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A further investigation of the effects of achievement imagery and differential instructions on maze learning performance

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A FURTHER INVESTIGATION OF THE EFFECTS OF ACHIEVEMENT IMAGERY AND DIFFERENTIAL INSTRUCTIONS ON MAZE LEARNING PERFORMANCE

by Ann Hunter

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Chapter I

INTRODUCTION

One of the personality variables that has been the object of considerable interest in recent years is "need achievement." This variable was first defined by Murray as the need for "success in competition with some standard of excellence." (9) McClelland and his associates, measuring need for achievement from written responses to TAT-type pictures, have reported significant and useful relationships between this variable and several behavioral criteria. (8)

In order to have a more objective method of measuring need achievement, the Iowa Picture Interpretation Test (IPIT) was developed at the State University of Iowa laboratories. (2) The IPIT obtains scores on four variables: achievement imagery, blandness, hostility, and insecurity. The test originally employed ten TAT cards with four alternative responses to each card, to be ranked in order of preference. In its present form (Form RK) the IPIT has been expanded to include twenty-four TAT cards. Form RK has been shown to have higher internal consistency and stability than the earlier form and to be a better predictor of behavior on a simple additions task. (5)

Recent research using the IPIT as the measure of achievement imagery has demonstrated relationships between AI and a variety of extra-test behavior. Williams (11) found a positive relationship between AI scores and performance on a simple additions task, as did Johnston (5), as well as an interaction of AI and mode of failure. Spielberger (1) has reported a positive, although not significant, relationship between AI and stuttering behavior in college males. Klumb (6) has reported an

interaction between level of AI and task complexity.

Hurley (3), investigating the effects of differential instructions and "need for achievement" on a verbal learning task, reported that under low motivational instructions, high AI subjects performed significantly better than did low AI subjects. He found no differences in performance under high motivational instructions.

Johnston (4), in an attempt to extend Hurley's findings to a different task, investigated the effects of high and low achievement imagery and two types of motivational instructions on the learning of an electric maze. On the basis of Hurley's earlier results, he hypothesized that under threat of shock instructions there would be no differences in maze learning between the high and low achievement imagery groups. Under neutral instructions, however, it was hypothesized that the high AI group would learn the maze faster and with fewer errors than the low AI group. Since a preliminary study had indicated no sex differences with respect to learning the maze, the data for male and female Ss were combined. Analysis of the error scores indicated a significant interaction between AI and instructions. As hypothesized, there were no differences between the groups under threat of shock instructions; but under neutral instructions, the high AI group made fewer errors than the low AI group. It was found that the high AI group worked faster under both sets of instructions.

Since further investigation of AI at the Iowa laboratories failed to confirm Johnston's findings, Tyler (10) attempted a replication of this investigation. His results differed in several ways. Whereas Johnston had found no sex differences, Tyler reported that female Ss

made more errors and took longer to learn the maze and that variation in AI and instructions did not significantly influence female performance. Results for the combined sex data also differed from Johnston's. Under neutral instructions there was no difference between the high and low AI groups; while under threat of shock instructions, the high AI group made more errors and took more time to learn than the low AI group.

One notable difference between these two studies is that while Johnston used the original ten card form (Form O) of the IPIT to constitute the AI groups, Tyler used the revised twenty-four card form (Form RK). Johnston, in reporting on this revision, has pointed out that sex differences were obtained on some of the items and that there was low internal consistency for the AI scale with women. This possibly might have led to the differences in results between these studies with regard to sex.

An inspection of the graphs comparing Tyler's results with those of Johnston for the combined sex data shows a marked difference in the maze learning ability of the Ss in these two studies. Tyler's groups were, without exception, superior on both time and error scores. Particularly noteworthy in this regard were his low AI Ss. It can also be seen that in both studies, the high AI Ss performed better under neutral instructions, while the low AI Ss obtained better scores under threat of shock instructions. The major differences in the results of these investigations appear to be related to the differential ability levels of the subjects involved. Neither author reports an attempt to

control for this factor.

The purpose of the present investigation is to provide a further replication of these two studies, using both Form O and Form RK of the IPIT to constitute the AI groups, and controlling for the general learning ability of the Ss in these groups in an attempt to better understand the differences in results.

Chapter II

PROCEDURE

Form RK of the Iowa Picture Interpretation Test (IPIT) was administered to 231 students in General Psychology classes at the University of Richmond. This test consists of 24 TAT pictures which are flashed on a screen for one minute each. Ss are provided with test booklets containing four alternative responses for each of the 24 pictures, each response involving one of the following themes: achievement imagery, blandness, hostility, and insecurity. (See appendix) Ss are then asked to rank the four alternative responses from one to four, a rank of one indicating that it is the interpretation that S would be most likely to give, and a rank of four indicating that it is the interpretation that S would be least likely to give. A total AI score for each S was obtained by adding the ranks given to the achievement foil for the 24 pictures.

The scores for all 231 Ss were placed in two distributions, one for male Ss and one for female Ss. Two groups, high and low AI, were selected from approximately the upper and lower 25 percent of the distributions. The cutting scores were 51 for the high AI group and 62 for the low AI group, as compared with cutting scores of 49 and 64 in Tyler's study.

The Ss of each sex in the high and low AI groups were randomly divided into two experimental conditions, neutral instructions or threat of shock instructions. This was done in such a way that E was unaware of the AI classification of the Ss. There were four treatment con-

ditions: high AI under neutral instructions, high AI under threat of shock instructions, low AI under neutral instructions, and low AI under threat of shock instructions. For each of these conditions there was a male and a female group. The experimental design thus consisted of eight groups.

The criterion task was almost identical to that used by Johnston and Tyler[1] and consisted of learning the correct path through an electric maze (see appendix) by moving from point to point on the maze with a metal stylus. An error was indicated by the sound of a buzzer as the stylus touched an incorrect point. The correct points were indicated by the absence of the buzzer sound. The criterion of learning was three consecutive errorless trials.

The motivational instructions were identical to those used by Johnston and Tyler, both in the neutral and threat of shock conditions; and the general instructions for learning the maze differed only in the method for indicating errors. (See appendix)

The shocks administered to the Ss were delivered through an inductorium and were adjusted to the point at which it seemed to E that they were decidedly uncomfortable. The Ss under threat instructions,

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1. Although the direction of the correct path of the present maze is identical to that of Johnston and Tyler, the maze itself is slightly smaller, having eleven less choice points. Data collected separately, concerning the number of errors made at each choice point, indicate that all except two of these eleven choice points included in the Johnston and Tyler maze and not in the present one were located in positions where Ss made few errors. An inspection of the data for the remaining two choice points did not reveal any factors that might have affected the present results.

were, in all cases, shocked three times while the shock was being adjusted and one additional time at the completion of the instructions. They were then given no additional shocks, regardless of their performance during learning.

There were 10 Ss in each of the 8 groups, giving a total N of 80. It was decided, in order to equate the groups of the present study as closely as possible with those of Johnston and Tyler, to eliminate any S who took more than 30 minutes to complete any trial or who was unable to learn the maze in one hour.

Following the motivational instructions, all of the Ss were given the same general instructions for learning the maze.

After each trial the elapsed time and the number of errors were recorded. These constituted the two criterion measures. During the learning trials, E sat behind S in order to time each trial. A hidden counter recorded the total number of errors. At the completion of the experiment, the S was asked not to discuss the experiment with other students.

Chapter III

RESULTS

The means and standard deviations of the total error scores when the groups are constituted according to Form RK (24-card form) of the IPIT are presented in Table I and are shown graphically in Figure 1. The data were analyzed in a three dimensional factorial design (7), with sex constituting one dimension, instructions another, and AI a third. The summary table of the analysis of variance for this data is presented in Table II. Since none of the results obtained suggests that sex interacts with any other factor, the graphs are presented for the combined sexes.

