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THE EFFECTS OF FAILURE AND ACHIEVEMENT IMAGERY ON A PAIRED ASSOCIATES VERBAL LEARNING TASK

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of Masters of Arts, in the Department of Psychology in the Graduate School of the University of Richmond

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Chapter 1

INTRODUCTION

Concern over the effects of failure on performance has led many researchers to experimental investigation of this problem. However, a review of the literature indicates that the exact effects of failure are still not known. The results of most studies have shown a decrement in performance or learning following failure while others have found either no effect or an increment.

Sears (1937) found that a group of Ss failed on a card-sorting task showed a decrement in performance from the beginning to the end of each session. On the other hand, a group succeeded on this task showed a continuing improvement due to practice. Sears also found that failure caused a decrement in performance on a verbal learning task that was given at the beginning and end of each experimental session.

Russell (1952) studied the effects of motivational instructions and verbally induced failure on learning and retention of a verbal learning task. Following a practice list, which established the fact that the groups were equal in learning ability, Ss learned a list of 12 nonsense syllables to the criterion of 5 correct anticipations. Half of the Ss had been given high motivating instructions, while the other half received low motivational instruction. Half of the Ss in each group were

then told they had failed. Half of the Ss relearned the list immediately and half after a 24 hour delay. Russell found that failure led to an immediate disruption of performance which had dissipated 24 hours later. There was no interaction between failure and motivation.

A number of experimenters have noted that failure may be one way to induce psychological stress. Lazarus and Eriksen (1952) were interested in the effect of stress on speed and also accuracy of performance on the Wechsler-Bellevue digit-symbol subtest. This test was presented as a test of intelligence. On its completion the Ss were given the Group Rorschach test. The control group was then taken from the experimental room and told that they had done well on the digit-symbol test, but that they would be given the test again as a check. The experimental group was told that they had performed very poorly, but that they would be given another chance. During this administration of the digit-symbol test false norms were called out which exceeded the capacity of the Ss. This was done in order to intensify stress. Lazarus and Eriksen report that the primary effect of failure was to increase the variability of over-all performance. Although the experimental group showed a significant increase in errors, it was found that those Ss who made more errors also increased in speed. However, the speed of both groups decreased slightly on the second test. They also found that those Ss with higher academic standing performed better and with less variability than those with a low academic standing. These authors point out that the Ss were affected in different ways by the failure experience. They suggest that the relationship between poor performance in the stressful experimental

situation and low academic standing might be the result of unfavorable reactions to stress on the part of an individual. These experimenters make it very plain that failure seems to affect people in different ways. they point out that any prediction made when failure is used in the experimental design must take into account individual differences.

Sarason (1956) studied the effects of anxiety, as measured by the Taylor Manifest Anxiety Scale, and its interaction with motivation level and failure on a verbal learning task. He found, as did Russell, that failure instructions resulted in an immediate decrement in performance which was not found 24 hours later. There was also a highly significant interaction between failure and motivation. Among those Ss given failure instructions the high motivation Ss did better than the low motivation Ss. Sarason points out that there are not any theories of motivation which can explain this finding. He stresses that personality differences must be taken into account when failure is used in an experimental design. Failure did not interact with the anxiety level of the Ss.

Sarason and Sarason (1957) studied the effects of failure and motivational instructions on immediate and delayed recall. The investigators were attempting to clear up conflicting results concerning the delayed effects of motivational instructions. All Ss received 15 trials on the first list of 17 nonsense syllables. Half of the Ss then received low motivational instructions on the second list, while the other half was given high motivational instructions. Each of these groups was further divided into a failure group and a nonfailure group. The failure groups were given failure instructions at the end of the 14th trial on

the second list. The nonfailure Ss were engaged in a short conversation with the E at the end of this trial. All Ss were then given one more trial on the list as a measure of retention. Five more trials were given 24 hours later as a delayed retention test. The results showed that on immediate retention failed Ss gave significantly fewer correct anticipations. However, this effect was not found on the delayed retention test. A near significant interaction between failure and motivational instructions was also found. Here, as above, the authors point out that reactions to failure may depend upon the differing motivational levels of individuals.

Taylor (1958) also investigated the effects of failure on verbal learning. The effects of failure may be accounted for in two ways. Following Hullian drive theory failure may increase drive level which in turn raises reaction potential. In such a case performance will be facilitated if the task is an easy one which calls for a single response tendency. However, if the task is a difficult one which contains many competing responses tendencies with the correct tendency being no stronger than the other, an increase in drive due to failure may increase the probability of competing responses and thus impair performance. In the habit interpretation, on the other hand, failure may be thought of as arousing competing internal responses or habits. These habits may facilitate performance or they may be detrimental. Taylor used Ss scoring high or low on the Taylor Manifest Anxiety Scale. The task, two lists of 8 pairs of nonsense syllables each, was designed to reduce competing response tendencies. According to drive theory under neutral

conditions the high anxiety group should do better since they have higher drive than the low anxiety group. This theory would further predict that when drive is increased by means of failure the high anxious should improve even more. If, however, the failure increased competing habits the high anxious should remain the same or work at a lower level.

The two groups, high and low anxious, were each separated into a neutral and a stress group. All Ss were given a practice list and then one experimental list to learn. Preliminary instructions indicated that the test was a measure of intelligence. Before being given the second experimental list the stress groups were told that they had done very poorly on the first lists. On the other hand, the neutral groups were told at this time that their previous performances had been fine. The results showed that the high anxious group performed better on the first list. A decrement in performance was found, however, for both the high and the low anxious groups following failure. However, the high anxious continued to be superior to the low anxious even under failure. Taylor suggested that under failure both drive level and competing habits, each with its opposite effect, were increased for the high anxious Ss and that these opposite effects cancelled each other.

