3.	85%	"Pretty good"
4.	50%	"About average"
5.	90%	"That's very good"
6.	95%	"Very good; in fact excellent"
7.	50%	"That's about average"
8.	45%	"Slightly below average"
9.	55%	"Slightly above average"
10.	85%	"That's fairly good"
11.	55%	"You were actually a little slower; little above average"
12.	50%	"Around average"
13.	50%	"Still about average"
14.	55%	"Not too good at this stage of the game"
15.	45%	"Slightly below average"

A P P E N D I X B

GROUP PERFORMANCE TESTING

The purpose of this questionnaire is to discover how the test situation was perceived by the individuals who participated in it. None of the questions have a "right" or a "wrong" answer. In order to evaluate the results of the testing we need your honest opinion of what you perceived to be happening. On some of the questions you may not be certain about your answer. Do not let this worry you. Just give the most accurate answer you can.
Do <u>not</u> skip any of the questions.

Name _____

Color of Cubicle _____

1. Do you think that your group had a leader?

Yes _____ No _____

If your answer is yes, check the color below which corresponds to that of his cubicle.

Brown	Blue	Red	Orange	Green
_____	_____	_____	_____	_____

2. a. Did your group develop a system or organized manner for relaying information or messages in solving the problems in addition to the fixed communication network?

Yes _____ No _____

b. If your answer is yes, briefly describe this system below.

3. a. If your group did organize itself, was the organization or system for relaying messages stable throughout the experiment, or did it seem to undergo change over the trials?

Change _____ No Change _____

b. If you think changes occurred, describe them below.

4. Rank order the members of your group according to their contributions to getting the problem solved. Put a one (1) under the color corresponding to the cubicle of the person who you think contributed the most, a two (2) under the color of the person contributing second most and so on for all members of the group <u>including</u> yourself.

Red	Green	Orange	Brown	Blue
___	_____	_____	_____	____

5. Rank order the members of your group in terms of who you think you would like the best or whose company you might enjoy the most. <u>Exclude</u> your own color. Put a one (1) under the color of the person you think you would like best, a two (2) under the color of the person you think you would like second best and so on.

Blue	Orange	Green	Red	Brown
____	_____	_____	___	_____

6. Rank order the members of your group, <u>including</u> yourself, according to how much they contributed to getting the group organized, that is, in seeing to it that a system for relaying information was set up. Put a one (1) under the color of the person who you think contributed the most, a two (2) under the color of the person contributing second most and so on.

Orange	Brown	Blue	Green	Red
_____	_____	____	_____	___

7. In general, how did you like your job or position in the group over the trials as a whole?

Liked it very much :___:___:___:___:___:___:___:___:___: Disliked it very much

8. More specifically, how did you feel about your job or position in the group during the following sets of trials?

A. Trials 1 through 10

Liked it very much :___:___:___:___:___:___:___:___:___: Disliked it very much

B. Trials 11 through 15

Liked it very much :___:___:___:___:___:___:___:___:___: Disliked it very much

9. In general, how well do you think your group did on the trials as a whole?

Extremely poor :___:___:___:___:___:___:___:___:___: Extremely well

10. More specifically, how well do you think your group did on the following sets of trials?

A. Trials 1 through 10

Extremely poor :___:___:___:___:___:___:___:___:___: Extremely well

B. Trials 11 through 15

Extremely poor :___:___:___:___:___:___:___:___:___: Extremely well

11. How well did you like the group in which you worked?

Liked it very much :___:___:___:___:___:___:___:___:___: Disliked it very much

12. How interesting were the tasks to you?

Extremely interesting :___:___:___:___:___:___:___:___:___: Extremely uninteresting

13. How efficient and competent did the experimentor seem to you?

Extremely efficient and competent :___:___:___:___:___:___:___:___:___: Extremely inefficient and incompetent

14. How well do you think you as an individual performed on the tasks?

Extremely poor :___:___:___:___:___:___:___:___:___: Extremely well

15. Did you know any of the members of the group personally?

Yes _____ No _____

VITA

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