The significant main effect of AI indicates that under both neutral and threat of shock instructions, the high AI group made more errors than did the low AI group.

The means and standard deviations of the total time scores for the eight groups are similarly presented in Table III and are shown graphically in Figure 2. The summary table for the analysis of variance of this data is presented in Table IV. In this case, the test of the main effects of AI approached statistical significance ($p. .07$), with the direction of the results being the same as for the error scores (high AI Ss taking longer to solve the maze than low AI Ss). The F for the main effect of sex was significant, showing that males worked faster than females under both sets of instructions.

In order to determine what changes, if any, might have been caused

Table I

Means and Standard Deviations of the Total Error Scores for the Eight Groups Form RK

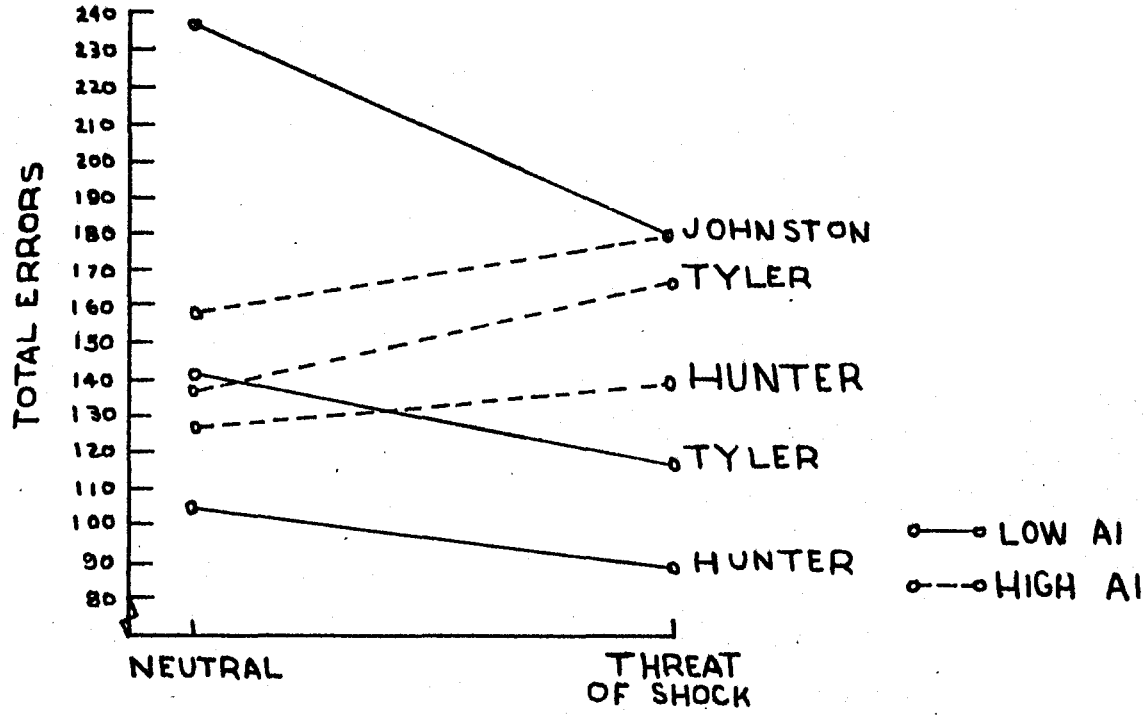
Groups	Mean	S.D.
Male High AI Threat Instructions	134.90	87.22
" " " Neutral "	111.60	62.02
" Low " Threat "	89.00	43.36
" " " Neutral "	95.20	54.91
Female High AI Threat Instructions	144.00	86.24
" " " Neutral "	140.60	55.91
" Low " Threat "	91.40	43.59
" " " Neutral "	113.70	69.45

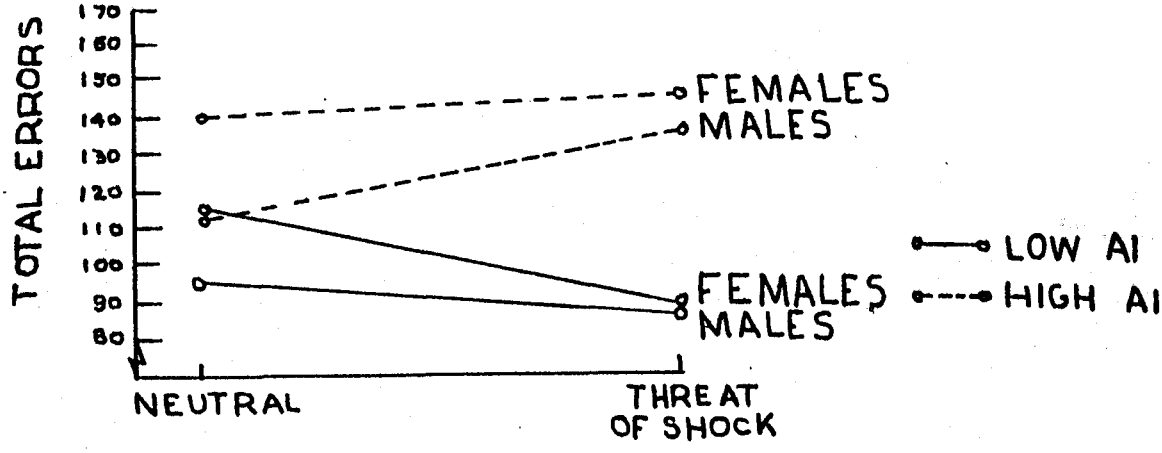
Table II

Summary Table for the Analysis of Variance of Total Error Scores - Form RK

Source	d.f.	ss	ms	F
Sex	1	4351.25	4351.25	-
Instructions	1	4.05	4.05	-
AI	1	25134.05	25134.05	5.38*
Cells	7	35306.	-	-
Sex x Instructions	1	1620.	1620.	-
Sex x AI	1	369.80	369.80	-
Instructions x AI	1	3808.80	3808.80	-
Sex x Instructions x AI	1	18.05	18.05	-
Within Cells	72	336355.80	4671.61	
Total	79	371661.80		

* Significant beyond the 2.5 percent level of confidence.





SEPARATE SEX DATA (HUNTER)

Figure 1

The Effect of Instructions and Achievement Imagery on Error Scores in Maze Learning Form RK

