The Effects of State Anxiety on Digit Span and Wonderlic Personnel Test Performance for Freshmen and Graduate Students

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THE EFFECTS OF STATE ANXIETY ON DIGIT SPAN AND WONDERLIC PERSONNEL TEST PERFORMANCE FOR FRESHMEN AND GRADUATE STUDENTS

by

David P. Krackow

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
August 1972
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In writing this thesis, I have greatly benefited from the encouragement, advice, and constructive criticism of Dr. Richard Schmidt and Dorothy Smith. My association with these committee members has been a highly rewarding, enriching, and pleasant experience for me. I especially want to thank Dr. Malcolm Robertson, my committee chairman and friend, whose advice, intellectualism and personality contributed far more to me than merely the contents of this thesis. It is not necessary to say that gratitude and appreciation in no way divorces me from the sole responsibility for what is written here.

David P. Krackow
MASTERS THESIS

KRACKOW, David Peter
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Western Michigan University, M.A., 1972
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INTRODUCTION

Since the early 1950s there have been numerous studies designed to ascertain the effects of anxiety on intelligence test performance. Much research has also been done on the effects of anxiety on the digit span (DS) and digit backwards (DB) section of the Wechsler Adult Intelligence Scale (WAIS).

The reports of the possible effects of anxiety on DS and DB are contradictory. Moldawasky and Moldawasky (1952) and Calvin et al. (1955) reported significant negative relationships between anxiety and DS. Walker and Spence (1964) found a significant relationship for only those Ss who admitted being anxious "at the moment." They did not, however, find any relationship between DS and anxiety as measured by the Taylor A-Scale. Jackson and Bloomberg (1958) and Matarazzo (1955) have also reported no relationship between DS and manifest anxiety.

Researchers have also disagreed on the relationship between anxiety and intelligence. Farber and Spence (1955) have "been unable over a period of years, to find any relationship between the Anxiety Scale scores of college students and conventional measures of intellectual
ability." Other investigators who also could not find any relationship between anxiety and intelligence test performance were Klugh and Bendig (1955), Sarason (1956), Spielberger (1959) and French (1962).

However, Sarason (1960), Calvin et al. (1955), Matarazzo (1954) and Jenness (1962) have found a significant negative correlation between manifest anxiety and intellectual performance. Still other researchers have found a low negative correlation between the two variables.

A possible reason for these contradictory findings is that "the meaning and conceptual status of anxiety is ambiguous" (Hodges and Spielberger, 1969). During the 1950s and early 1960s, researchers used the term "manifest anxiety." It seems that manifest anxiety was used to indicate or describe a person who was anxious. Spielberger (1966) illustrates the inadequacy of this definition:

Ambiguity in the conceptual status of anxiety arises from the more or less indiscriminate use of the term to refer to two very different types of concepts ... For example, consider the statement: "Mr. Smith is anxious." This might be interpreted as meaning that Smith is anxious now or that Smith is an anxious person. (p. 12)

Manifest anxiety was generally measured in these earlier studies by the Taylor Manifest Anxiety Scale (MAS). Matarazzo (1955) described the MAS as "an objective and apparently valid measure of anxiety." The MAS, however, appears to measure what Cattell and Scheier (1961)
called trait anxiety (A-trait). A-trait is a personality trait which "would seem to imply a motive or acquired behavioral disposition that predisposes an individual to perceive a wide range of objectively nondangerous circumstances as threatening" (Spielberger, 1966, p. 17).

The MAS requires the subject to report what he generally feels. This is consistent, intuitively, with the Cattell and Scheier, and Spielberger concept of A-trait. Empirically, according to Cattell and Scheier, the MAS correlates .75 to .85 with their A-trait factor (1961, p. 442). It would appear that the previous studies were ascertaining the effects of A-trait on DS and DB as well as on intelligence test performance. Hodges and Spielberger (1969) found no differences between high and low A-trait Ss on DS performance. They did find significant differences between low and high state anxiety (A-state) subjects on DS.

A-state is transitory anxiety. It is the anxiety a person feels at a specific time. It can essentially be defined as "the conscious and reportable experience of dread and foreboding, conceptualized as internally derived" (Basowitz et al., 1955).

Essentially, if one is anxious now, he is subjectively feeling apprehensive, nervous and his autonomic nervous system is aroused. He is afflicted with A-state. When a
subject is considered an anxious person, he has high A-

trait. A-trait is an individual’s propensity towards
attaining A-state.

