

AN OBJECTIVE STUDY OF PERSONALITY  
CHANGES OF COLLEGE STUDENTS

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## ABSTRACT

### AN OBJECTIVE STUDY OF PERSONALITY CHANGES OF COLLEGE STUDENTS

by Lawrence H. Levey

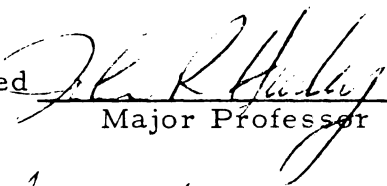
The present investigation concerned personality changes of college students based entirely upon objective personality test data. Previous research in this area has emphasized attitude formation and change, although a current interest in other areas of personality was noted.

The Edwards Personal Preference Schedule (EPPS), the Iowa Picture Interpretation Test (IPIT), and six MMPI-type scales were administered to a sample of 83 Michigan State University students in 1955 and in 1959. The results suggest that seniors, as opposed to freshmen, are more independent of others for guidance and emotional types of support. They are more sophisticated and self-confident, have greater achievement motivation, and seem to be less rigid in their functioning. They also appear to manifest fewer directly hostile tendencies. Males and females evidence few differences on the variables investigated; and much similarity was noted between the personality score shifts of the older and younger male sub-groups, suggesting that the changes were college-influenced and not solely a function of chronological age. In general, the findings were felt to be quite congruent with those of the recent Vassar College study.

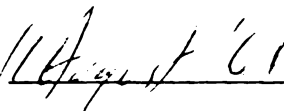
Information was also reported concerning the stability of the various measures employed. The coefficients for the total group of Ss tended to be rather low (average test-retest  $r = .45$ ) but with one exception were all significant at the 5% level.

The design of the investigation was appraised with respect to the influence of validity of the measures, the use of volunteer subjects, representativeness of the sample, differences in test-retest environmental circumstances, and number of subjects. Specific recommendations for future studies of the problem were also offered.

Approved

  
Major Professor

Date

  
11 August '61



AN OBJECTIVE STUDY OF PERSONALITY CHANGES  
OF COLLEGE STUDENTS

By

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## INTRODUCTION

That colleges are expected to produce a variety of changes in their students is a matter generally taken for granted; however, as Sanford points out:

Agreement about the aims of liberal education is not complete, and statements are likely to be somewhat vague--like statements about the goals of psychotherapy. It seems clear, however, that liberal education has accepted the task of familiarizing the student with his cultural heritage and of exercising his intellect and, in addition, is concerned with the development of the individual as a whole person. The kinds of intellectual, moral, social, and emotional characteristics which the liberal college usually seeks to develop or foster, and those which it seeks to reduce or to eliminate, are much like those which concern the psychologist when he thinks about maturity or health or the optimum functioning of the individual.

It appeared, then, that the study of personality development after the ages of 17 or 18 might yield information that would ultimately prove useful to the college educator. It appeared also that this study would be interesting and challenging in its own right, for the area in question is one to which psychologists have given little attention.

In what ways do people change after the age of 17? Are these changes in the underlying personality structure itself or merely in behavior? If there are changes in personality, in what areas and at what levels do these occur? Above all, what are the determinants and the processes of change? (1956, p. 4)

Previous research into the effects of a college experience on students has been concerned with three main areas: (a) changes in skills and information; (b) changes in mental ability; and (c) changes in values and attitudes, which has received the bulk of the attention. However, there has been a recent trend toward the investigation of other aspects of personality functioning and development. Although most studies have been concerned with "relatively molecular types of activities, " to use

Freedman's term (1961, p. 21), such as the relation between personality and academic performance, current interest seems to be directed toward a more "molar" approach to the investigation of personality change and development of college students.

One reason for the relative lack of previous psychological research into personality change during late adolescence or young adulthood has perhaps stemmed from theories stressing the prime importance of infantile experiences as determinants of personality, and that later changes are "an expression of dispositions that have been established earlier. . . ." (Sanford, 1956, p. 61). However, there has been a growing influence of theories such as Erikson's (1953) which emphasize the importance of experiences beyond the infantile stage upon personality development.

A comprehensive summary of past studies into the effects of a college experience upon personality is included in a forthcoming book edited by Sanford entitled The American College: a Psychological and Social Interpretation of the Higher Learning. After reviewing the relevant research and findings, Webster, et al. (1961, Ch. 24), suggest that our understanding of personality changes of college students is still quite limited, both in terms of the types and determinants of change and also in terms of the principles of development that apply for college students.

#### The Vassar Study:

The one major exception to the dearth of research in this area is the investigation known as the Vassar study. Although it has been described elsewhere (Freedman, 1961; Sanford, 1956; Webster et al., 1961, Ch. 24), its relevance to the present investigation warrants brief treatment here. Through a comprehensive program of tests and retests, of student and alumnae interviews, and of sociological studies,

the investigators attempted to assay, define, and measure the types of personality changes wrought by a college experience. The research was carried out at Vassar College, a privately supported, "traditional" girls' school, which commonly attracts students from an upper-middle- or upper-class background.

The specific areas of personality investigated in the study were as follows: (a) intellectual functioning and achievement; (b) authoritarianism and its opposites; (c) femininity and masculinity; and (d) psychological and physical well-being. Highly substantial Ns and a variety of test batteries, including personality inventories were employed in the study.

In general, the results indicated that very definite personality changes do occur. Seniors differed from freshmen in such areas as maturity, impulse expression, flexibility of functioning, critical attitudes, self-confidence, and sex role. Specific findings of the Vassar study will be reported in a later section where they will be compared with those of the present investigation.

#### Statement of Problem:

The relative lack of information regarding personality changes in college students stimulated the present study. The Vassar study, in spite of its comprehensiveness, has pointed up several specific questions. First, how applicable are its findings for a male population? Males and females frequently perform quite differently on various personality measures (Carlson, 1960). Does college exert a differential effect on the personality development of the two sexes as determined by such tests? Secondly, is the Vassar study, in addition to its all-female sample, further restricted in terms of the socio-economic status and geographic background of its subjects? Are Vassar students typical of the average college student? And thirdly, does an investigation

of personality changes of students require the intensive and varied approaches utilized by the Vassar study, or can such information be obtained through the sole use of objective types of measurements?

#### Description of the Present Study:

The present study is a further attempt to investigate personality changes of college students and to suggest answers to the questions raised above. Although the findings of the Vassar study might have been used for making predictions regarding the types and directions of personality change, the limitations of the present design, to be discussed below, made it desirable to view the latter less as a specific check upon the findings of the former and more as an independent investigation.

The present study involved the testing of freshmen and their subsequent retesting as seniors on three personality indices: the Edwards Personal Preference Schedule (EPPS), the Iowa Picture Interpretation Test (IPIT), and a set of six scales from the Minnesota Multiphasic Inventory (MMPI) but referred to here as the "Biographical Inventory" (BI). These devices were selected because

. . . each represented a very different approach to personality measurement. This . . . point may be illustrated by noting that the MMPI scales restrict the S to true-false responses, the ipsative EPPS requires that S choose between two statements supposedly equated for social desirability, and the IPIT requires that S arrange in rank order a series of four responses offered in conjunction with TAT pictures (Hurley, 1959, p. 1).

It should be noted that the original testing of the subjects was carried out as part of the design of another study (Hurley, 1959).

The present study evolved when it became known four years later that many of the Ss previously tested were still on campus.



Available for each S, then, were two sets of test scores with a four year interval between testings. Personality changes were inferred through statistical analyses of the scores. Because of some of the limitations in the design (e.g., extremely small Ns) and the absence of specific predictions or hypotheses, it was decided to set the standard for statistical significance at the .10 level, rather than at the more rigorous and conventional .05 level. In this way, various trends, consistencies, and inconsistencies were made easier to identify; however, the greater opportunity for significant findings to occur by chance was also recognized.

The areas of personality investigated in the present study were not so broadly categorized as they were in the Vassar study, but instead consisted of the twenty-five variables purportedly measured by the tests themselves; and any changes will be reported in terms of the definitions of these variables. However, an attempt will be made to organize the changes into categories that for a more meaningful discussion and that lend themselves to comparison with the Vassar findings. The variables are listed, by test, and defined in the Appendix.

#### Test Stability:

The two sets of scores by the same individuals on the same measures over a four year period allowed for an investigation into the reliability or stability of the measures themselves. There are few, if any, articles in the literature reporting on the reliability of tests, especially those measuring personality variables, over such an extended period of time with presumably "normal" subjects. Consequently, these data will be compared with available data obtained over shorter test-retest intervals.

Summary of the Problem:

The matter of personality change during the college years has received relatively little attention. Except for the Vassar study, the emphasis has been on attitude, rather than personality, change and development. Although the study conducted as Vassar was both extensive and comprehensive, it nevertheless raised numerous questions regarding its design and the generalization of its findings to other populations. The present research, a longitudinal study of college freshmen and seniors on three different objective personality measures, is an attempt to provide further information as to the types of changes that occur in college and to help clarify the issues left unsettled by the Vassar study. Secondary to its interest in personality change, the present study is also able to offer information relating to the stability of the various measures employed.

## METHOD

### Personality Measures:

Edwards Personal Preference Schedule (EPPS): "The PPS was designed primarily as an instrument for research and counseling purposes, to provide quick and convenient measures of a number of relatively independent normal personality variables" (Edwards, 1959, p. 5). These variables or "needs" were derived from the work of H. A. Murray (1938). Specifically, the test

. . . consists of 210 forced choice items. Each pair of items is matched approximately for mean social desirability . . . to minimize the effect of social desirability on item choice. . . . Since the items are paired, the total raw score on the test will be the same for all persons. Thus, the PPS reflects only the relative strength of competing needs and attitudes rather than the absolute strength of any need. Hence this test clearly has the advantages as well as the disadvantages of an ipsative scale (Merrill and Heathers, 1956, p. 310)

Biographical Inventory (BI): The "Biographical Inventory" refers to the set of six MMPI scales administered to the subjects. Although the MMPI was intended to serve as a clinical tool, attempting to "assay those traits that are commonly characteristic of disabling psychological abnormality" (Hathaway and McKinley, 1951, p. 5), there has been a recent emphasis on using it with non-hospitalized populations for research and counseling purposes (Drake and Oetting, 1959; Hurley, 1959).

Both in terms of scales and test directions, the "Biographical Inventory" represents a modification of the standard MMPI. Three of the six scales employed in the present study, L, K, and Pd, are taken directly from the MMPI as devised by Hathaway and McKinley (1951). Although restricted to items contained in the original MMPI, the remaining three scales, MA, MR, and MH, were devised by other

authors (Taylor, 1953; Wesley, 1953; Moldowsky, 1953). The BI, unlike the MMPI, calls for either a "true" or "false" response from the S, who has an added choice of "?" on the standard MMPI. The six scales included in the BI are composed of 218 items, with some items appearing in more than one scale. The items which appear under each scale, along with a notation as to which response (true or false) contributes to the particular scale score are shown in the Appendix.

Iowa Picture Interpretation Test (IPIT): Like the EPPS, the IPIT, a variation of the Thematic Apperception Test, has its origins in the work of H. A. Murray (1938). Originally developed by Hurley (1955), the test has undergone some revision, with Form RK (Johnston, 1957) having been used in the present study. Specifically, the IPIT is an attempt

. . . to integrate the objective and quantitative advantages of traditional paper and pencil personality measures with the so-called "depth" of projective techniques (Hurley, 1955, p. 372).

Form RK of the IPIT consists of slide reproductions of 24 TAT cards. When each slide has been projected onto a screen, subjects are required to rank four alternative choices which represent the following response classes: Achievement Imagery, Insecurity, Blandness, and Hostility. A copy of the alternatives, labelled as to the class they represent appears in the Appendix.

Note should be taken of the IPIT's somewhat unique scoring system. As it requires the ranking of four statements, there is an inverse relationship between the test score and the preference for the particular class of response. Unlike the scoring for the other two measures, a "higher" retest score, for example, implies a lesser preference for the relevant type of response. To avoid the confusion that might arise over the difference in scoring, the IPIT data will be



discussed in a manner similar to that of the EPPS and BI; i.e., a "higher" retest score or a "lower" retest score always implies a greater or lesser preference respectively. In the tables listing the mean scores, or mean differences, however, the inverse relationship for the IPIT still applies.