Table III

Means and Standard Deviations of the Time Scores for the Eight Groups Form RK

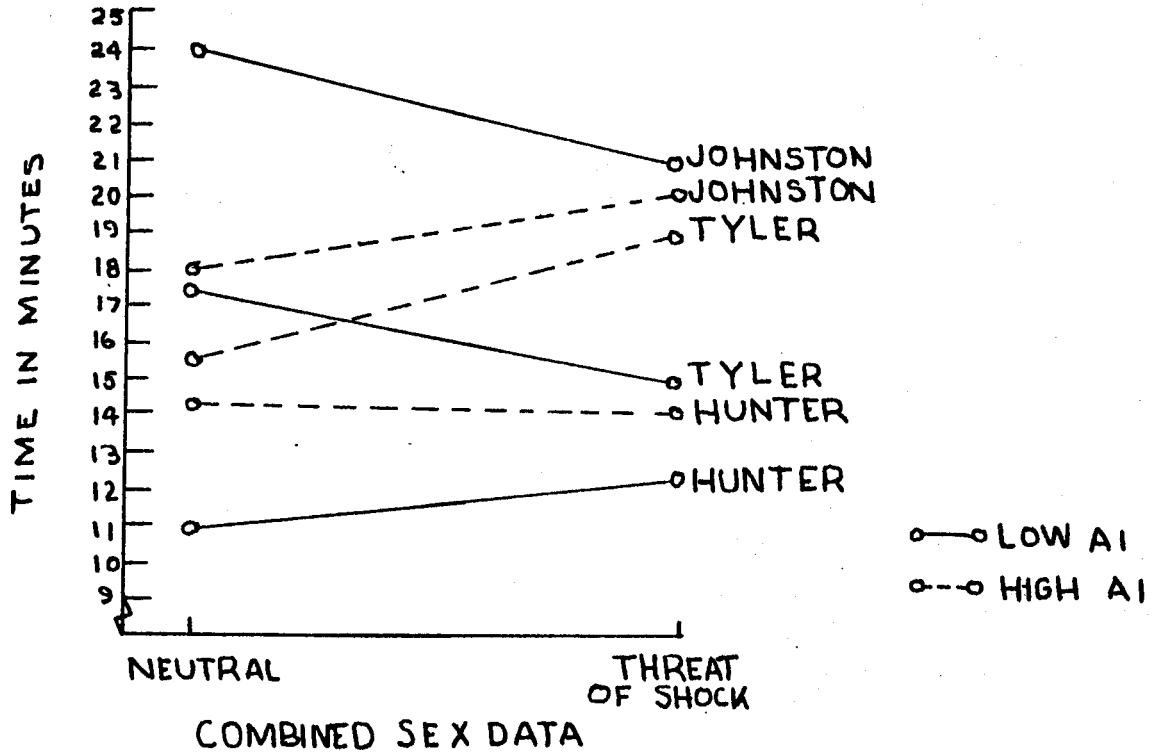
Groups	Mean	S.D.
Male High AI Threat Instructions	12.79	4.78
" " " Neutral "	12.16	4.82
" Low " Threat "	10.51	5.12
" " " Neutral "	10.02	2.99
Female High AI Threat Instructions	14.82	8.01
" " " Neutral "	16.18	7.34
" Low " Threat "	14.22	6.85
" " " Neutral "	11.89	3.83

Table IV

Summary Table for the Analysis of Variance of Time Scores - Form RK

Source	d.f.	ss	ms	F
Sex	1	154.71	154.71	4.27*
Instructions	1	8.59	8.59	-
AI	1	119.83	119.83	3.31
Cells	7	328.04		
Sex x Instructions	1	.15	.15	-
Sex x AI	1	1.13	1.13	-
Instructions x AI	1	20.33	20.33	-
Sex x Instructions x AI	1	23.30	23.30	-
Within Cells	72	2609.03	36.24	-
Total	79	2937.07		

* Significant beyond the 5 percent level of confidence.



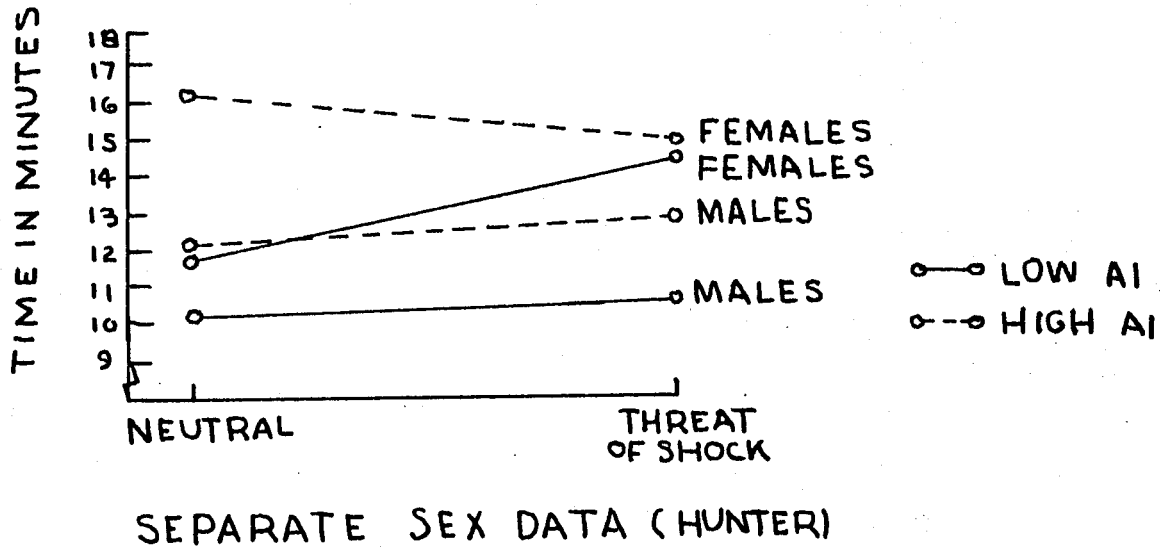


Figure 2

The Effect of Instructions and Achievement Imagery on Time Scores in Maze Learning Form RK

by the use of different forms of the IPIT, the AI groups were re-constituted on the basis of scores on Form 0 (10-card form) of the IPIT. The distributions were divided at the median into low AI and high AI groups. The twelve Ss who fell at the median were omitted from the analysis. The data were then analyzed in a design identical to that used with the 24-card scores.

The means and standard deviations of the total error scores for the eight re-constituted groups are presented in Table V and are pictured graphically in Figure 3. The summary table of the analysis of variance for this data is presented in Table VI.

The Instructions x AI interaction was significant, showing that under neutral instructions there are no differences between the AI groups; but under threat of shock instructions, the low AI group makes fewer errors than does the high AI group. The main effect of AI was not significant, but the direction of the results was the same as for the 24-card time and error scores.

Similar data for the total time scores are presented in Tables VII and VIII and in Figure 4. The test of the main effects of sex approached statistical significance (p. .07). These results indicate that the males worked faster than the females under both sets of instructions.

A coefficient of .63 was obtained when time and error scores were correlated, indicating that a substantial relationship exists between the two criteria.

In order to determine whether differences in the learning ability of the Ss might be influencing results, ACE scores were obtained for all

Table V

Means and Standard Deviations of the Total Error Scores for the Eight Groups Form O