Still other investigators have found an increment in performance upon the introduction of failure. Stoisel and Cohen (1951) investigated the effects of differing degrees of failure on level-of-aspiration. In this experiment failure was induced by informing the Ss that they had not reached their goals. Differing levels of failure were obtained by stopping the Ss at different points short of their goal. The results revealed

that all Ss lowered their level-of-aspiration following failure, with the group given severe failure showing the greatest reduction. It was also found that speed of performance was significantly increased after severe failure was given a second time. In the severe-failure group there was a significant increase in speed of performance with successive failures.

Lucas (1952) studied the variables of anxiety, failure, and intra-serial duplication and their effect on performance. Six lists of 10 consonants were presented to the Ss. A test of retention was given after each presentation. The anxious and non-anxious groups were each divided into four groups. The first group was given failure instructions after every list. The second group received failure after the last four lists; the third after the last two lists; and the fourth group received completely neutral instructions. Lucas found that there was no significant difference in performance between anxious and non-anxious groups given failure only once or not at all. Moreover, the performance of the non-anxious group improved with each failure, until they were performing significantly better than the anxious group. The improved performance of the non-anxious group given failure was significant as was the decrement in performance of the anxious group given failure. This interaction is contrary to the results of Sarason (1956). Lucas suggested that these results were due to a difference in the rate of producing conflicting responses between anxiety and failure. The conflicting responses of anxiety with increased drive might develop at a much more rapid rate than those produced by failure; therefore, this would cause an interference in performance. With continued increase in drive (more than six failures)

there would be an increase in conflicting tendencies due to failure until they also would interfer with performance.

Truax and Martin (1957) investigated three factors, time of retention test, task complexity, and the degree of the personalization of failure, which they believed might affect the interaction of anxiety and failure. The results showed that on a simple task there was a significant improvement following failure in terms of time necessary to complete the task. Those Ss given a delayed test after failure showed an even greater improvement following failure. The high anxious Ss improved more than did the low anxious group. However, low anxious did better under severe failure while high anxious improved less. They found no evidence that variability of performance was increased following failure. However, as there was no control group, it cannot be knownif these effects were due to the treatment or to a practice effect.

Johnston and Wright (1962) sought to clear up conflicting results found by other researchers concerning the effects of failure on performance by inducing failure at different levels of learning. A disruption of performance in early learning was predicted if failure was acting as a drive, since the correct responses are not yet dominant in the habit hierarchy. They expected a lesser disruption in later learning when the correct responses are more dominant.

Three groups each with a corresponding control group were set up. The first group was failed after ten trials, while its companion group rested for 30 seconds by talking to the E. The second failure group received failure instructions after 15 trials on a list; the third group

after 20 trials. The companion groups were rested when the other two groups were given failure instructions. All groups continued after failure or rest to 25 trials. There was no attempt to manipulate the motivational level of the Ss. The group failed on the tenth trial showed significantly better performance than the group rested after the tenth trial. The groups failed on the 15th and 20th trials showed a decrement in performance. The authors set forth two possible theoretical possibilities to account for the results. One possibility was that since competing responses are not being directly reinforced while below threshold, and the correct response is, an increase in dive may not raise the competing response tendencies above threshold. Some correct responses would, however, appear above threshold and would cause an improvement in learning. The apparent decrement in the performance of the rested group might be due to the inhibiting effect of conversation. On the other hand, it could be that certain stimuli, such as failure, lead to an abrupt increase in drive. Such rapid increases in drive are thought to decrease the probability of preceeding responses. If "not responding" is considered a response, then in early learning, where there is usually no responding, an increment in perform - ance would occur after failure since an increase in responding would be likely to increase correct responses. The decrement found in later learning could be expected since in this case responses have been made previous to failure. The rapid rise in drive would thus increase the probability of not responding.

Aborn (1953) found no effect of failure on the retention of an experimental group which was set to learn. He found that their recall of a nu-

merical list was the same as the control group which had not been placed in a failure situation. Abern suggested that this might be due to rehearsal by the Ss because they inferred that their intelligence was being tested, and this counteracted the effects of failure. He did, however, find that failure had the effect of a decrement on performance with a failure group which had not been told to learn the list but only learned incidentally.

This review of the literature suggests that personality factors must be accounted for in predicting reactions to failure. One of the predominate factors in any learning situation would be the person's willingness or interest in the situation. If such a relationship between failure and individual differences can be shown to exist the effects of failure can be more accurately predicted than when these personality differences are not accounted for. Hurley (1957) tested the prediction that Achievement Imagery (AI) scores of the Iowa Picture Interpretation Test (IPIT) could be used to select such people. He found that under low motivating instructions high AI Ss did significantly better than the low AI Ss on a verbal learning task. This difference, however, disappeared when the Ss were given high motivational instructions. Johnston (1955) found similar results on a maze learning task.

The dual effects of failure, a stimulus defined variable, and achievement imagery, a response defined variable, have been employed in some experimental investigations. Williams (1955) investigated the effects of failure on high and low AI Ss in a level-of-aspiration situation. The Ss were given 5 trials on the task which consisted of simple addition problems. On the first trial the Ss were given a score. On the next trial

half of the Ss were asked to state a level-of-aspiration. The other half had this level set for them by the E. In turn, half of each of these groups were told that they had failed to reach the goal while the other half were told that they had succeeded in reaching the goal. Over-all, the high AI Ss performed at a faster rate of speed than the low AI Ss did, however, the low AI Ss showed a significant increment after failure to reach goals that had been set by the E while the high AI Ss showed a decrement in speed after failure to reach such goals. On the other hand, after failure to reach self-determined goals it was the high AI Ss who improved and the low AI group which showed a decrement in performance.