#### Selection of Subjects:

All subjects were originally part of a group of 795 entering freshmen tested by Hurley in 1955 in an investigation of the relationship between personality characteristics and scholastic success. The Ss were divided into three groups, with each group completing a different pair of the three personality tests described above. These tests were administered as part of the general college aptitude testing program, i.e., on a non-volunteer basis.

The present study, which is unrelated to Hurley's except in the employment of the same Ss, was initiated in 1959 when it was ascertained that approximately 300 of the students who had been tested in 1955 were still on campus. By means of a letter and/or telephone call, each one of these remaining Ss was reminded of his 1955 participation and was asked to assist in the "second phase" of the research. They were also advised that all volunteers would subsequently be invited to discussion groups where both the general findings and their own individual test scores would be reviewed. Approximately 30% of the students contacted (83 out of 300) appeared for the retest sessions.

#### Description of Sample:

The 83 subjects making up the sample were all Michigan State University (MSU) undergraduates, 61 males and 22 females. The mean age for the males at the time of retesting was 23.54, with a standard

deviation of 2.54; for the females, the mean age and standard deviation were 21.82 and 1.30, respectively. As Hurley has pointed out, the greater age heterogeneity of the males "was probably a reflection of a high incidence of Korean War veterans" (1959, p. 3). Because of the possibility that personality scores might be influenced by the age variable, it was decided to process the data for the "typical" students (non-veterans, or younger males) and the veterans separately, as well as together.<sup>1</sup> The absence of 24 year olds in the sample at the time of retesting made this a convenient separation point between veteran and non-veteran students. The mean age for the 38 males under 24 years was 21.74 (which compares with the female mean age of 21.82); and for the 23 males over 24 years of age, the mean age was 26.52. Because of the relatively small number of female Ss and their greater age homogeneity, no such dichotomy was employed. The subjects represented a fairly wide range of majors, with education, business, agriculture, and the natural and social sciences as the most frequently noted.

With three exceptions, all Ss had been enrolled in MSU since 1955 with only minor or brief absences. The exceptions involved three males who had been absent for two or more years. The scores for these particular Ss were included in the total group computations; however, they were excluded from the veteran-non-veteran analyses, in order to help reduce the number of possible factors to be considered in the discussion of the results.

#### Experimental Design:

As already indicated, the present study was essentially a test-retest design. Ss were originally tested in 1955 as part of the freshmen

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<sup>1</sup>Although these older students are here referred to as "veterans," it is not known specifically if each one had actually had military service. The terms "veteran" and "non-veteran" are retained, however, for the sake of convenience.

orientation program; and four years later, they were tested again on a volunteer basis. Approximately ten retest sessions were held, each lasting two hours with about 9 Ss in attendance at each one. In addition to completing the same two tests they had taken in 1955, all Ss filled out a questionnaire asking for such information as age, number of years in college, names of psychology courses taken, etc. After all tests had been scored and checked for errors by the writer, each S's results were recorded on index cards. From these cards, the IBM office at MSU transferred the information onto IBM cards for processing by MISTIC, the MSU computer, under Program K5-M, which computes correlations, means, and standard deviations. From this information, the necessary statistical tests were performed by the writer on a hand calculator.

Because each S had been given two of the three personality measures employed in the study, the actual number of Ss completing each test was less than the total number of Ss involved. Table 1 shows the number of Ss, by sex, who completed either the EPPS, the BI, or the IPIT. Table 2 lists the number of male and female Ss who completed the various pairs of tests (i.e., either the EPPS and BI, the BI and IPIT, or the EPPS and IPIT).

Table 1. Number of Subjects Completing Either the EPPS, BI or IPIT

	EPPS	BI	IPIT
Males	35	41	44
Females	11	15	18
Totals	46	56	62

Table 2. Number of Subjects Completing Each Pair of Tests

	EPPS and BI	EPPS and IPIT	BI and IPIT
Males	45	19	25
Females	4	7	11
Totals	49	26	36

#### Statistical Treatment of the Data:

The test-retest scores of the 83 Ss were then analyzed to obtain information on the two matters under investigation: the first, changes in personality as reflected by test score differences over the four year period; the second, the stability of the various measures themselves.

Investigation into the matter of personality change was handled by means of two different statistical analyses. In the first, the significance of the difference between the 1955 and the 1959 mean scores on each of the twenty-five variables was determined. The statistical test used in this analysis was the t test, corrected for correlated means, as reported by Walker and Lev (1953, p. 154). The second analysis was concerned with the number of subjects whose 1959 scores either increased or decreased in terms of their 1955 scores. On the basis of chance (the null hypothesis), it is expected that approximately as many Ss will show an increase as will show a decrease on a given variable. The statistical test used to determine the significance of this proportion of Ss changing in either direction is the sign test, a non-parametric test reported in Edwards (1954, p. 208), and which is a variant of the chi square test.

Test stability was determined by correlating Ss 1955 scores with their 1959 scores. Computation of these Pearsonian correlations was accomplished by MISTIC.



## RESULTS

### Mean Score Changes:

Table 3 lists the mean scores and standard deviations for all male Ss, all females, and for the combined sexes on each of the three tests for both 1955 and 1959. Table 4 presents the same information for the male veterans and non-veterans. In each table, where the mean score in 1959 differs significantly ( $p. < .10$ ) from the corresponding mean score in 1955 (t test), it is so indicated. All mean differences and t values are listed in Table 5.

### Changes in Direction of Scores:

Table 6 shows the number of Ss, by sex, whose 1959 scores either decreased or increased in terms of their 1955 scores. This information for the veterans and non-veterans is contained in Table 7. Statistical significance of the proportions ( $p. < .10$ ) is also indicated on each table (sign test).

### Statistical Agreement of Significant Findings:

Note that statistical significance as obtained by one analysis is not always supported by a similar finding from the other analysis. Table 8 lists the number of variables, by group, which showed significant changes, according to the statistical test employed. Also shown is the number of changes on which there is statistical agreement by both analyses.

Except for the female data, there appears to be a reasonable amount of agreement between the two statistical tests on the number of

significant results. The greater inconsistency of findings for the females can be partially attributed to their small Ns.

Test Stability:

Table 9 lists the test-retest reliability coefficients (or stability coefficients) over the four year interval on the twenty-five variables for all Ss, females, males, non-veterans, and veterans. Significance of these Pearsonian correlations is indicated ( $p. < .10$ ).

Table 3. Test and Retest Mean Scores and Standard Deviations of the Twenty-Five Personality Variables

Test and Variable	Males				Females				Combined			
	Means		SD		Means		SD		Means		SD	
	1955	1959	1955	1959	1955	1959	1955	1959	1955	1959	1955	1959
<b>EPPS</b>												
1. ach	15.66	16.60	4.16	4.92	N = 11				N = 46			
2. def	12.66	11.77	2.34	3.71	12.73b	15.73	4.02	5.01	14.96a	16.39	4.31	4.96
3. ord	10.89	11.66	4.63	4.54	13.91b	11.27	3.70	4.51	12.96b	11.65	2.77	3.92
4. exh	15.23	14.54	3.81	3.89	12.09a	10.27	4.40	4.79	11.17	11.33	4.60	4.64
5. aut	13.63	14.40	3.60	4.46	13.82	14.27	3.46	3.14	14.89	14.48	3.78	3.72
6. aff	14.83	14.17	4.49	3.62	13.27	14.73	4.24	3.70	13.54	14.48	3.77	4.29
7. int	14.37	15.46	4.55	5.40	16.82	15.00	2.37	5.15	15.30	14.37	4.17	4.06
8. suc	9.69b	8.11	4.34	4.32	17.27	17.82	4.02	4.57	15.06	16.02	4.60	5.31
9. dom	16.60a	18.23	3.97	5.15	11.73a	9.27	6.18	5.89	10.17c	8.39	4.92	4.77
10. aba	14.29c	11.63	4.74	4.47	15.27	14.09	4.51	5.18	16.28	17.24	4.15	5.45
11. nur	13.37a	12.23	4.40	4.01	15.00	12.91	3.08	4.62	14.46c	11.94	4.41	4.54
12. chg	16.97	17.43	3.94	4.47	14.82	14.55	3.76	3.70	13.72	12.78	4.30	4.06
13. end	15.37	14.80	4.50	5.47	17.18b	20.18	5.88	4.24	17.02a	18.09	4.48	4.57
14. het	13.37c	16.49	5.78	5.45	12.55	12.73	6.79	4.88	14.70	14.30	5.28	5.41
15. agg	13.06	12.49	4.16	5.14	13.00	15.45	5.06	5.16	13.28c	16.24	5.62	5.40
<b>BI</b>												
1. L	3.85c	2.42	2.11	2.05	N = 15				N = 56			
2. K	15.22	15.93	4.08	4.68	5.47c	3.33	1.71	1.92	4.29c	2.66	2.14	2.06
3. Pd	15.73	15.12	2.97	3.28	17.40	17.80	3.32	4.55	15.80	16.43	4.01	4.72
4. MA	15.58	14.39	7.52	7.36	14.80	15.40	4.02	4.69	15.48	15.20	3.31	3.72
5. MH	12.90	12.58	6.51	5.82	14.93	13.87	9.93	9.42	15.41	14.25	8.24	7.97
6. MR	20.68b	18.42	5.12	4.89	10.00	9.73	4.18	4.43	12.12	11.82	6.12	5.63
<b>IPIT</b>												
1. AI	55.57b	52.68	5.46	7.71	N = 18				N = 62			
2. I	56.41c	61.18	5.94	7.88	53.56	51.22	7.63	8.65	54.98b	52.26	6.26	8.02
3. B	62.32c	54.93	7.69	8.50	58.50b	62.89	7.60	7.57	57.02c	61.68	6.53	7.83
4. H	65.70c	71.20	7.34	9.57	56.33c	49.72	10.42	8.58	60.58c	53.42	8.99	8.84
					71.61a	76.17	9.79	10.31	67.42c	72.64	8.56	10.05

<sup>a</sup>The difference between the two underlined means is significant ( $p. < .10$ ).<sup>b</sup>( $p. < .05$ )<sup>c</sup>( $p. < .01$ )



Table 4. Test and Retest Mean Scores and Standard Deviations of the Twenty-Five Personality Variables for Male Veterans and Non-Veterans

Test and Variable	Non-Veterans				Veterans			
	Means		SD		Means		SD	
	1955	1959	1955	1959	1955	1959	1955	1959
<b>EPPS</b>								
1. ach	15.85	15.75	3.70	5.37	15.79 b	18.00	4.62	4.00
2. def	12.70	12.10	2.43	3.82	12.57	11.64	2.29	3.44
3. ord	10.80	10.85	4.31	4.25	11.00	12.79	5.20	4.86
4. exh	15.25	14.70	3.48	3.62	15.36	14.64	4.32	4.19
5. aut	13.00	14.15	3.41	4.93	14.21	14.64	3.69	3.83
6. aff	16.05	14.65	4.60	3.86	12.86	13.36	3.66	3.20
7. int	14.20	15.65	4.63	5.05	14.71	15.71	4.56	5.69
8. suc	10.25	9.00	4.01	4.27	8.71	6.93	4.73	4.23
9. dom	17.00	18.65	3.95	4.54	16.50	17.36	3.72	5.90
10. aba	13.50	12.00	3.88	5.08	15.71 b	11.07	5.52	3.54
11. nur	13.90	13.00	4.53	3.77	12.29	11.14	4.01	4.22
12. chg	17.75	16.70	3.66	4.83	15.64 c	18.21	4.05	3.78
13. end	16.05	14.60	4.93	6.13	14.93	15.36	3.35	4.45
14. het	12.10 c	16.80	5.83	5.78	14.64	15.79	5.19	5.02
15. agg	11.60	11.40	3.87	5.33	14.93	13.36	3.84	4.06
<b>BI</b>								
1. L	3.84 c	1.76	2.11	1.84	3.93	3.60	2.18	1.89
2. K	14.92	15.24	4.19	4.91	15.47 a	17.07	3.88	4.19
3. Pd	15.32	15.16	2.92	3.76	16.40	15.07	3.03	2.44
4. MA	16.32	15.12	7.23	7.66	15.20	13.07	7.47	6.89
5. MH	12.76	14.16	6.02	5.82	13.60 b	10.40	7.21	4.95
6. MR	21.64 b	19.00	4.89	4.61	19.00	17.33	5.23	5.30
<b>IPIT</b>								
1. AI	54.56	52.07	5.53	8.28	57.47 b	53.40	5.08	6.96
2. I	55.85 c	60.78	5.95	7.93	57.33 c	62.47	5.45	8.01
3. B	63.30 c	56.56	7.38	7.20	59.80 c	51.33	6.60	9.84
4. H	66.30 a	70.59	6.56	9.26	65.40 c	72.80	8.69	10.45

<sup>a</sup>The difference between the two underlines means is significant ( $p < .10$ ).