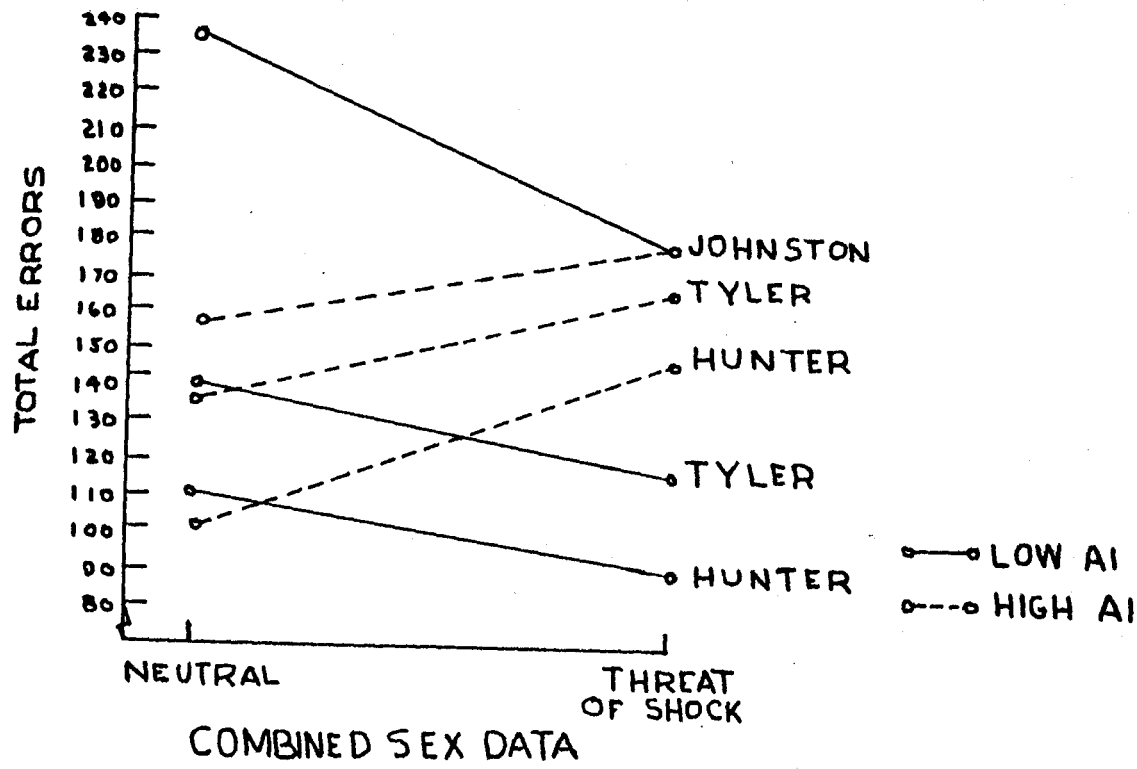
Groups	Mean	S.D.
Male High AI Threat Instructions	144.13	95.15
" " " Neutral "	85.25	26.09
" Low " Threat "	84.13	35.43
" " " Neutral "	100.13	60.40
Female High AI Threat Instructions	153.56	85.73
" " " Neutral "	118.67	57.65
" Low " Threat "	95.00	44.83
" " " Neutral "	121.44	67.66

Table VI

Summary Table for the Analysis of Variance
of Total Error Scores - Form O

Source	d.f.	ss	ms	F
Sex	1	5962.50	5962.50	1.31
Instructions	1	2581.78	2581.78	-
AI	1	10952.48	10952.48	2.41
Cells	7	40548.66	-	-
Sex x Instructions	1	1254.51	1254.51	-
Sex x AI	1	120.16	120.16	-
Instructions x AI	1	19482.37	19482.37	4.29*
Sex x Instructions x AI	1	194.86	194.86	-
Within Cells	60	272468.56	4541.14	-
Total	67	313017.22		

* Significant beyond the 5 percent level of confidence.



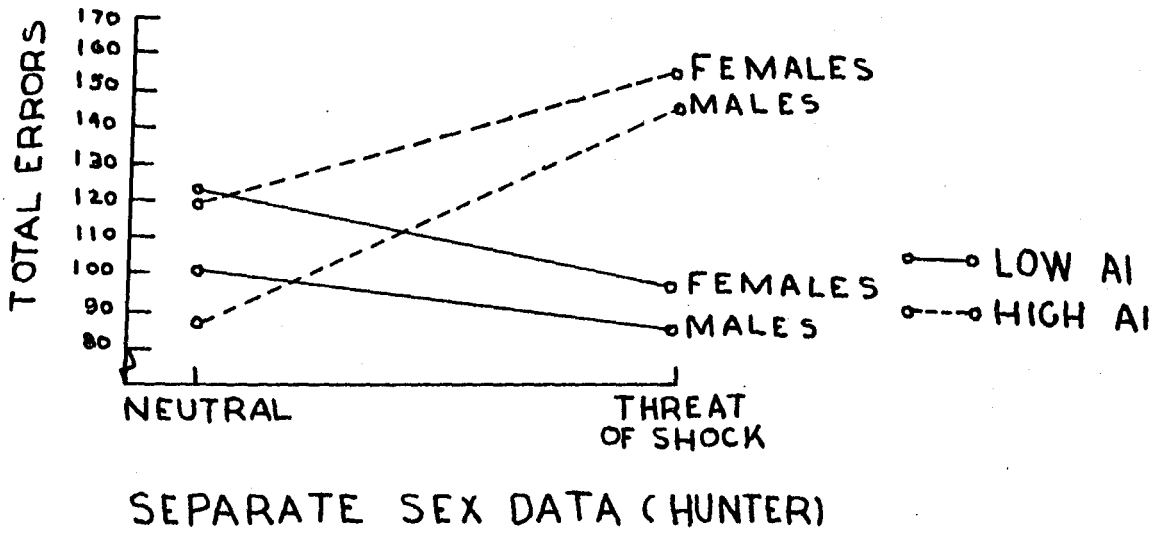


Figure 3

The Effect of Instructions and Achievement Imagery on Error Scores in Maze Learning Form O

Table VII

Means and Standard Deviations of the
Time Scores for the Eight Groups
Form O

Groups	Mean	S.D.
Male High AI Threat Instructions	13.78	4.88
" " " Neutral "	11.08	4.66
" Low " Threat "	9.62	4.12
" " " Neutral "	10.24	3.30
Female High AI Threat Instructions	15.71	7.97
" " " Neutral "	12.56	3.11
" Low " Threat "	14.42	7.20
" " " Neutral "	11.61	4.03

Table VIII

Summary Table for the Analysis of Variance of Time Scores - Form O

Source	d.f.	ss	ms	F
Sex	1	97.12	97.12	3.13
Instructions	1	72.70	72.70	2.35
AI	1	53.34	53.34	1.72
Cells	7	269.50	-	-
Sex x Instructions	1	15.90	15.90	-
Sex x AI	1	8.12	8.12	-
Instructions x AI	1	12.97	12.97	-
Sex x Instructions x AI	1	9.35	9.35	-
Within Cells	60	1858.94	30.98	-
Total	67	2128.44		