A study by Miller and Worchel (1956) also investigated the relationship between need achievement and failure. Three groups, high, middle, and low achievement, were formed on the basis of scores made on the Thematic Apperception Test (TAT) of need achievement (McClelland, Atkinson, Clark, and Lowell, 1953). The Ss were given the McKinney Reporting Test, presented as an intelligence test, and allowed to work at their own rate for the first 8 minutes. For the next 16 minutes the Ss were stopped every 30 seconds and told that they were not meeting a standard. The Ss again worked at their own rate for the last 8 minutes. No significant relationships between need achievement and the effects of stress were found. The authors suggest that perhaps differences between the achievement groups did not appear since all groups were given high motivational instructions to begin with and thus would be working at or near the same motivational level.

The purpose of the present study is to determine if a consistent function of failure can be determined by distinguishing among high and low AI

Ss. On an associative basis (under low motivational instructions) high AI Ss seem to have more habits which facilitate learning than the low AI Ss as suggested by their superior performance in a neutral learning situation (Johnston, 1955; Hurley, 1957). If failure is thought of as introducing competing habits high AI Ss would show a decrement in performance but would continue to be superior to the low AI Ss since they would bring more facilitating habits into the experimental situation. This should be true regardless of the difficulty level of the task. If, however, the superiority of high AI Ss in a neutral situation is the result of a higher drive level than that of low AI Ss and if failure is seen as further increasing drive, high AI Ss should show superior performance on an easy task and inferior performance on a difficult task. It is of course possible that one of the variables will combine associatively and the other multiplicatively. In view of the conflicting evidence, the present study is seen as exploratory and no specific hypotheses regarding the outcome seem possible.

All of the Ss in this experiment received low motivation instructions in order to allow the individual differences selected to operate since in several of the studies cited above (Miller and Morchel, 1956; Taylor, 1953; Abarn, 1953) it was suggested that high motivating instructions may obscure differences in reaction to failure.

Chapter II

METHOD

A lengthened version of the IPIT (Form 5, Johnston, 1957) was administered to all 240 students enrolled in General Psychology at the University of Richmond in order to obtain measures of achievement imagery. The administration of the test required approximately a half an hour and was given to each class during a regular class period. Forty Ss scoring in the bottom 23.2% of the AI distribution were selected to form the high AI group. The cut off score was 52. Forty Ss in the top 20.8% made up the low AI group, the cutting score here was 62. The argument might be made that elimination of the middle group of AI Ss restricts the generalization of the results. However, it is felt that at the present stage of development of the scale, it is necessary to gain reliable results. The Ss in each group were randomly divided into a failure group and a rest or control group. The assignment of Ss to treatment groups was done by a colleague to prevent the E from knowing the AI group of an S before the experimental session. The experimental design consisted of four groups, low achievement-failure, low achievement-rest, high achievement-failure, high achievement-rest, with 20 Ss in each group.

The experimental task consisted of a list of 12 pairs of two-syllable adjectives (Spence, Farber, and McFann, 1956) presented on a Lafayette

Memory Drum. This was believed to be generally a difficult list since the association between 8 of the pairs was minimized by selecting paired adjectives which have entirely different meanings. Four of the adjectives, however, were paired with synonyms. Thus part of the list may be described as difficult and part easy. A four second presentation time was used for the stimulus words and the paired word was exposed for two seconds. The pairs were presented in random order so as to eliminate serial learning. The experimental room was five feet by six feet and contained a table and two chairs. The table was two feet by two feet and on it was placed the Lafayette Memory Drum. A board measuring three feet by three feet was fitted over the memory drum to prevent the S from seeing E. E recorded the Ss' correct responses on a score sheet which showed the paired associates in the order of presentation down the side and the number of trials across the top.

The Ss were brought into the experimental room and were given a chair facing the Lafayette Memory Drum. The following general instructions were used to explain the task:

> Two words will appear in this opening at one time. However, a slide will cover one of the words and then will reveal the word to you for a couple of seconds. Tell me the word which is paired with the first word and call this paired word out before it appears. Do not learn the lists in serial order. Of course, the first time through the lists you will not be able to call out any of the paired words, but after that call out the word before it appears. Just tell me when they come to you and don't make any extra effort to learn them. I am interested in certain characteristics of these pairs and not in your performance on this task. Do you understand?

The S was told that it was not necessary to make any extra effort to learn the list so that the situation can be described as low motivation or "non-

ego involving."

E started the memory drum and sat down across the table from the S. Responses were recorded if the S anticipated the paired word before the slide dropped down to expose it. E was able to accurately judge when this slide dropped by the mechanism exposed in the back of the machine. When a clearly visible gear hit the lever the slide was dropped. It was possible for E to watch this contact and, therefore, to judge whether or not the S's response anticipated the word. The Ss then received 11 trials on the list. Immediately following the 11th trial, E called the failure Ss by their last name and administered the failure instructions as follows:

> You seem to be having trouble with this test. Is anything wrong? Can you see the words clearly? How do you feel? You've been doing much worse than the other people who have worked on this task. In fact, yours is one of the lowest scores I've gotten so far, and you're one of the few people I've had who has not reached college level on this task. That's why I asked if anything was the matter. You've only gotten___right. Usually people get that many right in half the time it's taken you.

This procedure took approximately 30 seconds. At the end of the 11th trial the control Ss were also stopped and engaged in conversation for 30 seconds. At the completion of either a failure or a rest period, E turned on the machine and began trial twelve. Learning was continued to a criterion of two successive errorless trials. When the experimental session was over, E told the S that he had done very well. He was also asked not to discuss the experimental procedure with others.

