The Relationship of Deviant Responses to Academic Achievement.

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TO ACADEMIC ACHIEVEMENT

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in

The Department of Psychology

by

John Carl Roitzsch
B.A., Louisiana State University, 1956
M.A., Louisiana State University, 1958
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1. Deviation Scores on the PRT for Male and Female Achievement Groups
ABSTRACT

The Perceptual Reaction Test (PRT) was administered to a group of 987 first semester college freshmen. These students had previously taken the American Council on Education Psychological Examination for College Freshmen (ACE) as part of the university testing program. At the end of the first semester, the grade point average for each student was compiled and each student was placed in one of three achievement groups. Those whose grade point average was three or more deciles greater than their ACE score were placed in the overachievement group, those whose grade point average was three or more deciles less than their ACE score were placed in the underachievement group, and those with less than three deciles between their grade point average and ACE score were placed in the normal achievement group. The top and bottom 30 per cent of the Ss were eliminated since the top 30 per cent could not be placed in the overachievement group and the bottom 30 per cent could not be placed in the underachievement group due to the selection criterion. After the elimination of these two groups 279 males and 159 females remained.

Each of the male and female achievement groups was then compared to each of the other two male and female groups. The results showed significant differences in the number of
deviant responses for all three of the comparisons made for the females. There were approximately twice as many deviant responses when the underachievers were compared with the overachievers as there were when either the underachievers or overachievers were compared with the normal achievers. The results were not significant for any of the comparisons made for the male subjects.

The hypotheses that under, over, and normal achievers would be significantly different from each other as measured by the number of deviant responses on the PRT was upheld for the female subjects but not for the male subjects.
INTRODUCTION

The problem of set has interested psychologists for a number of years. The problem was first given serious attention at the turn of the present century when the concept was used to describe changes in behavior which were not apparently due to any external stimuli. Since that time the concept has appeared under a variety of names: Aufgabe, task set, determining tendency, Bewusstseinslage, connective disposition, Einstellung, and readiness. Boring (1950) lists no less than seventeen different words which have been used to indicate the phenomenon of "set." The problem has become a complex one and differences have arisen in the past over such issues as whether the locus of set is peripheral or central, whether it is related primarily to stimuli or responses, or whether it is not only a determiner of responses but also a habit.

Among the early investigators in this field were Kulpe, Ach, and Watt at Wurzburg. Ach (1905) and Watt (1905) became interested in the problem when they noted wide variations in the formulation of tasks presented to their subjects. Kulpe (1904), already working in the area, emphasized the importance of "task set" in attention preparation. These men tended to stress the antecedent organic adjustments involved in set. Other advocates of this
position have been Woodworth (1938), who used the term "prepared act," and Dashiell (1940), who spoke of "pos­
tural response."

Advocates of a neural basis include Von Kries (1895), who used the term "connective disposition," Titchener (1908), who used the term "brain habit," and Mowrer (1940), who identified set with expectancy. Most of the earlier investigators held to the notion of a conscious predispo­
sition for set. One exception to this trend, according to Freeman (1939), was Messer who included non-conscious as well as conscious predispositions.

American psychologists as a group have tended to emphasize that sets were not only determiners of responses but also habits. Titchener (1908) and Washburn (1934), for example, thought sets were kinesthetic feelings of bodily attitudes or automatic habits. Allport (1937) car­
rried this to an extreme and classified habits as sets with directing and determining functions—thus drives. Lewin (1922) could not reconcile sets and habits as being the same phenomenon and he sacrificed the concept of habits to resolve the contradiction. He felt that association (habit) has no force as a determining tendency (set) has.

At the present time there seems to be no common meaning of set. There appears to be not one set, but rather many sets of various kinds. Numerous studies have investigated the problem in terms of the effect on behavior of various
kinds in experimental as well as clinical situations. The effects of set have been found to operate even in situations in which there is no apparent reason for the selection of one response over another.

Biases have been found to operate in such simple situations as when subjects are asked to call "heads" or "tails" when a coin is flipped (Goodfellow, 1940), to select a number from one to ten (Ross and Kohl, 1948), or to select a letter from a group such as A, B, C, D, (Berg and Rapaport, 1954). Such biases occur also in motor responses such as in the foyers of movie theaters where 75 per cent of people turn right even though there is equal opportunity to turn right or left (Robinson, 1933).