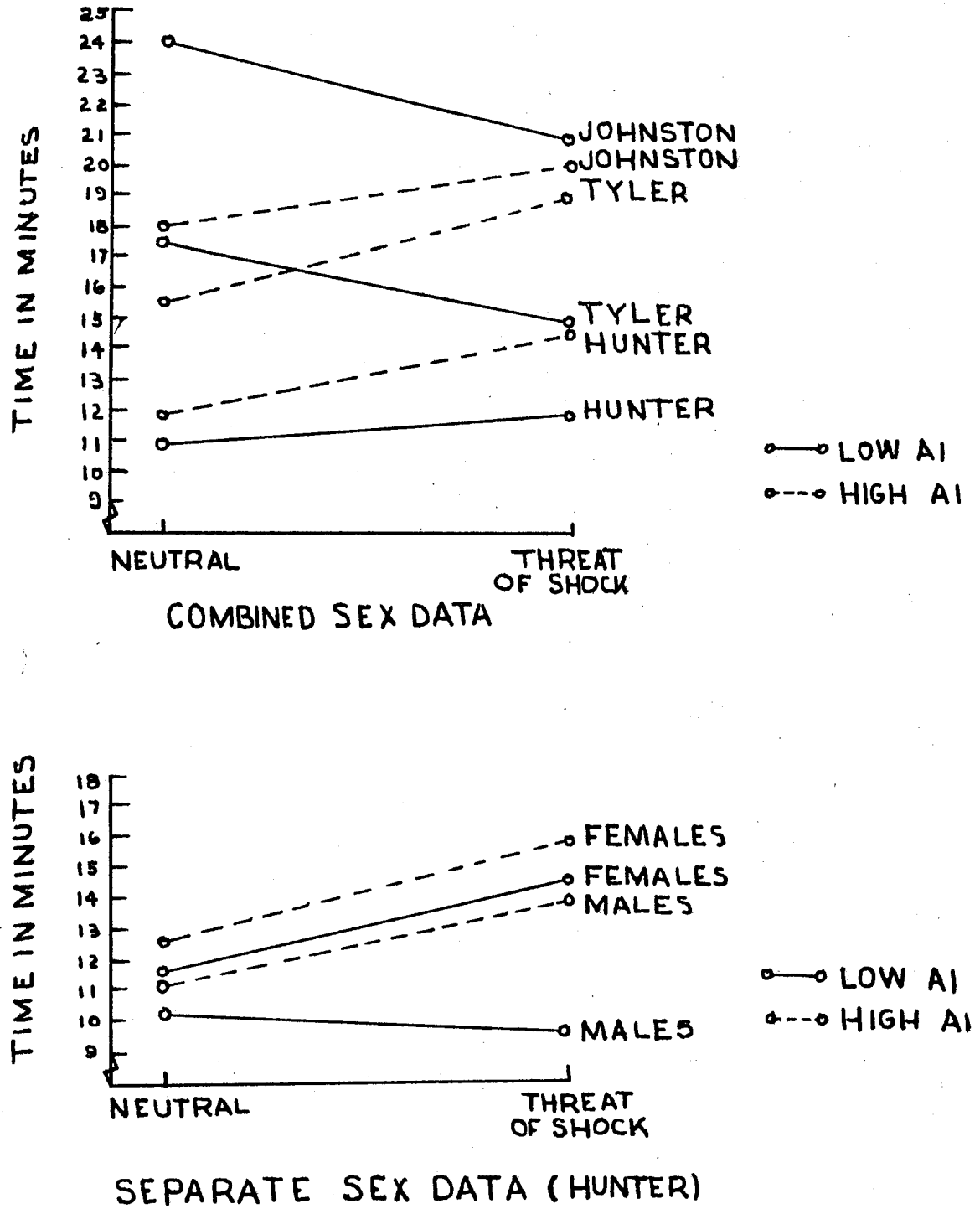


Figure 4

The Effect of Instructions and Achievement Imagery on Time Scores in Maze Learning Form O

but nine of the Ss[1]; and mean ACE scores were computed for each group. (The individual ACE scores were obtained when the Ss entered the University of Richmond as Freshmen or transferred from another college and were kept on permanent file at the University.) An inspection of these means shows essentially no differences. For combined sexes, there was a difference of only one point between the high and low AI groups.

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1. These Ss for whom ACE scores were not available were fairly evenly distributed among the eight groups.

Chapter IV

DISCUSSION

The main trend of these results supports the findings of Tyler. There are, however, several similarities to Johnston's results, as well as findings which differ from both previous studies. A comparison of the curves for the total high and low AI groups with those of the other two studies reveals that in both the present study and Tyler's, the greater difference between the high and low AI groups in the number of errors made occurs under threat of shock instructions; while in Johnston's study, the greater difference between the two AI groups is under neutral instructions. When time scores are used as the criterion, however, the present results are more similar to Johnston's, with the greater difference tending to occur under neutral instructions. In both the Johnston and Tyler studies, it can be seen that there are large differences between the groups under one set of instructions and essentially no differences under the other set of instructions. In the present study, however, there are significant differences between the two AI groups under both neutral and shock instructions, although the latter difference is the greater. Moreover, in both Tyler's and Johnston's studies, the high AI group tends to make fewer errors and to work faster than the low AI group under neutral instructions; while in the present study, the low AI group performs consistently better under both sets of instructions. When the present data are analyzed for Form 0 (10-card form) of the IPIT, the form used by Johnston, the

curves are still similar to those of Tyler in that the greater difference between AI groups occurs under shock instructions. Also, the main effect of AI is lost, and there is little difference between the groups under neutral instructions. Time scores now correspond to error scores in resembling those of Tyler.

One factor that could account for the greater difference between AI groups being found under opposite sets of instructions by Johnston and Tyler is that in the present study, as in Tyler's, the low AI Ss made considerably fewer errors than did Johnston's low AI Ss. While high AI Ss in Tyler's and the present study tend to make fewer errors than Johnston's high AI Ss, these differences are small.[1] As a result, when the groups are pictured graphically, the downward shift of the low AI curve causes the difference between high and low AI Ss to occur under threat of shock instructions rather than under neutral instructions as it did in Johnston's study. It can be seen that the AI curves are parallel in all three studies and that the only real change is in the downward shift of the low AI curve.

Because of the superior performance exhibited by the low AI Ss in both Tyler's and the present study, it was thought that perhaps the results were due to differences in the learning ability of the groups. An inspection of group ACE means seems to eliminate this as a factor in the present experiment. However, as this factor was not investigated

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1. It may be noted that the Ss in the present study appear to be consistently superior to Tyler's Ss, as his were to Johnston's. This, however, is probably due to the fact that there are fewer choice points on the present maze.

by Johnston, it is still possible that he obtained by chance Ss who had poor learning ability, especially in the low AI groups. The relatively poor performance of Johnston's low AI Ss may also involve the number of Ss eliminated from each study. This number differs from the first two studies to the present one. Johnston eliminated six Ss who could not complete the first trial in 30 minutes. Tyler eliminated four Ss who failed to complete any trial in 30 minutes or were unable to learn the maze in one hour. In the present study, only one S, who could not learn the maze in one hour, was eliminated. It is possible that, by chance, the majority of Ss eliminated by Johnston because of poor performance might have been high AI Ss, thus improving the over-all average of his high AI curve. This, of course, might explain only the relative superiority of Johnston's low AI group to his high AI group and not the over-all superiority in performance exhibited by the Ss of Tyler and the present study.

The observed differences in results are difficult to explain. There do not seem to be any other obvious factors which could account for them. It was suggested by Tyler that his results might be due to the use of the revised 24-card form of the IPIT instead of the original 10-card form employed by Johnston. In the present study, however, the analysis of data from the re-constituted groups reveals results that are quite similar to those obtained by Tyler using the 24-card form. With both of these forms, it was found that there was little difference between the high and low AI groups under neutral instructions and a large difference between the two groups under threat of shock instruc-

tions. These 10-card results, in fact, were actually more similar to Tyler's than were the results from the 24-card form, where no interaction was found. It seems unlikely, therefore, that the obtained differences in results between Johnston and Tyler were due to different forms of the IPIT; since, in the present study, a return to the 10-card form produces results that are more similar to those of Tyler than were the results obtained with the 24-card form. It must be noted that the re-constituted groups in the present study were obtained by dividing the 10-card scores at the median in order to prevent the loss of a large number of Ss; while Johnston used only the upper and lower 12 percent of his distribution. Since the selection of Ss from the middle of the distributions might conceivably alter the results, Ss were again assigned to groups on the basis of Johnston's cutting scores. Although the number in each group was quite small, the indications were that there were no essential differences between the results obtained by dividing the distributions at the median and those obtained when Johnston's cutting scores were used.

Another possible, although rather unlikely, explanation of the obtained results involves experimenter differences. In spite of the fact that all three Es used identical motivational instructions, it is always possible that individual differences in the manner of presenting the instructions may have affected the results.

One of the major discrepancies between the findings of Johnston and Tyler involves sex differences. Whereas Johnston found no sex interaction among his Ss, Tyler found that sex interacted with AI and

instructions. His AI x Instructions interaction was present for men but not for women. Unlike Tyler's results, the findings of the present study show no interaction of sex with any other variable. The curves for both sexes follow the same direction in nearly every instance, and in no case does the effect of any variable differ according to sex. The results obtained here, then, do not support Tyler's conclusion that the effects of achievement imagery are clearly differential with regard to sex.