Chapter III

RESULTS

The learning curves for each of the four groups are presented in Figure 1. The means and SD's of the correct anticipations for the four groups on trial 11 (pre-failure trial) are presented in Table I. The experimental results were analyzed by a two by two factorial design with AI level constituting one factor and failure-nonfailure the other. The summary table of the analysis of variance is presented in Table II. There is a significant main effect of AI ($F = 8.370$; $P < .01$) indicating that the high AI Ss anticipated a significantly greater number of paired associates than the low AI Ss.

The means and SD's of the correct anticipations for the four groups following failure or rest (trial 12) are presented in Table III. The two by two analysis of variance, presented in Table IV, indicates that high AI Ss again anticipated a significantly greater number of paired associates ($P < .01$). The failure-nonfailure dimension was also significant with an F of 7.024 ($P < .01$), indicating that the failure Ss anticipated significantly fewer paired associates on trial 12 than the nonfailure Ss.

Table V presents the means and SD's of the total number of trials to criterion following failure or nonfailure. The results of a two by two analysis of variance are presented in Table VI. The test of the main

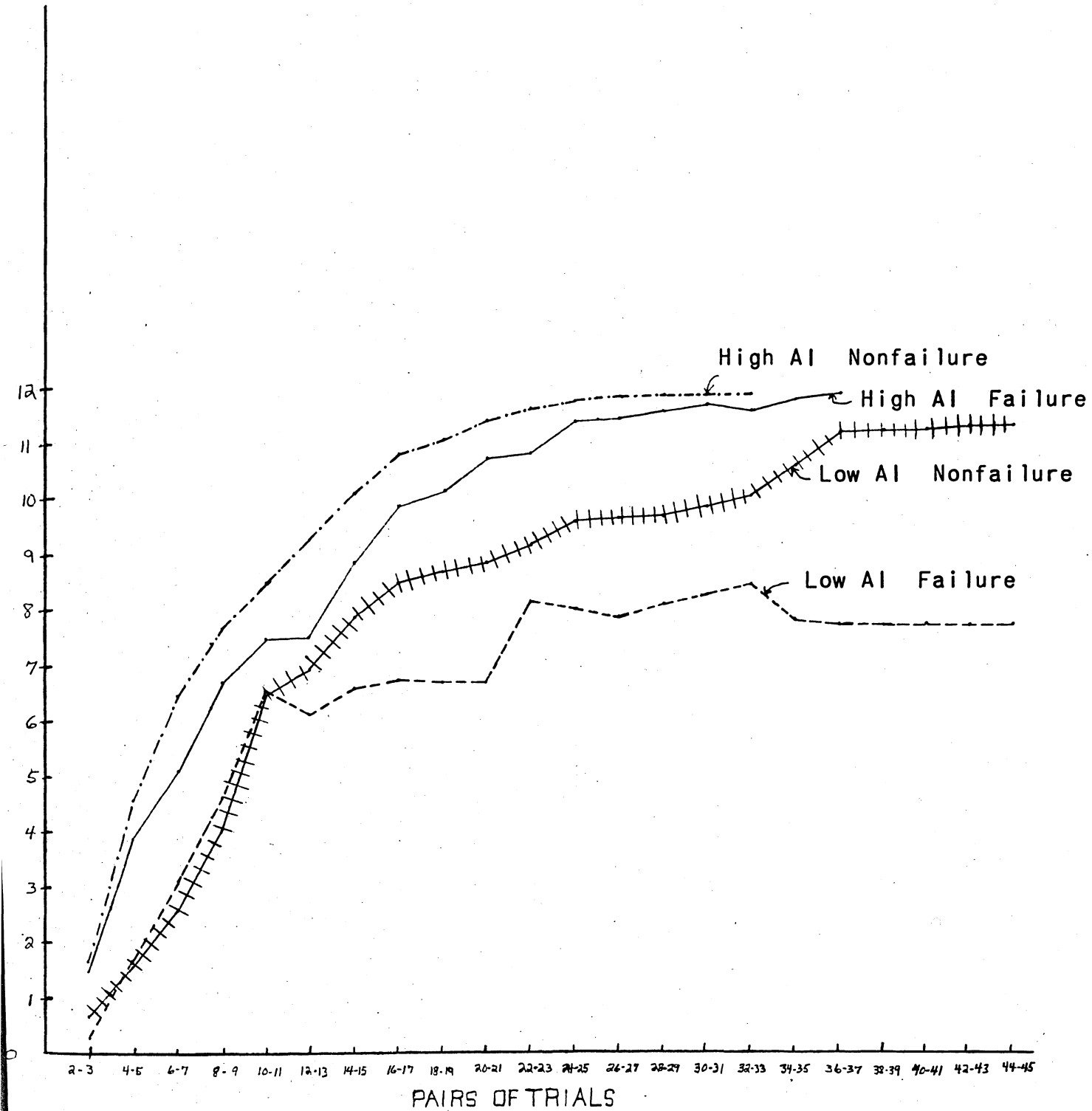

Figure 1. Curves Showing Mean Number of Correct Anticipations of Paired Associates Per Trial For High AI-F and NF and Low AI-F and NF.