<sup>b</sup>( $p < .05$ )

<sup>c</sup>( $p < .01$ )

Table 5. Mean Differences and  $t$  Values Between Test and Retest on the Twenty-Five Personality Variables<sup>1,2</sup>

	Males			Females			Combined			Non-Vet.			Vet		
	$D$		$t$	$D$		$t$	$D$		$t$	$D$		$t$	$D$		$t$
	$n$	$t$		$n$	$t$		$n$	$t$		$n$	$t$		$n$	$t$	
<b>EPDS</b>	$n = 35$			$n = 11$			$n = 46$			$n = 20$			$n = 14$		
1. ach	.94	1.13		3.00	2.30 <sup>b</sup>		1.43	1.99	.81	-.10	.81		2.21	2.23 <sup>b</sup>	
2. def	-.89	1.25		-2.64	2.00 <sup>a</sup>		-1.31	2.06 <sup>b</sup>	.62	-.60	.62		-.93	.82	
3. ord	.77	.80		-1.82	2.01 <sup>a</sup>		.16	.19	.04	.05	.04		1.79	1.04	
4. exh	-.69	.99		.45	.54		-.41	.70	.66	-.55	.66		-.72	.53	
5. exh	.77	.95		1.46	.93		.94	1.30	.96	1.15	.96		.43	.41	
6. aff	-.66	1.03		-1.82	1.36		-.93	1.60	1.54	-1.40	1.54		-.50	.61	
7. int	1.09	1.10		.55	.33		.96	1.13	1.02	1.45	1.02		1.00	.76	
8. suc	-1.58	2.35 <sup>b</sup>		-2.46	1.88 <sup>a</sup>		-1.78	2.97 <sup>c</sup>	1.55	-1.25	1.55		-1.78	1.51	
9. dom	1.63	1.86 <sup>a</sup>		-1.18	.87		.96	1.25	1.39	1.65	1.39		.86	.74	
10. aba	-2.66	2.87 <sup>c</sup>		-2.09	1.61		-2.52	3.25 <sup>c</sup>	1.56	-1.50	1.56		-4.64	2.71 <sup>b</sup>	
11. nur	-1.14	1.71 <sup>a</sup>		-.27	.21		-.94	1.56	.91	-.90	.91		-1.15	1.39	
12. chg	.46	.66		3.00	2.46 <sup>b</sup>		1.07	1.70 <sup>a</sup>	1.10	-1.05	1.10		2.57	3.27 <sup>c</sup>	
13. end	-.57	.72		.18	.10		-.40	.52	1.37	-1.45	1.37		.43	.36	
14. het	3.12	2.95 <sup>c</sup>		2.45	1.01		2.96	2.98 <sup>c</sup>	3.19 <sup>c</sup>	4.70	3.19 <sup>c</sup>		1.15	.82	
15. agg	-.57	.80		1.18	.96		-.16	.24	.21	-.20	.21		-1.57	1.58	
<b>BI</b>	$n = 41$			$n = 15$			$n = 56$			$n = 25$			$n = 15$		
1. L	-1.43	4.72 <sup>c</sup>		-2.14	4.00 <sup>c</sup>		-1.63	6.09 <sup>c</sup>	5.61 <sup>c</sup>	-2.08	5.61 <sup>c</sup>		-.33	.80	
2. K	.71	1.16		.40	.32		.63	1.12	.38	.32	.38		1.60	1.91 <sup>a</sup>	
3. Pd	-.61	1.06		.60	.58		-.28	.56	.21	-.16	.21		-1.33	1.51	
4. MA	-1.19	1.04		-1.06	.63		-1.16	1.21	.82	-1.20	.82		-2.13	1.22	
5. MH	-.32	.40		-.27	.17		-.30	.42	1.64	1.40	1.64		-3.20	2.34 <sup>b</sup>	
6. MR	-2.26	2.60 <sup>b</sup>		-3.87	3.08 <sup>c</sup>		-2.70	3.70 <sup>c</sup>	2.14 <sup>b</sup>	-2.64	2.14 <sup>b</sup>		-1.67	1.40	
<b>IPIT</b>	$n = 44$			$n = 18$			$n = 62$			$n = 27$			$n = 15$		
1. AI	-2.89	2.20 <sup>b</sup>		-2.34	1.14		-2.72	2.47 <sup>b</sup>	1.29	-2.49	1.29		-4.07	2.50 <sup>b</sup>	
2. I	4.77	4.14 <sup>c</sup>		4.38	2.39 <sup>b</sup>		4.66	4.78 <sup>c</sup>	4.07 <sup>c</sup>	4.93	4.07 <sup>c</sup>		5.04	3.02 <sup>c</sup>	
3. B	-6.39	5.49 <sup>c</sup>		-6.61	3.32 <sup>c</sup>		-7.16	6.44 <sup>c</sup>	3.86 <sup>c</sup>	-6.74	3.86 <sup>c</sup>		-8.47	3.93 <sup>c</sup>	
4. H	5.50	3.45 <sup>c</sup>		4.56	1.80 <sup>a</sup>		5.22	3.87 <sup>c</sup>	1.95 <sup>a</sup>	4.29	1.95 <sup>a</sup>		7.40	3.10 <sup>c</sup>	

<sup>1</sup>"\_" indicates a higher test (1955) score.<sup>2</sup>For ease of presentation, the sign for  $t$  has been omitted.ap. < .10; <sup>b</sup>p. < .05; <sup>c</sup>p. < .01

Table 6. Number of Subjects Whose 1959 Test Scores Either Increased or Decreased in Terms of Their 1955 Scores on Each of the Twenty-Five Personality Variables<sup>1,2</sup>

Test and Variable	Males		Females		Combined	
	1959>1955	1959<1955	1959>1955	1959<1955	1959>1955	1959<1955
<b>EPPS</b>						
1. ach	21	14	8.5	2.5	29.5 a	16.5
2. def	12.5 a	22.5	3.5	7.5	16 a	30
3. ord	21	14	3	8	24	22
4. exh	16	19	5.5	5.5	21.5	24.5
5. aut	19	17	5.5	5.5	23.5	22.5
6. aff	15.5	19.5	3	8	18.5	27.5
7. int	19	16	8	3	27	19
8. suc	13	22	3.5	7.5	16.5 a	29.5
9. dom	23.5 a	11.5	5	6	28.5	17.5
10. aba	11 b	24	3.5	7.5	14.5 b	31.5
11. nur	10.5 b	24.5	6.5	4.5	17	29
12. chg	23 a	12	8	3	31 b	15
13. end	14	21	5	6	19	27
14. het	23 a	12	7	4	30 a	16
15. agg	12.5	22.5	7	4	19.5	26.5
<b>BI</b>						
1. L	8.5 c	32.5	1.5 c	13.5	10.5 c	45.5
2. K	22.5	18.5	7	8	29.5	26.5
3. Pd	16.5	24.5	6.5	8.5	23	33
4. MA	19	22	7.5	7.5	26.5	29.5
5. MH	18.5	22.5	7.5	7.5	26	30
6. MR	13 b	28	4	11	17 c	39
<b>IPIT</b>						
1. AI	26	18	11.5	6.5	37.5	24.5
2. I	9 c	35	6.5	11.5	15.5 c	46.5
3. B	35 c	9	13.5 a	4.5	48.5 c	13.5
4. H	13.5 b	30.5	5.5	12.5	19 c	43

<sup>1</sup>A higher score indicates an increase in the number of relevant responses made by a subject.

<sup>2</sup>Ss whose scores remained constant were divided equally between the two categories.  
a p. < .10; b p. < .05; c p. < .01

Table 7. Number of Veterans and Non-Veterans Showing Changes in Test Scores From 1955 to 1959 on Twenty-Five Variables<sup>1, 2</sup>

Test and Variable	Non-Veterans		Veterans	
	1959>1955	1959<1955	1959>1955	1959<1955
<b>EPPS</b>				
1. ach	10.5	9.5	9.5	4.5
2. def	9.5	10.5	4	10
3. ord	11	9	9	5
4. exh	9	11	7	7
5. aut	11.5	8.5	8	6
6. aff	7.5	12.5	8	6
7. int	10.5	9.5	8.5	5.5
8. suc	6	14	7	7
9. dom	15	b 5	7.5	6.5
10. aba	7	13	4	10
11. nur	6.5	13.5	4.5	9.5
12. chg	10	10	12.5	c 1.5
13. end	6	14	7	7
14. het	14	6	9	5
15. agg	7	13	4.5	9.5
<b>BI</b>				
1. L	2.5	c 22.5	6	9
2. K	13	12	9.5	5.5
3. Pd	12	13	4.5	10.5
4. MA	10.5	14.5	7.5	7.5
5. MH	16	9	2	c 13
6. MR	8.5	16.5	5	10
<b>IPIT</b>				
1. AI	13.5	13.5	11.5	a 3.5
2. I	5.5	c 21.5	2.5	b 12.5
3. B	19.5	b 7.5	13.5	c 1.5
4. H	10.5	16.5	3	b 12

<sup>1</sup>A higher score indicates an increase in the number of relevant responses made by a subject.

<sup>2</sup>Ss whose scores remained constant were divided equally between the two categories.

a  
b<sup>a</sup> p. < .10  
c<sup>b</sup> p. < .05  
p. < .01



Table 8. Number of Significant Variable Changes, According to Group and Type of Statistical Test\*

Group	Number of Changes (t test)	Number of Changes (Sign test)	Number of Changes Agreed on by Both Tests
Males	11	11	9
Females	10	2	2
All <u>Ss</u>	12	11	11
Veterans	9	6	6
Non-Veterans	6	4	3

\*  
p. < .10

Table 9. Pearsonian Stability Coefficients Between Test and Retest Scores for Twenty-Five Variables<sup>1</sup>

