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A PERSONALITY SCALE OF MANIFEST ANXIETY

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A SERIES of recent studies (3, 4, 5, 6, 7, 9, 10) has shown that performance in a number of experimental situations, ranging from simple conditioning and reaction time to a "therapy" situation involving experimentally induced stress, is related to the level of anxiety as revealed on a test of manifest anxiety. Most of these investigations were concerned with the role of drive or motivation in performance, drive level being varied by means of selection of subjects on the basis of extreme scores made on an anxiety scale rather than by experimental manipulation (e.g., electric shock, stress-producing instructions, etc.). The use of the anxiety scale in this connection was based on two assumptions: first, that variation in drive level of the individual is related to the level of internal anxiety or emotionality, and second, that the intensity of this anxiety could be ascertained by a paper and pencil test consisting of items describing what have been called overt or manifest symptoms of this state.

Since the scale has proved to be such a useful device in the selection of subjects for experimental purposes, a description of the construction of the test and the normative data that have been accumulated in connection with it may be of interest to other investigators in the field of human motivation.

DEVELOPMENT OF THE SCALE

The manifest anxiety scale was originally constructed by Taylor (6) for use in a study of eyelid conditioning. Approximately 200 items from the Minnesota Multiphasic Personality Inventory were submitted to five clinicians, along with a definition of manifest anxiety that followed Cameron's (2) description of chronic anxiety reactions. The judges were asked to designate the items indicative of manifest anxiety according to the definition. Sixty-five items on which there was 80 per cent agreement or better were selected for the anxiety scale. These 65 statements, supplemented by 135 additional "buffer" items uniformly classified by the judges as non-indicative of anxiety, were administered in group form to 352 students in a course in introductory psychology. The measures ranged from a low anxiety score of one to a high score of 36, with a median of approximately 14. The form of the distribution was slightly skewed in the direction of high anxiety.

Subsequently, the scale went through several modifications.[1] At present it consists of 50 of the original 65 items that showed a high correlation with the total anxiety scores in the original group tested. Furthermore, the buffer items have been changed so that the total test, which has been lengthened from 200 to 225 items, includes most of the items from the *L*, *K*, and *F* scales of the MMPI and 41 items that represent a rigidity scale developed by Wesley (10). The 50 anxiety items are reproduced in Table 1, along with the responses to these items considered as "anxious" and the ordinal numbers of the statements as they appear in the present form of the test.

Normative Data

Under the innocuous title of *Biographical Inventory,* the test in its present form has been administered to a total of 1971 students in introductory psychology at the State University of Iowa during five successive semesters from September, 1948 to June, 1951. The distribution for this sample is presented in Fig. 1. As can be seen by inspection, the distribution shows a slight positive skew, as did the original scale. The fiftieth percentile falls at about 13, the eightieth at about 21, and the twentieth at about 7. The mean of the distribution is 14.56.

[1] HEDLUND, J. L., FARBER, I. E., & BECHTOLDT, H. P. Normative characteristics of the Manifest Anxiety Scale. Unpublished paper. The statistical analysis, along with most of the data collected with the scale, was carried out under the direction of H. P. Bechtoldt at the State University of Iowa.

Sex Differences

A comparison of the scores of males and females in this total sample revealed that the mean score of the women was somewhat higher. The difference between the two means however was not statistically significant. For this reason, both sexes have been included in a single distribution.

Consistency of Scores

In order to determine the stability of the anxiety scores over time, groups of individuals have been retested on the scale after various intervals. In one instance, the results of retesting 59 students in introductory psychology after a lapse of three weeks yielded a Pearson product-moment coefficient of .89.

TABLE 1

ITEMS INCLUDED ON THE MANIFEST ANXIETY SCALE AND RESPONSES SCORED AS "ANXIOUS" ITEMS ARE NUMBERED AS THEY APPEAR IN THE COMPLETE BIOGRAPHICAL INVENTORY