Other areas in which biases have been found to operate are in food preferences (Altus, 1949; Wallen, 1945; Gough, 1946), musical excerpts (Cattell and Anderson, 1953), meaningless sounds (Grings, 1942; Adams, 1959, 1960a), and word choice in written and spoken language (Mann, 1944; Berg, 1958). As may be seen, biased response patterns have been found to operate in a broad variety of stimulus situations.

The generality of such response patterns led Berg (1955, 1957, 1961) to formulate the Deviation Hypothesis. It is stated as follows: "Deviant response patterns tend to be general; hence those deviant behavior patterns which are significant for abnormality (atypicalness) and thus regarded as symptoms (earmarks or signs) are associated
with other deviant response patterns which are in noncritical areas of behavior and which are not regarded as symptoms of personality aberration (nor as indicators, signs, earmarks).” Thus if it is possible to measure deviant response patterns in a noncritical area of behavior, it may be also possible to identify them in a critical area.

The development of the Perceptual Reaction Test (PRT) by Berg, Hunt, and Barnes (1949) provided a tool to investigate this concept of deviant responses. The test is composed of 60 abstract designs drawn with ruler and compass. For each design the subject is instructed to mark one of the four options: Like Much, Like Slightly, Dislike Slightly, and Dislike Much. An occasional subject fails to mark any of the choices and since this tendency has been found to be significant for atypicalness a total of 300 possible responses are available.

Various groups have been successfully distinguished on the basis of their response sets on the PRT. Berg and Collier (1953) were able to differentiate high anxiety subjects by means of their preference for extreme response sets. They felt that the subjects were reacting to the extreme positions in the test but Lewis and Taylor (1955) repeated the study, systematically varying the positions of the four options, and found the preference was for extreme option content (Like Much or Dislike Much). Assuming that people suffering from a chronic physical disease can
be distinguished on the basis of their deviant response patterns, Engen (1959) administered the PRT to hospitalized tuberculosis patients. He found tuberculosis patients differed significantly from normal persons. Thus it appears possible to prepare a scale for deviant responses associated with tuberculosis. Berg (1960) conducted a similar study with cardiac patients and found they also differed significantly from an unselected group of normal persons.

The PRT has also found to be useful in discriminating various psychiatric syndromes. Barnes (1955) has developed eight clinical scales from deviant responses on the PRT. Hesterly and Berg (1958) compared adult schizophrenics with normal children of various ages. They hypothesized that these two groups would be similar since schizophrenics are usually characterized by immaturity. As hypothesized, the two groups were quite similar and the degree of similarity decreased from the younger to the older children. In a similar fashion Roitzsch and Berg (1959) hypothesized that neurotics would respond in a manner similar to older normal children of 13, 14, and 16 years of age. They found that these two groups were similar to each other but quite different from both adult normals and adult schizophrenics. Other groups that the PRT has proved successful in distinguishing are emotionally disturbed children (House, 1960), mentally defective adolescents and adults (Cieutat, 1960),
and aged, but otherwise normal, subjects (Boozer, 1961).

On the basis of the success of the information obtained from the research stimulated by the Deviation Hypothesis in differentiating such wide varieties of groups it was felt that the Deviation Hypothesis might be useful in differentiating over and underachievers from each other and also from normal achievers. Previous studies have attempted to correlate academic success with a variety of factors. Correlations have been obtained between scholastic grades and intelligence test scores, personality inventories, anxiety scales, work habits, etc. The results obtained have been as varied as the methods used to achieve them.