Test and Variable	Present Study				
	Combined Sexes	Females	Males	Non-Veterans	Veterans
<u>EPDS</u>	N = 46	N = 11	N = 35	N = 20	N = 14
1. ach	.45 <sup>c</sup>	.55 <sup>a</sup>	.42 <sup>b</sup>	.30	.64 <sup>b</sup>
2. def	.21	.45	.10	.10	.12
3. ord	.34 <sup>b</sup>	.79 <sup>c</sup>	.23	.27	.19
4. exh	.43 <sup>c</sup>	.64 <sup>b</sup>	.39 <sup>b</sup>	.45 <sup>b</sup>	.30
5. aut	.27 <sup>b</sup>	.16	.31 <sup>a</sup>	.21	.46 <sup>a</sup>
6. aff	.53 <sup>c</sup>	.51 <sup>a</sup>	.59 <sup>c</sup>	.55 <sup>c</sup>	.60 <sup>b</sup>
7. int	.33 <sup>b</sup>	.20	.32 <sup>a</sup>	.13	.56 <sup>b</sup>
8. suc	.65 <sup>c</sup>	.74 <sup>c</sup>	.58 <sup>c</sup>	.62 <sup>c</sup>	.52 <sup>b</sup>
9. dom	.45 <sup>c</sup>	.57 <sup>a</sup>	.38 <sup>b</sup>	.22	.69 <sup>c</sup>
10. aba	.32 <sup>b</sup>	.43	.30 <sup>a</sup>	.57 <sup>c</sup>	.05
11. nur	.53 <sup>c</sup>	.34	.56 <sup>c</sup>	.44 <sup>b</sup>	.72 <sup>c</sup>
12. chg	.56 <sup>c</sup>	.73 <sup>c</sup>	.53 <sup>c</sup>	.52 <sup>b</sup>	.72 <sup>c</sup>
13. end	.54 <sup>c</sup>	.47	.57 <sup>c</sup>	.65 <sup>c</sup>	.37
14. het	.26 <sup>b</sup>	-.24	.38 <sup>b</sup>	.36	.48 <sup>a</sup>
15. agg	.62 <sup>c</sup>	.71 <sup>c</sup>	.60 <sup>c</sup>	.60 <sup>c</sup>	.56 <sup>b</sup>
<u>BI</u>	N = 56	N = 15	N = 41	N = 25	N = 15
1. L	.55 <sup>c</sup>	.36	.57 <sup>c</sup>	.57 <sup>c</sup>	.69 <sup>c</sup>
2. K	.55 <sup>c</sup>	.26	.61 <sup>c</sup>	.59 <sup>c</sup>	.68 <sup>c</sup>
3. Pd	.41 <sup>c</sup>	.58 <sup>b</sup>	.30 <sup>a</sup>	.35 <sup>a</sup>	.23
4. MA	.61 <sup>c</sup>	.77 <sup>c</sup>	.51 <sup>c</sup>	.52 <sup>c</sup>	.56 <sup>b</sup>
5. MH	.58 <sup>c</sup>	.004	.66 <sup>c</sup>	.74 <sup>c</sup>	.68 <sup>b</sup>
6. MR	.37 <sup>c</sup>	.39	.38 <sup>b</sup>	.16	.62 <sup>b</sup>
<u>IPIT</u>	N = 62	N = 18	N = 44	N = 27	N = 15
1. AI	.28 <sup>b</sup>	.44 <sup>a</sup>	.16	-.003	.49 <sup>a</sup>
2. I	.44 <sup>c</sup>	.47 <sup>b</sup>	.42 <sup>c</sup>	.34 <sup>a</sup>	.58 <sup>b</sup>
3. B	.51 <sup>c</sup>	.62 <sup>c</sup>	.39 <sup>c</sup>	.22	.54 <sup>b</sup>
4. H	.36 <sup>c</sup>	.43 <sup>a</sup>	.24	-.02	.55 <sup>b</sup>

<sup>1</sup>Four year interval between test and retest.

<sup>a</sup>p. < .10

<sup>b</sup>p. < .05

<sup>c</sup>p. < .01

## DISCUSSION

Prior to any discussion of personality changes in college students, some attention should be given to the factors relating to or influencing the general findings. Preceding an evaluation of these findings, then, will be sections dealing with (a) statistical aspects of the results; (b) differences between male and female Ss; and (c) differences between veterans and non-veterans. These will be followed by a review of the significant results and comparisons with other findings. The secondary concern of the study, test stability, will be dealt with last.

### Personality Score Changes

Statistical Aspects: For ease of presentation, Table 10 is a relisting of those variables on which at least one of the groups of Ss showed a significant change after four years as determined by the t and/or sign test. Prior to any interpretation, it should be noted that in terms of the number of significant results, their consistency among the various groups, and the types of changes themselves, these statistically significant findings do not appear attributable to more random or chance occurrences. Regarding the number of findings, Table 8 should prove helpful in an evaluation. Looking only at the male and female results, of the 50 t tests performed, 21 (or 42%) were significant at or beyond the .10 level. On the basis of chance alone, only five significant findings would have been expected. On the sign test, 13 (or 26%) of the analyses were significant, with five having been expected to arise by chance. The fact that the female data produced only two significant results, which does not differ from chance expectations, is noteworthy. But the total number of significant findings, for the two sexes, especially on the more

Table 10. Variables on Which One or More Groups Showed Significant Changes After Four Years<sup>1, 2</sup>

Test and Variable	All Ss	Females	Males	Non-Veterans	Veterans
<u>EPPS</u>					
1. ach	I	I			I
2. def	D	D	D		
3. ord		D			
.					
.					
8. suc	D	D	D		
9. dom			I	I	
10. aba	D		D		
11. nur			D		
12. chg	I	I	I		I
.					
.					
14. het	I		I	I	
.					
.					
<u>BI</u>					
1. L	D	D	D	D	
2. K					I
.					
.					
5. MH					D
6. MR	D	D	D	D	
<u>IPIT</u>					
1. AI	I		I		I
2. I	D	D	D	D	D
3. B	I	I	I	I	I
4. H	D	D	D	D	D

<sup>1</sup>Analyses by means of t and sign test ( $p. < .10$ ).

<sup>2</sup>"I" refers to an increase in the relevant response.

"D" refers to a decrease in the relevant response.

sensitive t test, appears to be in excess of that expected by chance alone.

Sex Differences: In terms of both type and direction of change, the two sexes displayed considerable agreement. Of the 25 variables, males and females changed in the same direction, in terms of mean scores, on 19 of them. Further, of the 11 variables on which t was significant for the males, the females changed in the same direction on 10; in 6 of these 10 cases, the female findings also attained the significance level. On only six variables did the two sexes change in opposite directions over the four years, and only on two of these did either sex show a significant change. These two variables were EPPS #3, Order, on which females decreased a significant extent while males tended to increase; and EPPS #9, Dominance, on which males increased significantly, with females tending to score lower.

The high degree of similarity in personality score shifts of males and females would seem to justify combining the data of the two sexes in order to get a more general picture. Because of the numerical superiority of the males, however, the combined results are largely a reflection of the male findings.

Veteran-Non-Veteran Differences: In general, there seems to have been little difference between the two male sub-groups, both in terms of their personality characteristics at the beginning of their college experience and in the manner in which these characteristics were later modified. This conclusion is borne out by two findings. First, comparisons of the mean scores of the veterans and non-veterans for both 1955 and 1959 on the 25 variables revealed significant differences on only four (two at each year): EPPS #6, Affiliation; #15, Aggression; BI #1, L; and #5, Manifest Hostility. Secondly, inspection of the mean scores shows that

both groups tended to shift their 1959 scores in the same direction; only on two of the 25 variables did they change in opposite directions: **EPPS #1, Achievement**; #6, Affiliation; #12, Change; #13, Endurance; and BI #5, Manifest Hostility. On only this last variable, however, was there evidence that the two groups, after four years, differed significantly both in mean score differences and in the direction these scores had followed in relation to the original scores. Here the veterans' scores decreased while the non-veterans' scores increased. On two other variables where the two groups changed in different directions, **EPPS Achievement and Change**, the veterans evidenced significant increases in 1959 while the non-veterans tended toward lowered scores. No apparent explanation for these differences seems to exist, and perhaps they are chance findings. However, it should be noted that the veterans' significant rise in mean scores on **EPPS Achievement and Change** was duplicated by the females, suggesting that these results are attributable to factors other than chance.

Aside from these veteran-non-veterans differences, the data indicate that changes among the male Ss tended to be relatively homogeneous, regardless of age. Differences in the contribution of these male sub-groups to the total picture will be subsequently mentioned when warranted.

#### Review of Significant Findings:

As Table 10 indicates, scores on 17 of the 25 personality variables resulted in significant changes over the four year period for at least one of the groups of Ss. The combined group of Ss evidenced changes on 12 variables; females, on 10; males, on 13; non-veterans, on 7; and veterans, on 8. In terms of the tests themselves, 9 of the 15 EPPS variables showed significant changes for at least one group, with significance being attained by two or more of the sub-groups on seven of these.

On the BI, four of the six variables changed significantly with four groups reaching the significance level on two of these variables. All four of the IPIT variables showed marked changes, with all five groups changing significantly on three of these.

Rather than list and discuss each significant result individually, it would seem more heuristic to group the various changes into specific areas of personality, especially into those areas which loom important during the second decade of life. The Committee on the College Student of the Group for the Advancement of Psychiatry (1955) offers a framework of four topics with which personality development is concerned at this stage of life. These topics are (a) dependence-independence; (b) love and hostility; (c) sexuality; and (d) needs for security, adequacy, and prestige.

(a) Dependence-Independence: The results of the present study seem to support quite strongly the interpretation that seniors, as compared to freshmen, are characterized by a greater self-reliance and that they depend less on others for leadership, sympathy, praise, etc. The lowered scores on EPPS Deference (to depend on others for suggestions, decisions, etc.) and on EPPS Succorance (to depend on others for emotional types of support) clearly point in this direction. Although these findings are true for both males and females, the trend toward greater independence appears more pronounced for the former, who, as seniors, also scored significantly higher on EPPS Dominance (to lead, influence, supervise others) and lower on EPPS Nurturance (to help, sympathize with, support others). Females showed little or no change on these two particular variables.

(b) Love and Hostility: On the IPIT, seniors show a significantly lowered preference for hostile or aggressive themes. An explanation for this result may lie in the finding by Hurley of significant negative correlations

between hostility measures and grade point average after one year, suggesting that

. . . a higher reliance upon culturally disapproved adaptation techniques, as represented by overt hostile or maladjustive scores . . . interferes with a good academic performance (1959, p. 5).

The subjects in the present study, as seniors, evidently achieved a certain amount of academic success. Perhaps this success was facilitated by a growing ability to channel aggressive feelings into more socially acceptable techniques, thus explaining the lowered Hostility score.

Additional evidence that seniors are "less hostile" than freshmen lies in the lowered EPPS Aggression and BI Manifest Hostility mean scores for the total group, although these decreases were statistically insignificant. Also, the various sub-groups were not entirely consistent in their performance regarding the latter variable, as the younger males tended toward higher MH scores in 1959.

The positive value of some of the implied "socially acceptable techniques" is suggested by the higher scores on the EPPS and IPIT achievement variables, both of which had been previously found to correlate positively with grade point average at or beyond the .10 level (Hurley, 1959). Further support for the inverse relationship between Hostility and Achievement Imagery scores lies in the highly significant correlation of  $-.64$  between the two variables (Hurley, 1955).

(c) Sexuality: Although all groups of Ss evidenced an increase on EPPS Heterosexuality (to have an interest in the opposite sex), this trend was much more pronounced with the younger males, whose 1955 mean score was less than that of both females and veterans. For several reasons, these results do not appear too surprising. Females supposedly mature earlier than males, so that female freshmen might be expected to have a greater concern in heterosexual matters than their male counterparts.



Also, the younger males, who are still in their adolescence, might be expected to show less of an interest in this area than the older males. Although the increased heterosexual awareness in the younger males is probably related to maturational developments, the substantially higher 1959 mean score of the younger males over the 1955 mean score of the older males (when the two groups were approximately at the same age) suggests that college tends to stimulate sexual awareness in younger males to a greater extent than a non-college environment. This interpretation is supported by the normative data showing the college sample scores significantly higher than the general adult sample on the Heterosexuality variable (Edwards, 1959).

(d) Security, Adequacy, Prestige: Of the four areas under discussion, the evidence seems the most pronounced regarding trends toward increased security, adequacy, and prestige. The lowered senior means on EPPS Abasement (to take the blame; to feel inferior, inadequate), on IPIT Insecurity, and on BI Manifest Rigidity all suggest an improved self-concept and a more flexible functioning. A gain in sophistication is also indicated by the lowered BI Lie score. Similarly, the increased means on the achievement variables, and for the males, on EPPS Dominance (to lead, influence, supervise others), and for the females and older males, on EPPS Change (to do new and different things), further support the assumption of greater self-confidence and maturity of the seniors. Less direct support for these trends may be inferred from the highly significant increase on IPIT Blandness, which implies a more objective manner of viewing the world.

#### Summary of Freshmen-Senior Changes:

That the two groups differ on objective measures of personality seems obvious. There has been the recognition that personality can be

modified during the college years. As the Group for the Advancement of Psychiatry comments: the student

. . . must give up the familiar and reassuring, make choices and decisions, learn new patterns of conduct and thinking, break off old and establish new relationships, and above all, develop a valid concept of himself and sound goals for the future. . . . Although certain patterns of personality have already been determined, the entering college student is still capable of much change (1955, p. 2).