4. I do not tire quickly. (False)
5. I am troubled by attacks of nausea.* (True)
7. I believe I am no more nervous than most others.* (False)
11. I have very few headaches. (False)
13. I work under a great deal of tension.* (True)
14. I cannot keep my mind on one thing. (True)
16. I worry over money and business. (True)
18. I frequently notice my hand shakes when I try to do something. (True)
24. I blush no more often than others.* (False)
25. I have diarrhea once a month or more.* (True)
26. I worry quite a bit over possible misfortunes.* (True)
27. I practically never blush. (False)
33. I am often afraid that I am going to blush. (True)
35. I have nightmares every few nights. (True)
36. My hands and feet are usually warm enough. (False)
37. I sweat very easily even on cool days. (True)
38. Sometimes when embarrassed, I break out in a sweat which annoys me greatly.* (True)
41. I hardly ever notice my heart pounding and I am seldom short of breath.* (False)
43. I feel hungry almost all the time. (True)
44. I am very seldom troubled by constipation.* (False)
48. I have a great deal of stomach trouble. (True)
51. I have had periods in which I lost sleep over worry.* (True)
54. My sleep is fitful and disturbed.* (True)
56. I dream frequently about things that are best kept to myself.* (True)
66. I am easily embarrassed. (True)
67. I am more sensitive than most other people.* (True)
77. I frequently find myself worrying about something.* (True)
82. I wish I could be as happy as others seem to be.* (True)
83. I am usually calm and not easily upset. (False)
86. I cry easily. (True)
87. I feel anxiety about something or someone almost all the time.* (True)
94. I am happy most of the time. (False)
99. It makes me nervous to have to wait. (True)
100. I have periods of such great restlessness that I cannot sit long in a chair.* (True)
103. Sometimes I become so excited that I find it hard to get to sleep. (True)
107. I have sometimes felt that difficulties were piling up so high that I could not overcome them.* (True)
112. I must admit that I have at times been worried beyond reason over something that really did not matter.* (True)
117. I have very few fears compared to my friends.* (False)
123. I have been afraid of things or people that I know could not hurt me. (True)
136. I certainly feel useless at times. (True)
138. I find it hard to keep my mind on a task or job. (True)
145. I am unusually self-conscious.* (True)
152. I am inclined to take things hard.* (True)
153. I am a high-strung person.* (True)
163. Life is a strain for me much of the time.* (True)
164. At times I think I am no good at all. (True)
168. I am certainly lacking in self-confidence.* (True)
183. I sometimes feel that I am about to go to pieces.* (True)
187. I shrink from facing a crisis or difficulty.* (True)
190. I am entirely self-confident.* (False)

* Statements rewritten for subsequent revision.

Different Populations

Scores on the scale are also available for samples drawn from somewhat different populations. Distributions for 683 airmen tested at the beginning of basic training at Lackland Air Force Base and for 201 Northwestern University night-school students of introductory psychology show essentially the same form as the group reported above, while the quartiles are in close agreement.

In a second test-retest study,[2] the scale was given to 163 students in an advanced undergraduate psychology course who had previously taken the test as introductory students. For 113 of these cases 5 months had elapsed since the first testing, while an interval of 9–17 months had intervened for the remaining 50. The test-retest coefficient was found to be .82 over 5 months and .81 for the longer

[2] See footnote 1.

period. Furthermore, no systematic change, upwards or downwards, was found in these distributions, i.e., the means of each of the three sets of scores remained essentially the same after retesting. Thus, for all groups tested, both the relative position of the individual in the group and his absolute score tended to remain constant over relatively long periods of time.

tered to 282 freshmen males, and approximately 18 weeks later the group MMPI was given to the same students. The correlation between the two sets of measures, obtained by determining the scores on the 50 anxiety items on each test, was .68. This, it will be noted, is a slightly lower figure than that obtained by test-retest on the Inventory after a comparable length of time. In addition,