In spite of the fact that differences in results have been found, there are notable similarities among the studies. In all three experiments, the direction of the curves is identical in most instances. The high AI Ss made fewer errors under neutral instructions than under threat of shock instructions; while the low AI Ss made more errors under neutral than under shock instructions. In the first two studies, this finding held true for time scores also; but in the present study, the time curves are inexplicably reversed. The findings of the three studies, that high AI Ss work better under neutral than under shock instructions and that the opposite is true of low AI Ss, is in agreement with earlier research by Hurley (3) and Williams (11). On a verbal learning task, Hurley found that there was little difference between the AI groups when they were given highly motivating instructions to learn; but there was a large difference, with high AI Ss performing better, under low motivational instructions. Williams, using a simple additions task as his criterion, found that high AI Ss improve after failure to reach goals set by themselves; while low AI Ss improve after failure to reach goals

set by the experimenter. In all of these studies, two distinct learning or performance conditions can be identified. Under one set of conditions, the S is given no instructions to do his best or to perform in any way other than he desires. It is presumed, then, that any goal the S has must in this situation originate within the S himself. Under the other set of conditions, the S is given highly motivating instructions by the experimenter and is told that he must meet certain externally imposed standards of performance. It has been a consistent finding in all the studies to date that high achievement imagery individuals seem to give their best performance when they are not under pressure but are presumably motivating themselves from within; while individuals with low achievement imagery respond more positively to externally imposed motivation.

One of the most impressive conclusions that may be drawn from this research is the importance of achievement imagery as an influential variable on behavior. High and low achievement imagery individuals have been shown to respond differentially to a variety of tasks. The exact nature of this difference in response can be clarified only by further research. The reduction of error variance, in order to isolate the effects of the variables under study, is clearly needed. One method of reducing this error variance might be to instruct Ss in how to learn the maze or to give them a practice session beforehand. In this way, individual differences in approach to a new task might be eliminated from the error variance. Another area for further research might involve changing the level of difficulty of the task itself.

Research by Klumb (6) indicates that low AI Ss perform better on a task with a high difficulty level and that the opposite is true of high AI Ss. In view of this, it would appear from Johnston's study that the maze is at a low difficulty level. Tyler's and the present study, however, indicate that the maze represents a high level of difficulty. It is suggested, therefore, that the maze be made simpler in general in order to determine what results are obtained at lower difficulty levels.

Chapter V

SUMMARY

The purpose of the present study was to investigate the relationship between achievement imagery and differential instructions in a maze-learning situation and to resolve certain differences in results which had been found in two previous studies by Johnston and Tyler.

The Iowa Picture Interpretation Test (IPIT) was administered to 231 students in General Psychology classes at the University of Richmond, and their Achievement Imagery (AI) scores were placed in two distributions - one for each sex. The upper 25 percent of each distribution was called the high AI group, and the lower 25 percent was called the low AI group.

The learning task was an electric maze, and the criterion of learning was three consecutive errorless trials.

Half of the Ss in each AI group learned the maze under neutral instructions and half under threat of shock instructions. There were 10 Ss in each of the eight experimental groups, giving a total N of 80.

The data were analyzed in a three-dimensional factorial design, with sex constituting one dimension, instructions another, and AI a third. The criterion measures were time elapsed while learning the maze and the total number of errors made.

Data from two forms of the IPIT were analyzed - Form RK (the 24-card form) and Form O (the first 10 cards of Form RK) - in an attempt to determine what differences might occur as a result of a change in form.

The learning ability of the Ss was investigated by computing ACE means for the eight groups.

The results are as follows:

1. When data are analyzed for Form RK (24-card form), the high AI Ss take longer to learn the maze and make more errors under both sets of instructions. Also, male Ss work faster than females under both sets of instructions.

2. When scores from Form O (10-card form) are used to constitute the groups, the Instructions x AI interaction is significant. This shows that under neutral instructions, there are no differences between the AI groups; but under threat of shock instructions, the low AI group makes fewer errors than does the high AI group. Again, males worked faster than females under both sets of instructions.

3. An inspection of ACE scores showed no essential differences in learning ability among the various groups.

It was concluded that the main trend of results supported the findings of Tyler. Possible explanations of the differences in results among the studies were discussed. It was also pointed out that there was some essential agreement among the three experiments, in that high AI Ss always performed better under neutral than under threat of shock instructions, while the reverse was true of low AI Ss. This finding was related to other studies by Hurley and Williams.

It was felt that achievement imagery has been shown to influence behavior on a number of tasks and that more research is needed to clarify the nature of this influence.

APPENDIX A

Table IX

Frequency Distribution of AI Scores - Male

Score	Number of Scores
39	1
43	1
45	2
47	1
48	2
49	3
50	10
51	11
52	8
53	6
54	6
55	5
56	8
57	7
58	11
59	2
60	8
61	9
62	2
63	6
64	5
65	5
66	4
67	6
68	6
69	2
70	1
74	2
	140

Mean - 57.6

Median - 57.4

Table X

Frequency Distribution of AI Scores - Female

Score	Number of Scores
42	1
44	2
45	2
46	4
47	1
48	1
49	3
50	4
51	3
53	6
54	6
55	7
56	8
57	3
58	1
59	6
60	5
61	5
62	7
63	5
64	2
65	3
66	1
68	2
69	2
74	1
	91

Mean - 56.6

Median - 56.1

APPENDIX B

General Instructions for Learning the Maze

This is an electric maze. I want you to learn the correct path from here (upper left hand corner) to here (lower right hand corner) by moving from point to point with this stylus. The correct moves are always either horizontal or vertical; moving diagonally is always an error. Your mistakes will be indicated by the sound of a buzzer. Move from point to point with this stylus until you make an error as indicated by the buzzer. Then you must back up to the last point at which the buzzer did not sound and go on from there. You will continue making trials until you have been able to follow the correct path three consecutive times without making any errors. There will be a 30 second interval between trials. Are there any questions?

Neutral Instructions for Learning the Maze

We are interested in the relationship between learning and certain physical changes in the body. This experiment is designed to study changes in pulse rate during maze learning. (E will then find S's pulse and attach the electrodes to this place on the wrist.) This is the device we will use to record your pulse as you learn the maze. I'm sure that you'll forget all about it after the experiment starts, and it shouldn't bother you in any way.

Instructions for Learning the Maze Under Threat of Shock

We are interested in how long it will take you to learn this maze as compared with our other subjects. Each time that your performance is not satisfactory, as compared with other subjects, you will receive a shock. (E then attached the electrodes to the S's wrist. The apparatus used here was the same as that used under neutral instructions presumably to measure pulse rate.) This is the device that we will use to shock you. We know about the number of errors that other college students have made while learning this maze, and, if you do more poorly than they, the apparatus is designed to give you a shock. (The shock was adjusted to that point at which S reported that it was definitely uncomfortable but not painful. Following the general instructions for learning the maze, E said:) Remember, it is important that you do as well as you can. Each time that your performance is not as good as that of other college students, you will be shocked like this. (At this point, E gave S an additional shock.)

APPENDIX C

Table XI

ACE Means for the Eight Groups

Group	Mean
Male High AI Threat Instructions	103
" " " Neutral "	90
" Low " Threat "	99
" " " Neutral "	102
Female High AI Threat Instructions	109
" " " Neutral "	101
" Low " Threat "	102
" " " Neutral "	105
High AI (combined)	101
Low AI (combined)	102

APPENDIX D

Table XII

Distributions of Error Scores for the Eight Groups
Form RK

Males

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
152	72	149	108
99	77	114	43
87	82	83	64
293	51	49	229
49	147	112	32
161	83	39	118
70	176	171	65
292	70	46	142
37	263	59	76
109	95	68	75

Females

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
58	143	63	148
214	104	67	38
103	97	107	100
313	48	31	36
248	229	167	66
171	231	51	101
58	138	165	146
36	92	65	281
123	153	107	153
116	171	91*	68

* Mean substituted for eliminated score.