Table I

Means and SD's of Correct Anticipations Trial 11

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	6.0	1.30
Hi AI-NonFailure	20	6.75	2.474
Lo AI-Failure	20	6.9	2.615
Lo AI-NonFailure	20	7.05	3.523

Table II

Summary Table of the Analysis of Variance of the Correct Anticipations for the Four Groups on Trial 11

Source	df	MS	F
A (H & Lo AI)	1	39.20	8.370**
B (F or HF)	1	4.05	.865
A x B	1	1.80	.384
Error	76	4.683	

**Significant beyond the 1 per cent level of confidence.
Critical value .01 level = 6.95

Table III

Means and SD's of Correct Anticipations Trial 12

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	6.8	2.02
Hi AI-NonFailure	20	8.75	2.151
Lo AI-Failure	20	5.5	2.351
Lo AI-NonFailure	20	6.6	3.2761

Table IV

Summary Table of the Analysis of Variance of the Correct Anticipations for the Four Groups on Trial 12

Source	df	MS	F
A (H & Lo AI)	1	61.25	9.559**
B (F or NF)	1	45.00	7.024*
A x B	1	4.05	.632
Error	76	6.407	

**Significant beyond the 1 per cent level of confidence.
Critical value .01 level = 6.95

Table V

Means and SD's of Trials to Criterion Following Treatment

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	12.4	4.847
Hi AI-NonFailure	20	8.4	4.249
Lo AI-Failure	20	25.1	15.8
Lo AI-NonFailure	20	20.5	12.11

Table VI

Summary Table of the Analysis of Variance of the Total Number of Trials to Criterion Following Failure or Nonfailure

Source	df	MS	F
A (H & Lo AI)	1	2964.624	26.930**
B (F or NF)	1	418.524	3.802
A x B	1	5.501	.040
Error	76	110.084	

**Significant beyond the 1 per cent level of confidence. Critical value .01 = 6.95

effect of AI yielded an F of 26.930 (P .01). Inspection of the means indicates that the low AI Ss took significantly longer to reach the criterion of two successive trials than the high AI Ss. The failure Ss also showed a tendency to take longer to reach the criterion than the rest groups, but the F observed failed to reach significance at the .05 level.

Five t-tests were run on pairs of trials beginning with trial 2 and ending with trial 11. The obtained t-value for trials 2-3 was 4.702 which exceeds the critical t-ratio of 2.58 at the .01 level of significance. Analysis of trial 4-5 revealed an obtained t of 5.977 which is also significant at the .01 level. Trials 6-7 and 8-9 resulted in obtained t-ratios of 10.467 and 5.203 respectively which are significant at the .01 level. The critical t-ratio for trials 10-11 failed to reach significance. The four significant t-values indicate that the high AI Ss were superior to the low AI in performance on the first nine trials.

In order to determine whether or not high AI Ss retained their superiority after failure or nonfailure, an analysis of variance was run on trials 16, 26, and 36 with AI representing one dimension and failure-nonfailure the other. The means and SD's for trials 16, 26, and 36 are presented in Tables VII, IX, and XI respectively. The summary tables for these three trials are presented in Tables VIII, X, and XII. Since there was a significant interaction on trials 16 and 36, no concise statement can be made for Factor A (High AI and Low AI). The analysis of simple effects, presented in Tables XIII and XIV, shows that the high and low AI Ss reacted differently to the failure condition on both trials 16 and 36. The low AI Ss did significantly poorer following failure than the high AI

Table VII

Means and SD's of Correct Anticipations Trial 16

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	9.8	5.787
Hi AI-NonFailure	20	10.65	1.504
Lo AI-Failure	20	7.15	3.835
Lo AI-NonFailure	20	8.75	2.909

Table VIII

Summary Table of the Analysis of Variance of the Correct Anticipations for the four Groups on Trial 16

Source	SS	df	MS	F
A (H & Lo AI)	103.512	1	103.512	17.249**
B (P or NP)	30.012	1	30.012	5.001*
A x B	52.813	1	52.813	8.801**
Error	465.050	76	6.001	

*Significant beyond the 5 per cent level of confidence.
Critical value .05 level = 3.97

**Significant beyond the 1 per cent level of confidence.
Critical value .01 level = 6.95

Table IX

Means and SD's of Correct Anticipations Trial 26

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	11.5	1.572
Hi AI-NonFailure	20	12	0
Lo AI-Failure	20	7.95	5.02
Lo AI-NonFailure	20	9.55	3.478

Table X

Summary Table of the Analysis of Variance of the Correct Anticipations for the Four Groups on Trial 26

Source	SS	df	MS	F
A (H & Lo AI)	180.0	1	180.0	17.564**
B (F or NF)	22.05	1	22.05	2.151
A x B	6.05	1	6.05	.591
Error	778.9	76	10.248	

**Significant beyond the 1 per cent level of confidence.
Critical value .01 level = 6.95

Table XI

Means and SD's of Correct Anticipations Trial 36

Group	N	Correct Anticipations	
		Means	SD
Hi AI-Failure	20	12	0
Hi AI-NonFailure	20	12	0
Lo AI-Failure	20	7.8	7.331
Lo AI-NonFailure	20	10.6	2.533

Table XII

Summary Table of the Analysis of Variance of the Correct Anticipations for the Four Groups on Trial 36

Source	SS	df	MS	F
A (H & Lo AI)	156.80	1	156.80	16.737**
B (F or NF)	39.20	1	39.20	4.185*
A x B	39.20	1	39.20	4.185*
Error	712.00	76	9.368	

*Significant beyond the 5 per cent level of confidence.
Critical value .05 level = 3.97

**Significant beyond the 1 per cent level of confidence.
Critical value .01 level = 6.95

group. The fact that on trials 16 and 36 the high AI failure group was not significantly different from the high AI nonfailure group shows that the effects of failure dissipated for these Ss. However, the low AI failure group continued to show the effects of failure through out learning as shown by the significant simple effect. The main effects of the analysis of trial 26 show that the high AI group was still superior to the low AI group in mean number of correct anticipations. The obtained F ratio was significant beyond the .01 level of confidence.