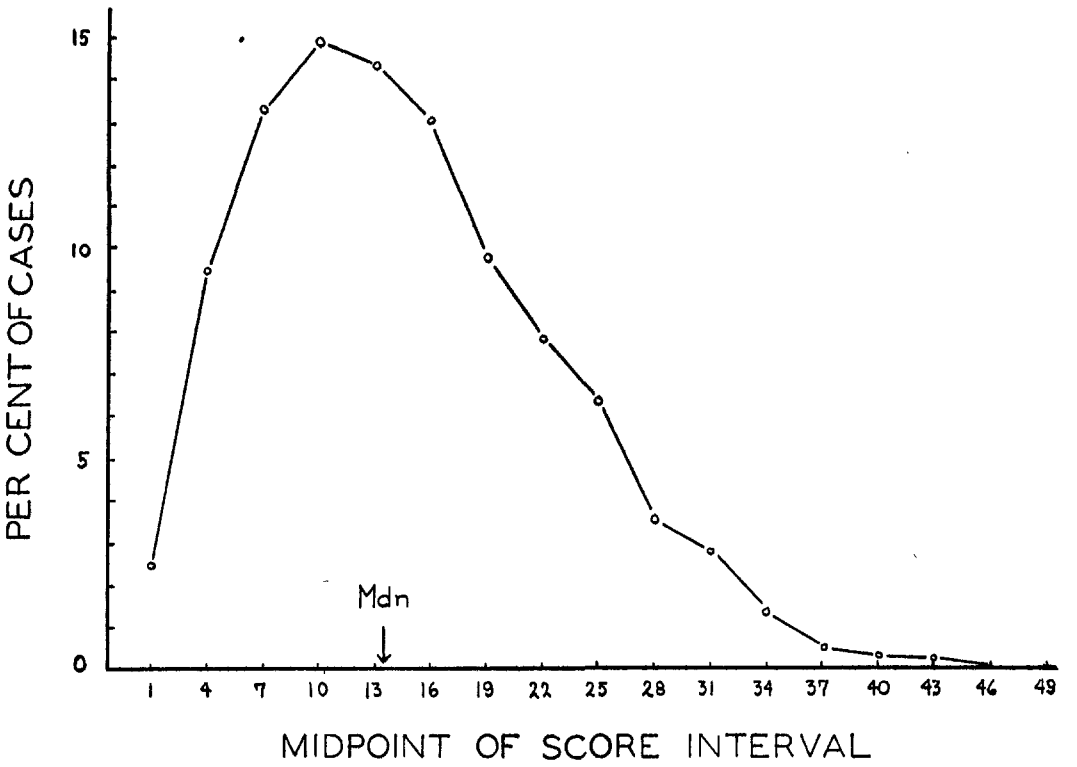

FIG. 1. FREQUENCY POLYGON SHOWING PER CENT OF THE 1971 UNIVERSITY STUDENTS RECEIVING THE INDICATED SCORES ON THE MANIFEST ANXIETY SCALE

Relationship of the Biographical Inventory to the MMPI

Since it might be desired to obtain anxiety scores for individuals who have been given the complete MMPI rather than the Biographical Inventory, it is necessary to consider the effects of the different sets of filler items on the 50 anxiety statements. There is some evidence [8] to suggest that the distribution of anxiety scores given in the form of the MMPI will differ significantly from that obtained from the Biographical Inventory. The Biographical Inventory was administered to 282 freshmen males, and approximately 18 weeks later the group MMPI was given to the same students. The correlation between the two sets of measures, obtained by determining the scores on the 50 anxiety items on each test, was .68. This, it will be noted, is a slightly lower figure than that obtained by test-retest on the Inventory after a comparable length of time. In addition, the forms of the distributions were statistically different, as indicated by a chi-square test of homogeneity. Since the initial scores of this group, obtained from the Biographical Inventory, were similar to those found with other groups, the discrepancy of the results between the Inventory and the MMPI suggests that the radical change in filler items may exert a definite influence on the anxiety scores. Before anxiety scores obtained from the MMPI can be evaluated it would appear to be necessary to have more normative data concerning the scale scores obtained from this form.

[8] See footnote 1.

REVISION OF THE SCALE

A further revision of the scale is now being carried out by the writer. This variation represents an attempt to simplify the vocabulary and sentence structure of some of the anxiety items that appear to be difficult to comprehend, especially for a noncollege population. Toward this end, the 50 anxiety items were first submitted to 15 judges who were instructed to sort them into four piles according to comprehensibility, the first position representing the simplest to understand and new statement selected for inclusion on the scale was judged simpler than the original. These 28 rewritten items are shown in Table 2.

Relationship between the Old and New Versions of the Scale

To demonstrate the relationship between the old and new versions of the test, both forms were administered to students in introductory psychology at Northwestern University College. A sample was selected from the college population for this purpose since it was thought that this group would show the least confusion in interpreting the original versions of the difficult items and, therefore, better demonstrate the comparability of the two forms than less verbally sophisticated individuals. Scores obtained from 59 students showed a Pearson product-moment correlation of .85 between the old and new versions, the latter being administered three weeks after the initial testing. This figure is quite comparable to the test-retest coefficient found for the previous form of the scale after a similar time interval. Considering only the 28 rewritten items, the correlation becomes .80.

While the correlation coefficient shows the high degree of relationship between the old

TABLE 2

THE 28 ITEMS REWRITTEN FOR THE REVISED FORM OF THE MANIFEST ANXIETY SCALE AND RESPONSES SCORED AS "ANXIOUS"

(Items are numbered as they appear in the Biographical Inventory.)