Sarason, Mandler and Craighill (1952), Kraus (1961),
Lazarus and Opton (1966) and Hodges (1968) have indicated
that the best way to measure A-state is with a self-

report questionnaire. Allen (1970) raises the possibility
of falsifications of questionnaires. While this is a
possibility, the aforementioned researchers have not found
it to be a problem in their studies. Heart rate, blood
pressure, skin conductance and other physiological measures
were used in those studies in conjunction with self-report
indices. Lazarus and Opton have implied that the self-

report questionnaire may even be superior to physiological
indicators. Hodges (1968) has suggested that the question-
naire used in his experiment, the Zuckerman Affect Adject-
ive Checklist (AACL), seems to be a more sensitive
indicator of A-state than heart rate or any other physio-

logical indicators. Walker and Spence (1964) have further
suggested “that if an examiner is concerned with whether
an individual was anxious in the testing situation, he
would obtain more accurate information simply by asking
the subject.”

Researchers have also been interested in the possible
effects of test anxiety on school work performance,
notably on grades and on various aptitude indicators.
The results (Wine, 1971; Marlett and Watson, 1968; Sarason, Peterson and Nyman, 1968; and Mandler and Sarason, 1952) have indicated that test anxiety does detrimentally affect complex performance. Their consensus on why the high test anxious person performs relatively poorly is summed up by Marlett and Watson:

The high test anxious person spends a part of his task time doing things which are not task oriented. He worries about his performance, worries about how well others do, ruminates over choices open to him and is often repetitive in his attempts to solve the task. (p. 201)

It appears that Allen (1970) is correct when he suggests the possibility that test anxiety, as measured by the Test Anxiety Questionnaire (TAQ), may indiscriminately measure both A-trait and A-state. There appears to be a greater tendency for high A-trait subjects to attain A-state than low A-trait subjects (Hodges, 1968; Hodges and Spielberger, 1969). If Sarason (1960) is correct in his hypothesis that high anxious subjects are "more self-deprecatory, more self-preoccupied and generally less content with themselves," then these descriptions are most assuredly personality traits.

Test anxiety, and the philosophy behind the TAQ, however, is to measure a specific kind of stressful situation (Wine, 1971). Since test anxiety is specific and transitory, based on the frequency of tests, and does cause a conscious and reportable feeling of dread, and is
characterized by subjective feelings of apprehension and heightened autonomic nervous system arousal, then test anxiety must be considered as a type of A-state. It seems, however, that A-trait might be a variable in explaining individual differences in A-state arousal.

Lazarus and Erikson (1952) suggest that individual differences in performance under stressful, failure-threat conditions, are related to the individual subject's intellectual capabilities. They found that "there was a significant increase in inter-individual variability in test performance in the stress group, that students with high grade point averages showed a tendency to improve their performance under stress, while students with low academic standing did more poorly" (p. 105).

Another variable with which research has been concerned is the effects of anxiety on timed and untimed intelligence tests. Liebert and Morris's findings (1968) are typical of these studies. They found that timing intelligence tests tends to magnify differences between low and high anxious subjects. High anxious subjects tended to do more poorly on timed tests than on untimed ones. Low anxious subjects, though, did better on timed examinations. The authors explain this finding in terms of motivation:

Timing acts to motivate low-worry Ss, and thus enable the low-worry s to realize his potential. High-worry Ss
are motivated additionally by the
timed condition, but...have learned
task-irrelevant anxiety responses which
distract them from the task and thus
disrupt their performance. (p. 244)

The purpose of the present study is to ascertain the
effects of A-state for college freshmen and graduate
students on DS, DB and on a timed group intelligence test.

It is hypothesized that A-state can be experimentally
induced for freshmen Ss by giving them negative feedback
on an intelligence test. It is further anticipated that
those Ss under a failure-threat (F-T) condition will per­
form significantly more poorly on the DS and DB part of
the WAIS than Ss under a no-threat condition (N-T). It
is expected that performance under F-T should also be
significantly poorer on the Wonderlic Personnel Test, a
timed group intelligence test. The differences, however,
are expected to be larger for Ss who have relatively low
scores on the Wonderlic.