The findings of the present study suggest a substantially more mature functioning on the part of college seniors. In contrast to freshmen, they are characterized by personality test scores suggesting a much-improved self-concept, greater self-reliance, and increased self-confidence. Seniors appear more flexible in their functioning, more motivated to attain certain goals, and more willing to enter into new experiences. Also, they possess a greater interest in the opposite sex and seemingly have channeled their aggressive feelings into more acceptable modes of expression.

#### Comparison with the Vassar Findings:

The dissimilarity of measures employed by the present study and the Vassar study, with two minor exceptions, makes specific comparisons difficult. However, the trends suggested by the results of the two investigations seem quite compatible. The similarity of results can be seen by the Vassar finding that seniors, as opposed to freshmen, have increased confidence and are less dependent on their families. Further, they are characterized by a greater "flexibility" in that they show less of a need to conform to established customs and are "uncompulsive" (Webster et al., 1961). This lessening of compulsive tendencies was echoed by both sexes in the present study, but especially by the females, who, in addition to a significantly lowered mean retest score on BI

Rigidity, also decreased on EPPS Order (to organize, arrange, make plans, etc.).

Vassar seniors are also "more aware of their sexual and aggressive needs" (Freedman, 1961, p. 22). Although the MSU data support the findings of increased sexual awareness, the data regarding aggression are less clear and may even be somewhat contradictory. In the present study, mean score on the three hostility indices tended, in general, to show a decrease on the retest. In addition, it has already been suggested that MSU seniors, both male and female, tend to channel their aggression into more socially acceptable modes of expression (e.g., increased achievement motivation). Hostility needs, per se, then, do not appear to be as important a concern with MSU seniors as they seem to be with seniors at Vassar. On the other hand, the slight increases on mean scores for the younger males (on BI MH) and for the females (on EPPS Aggression) suggest that this interpretation be viewed quite cautiously.

The Vassar study also found that seniors "are more unstable, more disturbed, . . . than are freshmen" (Sanford, 1956, p. 42). Among the evidence leading to this finding were the increased scores of seniors on the MMPI clinical scales, including the Psychopathic Deviate scale (Pd). In the present study, male seniors tended to score lower on this scale, while females showed a slight tendency to score higher. On the other scale used in both studies, the K scale, Vassar students and most of the MSU sample displayed relatively little change over the four years, although the veterans evidenced a significant increase. It is intriguing to speculate as to whether MSU seniors would have scored higher on the MMPI clinical scales as did the Vassar seniors. The Pd and K results suggest that they may not have, although for females there seems to be more of a question. Sanford explains the increased scores of Vassar seniors by stating that:

. . . Seniors are more unstable because there is more to be stabilized, less certain of their identities because more possibilities are open to them. Processes making for differentiation and complexity have run somewhat ahead of processes making for equilibrium (1956, p. 42).

Perhaps a sex difference exists here. Female graduates are often torn between marriage and career. Males generally do not have to make such a choice; role expectations for them are less variable, so that conceivably there may be less of an inner conflict within the males.

Related to this area seems to be the Vassar finding that seniors are "less feminine" in terms of feminine interests and role behavior (i. e., conventionality and passivity) (Sanford, 1956, p. 42). Looking only at the data of the MSU females, the significant decrease in senior mean scores on EPPS Order and BI Manifest Rigidity and the increase on EPPS Achievement and Change would seem to support this Vassar finding. The relative lack of change in mean scores on such variables as EPPS Dominance and Aggression (although on this latter variable there was a slight increase) suggest that the trend toward masculinity may be more pronounced with Vassar females, who, as seniors, scored higher than as freshmen on similar scales relating to these variables.

MSU seniors have been characterized here as being more mature than freshmen. A lessening of dependency needs, a more flexible functioning, and a more objective way of perceiving the environment all suggested this increased maturity. Vassar seniors, too, are described as being more mature, but for reasons more complex than could be offered by the present study. As Sanford comments:

In stating that the seniors are more mature we mean that they have gained both in expression of impulse and in mechanisms of control. . . . [Seniors can admit problems but still show] evidence of increased differentiation, discrimination, and mastery (1956, p. 41).

### Summary:

On those topics where comparisons are possible, there seems to be a reasonable amount of agreement in the findings of the Vassar study and the present study. Some differences were noted, of course, but in general the similarities between the findings of the two studies suggest that at least on those variables included in this investigation, college produces similar changes in both males and females. The comparable findings also suggest that the personality changes discussed may be characteristic of college students in general and may not be highly limited with regard to specific school or geographic factors.

In addition, the present data imply that differences in chronological age of students may not be a critical factor with regard to these personality changes. Further, the present study seems to have demonstrated that objective measures of personality are able to offer considerable information relating to personality changes over a lengthy period of time.

### Stability of the Measures

Prior to an evaluation of the stability coefficients presented in Table 8, some attention will be accorded other stability findings as they apply to the present study. On the EPPS, the manual reports coefficients, based on a one week interval between test and retest, ranging from .74 to .88 (Edwards, 1959). Reliability studies dealing with the MMPI usually have employed psychiatric patients (Rosen, 1952). Based on intervals from one to twenty-one weeks,  $r_s$  for the clinical scales ranged from .55 to .88. A study by Mills (1954), using college students and employing an interval of a year and a half, found correlations of .37 to .59 for women and of .27 to .61 for men on the MMPI clinical scales. On the IPIT, Johnston (1957) reports coefficients of

.60 (AI), .58 (I), .69 (B), and .73 (H) for 109 male and female college students over a one month interval. In each case, coefficients for male Ss were appreciably higher than those for females. An r of .47 for AI scores of 275 Ss after a two month interval was also reported. However, as Johnston points out:

. . . it has been previously noted that the rank-ordering procedure used on the IPIT results in an interdependence among the four scales which . . . presumably modifies the interpretation of the coefficients of . . . stability (1957, p. 284).

Similarly, Stoltz has criticized the use of the product-moment correlation coefficient on such ipsative measures as the EPPS. "To the author's knowledge, no method has yet been developed to satisfactorily correct correlation coefficients derived from data such as that presented by Edwards" (1958, p. 241).

As might be expected, the correlations obtained in the present study tend to be substantially smaller than those reported for a shorter interval of time, especially for the EPPS variables. With one exception (EPPS Deference), all correlations for the combined sexes are significant at or beyond the 5% level, with 18 significant beyond 1%. For the males alone, all but four correlations are significant at or beyond the 10% level. The extremely small female Ns may have contributed to the fact that only half of the correlations for this sex are significant.

As might also be expected, the correlations associated with those variables on which Ss changed significantly tended to be somewhat lower than for those for which there were lesser changes. For the data for the combined sexes, the mean correlation for the former set of variables was .41; and for the variables showing little change, the mean r was .48. There were, however, striking exceptions to this trend. For example, the correlation for EPPS Succorance, .65, and for BI L, .55, were among the highest found, although Ss changed significantly on both these variables. A fairly large r can arise, of course, if Ss manifest a systematic change.

Commenting on the use of tests in the investigation of personality change in college students, Webster et al., state:

It would be impractical to attempt to understand changes that occur in college students without relying heavily upon mental tests, including personality tests. Data obtained by other methods are less economical, less objective, less reliable, and less valid. But even the more precise tests order subjects imperfectly, and this seriously limits the usefulness of the test-retest difference scores which must be used to estimating the true change. . . . It is impossible to measure change by means of test-retest difference scores unless the tests used have high reliability; otherwise the difference scores contain such a high proportion of random error that they are meaningless. An exact solution to the problem of comparing individuals or groups on amounts of change will probably have to await the development of new kinds of scales . . . (1961, Ch. 24).

But as Rosen points out:

. . . There has been some question as to whether a high degree of reliability is desirable in personality tests. According to this latter argument, the sensitivity of a personality scale to changes in an individual, say, through psychotherapy, is much more important than reliability. In intelligence and achievement testing, on the other hand, the ideal test is one which gives consistent results, regardless of extraneous factors. . . . A score for an individual on any scale at a given time should be within a reasonable distance of his "true" score. On the other hand, the scale should have the capacity for reflecting modifications in personality with the advent of radical change in environmental status . . . (1953, p. 217).

The exact relation between the relatively low correlations and the findings regarding personality changes in the present study seems unclear. Do these rs, as Webster might suggest, reflect unstable measures; or, as Rosen would argue, are they a reflection of real personality change on the part of the subjects? If the former interpretation is valid, then the change findings must be viewed with extreme caution. However, the nature of the findings themselves and their agreement with the Vassar study would seem to support the latter interpretation. Perhaps, as has been suggested, ". . . the validity of these . . . measures has been

sufficient to partially compensate for moderate reliability" (Hurley, 1955, p. 375). Until new scales are developed, the matter of test reliability over extended periods of time may have to be viewed differently than is done now.

### Limitations of the Present Study

The results of any study, and the interpretations of these results, are of course dependent upon the soundness of the experimental design. The design utilized in the present study raises certain problems.

Validity of the Measures: In general, the scales employed in the present study are relatively new developments. A recent reviewer of the EPPS feels that the test is still in the "experimental" stage (Barron, 1959). A like criticism could also be levelled against the newly developed IPIT and modified MMPI scales used in the study. The validity of all the measures has yet to be determined. Although all three tests, in some cases, purportedly measured the same or similar variables (e.g., achievement, hostility), a previous investigation found that the EPPS and IPIT indices of achievement motivation were essentially unrelated to each other ( $\underline{r} = .15$ ,  $\underline{N} = 237$ ), yet both correlated positively with the grade point average at or beyond the .10 level. Similarly, fairly low correlations were found between the three hostility or aggression indices (mean  $\underline{r}$  of approximately .22), yet all related to GPA in much the same way (Hurley, 1959). In spite of the similarity in definitions of these variables, rather different things appear to be measured by the tests. In the present study, both achievement indices resulted in significant increases for the combined group of  $\underline{Ss}$ ; on the hostility scales, all mean scores for the total group changed in the same direction after four years, but only the IPIT data achieved



significance. Despite the appearance of consistent trends, the lack of a substantial relationship between the achievement variables and between the hostility variables argues for some caution in interpreting the results.

There are but few other articles in the literature dealing with validity studies on the three measures. The EPPS has received the most attention, but even here the evidence is minimal and incomplete. Bernardin and Jessor report that their "research serves to contribute to the construct validity of the Autonomy and Deference scales of the PPS . . ." (1957, p. 14). And Zuckerman (1958) suggests that within the area of dependency and rebelliousness, the Edwards seems to be a valid indicator.

The L (Lie) scale, one of the two scales of the BI to show consistent and significant changes, is felt to be an indicator of defensiveness and naivete (Drake and Oetting, 1959). The other scale, R (Rigidity), according to Wesley, "is related to perseveration of response in a card sorting task of concept formation" (1953, p. 134).

Except for the relationships between the IPIT AI and H indices and grade point average, this personality test has received little attention so far. A factor analysis of the IPIT, however, is currently in process.<sup>1</sup>

Some indirect support for the validity of those variables showing significant changes over the four years can perhaps be assumed by the general agreement between this study and the Vassar investigation. But in the absence of scientifically proven definitions, a fair degree of caution is a requisite in the interpretation of the results.

One other possibly limiting factor concerning the variables themselves is their interrelationships, especially with regard to the

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<sup>1</sup>Personal communication from John Hurley.

IPIT. On this test, Johnston (1957) and the present study found fairly substantial positive relationships between Achievement Imagery and Blandness and between Insecurity and Hostility. The negative relationship between AI and H has already been mentioned. These relationships tend to minimize the finding that all four of the IPIT variables evidenced significant change after four years; without these relationships, such a finding would seemingly point to extreme sensitivity on the part of the IPIT to detect personality changes.

Regarding the EPPS, the present data, in general, appears to support the assumption that the low intercorrelations "indicate that the variables being measured by the EPPS are relatively independent" (Edwards, 1959, p. 20).