5. I am often sick to my stomach. (True)
7. I am about as nervous as other people. (False)
13. I work under a great deal of strain. (True)
24. I blush as often as others. (False)
25. I have diarrhea ("the runs") once a month or more. (True)
26. I worry quite a bit over possible troubles. (True)
38. When embarrassed I often break out in a sweat which is very annoying. (True)
41. I do not often notice my heart pounding and I am seldom short of breath. (False)
44. Often my bowels don't move for several days at a time. (True)
51. At times I lose sleep over worry. (True)
54. My sleep is restless and disturbed. (True)
56. I often dream about things I don't like to tell other people. (True)
67. My feelings are hurt easier than most people. (True)
77. I often find myself worrying about something. (True)
82. I wish I could be as happy as others. (True)
87. I feel anxious about something or someone almost all of the time. (True)
100. At times I am so restless that I cannot sit in a chair for very long. (True)
107. I have often felt that I faced so many difficulties I could not overcome them. (True)
112. At times I have been worried beyond reason about something that really did not matter. (True)
117. I do not have as many fears as my friends. (False)
145. I am more self-conscious than most people. (True)
152. I am the kind of person who takes things hard. (True)
153. I am a very nervous person. (True)
163. Life is often a strain for me. (True)
168. I am not at all confident of myself. (True)
183. At times I feel that I am going to crack up. (True)
187. I don't like to face a difficulty or make an important decision. (True)
190. I am very confident of myself. (False)

the fourth the most difficult. It was found that 28 of the items had a mean scale value of 2.00 or more. These 28 items were selected for revision and rewritten in at least two alternate forms.[4] Each set of alternatives was then ranked by a different set of 18 judges, first for ease of understanding and then for faithfulness of meaning to the original statement. For most of the items, the alternative judged to be simplest was also chosen as being closest in meaning to the original item and was therefore selected for the new scale. For those items in which a discrepancy occurred, faithfulness of meaning was chosen over simplicity. However, in every case, the

[4] In rewriting the items, the Thorndike word count (9) was consulted. These counts primarily determined substitution of words within an item whenever this was done.

and revised forms, the question still remains as to whether rewriting the 28 items has reduced the difficulty level of these statements so as to minimize confusion and misinterpretation. In an attempt to determine this, the scores of the 59 students given both versions were analyzed into two components: that for the 28 difficult items and that for the 22 items left intact. For each form, scores on the 28 items were correlated with the remaining 22. It was reasoned that if the original forms of the 28 items were confusing, then the rewritten items, if attempts to simplify were successful, would show a higher correlation with the 22 items left intact than would the original statements. The actual correlations obtained in this manner were .81 for the old version and .83 for the new. Although the difference between the coefficients was in the desired direction, a *t* test indicated that it was statistically insignificant. However, a significant difference in correlations might be obtained with subjects of lesser educational attainment since misinterpretation of the 28 original items would be more likely to occur with such a group.

Normative Characteristic of the New Scale

To determine further characteristics of the distribution of scores on the new version, 229 students in introductory psychology were given only the revised form of the scale (1). It was found that the shape of the distribution and the values of the quartiles did not differ significantly from those obtained with the previous form.

Retest scores are also available for 179 individuals from the sample described above. A product-moment correlation of .88 was found after an intertest interval of four weeks. However, while the position of the individuals in the group tended to remain the same, a downward shift in the absolute scores of the entire distribution was noted from test to retest. The difference between means (14.94 vs. 12.92) was significant at the .01 level of confidence, as indicated by a *t* test.