It was mentioned earlier that research indicates
that individual differences in performance under anxiety-
arousing conditions, or A-state, are due to intellectual
variances and/or personality trait differences. Highly
intelligent Ss and those with low A-trait tend to perform
similarly and sometimes actually improve their performance
under anxiety-arousing situations.

Graduate students have traditionally been considered
the intellectual elite of a university student body. It
is thought that due to their position as graduate students, they might tend to be less self-deprecatory and have fewer inappropriate preoccupations, be more task-oriented and have a positive self-concept relative to other students. It is therefore expected that these Ss would tend to doubt the validity of the intelligence test result, or the experimenter, before doubting their own intelligence. Thus A-state, successfully induced for other Ss by negative feedback, would not significantly raise A-state for graduate students. It is hypothesized that for graduate student Ss there will be no significant differences between F-T and N-T for both DS and Wonderlic tests. While there is always a possibility that A-state can be induced for these Ss, it is nevertheless hypothesized that these Ss, because of their superior intelligence and more positive self-concept, would realize their potential and consequently their performance would not be depressed under F-T.

It is assumed that the Ss' performance on the Wonderlic given under pre-test conditions (P-T) accurately reflects the Ss' ability. It is therefore thought that the Ss in the control condition, given the Wonderlic under N-T and under a special incentive system (SIS), would not differ significantly. The SIS offers the Ss a certain amount of money for each question they answer correctly, over what they obtained under N-T.

In summary, it is hypothesized that:
1. Freshmen Ss would perform significantly more poorly on the Wonderlic under A-state than under no-threat conditions.

2. Freshmen would also perform more poorly on DS and DB under A-state than under no-threat conditions.

3. Freshmen who do relatively poorly on the Wonderlic given under pre-test conditions, will have larger significant differences under A-state and no-threat conditions than those Ss who originally performed better on the Wonderlic.

4. A-state will not be induced in graduate students.

5. For both DS and Wonderlic tests, performance of graduate students under the failure-threat condition will not differ significantly from their performance under the no-threat condition.

6. Performance on the Wonderlic, given under pre-test conditions, will accurately reflect ability for freshmen and graduate students, i.e. the Ss will be sufficiently motivated to do their best under pre-test and no-threat conditions.
METHOD

Subjects: The Ss used for this experiment were 12 male and six female freshmen, and 30 graduate students, of whom 18 were male. The graduate Ss were between 22 and 41 years of age. The Ss were obtained from introductory and graduate psychology classes at Western Michigan University.

Apparatus: Form I and II of the Wonderlic Personnel Test (Wonderlic) were used. The Wonderlic is a 50-item, timed (12 minute) group intelligence test. Eight different forms are available, with equivalent form reliability, when used with the provided conversion table between .82 and .94 (Buros, 1966). The conversion table is determined by averaging the deviations at the mean and at the three quartile points, making the forms "technically equivalent" (Guion, p. 222).

A-state was measured by the Today form of the Zuckerman Affect Adjective Checklist (AACL). The AACL is a 21-item self-report questionnaire. Internal consistency has been found to range from .79 for odd vs. even, and .85 for split-half reliability. Both measures are significant at the .01 level. Its validity as a measure of A-state has been demonstrated in a number of studies in which fluctuations in AACL scores corresponded

The Ss used their own paper on which they were to write the orally-given DS, which was taken from the WAIS.

Procedure: The E went to various graduate and freshmen psychology classes approximately one half hour before the end of the class period. The Ss were asked whether they would participate in a two-part experiment that would be conducted that day and during the last 30 minutes of the next week's class.

The E distributed Form I of the Wonderlic to the Ss. They were told that it was an intelligence test, and that their scores would be compared with the results of those students at a rival school and also with other subjects at this university. The Ss were further instructed to put their name, class, age and sex on the test. They were then given ample time to read the instructions on the cover of the test. At the E's signal, they were given exactly 12 minutes to work on the test. The tests were then collected and the class dismissed.

Group U consisted of all the freshmen Ss who took part in the experiment, while Group G was made up entirely of graduate Ss. The Ss within each of these two groups were then matched according to the scores they obtained on Form I of the Wonderlic. Thus, two subgroups with identi-
cal or comparable means were formed from Group U and Group G.

At the next session the Ss were divided into two classrooms. The names of the F-T subgroup were called out by the E and instructed to report to the empty adjacent room. They were then given the following instructions which were nearly identical to Hodges's (1968).