Use of Volunteer Subjects: Unlike the 1955 test sessions, the 1959 sessions were composed strictly of volunteer Ss. Personality differences between volunteers and non-volunteers have been studied by a number of investigators (Himelstein, 1956; Maslow and Sakoda, 1952; Rosen, 1951; Siegman, 1956). The findings tend to be somewhat contradictory, even when the same scales are employed (Maslow and Sakoda, 1952; Siegman, 1956). In a more elaborate design than that normally used in such studies, Martin and Marcuse found that

. . . personality differences existed between volunteers and non-volunteers associated with different types of volunteer situations. Generalizations made from biased samples can be misleading (1958, p. 479).

On comparisons of volunteers and non-volunteers for personality experiments, however, they found no significant differences.

The present study afforded some check on possible differences between those Ss who volunteered in 1959 and the remainder of the 1955 students who were also tested as freshmen. Comparing the 1955 mean scores and variances of the two groups indicated few differences

(no mean differences and only two significantly dissimilar variances were found). However, the group of 1955 Ss who did not participate in 1959 cannot be considered as a "pure" non-volunteer sample, as it included subjects who might have agreed to participate in the retest phase, had they been on campus at the time.

#### Representativeness of the Sample:

The relative lack of differences between those students tested in 1959 and those tested in 1955 suggests that the present sample may be representative of MSU students, especially as the 1955 sample was composed of a fairly substantial N (approximately 270 Ss on each of the three tests) (Hurley, 1959). Although it may be true that the students used in the present study were representative of the entering class of 1955, this assumption may not hold for other classes. In evaluating the Vassar study, Freedman comments:

It is also evident that the tenor of the times at which students are in college has an appreciable effect upon the changes that take place. Thus, substantial differences are found among alumnae of different decades which do not seem to be attributable to chronological age (1961, p. 22).

Comparisons of both the 1955 and 1959 mean EPPS scores of male Ss from the present study with the published college male norms (Edwards, 1959) revealed differences significant beyond the 5% level on seven of the fifteen variables. Unfortunately, normative data were not available for either the IPIT or BI scales. These EPPS results, however, suggest that the MSU sample may not be representative of the general college population and caution against ready generalization of the present findings to other populations. On the other hand, Webster et al., (1961) found that students at various colleges changed in the same direction on retests of personality measures, even though substantial mean score differences existed between the schools.

Differences in Test and Retest Conditions: In 1955, Ss were exposed to a more or less impersonal group experience, which, to many freshmen, may have been quite confusing, frightening, and anxiety-producing, features possibly reflected in their test scores. In 1959, the situation was much more personal and relaxed. In addition, the retest Ss had been promised information regarding their results, so that the degree of ego-involvement during the two testings may have differed considerably. The effect of the first few days of college on MMPI scores has been investigated by Stone and West (1956), who suggest that abnormally high or low scores are often a reflection of the specific test situation; however, the finding more relevant to the present study was that Ss who score in the normal range do not show significant differences on a retest (five month interval).

Despite the seemingly relaxed retest conditions, the 1959 Ss may have been subjected to a temporarily disrupting force in the form of impending graduation. Freedman (1956) has pointed out the unsettled situation of the college senior.

Number of Subjects: The relatively small number of Ss, especially females, also suggests that the results of the study be viewed with some caution. However, the general agreement between the findings of the present study and those of the Vassar investigation, plus the similarity, when it might have been anticipated, of the male and female data, and the difference, too, where it might also have been expected, all indicate that the small samples may not have been as crippling a weakness as might have been predicted. Replications, though, should certainly employ a considerably larger female N.

### Suggestions for Further Research

Despite the limitations, the present study seems to have demonstrated that rather meaningful findings can be obtained from a more or less molecular type of investigation. Further, studies such as this can help to answer questions raised by a Vassar-type approach. In the present study, no attempt was made to relate the types of changes with specific college experiences, nor can it be stated with any great certainty that these changes arise solely from a college, rather than maturational or other experimental influences. Investigation of personality development and changes is obviously more difficult because of their lack of availability. Such information seems necessary, however, if the role of the college in shaping personality is to be evaluated. The Vassar study investigated college alumni; perhaps testing of high school alumni could also be developed.

Within the college itself there are a number of factors which seem related to personality changes in students. Among these which a study similar to the present one might investigate are (a) types of peer group relations; (b) psychotherapy or counseling; (c) and choice of major (Webster, 1961).

The Vassar study suggested that personality changes in college students "are not linear from year to year but tend to take place quite early" (Freedman, 1961, p. 22). Testing of students at various stages of their college career would seem invaluable in clarifying this matter. A longitudinal design (i. e., retesting the same Ss at different times) seems more desirable than a cross-sectional approach. However, similar mean score differences between seniors and freshmen were found at Vassar College in some studies employing both longitudinal and cross-sectional samples (Webster et al., 1961).

Regarding the choice of instruments, those used in the present study appear quite promising. The EPPS seems especially useful because of the wide range of variables it purports to measure. However, much clarification is needed regarding the relative independence of those scales supposedly measuring the same or similar personality variables. The factor analysis of the IPIT is a step in this direction. In addition, it has already been suggested that more of the clinical scales of the MMPI be included in any replication. Further, some of the scales employed in the Vassar study, such as those described by Webster et al. (1961, pp. 31-33), and measuring such characteristics of social maturity, impulse expression, repression and suppression, etc., would appear to be of extreme value, especially if a direct comparison with the Vassar findings is desired.

In conclusion, a quotation from Webster et al., seems appropriate:

It is obvious that not enough is known about these [personality] changes or about how they are interrelated within the personality. But [it has been suggested] that research of this nature can produce much that is of scientific interest. At the same time there is every indication that continued research will increase our understanding of the educational process, to the advantage of higher education generally (1961, p. 52).

## SUMMARY

The present investigation concerned personality changes of college students based entirely upon objective personality test data. Previous research in this area had emphasized attitude formation and change, although a current interest in other areas of personality was noted.

The Edwards Personal Preference Schedule (EPPS), the Iowa Picture Interpretation Test (IPIT), and six MMPI-type scales were administered to a sample of 83 Michigan State University students in 1955 and in 1959. The results suggest that seniors, as opposed to freshmen, are more independent of others for guidance and emotional types of support. They are more sophisticated and self-confident, have greater achievement motivation, and seem to be less rigid in their functioning. They also appear to manifest fewer directly hostile tendencies. Males and females evidence few differences on the variables investigated; and much similarity was noted between the personality score shifts of the older and younger male sub-groups, suggesting that the changes were college-influenced and not solely a function of chronological age. In general, the findings were felt to be quite congruent with those of the recent Vassar College study.

Information was also reported concerning the stability of the various measures employed. The coefficients for the total group of Ss tended to be rather low (average test-retest r = .45) but with one exception were all significant at the 5% level.

The design of the investigation was appraised with respect to the influence of validity of the measures, the use of volunteer subjects, representativeness of the sample, differences in test-retest environmental circumstances, and number of subjects. Specific recommendations for future studies of the problem were also offered.



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## APPENDIX

## APPENDIX I

### NAMES AND DEFINITIONS OF THE TWENTY-FIVE PERSONALITY VARIABLES

#### Edwards Personal Preference Schedule:

1. ach Achievement: To do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. def Deference: To get suggestions from others, to find out what others think, to follow instructions and do what is expected, to praise others, to tell others that they have done a good job to accept the leadership of others, to read about great men, to conform to custom and avoid the unconventional, to let others make decisions.

3. ord Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details of work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

4. exh Exhibition: To say witty and clever things, to tell amusing jokes and stories, to talk about personal adventures and experiences, to have others notice and comment upon one's appearance, to say things just to see what effect it will have on others, to talk about personal achievements, to be the center of attention, to use words that others do not know the meaning of, to ask questions others cannot answer.

5. aut Autonomy: To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions, to feel free to do what one wants, to do things that are unconventional, to avoid situations where one is expected to conform, to do things without regard to what others may think, to criticize those in positions of authority, to avoid responsibilities and obligations.

6. aff Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7. int Intraception: To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to put one's self in another's place, to judge people by why they do things rather than by what they do, to analyze the behavior of others, to analyze the motives of others, to predict how others will act.

8. suc Succorance: To have others provide help when in trouble, to seek encouragement from others, to have others be kindly, to have others be sympathetic and understanding about personal problems, to receive a great deal of affection from others, to have others do favors cheerfully, to be helped by others when depressed, to have others feel sorry when one is sick, to have a fuss made over one when hurt.

9. dom Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

10. aba Abasement: To feel guilty when one does something wrong, to accept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel depressed by inability to handle situations, to feel timid in the presence of superiors, to feel inferior to others in most respects.

11. nur Nurturance: To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy, to forgive others, to do small favors for others, to be generous with others, to sympathize with others who are hurt or sick, to show a great deal of affection toward others, to have others confide in one about personal problems.

12. chg Change: To do new and different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the country and live in different places, to participate in new fads and fashions.

13. end Endurance: To keep at a job until it is finished, to complete any job undertaken, to work hard at a task, to keep at a puzzle or problem until it is solved, to work at a single job before taking on others, to stay

up late working in order to get a job done, to put in long hours of work without distraction, to stick at a problem even though it may seem as if no progress is being made, to avoid being interrupted while at work.

14. het Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to kiss those of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or to tell jokes involving sex, to become sexually excited.

15. agg Aggression: To attack contrary points of view, to tell others what one thinks about them, to criticize others publicly, to make fun of others, to tell others off when disagreeing with them, to get revenge for insults, to become angry, to blame others when things go wrong, to read newspaper accounts of violence.

(Edwards 1959, p. 11)

Iowa Picture Interpretation Test: (Hurley, 1955, pp. 372-373)

1. Achievement Imagery (AI): A person high in AI is one who by word or action habitually indicates a desire to compete successfully with a standard of excellence. He indicates by word or act that successful competition with certain groups or individuals, or high accomplishment in terms of social standards, would be accompanied by feelings of success; he attempts, or verbalizes an interest in attempting, some unique accomplishment that would imply personal success; or he indicates by word or action some long-term involvement of a sort that would imply anticipation of successful competition or goal achievement.

2. Insecurity (I): An insecure individual is one who by word or action indicates that he has failed or anticipates failure to attain a desired goal, named or implied. He verbalizes actual or anticipated personal experiences, feelings, or fears of deprivation or threat of deprivation of some positively valued goal, especially of a social nature, e.g., affection, esteem, security, etc. Individuals who respond to failure or anticipation of failure by aggressive acts or statements are specifically excluded from this category.

3. Blandness (B): A bland individual is one who habitually depersonalizes situations or events. He acts or speaks in a manner implying lack of personal involvement. His self-references and references to others are guarded or noncommittal with respect to the expression of feelings, moods, or motives.

4. Hostility (H): A hostile person is one who habitually verbalizes feelings of annoyance, anger, or resentment. He acts, or verbalizes intentions or desires to act, in a punitive, threatening, or injurious manner toward others.

Biographical Inventory:

1. Lie Scale (L): This scale, along with the K scale, is an example of the "validity" scales of the MMPI, designed to represent "checks on carelessness, misunderstanding, malingering, and the operation of special response sets and test-taking attitudes" (Anastasi, 1955, p. 550).

As Drake and Oetting define it,

The L score is based on answers to a group of items that tend to place the test subject in a good social and moral light. High scores on this scale are not common among college subjects probably because the items are rather naive and concern attitudes that are not felt to be particularly socially rewarding in the college culture (1959, p. 31).

2. K Scale:

The K scale was designed to improve the predictive validity of some of the original scales and is used as a correction of five of them. . . . K has been considered at times as a rather subtle indicator of defensiveness, and its theoretical basis as a correction scale would support this conclusion to a certain extent. The evidence for this has been rather sketchy, however, and a high K score may have a considerably different meaning. In the college group, at least, a slight elevation of K is very common and may even be a relatively good sign of general adjustment (Drake and Oetting, 1959, p. 32).

3. Psychopathic Deviate Scale (Pd): This scale

. . . was originally derived from the responses of a group judged to be psychopathic deviates. Such persons were often young, had a history of delinquency, and appeared to be uncontrolled by the ordinary mores of society. They also tended to have a fairly high level of intelligence and presented a superficially appealing personality. . . . There is, however, some indirect support of



the tendency for this scale to indicate an antagonism to authority when it appears in a male college student's profile.