One advantage of the list used in the present experiment is that analysis can be made in terms of hard and easy paired associates. A three factor analysis of variance was run on trial 12 in order to determine if an interaction of the variables failure-nonfailure, hard-easy, and low AI-high AI occurred. Although no interaction was found, the results showed that all main effects were significant at the .01 level. The main effect of the failure-nonfailure dimension was significant at the .01 level as found above. As was stated above, the high AI Ss did better than the low AI Ss.

Table XIII

Analysis of Simple Effects of Correct Anticipations on Trial 16

Source	SS	df	MS	F
Factor A at level b_1	70.225	1	70.225	11.702**
Factor A at level b_2	36.10	1	36.10	6.016*
Factor B at level a_1	6.725	1	6.725	.001
Factor B at level a_2	25.6	1	25.6	4.266*

*Significant beyond the 5 percent level of confidence.
Critical value .05 = 3.97

**Significant beyond the 1 per cent level of confidence.
Critical value .01 = 6.95

Error Term = 6.001

Table XIV

Analysis of Simple Effects of Correct Anticipations on Trial 36

Source	SS	df	MS	F
Factor A at level b_1	176.40	1	176.40	18.7**
Factor A at level b_2	19.60	1	19.60	2.09
Factor B at level a_1	0	1	0	0
Factor B at level a_2	78.375	1	78.375	8.3**

**Significant beyond the 1 per cent level of confidence.
Critical value .01 = 6.95

Error Term = 9.368

Table XV

Summary Table of the Analysis of Variance of the Correct Anticipations For Three Dimensions (Nonfailure-Failure, Hard-Easy and High AI-Low AI) on Trial 12

Source	SS	df	MS	F
A (Nonfailure-Failure)	22.50	1	22.50	4.008*
B (Hard-Easy)	57.60	1	57.60	10.260**
C (H. AI-Lo. AI)	25.60	1	25.60	4.560*
AB	13.225	1	13.225	2.355
AC	3.025	1	3.025	.538
BC	4.125	1	4.125	.734
ABC	6.40	1	6.40	1.14
Error	404.20	72	5.614	

*Significant beyond the 5 per cent level of confidence.
Critical value .05 = 3.97

**Significant beyond the 1 per cent level of confidence.
Critical value .01 = 6.93

Chapter IV

DISCUSSION

The results of this study support earlier findings that failure causes an over-all decrement in performance and that high AI Ss are superior in learning to the low AI Ss. The data also showed that low AI Ss tended to show greater effects of failure than high AI Ss.

The learning curves presented in Figure 1 clearly show the superiority of the high AI Ss on the first 11 trials and confirm the previous findings of Johnston (1955) and Hurley (1957) concerning the superiority of high AI Ss over low AI Ss in learning. These experimenters found that high AI Ss performed better under low motivating instructions, but that the differences between the two groups tended to disappear under high motivating instructions. In the present experiment, therefore, since neutral or "non ego-involved" instructions were used, the high AI group was expected to correctly anticipate a significantly greater number of paired associates. Such results would tend to bear out the conclusion that the AI scale of the IPIT selects Ss which will tend to do better in a neutral learning situation.

The failure-nonfailure dimension showed that both high AI and low AI Ss who received failure instructions showed a decrement in performance. The analysis of total number of trials to criterion following treatment

effects, presented in Table VI above, would seem to indicate that the low AI Ss were more affected by treatment conditions than the high AI Ss. Factor A (AI) was highly significant indicating that the low AI Ss took much longer in reaching the criterion of two successive trials. Another finding concerning failure was that while the high AI group eventually recovered from the effects of failure, the low AI Ss did not. A major factor in the significance of this result is the fact that seven low AI Ss refused to continue the experiment after receiving failure instructions. They refused in spite of the fact that they were required to sit out the remaining trials until 45 trials had been run.

Achievement imagery can be shown to be a useful measure of drive level if individuals selected on the basis of this response index can be shown to behave in a manner based on the predictions of the drive theory. In evaluating whether AI acts as a drive the primary assumption is made that all habit tendencies are multiplied by the total drive operating at the time of the response. Thus in a simple task where the correct response is dominant, drive theory would predict that increased drive due to failure would facilitate performance since the additional drive would raise the correct response to a greater distance above threshold while the other response tendencies would still be at a much lower level. In the present learning situation, if the correct responses are assumed to be dominant in the hierarchy by the 11th trial and assuming that an increase in drive will be brought about by failure, the high AI Ss should have showed an increase in performance. This was not what the results showed.

It might be argued that the correct responses were not yet dominant

in the hierarchy by the 11th trial. In this case, again assuming an increase in drive due to failure, the prediction would be that the high AI Ss should be poorer than the Ss with low AI. This would occur since the response tendencies of the high AI Ss would be at a higher level in the habit hierarchy than the tendencies of the low AI Ss if it is assumed that AI is a measure of drive and high AI Ss thus have greater drive. If this was the case, an additional increase in drive due to failure would serve only to raise even more competing tendencies above threshold, especially for the high AI Ss. This increase in drive would thus bring about a decrement in performance for both groups with the greater decrease found for the high AI Ss. The results do not support this prediction. Analysis of trial 12 showed that the high AI group retained their superiority over the low AI Ss even after failure.