"You did not do very badly on the test, but it seems to me that you could do much better. In any case, most of the other students, at both universities, who took part in the experiment did much better than you people did. In a few minutes you will be given the opportunity to improve your scores on a similar test."

The other group of matched Ss were given the following N-T instructions:

"You people did very well on the test, in fact better than most of the other students who took part in the experiment. In a few minutes you will be given a parallel form of the previous test which is just as easy."

The DS and DB section of the WAIS was then given according to the manual (Wechsler 1955), with the following modifications: They were to write the numbers on a sheet of paper, rather than give the digits back orally. It was given to a group of Ss at the same time, rather than to each S individually, and only one trial was given for each series. No erasures or crossing out were permitted. This was regarded as especially important for the DB part in order to prevent the Ss from writing the digits in the order given and then merely copying them backwards.
All the Ss were then given the Today form of the Zuckerman Affect Adjective Checklist, and instructed to fill it out based on how they "feel now."

Form II of the Wonderlic was then given to all the Ss for the allotted 12 minutes.

The Wonderlic was then collected, and the real purpose of the test was told to all the Ss. The Ss in the F-T groups were assured that they performed quite satisfactorily, exactly the same as the Ss in the other groups.

A third group (control) consisted of four graduate and four freshman students. They were given Form I of the Wonderlic under the same conditions as the Ss in both Group U and G. A week later, the Ss were given Form II with the following instructions:

"I am going to give you a test similar to the one you took last week. You will be given 25¢ for each correct answer over what you got last week. If, for example, you got a 27 last week and obtain a 30 on this test, you will be given 75¢. If you obtain the same or lower score, you of course will not have to pay the E."
RESULTS

This study hypothesized that A-state would be induced for freshmen Ss under F-T. It was consequently hypothesized that the Ss would perform more poorly on the Wonderlic and DS under F-T than N-T.

The study further predicted that F-T would not induce above-normal A-state for graduate student Ss. It was therefore thought that there would be no differences in performance on the Wonderlic and DS between Group U F-T and N-T Ss.

TABLE 1
The Mean AACL, Wonderlic and DS Scores of the Four Groups

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>AACL Mean</th>
<th>Wonderlic Mean</th>
<th>Digit Span Mean</th>
<th>SD</th>
<th>DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group G N-T</td>
<td>15</td>
<td>8.53</td>
<td>30.20</td>
<td>11.67</td>
<td>5.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Group G F-T</td>
<td>15</td>
<td>7.60</td>
<td>28.87</td>
<td>11.00</td>
<td>7.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Group U N-T</td>
<td>9</td>
<td>6.77</td>
<td>30.11</td>
<td>11.22</td>
<td>4.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Group U F-T</td>
<td>9</td>
<td>11.22*</td>
<td>29.33</td>
<td>9.89</td>
<td>7.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*Considered by the AACL Manual to be above normal anxiety equivalent to the anxiety felt by a S before taking an important examination.
The data presented in the table show that F-T induced A-state for freshmen Ss, but not for graduate student Ss. The results also show that graduates under F-T had a lower mean anxiety score than those graduate Ss under N-T. These findings tend to confirm the hypothesis that F-T would induce A-state for freshmen Ss, but would not cause above-normal anxiety in graduate Ss. The nearly identical means (28.89 and 30.20) on the Wonderlic between Group G, F-T and N-T, and a one factor analysis of variance among the four groups, $F_{47} = 1.67$ (between MS = 6.05, within MS = 3.63) corroborates the hypothesis that the DS performance would not differ between the graduate Ss' conditions.

The table and the two analyses of variances indicate no differences among the four groups on DS and Wonderlic test performance. The hypothesis that freshmen Ss would perform more poorly on the Wonderlic and DS under F-T than under N-T was not confirmed.

Even though the mean AACL score for graduate Ss under F-T was in the normal range, in fact lower than those Ss under N-T, A-state was induced for some Ss in that condition.

Figure 1 shows the AACL scores for Group G Ss under

---

1It is recognized that the analysis of this data would be better suited with a randomized block design (RBD). The unequal Ns and the prohibitively complex and controversial (Snedecor, 1956) nature of estimating values for RBD, made use of that statistic untenable. In any case, the $F$ of .14 indicates that significant results would not have been obtained with the use of RBD.
F-T based on their Wonderlic performance. As indicated by the figure, those Ss who obtained above-average A-state levels were situated at the extremes of the distribution. The students who performed approximately at the mean on the test had below-normal A-state.