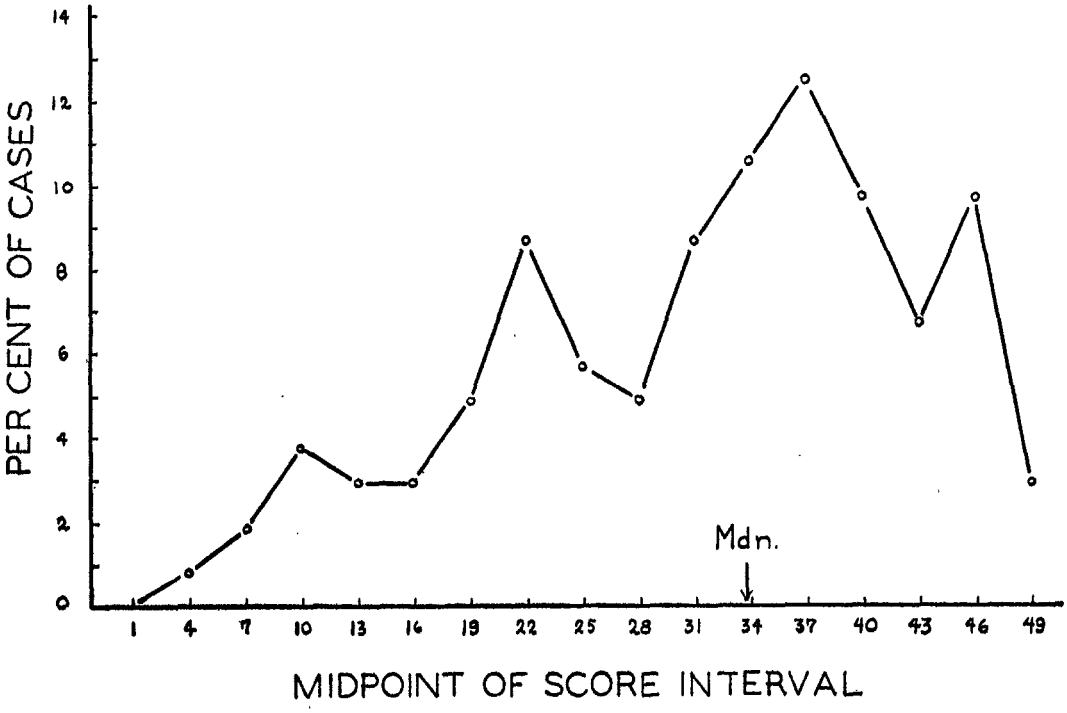

FIG. 2. GRAPH OF THE FREQUENCY DISTRIBUTION OF MANIFEST ANXIETY SCORES RECEIVED BY 103 PSYCHIATRIC PATIENTS

RELATIONSHIP OF THE ANXIETY SCALE TO OTHER MEASURES

The anxiety scale was developed for, and has been used exclusively as, a device for selecting experimental subjects, without re-

gard to the relationship of the scores to more common clinical definitions (e.g., clinical observation). While defining degree of anxiety in terms of the anxiety-scale scores is a perfectly legitimate operational procedure, determining the relationship between this definition and clinical judgments might extend the applicability of both the scale and the experimental results found in the studies utilizing the scale.

In order to determine the relationship between the scale and clinical judgments, it would be necessary to have ratings made by trained observers for a large, randomly selected group of individuals and to correlate these with the anxiety-scale scores. Such an investigation has not yet been carried out. However, some indirect evidence on this point is provided by the anxiety scores of patients undergoing psychiatric treatment.[5] The anxiety scale used with these patients is essentially the same as the unrevised Biographical Inventory except that it is being administered in an individual form.

Anxiety scores are available for 103 neurotic and psychotic individuals, drawn from both an in- and outpatient population. As can be seen from Fig. 2, the distribution of scores is highly skewed toward the low anxiety end of the scale. The median score is approximately 34, a score equivalent to the 98.8 percentile of the normal subjects shown in Fig. 1. Thus the distributions of scores for the patient and the normal group are markedly different.

On the assumption that psychiatric patients will tend to exhibit more manifest anxiety symptoms (as determined by direct observation) than do normal individuals, this difference between the two groups appears to indicate that there is some relationship between the anxiety-scale scores and clinical observation of manifest anxiety.

SUMMARY

A manifest anxiety scale, consisting of items drawn from the Minnesota Multiphasic Personality Inventory judged by clinicians to be indicative of manifest anxiety, was developed as a device for selecting subjects for experiments in human motivation.

After statistical analysis the original 65-item scale was reduced to the 50 most discriminating statements. These items, supplemented by 225 statements nonindicative of anxiety, are given under the title of the Biographical Inventory. Normative data and test-retest correlations found with scale scores taken from the Biographical Inventory are presented.

A further revision of the scale was undertaken in which certain items were rewritten in an attempt to simplify their vocabulary and sentence structure. Characteristics of the scores obtained from this revised version were found to be similar to those of the previous form.

In an attempt to determine the relationship between the anxiety-scale scores and manifest anxiety as defined and observed by the clinician, the anxiety scores for groups of normal individuals and psychiatric patients were compared.

[5] These data are obtained from a study currently being conducted by the writer and K. W. Spence investigating the role of anxiety in neurotic and psychotic disorders by means of an eyelid conditioning technique.

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