As previously stated, the experimental list may be broken down into hard and easy paired associates. Drive theory would predict that the high AI Ss would be superior to the low AI Ss in learning the easy paired associates. This is because the correct response is dominant in the habit hierarchy very much the same as in the eye-lid conditioning experiments. If failure is thought of as increasing drive, the high AI group should increase their superiority over the low AI Ss. This was not found to be true. Similar results were obtained by Taylor (1953) using the Taylor A scale with regard to performance of high anxious Ss. Since Taylor used a noncompetitional list (easy list), she expected that an increase in drive brought about by failure would increase the high anxiety Ss' superiority over the low anxiety Ss. However, it will be recalled that her high anxious Ss

continued to be superior to low anxious Ss following failure. She concluded that anxiety and failure may have cancelled each other out, one acting to increase drive tending to facilitate performance and the other to introduce irrelevent responses. A similar explanation, of course, might be used in discussing the present results.

Considering only the hard paired associates, the low AI group would be expected, according to drive theory, to be superior to the high AI group. This is because the correct response is not dominant in the habit hierarchy and the greater drive would tend to elicit competing responses. Increasing drive by means of failure should cause the high AI Ss to do more poorly than the low AI group. In the present study, however, the low AI Ss showed the greater effects of failure.

The fact that the high AI group was superior to the low AI group following failure tends to support an associative interpretation. This interpretation holds that AI operates to elicit certain learned habits to respond rather than showing the functional properties of a drive. In the present experiment high AI Ss seemed to have more habits which facilitate learning than the low AI Ss as shown by their superior performance on the first 11 trials which was a completely neutral situation. If it is assumed that the failure instructions introduced competing habits the decrement in performance of both AI groups is thus explained. The associative theory would go on to predict that the high AI Ss, after failure, would still be superior to the low AI Ss since they had more facilitating habits to begin with, if their superior performance was indeed due to more facilitating habits. This is the finding which was obtained.

This investigation has presented evidence as to the relationship between AI and failure. Further research needs to be done to check whether the Insecurity scale of the IPIT is related to failure as suggested by its definition; the definition being, failure or the anticipation of failure to reach a goal. Further work should also be performed on the possibility that the frequency of verbal responses increases following failure. It is possible that although the failure Ss gave fewer correct responses they may be giving a greater number of total responses. This would entail counting both correct and incorrect anticipations.

Chapter V

SUMMARY

The Iowa Picture Interpretation Test was administered to 240 students in the Introductory Psychology classes at the University of Richmond. Forty students from the upper 20.8% and 40 from the lower 23.2% of the distribution were selected as Ss and termed low and high AI groups respectively.

The Ss learned a list of 12 paired-associates on a Lafayette Memory Drum. The criterion of learning was two successive trials without an error or a total number of 45 trials. Analysis of variances were run on trial 11, before treatment of failure or nonfailure, and trial 12, following treatment.

The main findings of the present study were:

1. Under neutral or "non-ego involved" instructions it was found that high AI Ss performed significantly better than low AI Ss.

2. The main effect of failure was to cause an immediate decrement in performance.

3. The low AI Ss were found to show a greater over-all effect of failure.

APPENDIX A

Table XVI

Frequency Distribution of AI Scores on Form 5 of the IPIT

	Frequency (f)	d	fd	fd^2
80–84	1	4	4	16
75–79	0	3	0	0
70–74	5	2	10	20
65–69	25	1	25	25
60–64	54	0	0	0
55–59	73	-1	-73	73
50–54	59	-2	-118	236
45–49	18	-3	-54	162
40–44	5	-4	-32	128
N	240			
Mean	59.1625			
Standard Deviation	7.750			