Figures 2 and 3 respectively show freshman Ss' and graduate Ss' performance on the Wonderlic under both N-T and F-T.

Figure 4 shows the Wonderlic scores for both freshman and graduate Ss under F-T as compared with N-T.
Fig. 1. AACL scores and Wonderlic performance for graduate subjects under F-T.
Fig. 2. Wonderlic Form II performance for freshmen subjects under conditions N-T and F-T.

Fig. 3. Wonderlic Form II performance for graduate subjects under conditions N-T and F-T.
Fig. 4. Wonderlic performance for subjects under N-T as well as under F-T.

Score on Wonderlic

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It was further hypothesized that those Ss who did poorly on Form I of the Wonderlic and who were exposed to F-T would do significantly more poorly than their matched counterparts under N-T.

Inspection of Figures 2-4 reveals a difference between the poorer performing paired Ss. A dependent, one-tailed "t" test indicated that there was a significant difference present in the direction hypothesized, ($t_{10} = 2.56, p < .02$).

Table 2 shows correlations among Forms I and II of the Wonderlic, DS and AACL scores of all the students in the experiment. The nearly zero correlation between A-state and DS ($-.03$) indicated no relationship between those variables. Similarly, the .10 correlation between AACL scores and Wonderlic test performance is not significant.

**TABLE 2**

Correlations of Four Variables for the 48 Ss

<table>
<thead>
<tr>
<th></th>
<th>Form I</th>
<th>Form II</th>
<th>DS</th>
<th>AACL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form I</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Form II</td>
<td>0.76*</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DS</td>
<td>0.40**</td>
<td>0.58**</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>AACL</td>
<td>0.05</td>
<td>0.10</td>
<td>-0.03</td>
<td></td>
</tr>
</tbody>
</table>

* *$p < .01$
* $p < .001$
It was finally hypothesized that there would be no significant differences in the performance of a control group of students between Form I and Form II of the Wonderlic as a result of adding a special incentive system to Form II. A dependent, two-tailed "t" test confirmed this prediction ($T_7 = 1.29, p > .20$).
DISCUSSION

In summary, it was hypothesized that:

1. Freshmen Ss would perform significantly more poorly on the Wonderlic under A-state than under no-threat conditions.

2. Freshmen Ss would also perform more poorly on DS and DI under A-state than under no-threat conditions.

3. Freshmen and graduate Ss who did relatively poorly on the Wonderlic given under pre-test conditions would have larger significant differences under A-state and no-threat conditions than those Ss who originally performed better on the Wonderlic.

4. A-state would not be induced in graduate students.

5. For both DS and Wonderlic tests, performance of graduate students under the failure-threat condition would not differ significantly from their performance under the no-threat condition.

6. Performance on the Wonderlic, given under pre-test conditions, would accurately reflect ability for the freshmen and graduate students, i.e. the Ss would be sufficiently motivated to do their best under pre-test and no-threat conditions.

It seems reasonable that the major reason for lack of
differences found in the first hypothesis was due to the nature of the freshmen Ss. These Ss were a random selection of freshmen who volunteered to take part in "an experiment concerning intelligence test performance." It is suggested that those Ss who felt that they would do poorly on an intelligence test were a majority of the 34 Ss who left the various classes when told the experiment involved intelligence test performance. It seems that the pre-instructions acted to screen out the poorer performing freshmen with the more negative self-concept. This was undesirable, of course, since a major assumption of the study was that graduate students were more intelligent and had a more positive self-concept than freshmen.

According to Lazarus and Erikson (1952) and Liebert and Morris (1968), anxiety induced in those students with superior intelligence, positive self-concept and who are more task-oriented, not only inhibits the debilitating effects of anxiety, but leads to better performance due to increased motivation. An analysis of variance indicated that the freshmen performed quite similarly to the graduate students under the same conditions. The freshmen Ss, therefore, may have been closer in intelligence, positive self-concept and in task-oriented behavior to the graduate students than to the typical college freshman.