Table XIII

Distributions of Time Scores in Minutes for the Eight Groups
Form RK

Males

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
11.20	10.10	19.38	12.52
9.10	12.55	11.30	8.15
8.47	9.32	5.63	4.93
22.72	5.90	8.33	14.90
17.53	22.40	9.23	5.87
14.72	11.13	8.50	11.15
6.03	9.77	20.97	11.73
16.23	12.82	7.23	12.63
12.72	19.40	5.32	9.22
9.23	8.17	9.25	9.07

Females

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
6.83	13.88	12.70	12.60
16.08	11.90	7.30	5.98
17.42	18.18	19.43	17.17
37.25	6.92	7.20	10.88
13.60	33.62	12.60	8.68
10.07	11.12	9.02	12.98
10.30	12.85	22.75	11.42
13.32	12.23	8.42	16.85
12.33	24.50	28.60	12.28
11.02	16.47	14.22*	5.10

* Mean substituted for eliminated score.

Table XIV

Distributions of Error Scores for the Eight Groups
Form O

Males

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
152	72	83	142
37	82	49	43
99	77	68	108
161	51	39	65
70	75	149	64
49	95	112	229
292	83	59	232
293	147	114	118

Females

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
248	146	95*	138
214	104	167	68
58	231	107	281
36	92	107	101
103	171	67	38
313	36	31	148
123	97	165	66
116	48	51	153
171	143	65	100

* Mean substituted for eliminated score.

Table XV

Distributions of Time Scores in Minutes for the Eight Groups
Form O

Males

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
11.20	10.10	8.33	12.63
12.72	9.32	5.63	8.15
9.10	12.55	9.25	12.52
14.72	5.90	8.50	11.73
6.03	9.07	19.38	4.93
17.53	8.17	9.23	14.90
16.23	11.13	5.32	5.87
22.72	22.40	11.30	11.15

Females

High AI Threat	High AI Neutral	Low AI Threat	Low AI Neutral
13.60	11.42	14.42*	12.85
16.08	13.88	12.60	12.98
10.30	11.90	28.60	16.85
13.32	11.12	19.43	5.10
17.42	12.23	7.30	5.98
37.25	16.47	7.20	12.60
12.33	10.88	22.75	8.68
11.02	18.18	9.02	12.28
10.07	6.92	8.42	17.17

* Mean substituted for eliminated score.

APPENDIX E

MULTIPLE-CHOICE PICTURE TEST FORM 5 1954

Each of the pictures you will see is indicated in this booklet by a number. Underneath each number there are four descriptions for that particular picture. You are to rank the four descriptions according to your idea of what the picture expresses.

Each description can be ranked from 1 to 4 on the basis of how well you think it fits the picture, that is, tells what is happening. Read all four descriptions and decide which one you would most likely give. This one would get a rank of 1. Then decide upon the one that seems next most likely. Rank it 2. And so on. The description that you would be least likely to give should be ranked 4.

Here is an example:

A. She is listening to her favorite radio program.
B. She is annoyed because she has to work while her friends go out.
C. She feels that she cannot go to the party because no one ever asks her to dance.
D. She is looking forward to her opening night as the star of a great show.

If B is most like your own interpretation, you would rank it 1. Look at the separate answer sheet. Under the space marked Example you would write a 1 after the letter B. You would then write down the ranks for descriptions A, C and D.

Each picture will be shown for one minute. You must rank each description. Even if you have difficulty deciding what the rank should be, make the best decision you can. Remember, there are no right or wrong answers. Don't spend too much time trying to decide. Indicate your first impressions.

Now take the answer sheet. Fill in your name and other information at the top. Now turn the page. Judge the statements for Card 1 and then rank them on the separate answer sheet. Do not mark this booklet.

1. A. He is dreaming of the day when he will become a great musician. AI
   B. He is afraid that he will never be able to play the violin well. I
   C. His violin is on the table and he is waiting for his music lesson. B
   D. He is angry at his mother because she makes him practice while he'd rather be outside playing. H

2. A. She feels only scorn for these people and their way of life. H
   B. She is looking for a nice quiet place where she can read and get a little relaxation. B
   C. She is rather sad because she doesn't fit in at school or on the farm. I
   D. Her only ambition is to complete her education. AI

3. A. He very much wants to stay with her but is afraid of other people's contempt. I
   B. He is determined to fight for what he thinks is right and will win in the end. AI
   C. He is disgusted with her and is trying to get away as quickly as he can. H
   D. He is a patient being helped to his bed. B

4. A. They are waiting for the taxi to take him to the station. B
   B. He has told her that he resents her prying into his affairs. H
   C. He is telling her that he must leave home because opportunities are greater in the big city. AI
   D. He is telling her that he has lost his job and has little hope of finding another. I

AI - Achievement Imagery
B - Blandness
H - Hostility
I - Insecurity

5. A. The boy is determined to live up to the ideals and standards of this older man whom he greatly admires. AI
   B. The older man is telling about his childhood experiences. B
   C. The father is telling his son that if he does not stop his wild ways, he will disown him. H
   D. The boy is distressed because he feels that he has let his father down. I

6. A. The little girl has been left in the care of a governess and feels that she is less loved by her parents than other children. I
   B. The little girl is resentful because her mother insists upon drilling her over her homework. H
   C. The little girl is listening to a story about Florence Nightingale and is thinking of the time when she might achieve so much. AI
   D. The little girl listens while her mother reads her stories. B

7. A. He is remembering a part of the movie he has just seen. B
   B. He is dreaming of becoming a skilled and famous surgeon. AI
   C. He realizes that the operation is doomed to failure and he turns away. I
   D. He hates his cruel step-father and hopes he will not survive the operation. H

8. A. He is thinking of ways of getting back at his father who won't let his leave the cabin. H
   B. He is wondering why he is so unpupular and no one comes over to play with him. I
   C. He is enjoying the warmth of the sunshine. B
   D. He wishes he could grow up to be like Abe Lincoln who was also born in a log cabin. AI

9. A. Things have not worked out for him and he is wondering if life is worth living. I
   B. He is watching the plane passing overhead. B
   C. He is wondering how he can revenge himself on those who have wronged him. H
   D. He is thinking of great accomplishments. AI

10. A. He is demonstrating the way to climb a rope. B
    B. He is watching his hated rival and hopes he will fall. H
    C. He is in a rope climbing contest and is exerting every effort to win. AI
    D. Although he has tried his best, he sees that the race is lost. I

11. A. She despises this man who is forcing his attentions upon her. H
    B. He admires her for the success she has achieved in her career. AI
    C. She is sorry that she did not do more to make their marriage a happy one. I
    D. They are considering whether to buy this attractive table. B

12. A. He has resolved to do his best to live up to her expectations. AI
    B. He has failed her in spite of her high hopes. I
    C. They are at a party dancing to a Viennese waltz. B
    D. Despite his pretense and show of affection, he secretly despises her. H

13. A. She is furious because the elevator is out of order and she must walk. H
    B. She is on her way to catch a train. B
    C. Although she is still looking for work in the big city, she has no real hope of success. I
    D. Viewing the magnificence of the structure, she is inspired to work harder toward her career. AI

14. A. She cannot succeed and is going to commit suicide. I
    B. She is waiting to go on stage in what will be her greatest theatrical triumph. AI
    C. She is trying to hide her laughter after playing a mean practical joke. H
    D. She is wiping a cinder out of her eye. B

15. A. She is just coming home from a walk. B
    B. This maid is planning revenge on her arrogant employers. H
    C. She is eager for everything to be in perfect order because her husband's boss is coming for dinner. AI
    D. She worries that her home is so shabby that it will make a poor impression. I