APPENDIX B

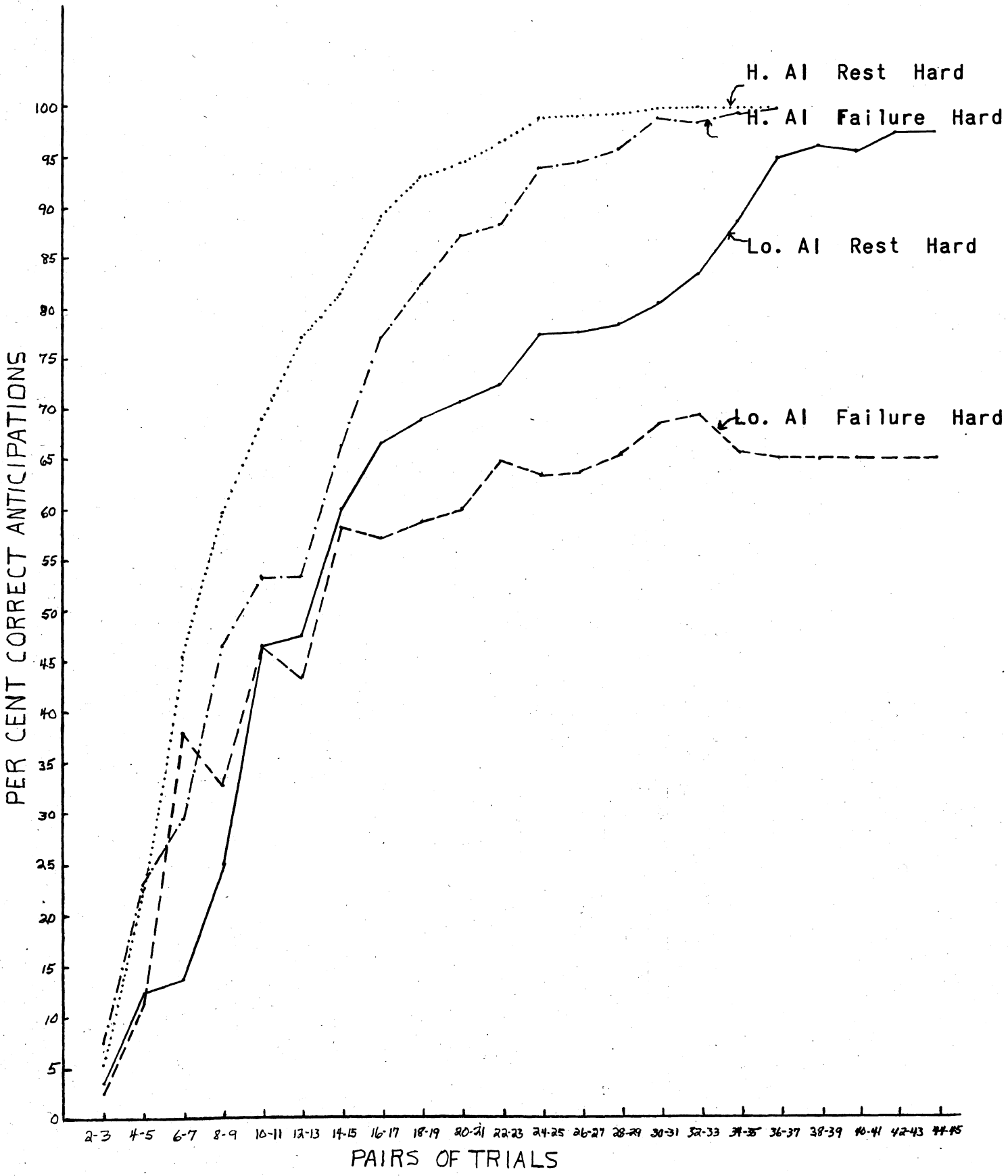

Figure 2. Curves Showing Percentage of Correct Anticipations on Hard Paired Associates For High and Low AI-Failure-Rest Ss.

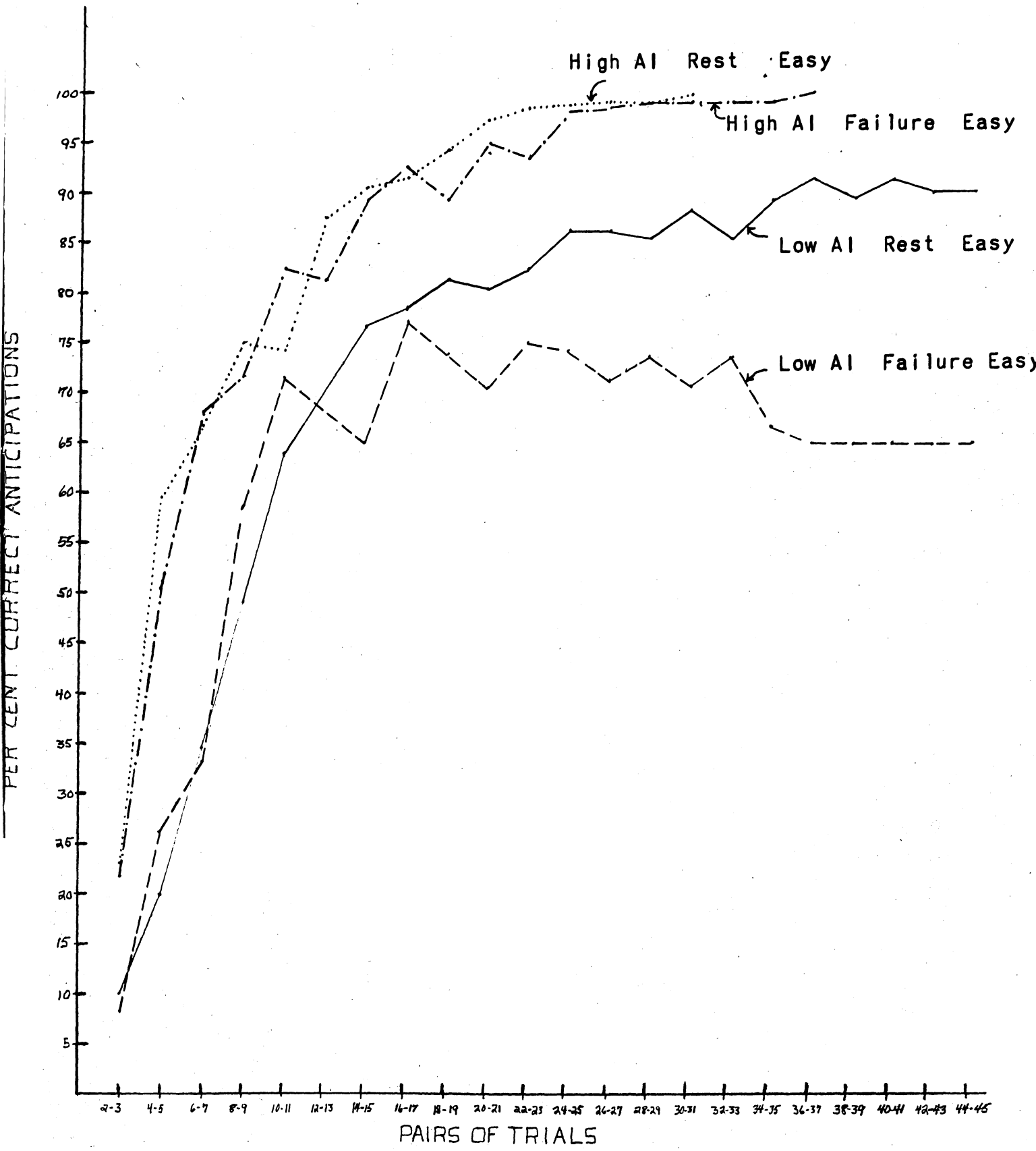

Figure 3. Curves Showing Percentage of Correct Anticipations on Easy Paired Associates For High and Low AI-Failure-Rest Ss.

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