One of the more widely used instruments in predicting academic success in college has been the American Council on Education Psychological Examination for College Freshmen (ACE). Henderson and Malueg (1959) administered this test to 232 subjects at the Los Angeles City College. The subjects were divided into ten groups of varying ability according to standard deviation scores on the 1952 revision of this test for college freshmen. A correlation of .58 was obtained between ACE scores and grade point averages. This is 18 per cent above chance. Most studies of this type have found that students with high ACE scores get higher grade point averages than those with low ACE scores.
A recent study done by Spielberger and Katzenmeyer (1960) correlated ACE scores, MAS scores, and college grades. They found that high and low aptitude Ss tended to obtain good and poor grades respectively regardless of their anxiety level. The authors conclude that evidently the high aptitude Ss managed to overcome their anxiety while the low aptitude Ss were just unable to do the difficult work. Only for the average aptitude Ss was anxiety level a factor. In another study using ACE scores, Harder (1958) separated his population into several groups. One group was composed of high school "Honor Grads." Their average ACE score was at the 75th percentile. Another group was a "High Potential" group and their average ACE score was at the 96th percentile. The percentiles were based on University of California, Davis Campus norms. The first group has a grade point average of 2.97 (roughly equivalent to a B), with only four of the 62 Ss having lower than a 2.0 average. The "High Potential" group on the other hand had a little better than a "C" average. In this study past performance was more important than potential.

Graff (1957) used the Strong Vocational Interest Blank to compare achievers and underachievers. The Ss in this study were superior 12th grade high school students. He found the two groups differed significantly on A scores in adjustment to school work and in realism evidenced in their
occupation choices. A similar study by O'Leary (1955) used the Work Habits Rating Scale. He obtained a correlation of .78 between work habits—study skills—achievement and a correlation of .70 between work habits—mental age—achievement. One further study in which study habits was a factor was conducted by Diemer (1957). Using 74 overachieving and 44 underachieving sophomores and juniors of both sexes he found that the female overachievers showed more order and better study habits while the underachievers showed more vocational artistic interest. There were no significant differences between males.

A number of studies have been published in which the Minnesota Multiphasic Personality Inventory (MMPI) was employed as the research instrument. The following two studies are representative. Quinn (1957) controlled for intelligence and found no significant relationship between any of the standard scales and achievement. He also developed two scales but they too proved invalid. In a later study Gallese (1959) did a review of the research using the Minnesota Multiphasic Personality Inventory as an instrument to predict academic achievement. He reported no consistent, reliable differences obtained between the mean scores of high and low achievers on any MMPI scale. It is possible that the MMPI is inadequate for differentiating between two such groups or it may be that the current scales, which were not devised to serve such a purpose,
are inadequate.

Gough (1955) investigated factors related to differential achievement among gifted persons from which he arrived at two separate scales of achievement. The first scale was achievement via conformance and the other achievement via independence. A later study by Gebhart and Hoyt (1958) however, failed to support this contention. They administered the Edwards Personal Preference Schedule to 240 freshman engineering students. In general they found that overachievement was associated with a drive to complete (achievement), a drive to organize or plan (order), and with intellectual curiosity (intraception). Underachievement was found to be associated with a need for variety or change and with social motives such as affiliation or nurturance. The overachievers scored significantly higher on the achievement, order, intraception, and consistency scales and significantly lower on the nurturance, affiliation, and change scales. The high ability, but not necessarily high achievers, scored significantly lower on the deference, order, abasement, and nurturance scales. In addition, two interactions between ability and achievement levels were found on the heterosexuality and consistency scales. On the heterosexuality scale the high ability group scored higher than the low ability group and the underachievers scored higher than the overachievers but low ability overachievers scored greater than the low ability
underachievers. On the consistency scale the overachievers scored higher than the underachievers and the high ability Ss higher than the low ability Ss but the high ability underachievers higher than the high ability overachievers.

One final study of interest was conducted by Burgess (1956) and deserves notice because of its scope. An original population of 492 male college freshmen was narrowed to 20 overachievers and 20 underachievers. The predictive index of college performance was based on high school ranks and on the arithmetic and algebra subtests of the Moore-Castore Test of Academic Aptitude. To these 40 Ss was individually administered the Rorschach, MMPI, Rosenzweig Picture-Frustration Study, Strong Vocational Interest Blank, and College Inventory of Academic Interest tests. In addition they were given 11 TAT cards and the results of the Bernreuter Personality Inventory was obtained from their files. Among the results obtained was that overachievers are less labile in their affective reactions, tending to be more constricted and inhibited. They also have greater intellectual adaptivity, show a greater need for achievement and improvement of the self or status, and are more motivated for college study.