Low codings . . . suggest a need for reassurance in counseling, possibly as a result of concern regarding the attitudes of other people. If this interpretation is correct, a low coding . . . would seem to be indicative of conformity with the mores of the social group (Drake and Oetting, 1959, p. 21).

4. Manifest Anxiety Scale (MA): This is a modification of the scale devised by Taylor (1953). As Erickson and Davids state

. . . it has been suggested that the Taylor scale is not so much a measure of anxiety as it is a measure of the way the Ss respond to, or handle, their anxiety. . . . From a clinical orientation, the presence of overt or manifest anxiety not only indicates that an S is anxious, but it also suggests the use of certain kinds of defenses. For example, intellectualizing or rationalizing defenses are considered to be associated with more overt anxiety indicators than are the avoidance defenses of the hysteric (p. 135).

5. Manifest Hostility (MH): Although no formal definition of this scale could be found, it would seem to measure of the presence of overt feelings of hostility, annoyance, or resentment.

6. Manifest Rigidity (MR): This is a scale devised by Wesley who defined Rigidity as follows:

A tendency to persist in responses that may previously have been suitable in some situations or other but that no longer appear adequate to achieve current goals or to solve current problems (1953, p. 129).

MULTIPLE-CHOICE PICTURE TEST

FORM 5 1954

Each of the pictures you will see is indicated in this booklet by a number.

Underneath each number there are four descriptions for that particular picture. You are to rank the four descriptions according to your idea of what the picture expresses.

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

Here is an example:

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

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

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

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

- AI 1. A. He is dreaming of the day when he will become a great musician. I B. He is afraid that he will never be able to play the violin well. B C. His violin is on the table and he is waiting for his music lesson. H D. He is angry at his mother because she makes him practice while he'd rather be outside playing.
- H 2. A. She feels only scorn for these people and their way of life. B B. She is looking for a nice quiet place where she can read and get a little relaxation. I C. She is rather sad because she doesn't fit in at school or on the farm. AI D. Her only ambition is to complete her education.
- I 3. A. He very much wants to stay with her but is afraid of other people's contempt. AI B. He is determined to fight for what he thinks is right and will win in the end. 14 C. He is disgusted with her and is trying to get away as quickly as he can. B D. He is a patient being helped to his bed.
- B 4. A. They are waiting for the taxi to take him to the station. H B. He has told her that he resents her prying into his affairs. AI C. He is telling her that he must leave home because opportunities are greater in the big city. I D. He is telling her that he has lost his job and has little hope of finding another.
5. A. The boy is determined to live up to the ideals and standards of this older man whom he greatly admires. B. The older man is telling about his childhood experiences. C. The father is telling his son that if he does not stop his wild ways, he will disown him. I D. The boy is distressed because he feels that he has let his father down.
6. A. The little girl has been left in the care of a governess and feels that she is less loved by her parents than other children. I B. The little girl is resentful because her mother insists upon drilling her over her homework. H C. The little girl is listening to a story about Florence Nightingale and is thinking of the time when she might achieve so much. AI D. The little girl listens while her mother reads her stories. B
7. A. He is remembering a part of the movie he has just seen. B B. He is dreaming of becoming a skilled and famous surgeon. AI C. He realizes that the operation is doomed to failure and he turns away. I D. He hates his cruel step-father and hopes he will not survive the operation. 14
8. A. He is thinking of ways of getting back at his father who won't let him leave the cabin. 14 B. He is wondering why he is so unpopular and no one comes over to play with him. I C. He is enjoying the warmth of the sunshine. B D. He wishes he could grow up to be like Abe Lincoln who was also born in a log cabin. AI

- I 9. A. Things have not worked out for him and he is wondering if life is worth living. H  
B 13 B. He is watching the plane passing overhead. B  
H 4 C. He is wondering how he can revenge himself on those who have wronged him. I  
AI AI D. He is thinking of great accomplishments. AI
- B 10. A. He is demonstrating the way to climb a rope. I  
H B. He is watching his hated rival and hopes he will fall. AI  
AI C. He is in a rope climbing contest and is exerting every effort to win. H  
I D. Although he has tried his best, he sees that the race is lost. B
- H 11. A. She despises this man who is forcing his attentions upon her. B  
AI B. He admires her for the success she has achieved in her career. H  
I C. She is sorry that she did not do more to make their marriage a happy one. AI  
B D. They are considering whether to buy this attractive table. I
- AI 12. A. He has resolved to do his best to live up to her expectations. AI  
I B. He has failed her in spite of her high hopes. B  
B C. They are at a party dancing to a Viennese waltz. H  
H D. Despite his pretense and show of affection, he secretly despises her. I
13. A. She is furious because the elevator is out of order and she must walk. H  
B. She is on her way to catch a train. B  
C. Although she is still looking for work in the big city, she has no real hope of success. I  
D. Viewing the magnificence of the structure, she is inspired to work harder toward her career. AI
14. A. She cannot succeed and is going to commit suicide. I  
B. She is waiting to go on stage in what will be her greatest theatrical triumph. AI  
C. She is trying to hide her laughter after playing a mean practical joke. H  
D. She is wiping a cinder out of her eye. B
15. A. She is just coming home from a walk. B  
B. This maid is planning revenge on her arrogant employers. H  
C. She is eager for everything to be in perfect order because her husband's boss is coming for dinner. AI  
D. She worries that her home is so shabby that it will make a poor impression. I
16. A. She is rushing to tell her sister they have won the contest. AI  
B. She has told her sister that she must hurry if she wants to meet her friends. B  
C. She feels only scorn for her sister and her wild ways. H  
D. She feels inferior to her sister who is everything that she had hoped to be. I

17. A. He feels that there is no use trying and will join this band of hobos. B. He despises these men for their irresponsible behavior. C. Watching the laborers, he dreams of the success that will put him far above such a life. D. The men are resting after lunch.
18. A. The girl is watching the men and waiting for her husband to finish work. B. Seeing her old waterfront neighborhood, she realizes how great her success has been. C. She wishes that she had more self-confidence but fears that she will never amount to much. D. She is furious at having been kept waiting so long.
19. A. He hates the people who have led him to this kind of life. B. He realizes now that he will never escape from the life he has been leading. C. He is tired and is leaving the party to get some sleep. D. He is determined to start anew and make something of himself.
20. A. She is explaining her despair of overcoming the limitations of her handicap. B. They are enacting a scene in a play. C. She has finally turned in fury on the woman who has so humiliated her. D. She is telling the other woman that despite her handicap she knows she will succeed.
21. A. He is thinking of how quiet the big city can become in the early morning. B. He is waiting in the dark to get back at his tormentors. C. He is sure that he will someday be one of the successful people living in this fashionable neighborhood. D. He feels that he will never be able to make the grade in the big city.
22. A. He is being awakened from a brief rest to resume work on his invention. B. The man is in despair because he can do nothing to help. C. He is waking up the other person from his sleep since it is day-break. D. His menacing gesture reveals his deep bitterness toward the sleeping man.
23. A. The old lady is envious and resentful of the younger woman. B. They are reminiscing about their years of happiness and success together. C. The old lady wishes that she had been able to help the younger woman when she needed it. D. They are watching the people pass on the street.
24. A. He has just successfully completed an extremely difficult and dangerous emergency operation. B. He has failed to save her life although he has tried his best. C. He is rubbing the sleep out of his eyes in an effort to keep awake. D. He is rejecting this woman because of his disgust for her and all that she stands for.

## BIOGRAPHICAL INVENTORY

(A, ES, H, K, L, Pd, and R Scales. 1956 Revision)

Do not write or mark on this booklet in any way. Your answers to the statements in this inventory are to be recorded only on the separate Answer Sheet.

Print your name, the date, the date of your birth, age, sex, etc., in the blanks provided on the Answer Sheet. Use only the special pencil provided for this test; this pencil must be used because the Answer Sheet will be checked by machine. If your special pencil runs out of lead, get another pencil from the Examiner. Do not use any other type of pencil. After you have completed this information, finish reading these instructions.

The statements in this booklet represent experiences, ways of doing things, or beliefs or preferences that are true of some people but are not true of others. You are to read each statement and decide whether or not it is true with respect to yourself. If it is true or mostly true, blacken the answer space in column T on the Answer Sheet in the row numbered the same as the statement you are answering. If the statement is not usually true or is not true at all, blacken the space in column F in the numbered row. You must answer the statement as carefully and honestly as you can. There are no correct or wrong answers. We are interested in the way you work and in the things you believe.

Remember: Mark the answer space in column T if the statement is true or mostly true; mark the answer space in column F if the statement is false or mostly false. Be sure the space you blacken is in the row numbered the same as the item you are answering. Use only the first two columns, the ones labeled T and F. Mark each item as you come to it; be sure to mark one, and only one, answer space for each item. Here is an example:

	<u>T</u>	<u>F</u>
I would like to be an artist.		

If you would like to be an artist, that is, if the statement is true as far as you are concerned, you would mark the answer space under T. If the statement is false, you would mark the space under F.

If you have any questions, please ask them now.

PLEASE DO NOT MARK ON THIS BOOKLET

- ( ) 114. At times I feel like swearing.
- ( ) 115. If I let people see the way I feel, I'd be considered a hard person to get along with.
- ( ) 116. It makes me nervous to have to wait.
- ( ) 117. At times I am all full of energy.
- ( ) 118. I like a great deal of variety in my work.
- ( ) 119. Criticism or scolding hurts me terribly.
- ( ) 120. At times I am so restless that I cannot sit in a chair for very long.
- ( ) 121. I have been quite independent and free from family rule.
- ( ) 122. I've met a lot of children who would benefit from a good spanking.
- ( ) 123. I am a methodical person in whatever I do.
- ( ) 124. Sometimes I become so excited that I find it hard to get to sleep.
- ( ) 125. There is very little love and companionship in my family as compared to other homes.
- ( ) 126. Once in a while I laugh at a dirty joke.
- ( ) 127. People generally demand respect for their own rights but are unwilling to respect the rights of others.
- ( ) 128. I have often felt that I faced so many difficulties I could not overcome them.
- ( ) 129. My parents have often objected to the kind of people I went around with.
- ( ) 130. I am usually able to keep at a job longer than most people.
- ( ) 131. I often think "I wish I were a child again."
132. At times I have been worried beyond reason about something that really did not matter. *M-7*
133. My relatives are nearly all in sympathy with me. *P-15*
134. I frequently revise my opinions of people in a downward direction. *M-14*
135. I do not always tell the truth. *L-1*
136. I do not have as many fears as my friends. *M-14*
137. I have been disappointed in love. *P-15*
138. I think it is usually wise to do things in a conventional way. *M-14*
139. It is generally a mistake to maintain a friendship with the same person over a long period of time. *M-14*
140. I have been afraid of things or people that I knew could not hurt me. *M-14*
141. My way of doing things is apt to be misunderstood by others. *P-15*
142. Often I can't understand why I have been so cross and grouchy. *K-1*
143. I always finish tasks I start, even if they are not very important. *M-14*
144. I certainly feel useless at times. *M-14*
145. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world." *M-14*
146. When you come right down to it, there are only a few people whom you are likely to find companionable. *M-14*
147. I gossip a little at times. *L-1*
148. I find it hard to keep my mind on a task or job. *M-14*
149. I am sure I am being talked about. *P-15*

1. I am often sick to my stomach.
- 4(F) 2. I do not tire quickly.
- (T) 3. Some people are so bossy that I feel like doing the opposite of what they request even though I know they are right.
- 2(T) 4. I am often the last one to give up trying to do a thing.
- (F) 5. My daily life is full of things that keep me interested.
- 4(F) 6. I am about as nervous as other people.
- 1, K(F) 7. I think a great many people exaggerate their misfortunes in order to gain sympathy and help of others.
- H(T) 8. I feel that I have often been punished without cause.
- 1(T) 9. At times I have very much wanted to leave home.
- 4(F) 10. I have very few headaches.
- R(T) 11. There is usually only one best way to solve most problems.
- (F) 12. I would rather win than lose in a game.
- V(F) 13. I have never been in trouble because of my sex behavior.
- 14(T) 14. I work under a great deal of strain.
- 14(T) 15. I tend to be on my guard with people who are somewhat more friendly than I expected.
- 14(T) 16. I prefer work that requires a great deal of attention to detail.
- 14(T) 17. No one seems to understand me.
18. I cannot keep my mind on one thing. MA(T)
19. I have had very peculiar and strange PD(F) experiences.
20. I am sure I get a raw deal out of MH(T), PD(F) life.
21. During one period when I was a PD(T) youngster I engaged in petty thievery.
22. I worry over money and business. MA(T), K(F)
23. I often become so wrapped up in something I am doing that I find it difficult to turn my attention to other matters. MR(T)
24. I do not like everyone I know. L(F)
25. I have diarrhea ("the runs") once a MA(T) month or more.
26. I frequently notice my hand shakes MA(T) when I try to do something.
27. I've noticed that I let a lot of unimportant things irritate me. MH(T)
28. I prefer doing one thing at a time to keeping several projects going. MR(T)
29. I have not lived the right kind of PD(T) life.
30. I blush as often as others. MA(F)
31. I think nearly anyone would tell a K(F) lie to keep out of trouble.
32. It takes me a long time to get over MH(T) being angry.
33. I have nightmares every few nights. MA(T)
34. I worry quite a bit over possible MA(T) troubles.