16. A. She is rushing to tell her sister they have won the contest. AI
    B. She has told her sister that she must hurry if she wants to meet her friends. B
    C. She feels only scorn for her sister and her wild ways. H
    D. She feels inferior to her sister who is everything that she had hoped to be. I

17.A. He feels that there is no use trying and will join this band of hobos. I
B. He despises these men for their irresponsible behavior. H
C. Watching the laborers, he dreams of the success that will put him far above such a life. AI
D. The men are resting after lunch. B

18.A. The girl is watching the men and waiting for her husband to finish work. B
B. Seeing her old waterfront neighborhood, she realizes how great her success has been. AI
C. She wishes that she had more self-confidence but fears that she will never amount to much. I
D. She is furious at having been kept waiting so long. H

19.A. He hates the people who have led him to this kind of life. H
B. He realizes now that he will never escape from the life he has been leading. I
C. He is tired and is leaving the party to get some sleep. B
D. He is determined to start anew and make something of himself. AI

20.A. She is explaining her despair of overcoming the limitations of her handicap. I
B. They are enacting a scene in a play. B
C. She has finally turned in fury on the woman who has so humiliated her. H
D. She is telling the other woman that despite her handicap she knows she will succeed. AI

21.A. He is thinking of how quiet the big city can become in the early morning. B
B. He is waiting in the dark to get back at his tormentors. H
C. He is sure that he will someday be one of the successful people living in this fashionable neighborhood. AI
D. He feels that he will never be able to make the grade in the big city. I

22.A. He is being awakened from a brief rest to resume work on his invention. AI
B. The man is in despair because he can do nothing to help. I
C. He is waking up the other person from his sleep since it is daybreak. B
D. His menacing gesture reveals his deep bitterness toward the sleeping man. H

23.A. The old lady is envious and resentful of the younger woman. H
B. They are reminiscing about their years of happiness and success together. AI
C. The old lady wishes that she had been able to help the younger woman when she needed it. I
D. They are watching the people pass on the street. B

24.A. He has just successfully completed an extremely difficult and dangerous emergency operation. AI
B. He has failed to save her life although he has tried his best. I
C. He is rubbing the sleep out of his eyes in an effort to keep awake. B
D. He is rejecting this woman because of his disjust for her and all that she stands for. H

ANSWER SHEET MULTIPLE-CHOICE PICTURE INTERPRETATION

Name_____ Sex_____ Age_____ Date_____

Example	Card 5	Card 10	Card 15	Card 20
A. 2	A_____	A._____	A_____	A_____
B 1	B_____	B_____	B_____	B_____
C 4	C_____	C_____	C_____	C_____
D 3	D_____	D_____	D_____	D_____

Card 1	Card 6	Card 11	Card 16	Card 21
A_____	A_____	A_____	A_____	A_____
B_____	B_____	B_____	B_____	B_____
C_____	C_____	C_____	C_____	C_____
D_____	D_____	D_____	D_____	D_____

Card 2	Card 7	Card 12	Card 17	Card 22
A_____	A_____	A_____	A_____	A_____
B_____	B_____	B_____	B_____	B_____
C_____	C_____	C_____	C_____	C_____
D_____	D_____	D_____	D_____	D_____

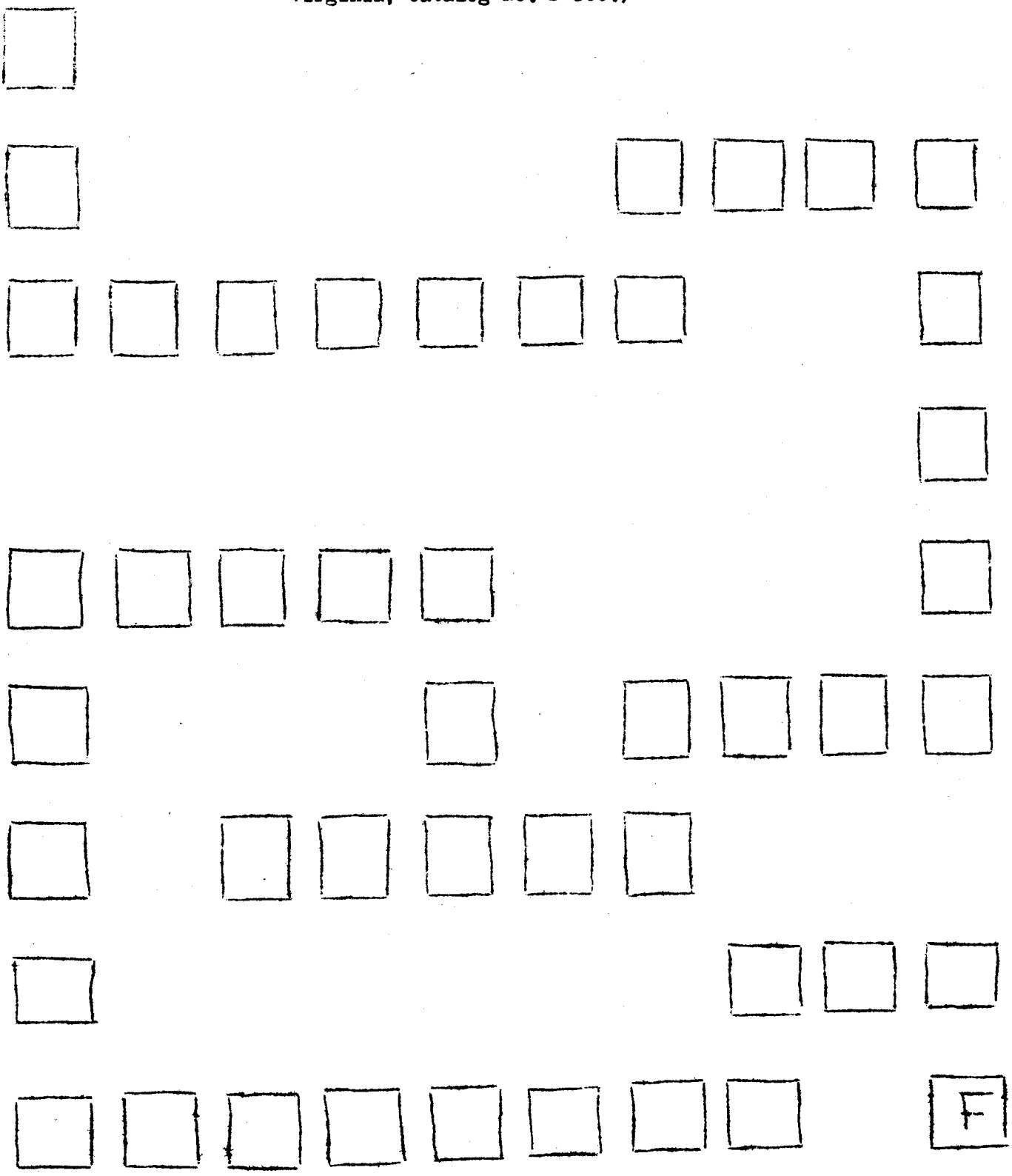
Card 3	Card 8	Card 13	Card 18	Card 23
A_____	A_____	A_____	A_____	A_____
B_____	B_____	B_____	B_____	B_____
C_____	C_____	C_____	C_____	C_____
D_____	D_____	D_____	D_____	D_____

Card 4	Card 9	Card 14	Card 19	Card 24
A_____	A_____	A_____	A_____	A_____
B_____	B_____	B_____	B_____	B_____
C_____	C_____	C_____	C_____	C_____
D_____	D_____	D_____	D_____	D_____

APPENDIX F

S

Data sheet showing the correct path of the electric maze (Phipps and Bird, Richmond, Virginia, Catalog No. P-500.)



TRIALS	1	2	3	4	5	6	7	8	9	10
TIME										
ERRORS										

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