The present study was designed to investigate the occurrence of deviant response scores among academic over and underachievers. Specifically it is hypothesized that (1)
overachievers will differ significantly from underachievers, (2) overachievers will differ significantly from normal achievers, (3) underachievers will differ significantly from normal achievers in terms of deviant response frequency, (4) there will be a significantly greater number of deviant responses between the underachievers and overachievers than between either the underachievers and normal achievers or the overachievers and normal achievers.
METHOD

Subjects

The subjects for this study were 987 first semester freshman students at Louisiana State University. All incoming freshmen are administered the American Council on Education Psychological Examination for College Freshmen (ACE) by the university during their indoctrination period prior to the beginning of classes. The PRT was administered by the author to the students in their freshman English classes during the first month of school. English is a required course for freshman students so all subjects received the PRT. After their first semester at school their grade point averages were obtained from the office of the Junior Division. This is the division of the university in which all freshmen are enrolled. The information obtained from the ACE test scores and grade point averages was used to select the three experimental groups from the large population.

Procedure

Subjects were assigned to experimental groups after dividing ACE scores and grade point averages into deciles. Those whose grade point average was three or more deciles greater than their ACE score were placed in the overachieving
Subjects whose grade point average was three or more deciles less than their ACE scores were placed in the underachieving group. Those with less than a three decile difference between grade point average and ACE score were placed in the normal achieving group. Since the top three ACE deciles (6, 9, and 10) could not possibly be overachievers or the bottom three ACE deciles (1, 2, 3) underachievers it was decided to use only the four middle ACE deciles (4, 5, 6, and 7).

Of the original 987 subjects selected for the experiment, 438 fell into the middle four ACE deciles and so comprised the final experimental population. The breakdown of this population into the respective achievement groups is listed in Table 1. As may be seen in that table there is a slightly higher percentage of females in the overachieving group (27 per cent) than in the underachieving group (20 per cent). These figures are exactly reversed for the males.

After the three experimental groups were selected the performance of each group on the PRT was compared to every other group. The responses for this test were separately tabulated for each group and for each option of each item. The frequency of each option was then converted into percentages. Following this, the percentage of each group choosing each option was compared and a test of statistical significance was made. Since males and females have
TABLE 1

DISTRIBUTION OF SUBJECTS

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<th></th>
<th>Males</th>
<th></th>
<th>Females</th>
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<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Underachievers</td>
<td>74</td>
<td>27</td>
<td>31</td>
<td>20</td>
</tr>
<tr>
<td>Normal Achievers</td>
<td>148</td>
<td>53</td>
<td>84</td>
<td>53</td>
</tr>
<tr>
<td>Overachievers</td>
<td>57</td>
<td>20</td>
<td>44</td>
<td>27</td>
</tr>
<tr>
<td>Total</td>
<td>279</td>
<td>100</td>
<td>159</td>
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been found to differ in their responses to this test, the two sexes were compared separately. The test of significance used was the fourfold contingency table as described by Mainland and Murray (1952).
RESULTS

The results for the female subjects are shown in Table 2. Scores for the females as well as for the males in Table 3 are presented in terms of the number of responses which differ significantly at the .01 and .05 levels of confidence. An inspection of Table 2 indicates that the females differ from each other in each of the three comparisons made. The underachievers differ from the overachievers, the underachievers differ from the normal achievers, and the overachievers differ from the normal achievers. Particular attention is called to the fact that there are approximately twice as many deviant responses at both the .01 and .05 levels of confidence between the underachievers and overachievers as there are between either the underachievers and normal achievers or overachievers and normal achievers. This may be seen in Figure 1.

However, the results for the males do not support the hypothesis. As seen in Table 3, the number of deviant responses did not differ significantly from chance for any of the three comparisons. There was a greater number of deviant responses in the underachievers-overachievers comparison than in the other two but not enough to be significant.