The second hypothesis was based on reports by Moldawasky and Moldawasky (1952), Calvin et al. (1955),
Walker and Spence (1962), Hodges (1968) and Hodges and Spielberger (1969). A one-way analysis of variance, of the results of this study, indicated no differences among the conditions on DS performance. The correlation of DS performance with anxiety levels for all the Ss was only slightly negative (-0.03). This study, therefore, cannot corroborate the findings of the above researchers—that DS performance is reduced as a function of anxiety.

Lack of similar findings, however, may have been in part due to the different experimental design used in this study. The Ss were required to write the digits, rather than respond orally to the E on an individual basis. It was observed that some Ss in both conditions wrote the digit backwards—forward—from right to left. This situation would tend to lower the validity of DS as used in this experiment. This would especially be unfortunate if it was anxiety that motivated those Ss to cheat! This phenomenon could not have happened in the other previously mentioned experiments, since they were done on an individual basis, and the Ss' responses were oral rather than written. These findings, therefore, should not be considered a challenge to the aforementioned reports.

The third hypothesis assumed a significant difference between N-T and F-T group means. There was no difference. The relatively poorly performing Ss of both groups, however, did do much worse under F-T than their matched
counterparts.

The implications of this phenomenon seem apparent. A student does poorly on an examination, gets negative feedback by virtue of being told he did poorly or merely by comparing scores with his classmates, becomes anxious, which for the poor student was found to cause a decrement in performance, and consequently does not improve on the next related test. Practice effects are negated. A vicious cycle develops.

A significant finding was that Hodges's (1968) and Hodges and Spielberger's (1969) F-T instructions failed to elicit anxiety in the graduate Ss. Hypothesis 4 was confirmed. It is therefore suggested that future researchers interested in A-state and intelligence test performance for this group use harsher failure-threat conditions.

The fifth hypothesis, which stated that there would be no difference in Wonderlic and DS performance, was confirmed since the Ss in both conditions of Group G had normal mean anxiety levels.

It is important to note, however, that anxiety was induced for some Ss in this group. Figure 1 clearly indicates that above-normal A-state was induced for the students who performed either very well or poorly on the Wonderlic. The anxiety level of the Ss performing at about the average on the Wonderlic, was quite low. Those scores, with some exceptions, corresponded to what
Zuckerman (1965) calls "an induced state of relaxation."

The validity of the AACL as an indicant of anxiety might be questioned, inasmuch as it is dubious that negative feedback on intelligence test performance would elicit an "induced state of relaxation" in the S.

Judging from the empirical, rather than rational basis for the AACL, and the myriad of supporting research it has garnered, it is probably too harsh to dismiss the AACL as being invalid. It seems probable that the fault in the AACL is in its attempt to equate raw scores with behavioral descriptions at the low end of the scale. It is therefore urged that those descriptions presented below the "normal" range be either re-assessed or preferably eliminated.

The results indicating that those Ss who were offered financial inducement failed to improve their performance significantly over what they obtained on Form I of the Wonderlic tend to confirm the sixth and final hypothesis.

It is further suggested, based on these data, and the highly significant (p< .001) correlation between Form I and II, that the Ss were sufficiently motivated to do their best on the matching variable. Additionally, it was noted that some Ss were quite interested in obtaining their Form I scores prior to the beginning of the second part of the experiment. Students approached the E even after the experiment was terminated and were told the true
nature of the study, desiring to find out whether a certain score was "good." Based on the results of the control group, motivation and concern, therefore, seemed evident.

A totally unanticipated phenomenon was the large-scale refusals by freshmen to take part in the experiment. It had been suggested earlier that a large percentage of those students thought they would do poorly on an intelligence test and therefore did not take part.

This design, of course, was not equipped to test that assumption. In future studies where S participation is not made mandatory, it is suggested that some attempt be made to obtain information on those who refuse participation. It seems preferable, however, that future experiments be of a non-optional nature to the students.

Past studies on anxiety were concerned with either its effect on DS or intelligence test performance, not on both. A possible reason for lack of significance between A-state and DS and Wonderlic performance is the inclusion of two dependent variables. The Ss were instructed to fill out the AACL after having been given the DS. Their anxiety responses might therefore have reflected their perceived DS performance, rather than having been caused by F-T.

The only other viable alternative would have necessitated giving the AACL immediately after F-T and N-T. This was originally rejected since A-state may be changed.
due to IQ performance and that the true nature of the experiment might have become apparent to the Ss.
REFERENCES