One additional finding is that there were particular
<table>
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<th>Overachievers</th>
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<tr>
<td>Underachievers</td>
<td>17</td>
<td>20</td>
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<td>Normal achievers</td>
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TABLE 2
DEVIANT RESPONSE FREQUENCIES ON THE PRT FOR FEMALE SUBJECTS
TABLE 3

DEVIAN T RESPONSE FREQUENCIES ON THE PRT
FOR MALE SUBJECTS

<table>
<thead>
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<th>Overachievers</th>
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<tr>
<td></td>
<td>.01</td>
<td>.05</td>
</tr>
<tr>
<td>Underachievers</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Normal Achievers</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Fig. 1. Deviation Scores on the PRT for Male and Female Achievement Groups
PRT items which were discriminating for more than one of the comparisons made. That is, thirteen of the items which were discriminating between underachievers and over-achievers were also discriminating between overachievers and normal achievers. Also, twelve different items which were discriminating between underachievers and overachievers were also discriminating between underachievers and normal achievers. There were only two items, however, which were discriminating between underachievers and normal achievers and overachievers and normal achievers. Since there were so few deviant responses this analysis was not conducted for the male groups.
DISCUSSION

The hypothesis that the response patterns of underachievers will differ significantly from those of overachievers was supported by the results for females. The hypotheses that the response patterns of underachievers will differ significantly from those of normal achievers and that those of overachievers will differ significantly from those of normal achievers were also supported for females. Unfortunately the results for the males did not support these hypotheses.

While the male groups did not significantly differ from each other there was a greater number of deviant responses for the underachievers-overachievers comparison than for either of these groups compared to normal achievers. In fact, there were approximately twice as many deviant responses for the underachievers versus overachievers than for either of the other two comparisons. This was also true for female S's. This is more important in the case of the females since their groups were significantly different from each other while the males were not.

It appears that a possible factor that could explain the negative results for the male S's is that they were a more heterogeneous group. There is an approximately equal
number of females in high schools as males yet there are
two to three times as many males in college as females.
There are a variety of reasons that may explain the fact
that more males attend college. Among these are that
greater academic achievement is expected of males in our
culture and males that do not go to college often face
either employment or military service. The smaller number
of female students that do go to college are possibly more
strongly motivated.

From the distribution of subjects in Table 1 may be
seen that there is a higher percentage of female subjects
in the comparison of the overachieving group with the
underachieving group. Just the reverse percentages were
found for the males. There was also a higher percentage
of females in the top three grade point average deciles,
a condition which was again reversed for the males. The
females not only made better grades as a group than the
males but also better grades than would be expected on the
basis of their ACE scores.

Probably the best way to test the assumption of the
author would be to test several classes of high school
seniors and then, if possible, determine which group of
female students go on to college. Selecting a matched
group of male subjects then should yield the same results
as were found for the females in the present study. The
high school females should also be tested to see if the
present results are reliable.
SUMMARY

The Perceptual Reaction Test (PRT) was administered to 438 freshman students who were divided into groups of underachievers, normal achievers, and overachievers for each sex. Significant differences were found when comparing the female groups with each other. Significant results were not obtained for the males. The greatest differences were found when comparing the underachievers with the overachievers. It was also found that there was a greater percentage of female overachievers than female underachievers and that females as a group made better grades than males as a group.

The results of the present study supported the hypotheses as far as the females were concerned but not for the males. It was suggested that a possible reason for this was that the females formed a more homogeneous group than the males since a larger number of male high school graduates attend college than do female graduates.
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VITA

John Carl Roitzsch was born on November 13, 1930, in New Orleans, Louisiana. After graduation from military school in Poplarville, Mississippi, he attended Louisiana State University for three years before enlisting in the U. S. Air Force. Upon completion of his enlistment he returned to Louisiana State University where he received his Bachelor of Arts degree in February, 1956, thereafter receiving his Master of Arts degree in June, 1958. He completed his graduate studies and became a candidate for his Doctor of Philosophy degree in January, 1962.
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Major Field:  PSYCHOLOGY

Title of Thesis:  THE RELATIONSHIP OF DEVIANT RESPONSES TO ACADEMIC ACHIEVEMENT

Approved:

[Signatures of Major Professor and Chairman, Dean of the Graduate School, and EXAMINING COMMITTEE members]

Date of Examination:  15 January 1962