35. I dislike to change my plans in the midst of an undertaking. *MA(T)*
36. Once in a while I put off until tomorrow what I ought to do today. *PD(F), K(F)*
37. I am easily downed in an argument. *MA(T)*
38. I practically never blush. *PD(F)*
39. In my daydreams, I often get the better of someone else. *MA(F)*
40. I never miss going to church. *MR(T)*
41. I have used alcohol excessively. *L(F)*
42. I am often afraid that I am going to blush. *PD(T)*
43. I am against giving money to beggars. *PD(T)*
44. I have had quite a few quarrels with members of my family. *MA(T)*
45. My parents and family find more fault with me than they should. *MA(T)*
46. My hands and feet are usually warm enough. *MR(F)*
47. I would like a position which requires frequent changes from one kind of task to another. *PD(T)*
48. I like to know some important people because it makes me feel important. *MA(T)*
49. I have reason for feeling jealous of one or more members of my family. *K(F)*
50. I sweat very easily even on cool days. *MA(T)*
51. I am often tempted to go out of my way to win a point with someone who has opposed me. *MR(T)*
52. I usually maintain my own opinions even though many other people may have a different point of view. *L(F)*
53. These days I find it hard not to give up hope of amounting to something. *PD(T)*
54. When embarrassed I often break out in a sweat which is very annoying. *MA(T)*
55. I find it hard to make talk when I meet new people. *PD(F), K(F)*
56. Families are frequently a nuisance. *MA(T)*
57. I do not mind being made fun of. *PD(F)*
58. I do not often notice my heart pounding and I am seldom short of breath. *MA(F)*
59. I find it easy to stick to a certain schedule, once I have started on it. *MR(T)*
60. My table manners are not quite as good at home as when I am out in company. *L(F)*
61. I do many things which I regret afterwards (I regret things more or more often than others seem to). *PD(T)*
62. I feel hungry almost all the time. *MA(T)*
63. I feel mildly resentful much of the time. *MA(T)*
64. I believe women ought to have as much sexual freedom as men. *MR(F)*
65. My hardest battles are with myself. *PD(T)*
66. Often my bowels don't move for several days at a time. *MA(T)*
67. People often disappoint me. *K(F)*
68. I am irritated a great deal more than people are aware of. *MA(T)*
69. Much of the time I feel as if I have done something wrong or evil. *PD(T)*
70. I have a great deal of stomach trouble. *MA(T)*
71. I do not enjoy having to adapt myself to new and unusual situations. *MR(T)*
72. If I could get into a movie without paying and be sure I was not seen I would probably do it. *L(F)*
73. My family does not like the work I have chosen (or the work I intend to choose for my life work). *PD(T)*



- 9(r) 74. At times I lose sleep over worry.
- (r) 75. Something exasperates me almost every day.
- (r) 76. I prefer to stop and think before I act even on trifling matters.
- (r) 77. Someone has it in for me.
- (r) 78. My sleep is restless and disturbed.
- (r) 79. It makes me impatient to have people ask my advice or otherwise interrupt me when I am working on something important.
- (r) 80. It annoys me to be called lazy.
- (r) 81. In school I was sometimes sent to the principal for cutting up.
- (r) 82. I often dream about things I don't like to tell other people.
- (r) 83. I would not like the kind of work which involves a large number of different activities.
- (r) 84. I do not read every editorial in the newspaper every day.
- (r) 85. My sex life is satisfactory.
- (r) 86. I am easily embarrassed.
- (r) 87. I would rate myself as 'an impulsive individual.
- (r) 88. I try to follow a program of life based on duty.
- (r) 89. I know who is responsible for most of my troubles.
- (r) 90. My feelings are hurt easier than most people.
- (r) 91. It takes a lot of argument to convince most people of the truth.
- (r) 92. I often find myself worrying about something.
- (r) 93. I believe my home life is as pleasant as that of most people I know.
94. I have kept a careful diary over a *MR(r)* period of years.
95. I find it hard to set aside a task *K(F)* that I have undertaken, even for a short time.
96. I wish I could be as happy as others. *MR(r), Fd*
97. My conduct is largely controlled by *Pd(F)* the customs of those about me.
98. I deeply dislike one or more persons *MH(r)* whom I see almost every day.
99. My interests tend to change quickly. *MR(F)*
100. I am usually calm and not easily *MA(F)* upset.
101. I am neither gaining nor losing *Pd(F)* weight.
102. Sometimes when I am not feeling well *L(F)* I am cross.
103. Politics are nothing but self- *MH(r)* interest and graft.
104. I cry easily. *MA(r)*
105. I liked school. *Pd(F)*
106. I usually find that my own way of attacking a problem is best, even though it doesn't always seem to work in the beginning. *MR(r)*
107. It makes me uncomfortable to put on *Pd(F), K(F)* a stunt at a party even when others are doing the same sort of thing.
108. I feel anxious about something or *MA(r)* someone almost all of the time.
109. I wish I were not so shy. *Pd(F)*
110. Most people are honest entirely *MH(r)* through fear of being caught.
111. I dislike having to learn new ways *MR(r)* of doing things.
112. I am happy most of the time. *MA(F), Pd*
113. I like to talk about sex. *Pd(F)*



(F)

(F) 114. At times I feel like swearing.

(T) 115. If I let people see the way I feel, I'd be considered a hard person to get along with.

(T) 116. It makes me nervous to have to wait.

(F) 117. At times I am all full of energy.

(F) 118. I like a great deal of variety in my work.

(F) 119. Criticism or scolding hurts me terribly.

(T) 120. At times I am so restless that I cannot sit in a chair for very long.

(F) 121. I have been quite independent and free from family rule.

(T) 122. I've met a lot of children who would benefit from a good spanking.

(T) 123. I am a methodical person in whatever I do.

(T) 124. Sometimes I become so excited that I find it hard to get to sleep.

(T) 125. There is very little love and companionship in my family as compared to other homes.

(F) 126. Once in a while I laugh at a dirty joke.

(T) 127. People generally demand respect for their own rights but are unwilling to respect the rights of others.

(T) 128. I have often felt that I faced so many difficulties I could not overcome them.

(T) 129. My parents have often objected to the kind of people I went around with.

(T) 130. I am usually able to keep at a job longer than most people.

(F) 131. I often think "I wish I were a child again."

132. At times I have been worried beyond reason about something that really did not matter. *MA(T)*133. My relatives are nearly all in sympathy with me. *PD(F)*134. I frequently revise my opinions of people in a downward direction. *MH(T)*135. I do not always tell the truth. *L(F)*136. I do not have as many fears as my friends. *MA(F)*137. I have been disappointed in love. *PD(T)*138. I think it is usually wise to do things in a conventional way. *MR(T)*139. It is generally a mistake to maintain a friendship with the same person over a long period of time. *MH(T)*140. I have been afraid of things or people that I knew could not hurt me. *MA(T)*141. My way of doing things is apt to be misunderstood by others. *PD(T)*142. Often I can't understand why I have been so cross and grouchy. *K(F)*143. I always finish tasks I start, even if they are not very important. *MR(T)*144. I certainly feel useless at times. *MA(T), K(F)*145. Sometimes without any reason or even when things are going wrong I feel excitedly happy, "on top of the world." *MA(F), PD(F)*146. When you come right down to it, there are only a few people whom you are likely to find companionable. *MH(T)*147. I gossip a little at times. *L(F)*148. I find it hard to keep my mind on a task or job. *MA(T), PD*149. I am sure I am being talked about. *PD(T)*



- MR(T) 150. People who go about their work methodically are almost always the most successful.
- MH(T) 151. I often feel like a powder keg ready to explode.
- HA(T) 152. I am more self-conscious than most people.
- Y(F) 153. I am always disgusted with the law when a criminal is freed through the arguments of a smart lawyer.
- K(F) 154. At times I feel like smashing things.
- MR(T) 155. When I have undertaken a task, I find it difficult to set it aside, even for a short time.
- HA(T) 156. I am the kind of person who takes things hard.
- Y(F) 157. I have very few fears compared to my friends.
- MH(T) 158. No one cares much what happens to you.
- Y(F) 159. Once in a while I think of things too bad to talk about.
- HA(T) 160. I am a very nervous person.
- MH(T) 161. Sometimes I feel as if I must injure either myself or someone else.
- MR(T) 162. I often find myself thinking of the same tune or phrase for days at a time.
- MH(T) 163. I am often said to be hot-headed.
- HA(T) 164. Life is often a strain for me.
- Y(F) 165. If people had not had it in for me I would have been much more successful.
- K(F) 166. At periods my mind seems to work more slowly than usual.
- MR(T) 167. I have a work and study schedule which I follow carefully.
168. At times I think I am no good at all. MA(T)
169. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose. MH(T), K(F)
170. Sometimes at elections I vote for men about whom I know very little. L(F)
171. I am not at all confident of myself. MA(T)
172. I usually check more than once to be sure that I have locked a door, put out the light, or something of the sort. MR(T)
173. I easily become impatient with people. MH(T)
174. At times I feel that I am going to crack up. MA(T)
175. I have often met people who were supposed to be experts who were no better than I. K(F)
176. I have never done anything dangerous for the thrill of it. MR(T)
177. I don't like to face a difficulty or make an important decision. MA(T)
178. I have often found people jealous of my good ideas just because they had not thought of them first. MH(T)
179. It is always a good thing to be frank. MR(T)
180. I am very confident of myself. MA(F)
181. What others think of me does not bother me. PL(F), K(F)
182. I think a great many people exaggerate their misfortunes to get the sympathy and help of others. MH(T)
183. I have a habit of collecting various kinds of objects. MR(T)
184. There seems to be a lump in my throat much of the time. MA(T)

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- (F) 185. I have never felt better in my life than I do now.
- (T), K(F) 186. I like to let people know where I stand on things.
- (A(T) 187. Several times a week I feel as if something dreadful is about to happen.
- R(F) 188. I have done a good many things on the spur of the moment.
- (F), H(F) 189. When in a group of people I have trouble thinking of the right things to talk about.
- H(T) 190. Almost every day something happens to frighten me.
- H(T) 191. Some of my family have habits that bother and annoy me very much.
- R(T) 192. I believe that promptness is a very important personality characteristic.
- (F) 193. I get mad easily and get over it soon.
- H(T) 194. I am afraid of finding myself in a closet or small closed space.
- H(T) 195. I do not try to cover up my poor opinion or pity of a person so that he won't know how I feel.
- R(F) 196. My interests change very quickly.
- H(T) 197. I have often been frightened in the middle of the night.
- (F) 198. I have periods in which I feel unusually cheerful without any special reason.
- H(T) 199. I commonly wonder what hidden reason another person may have for doing something nice for me.
- H(T) 200. I am troubled by discomfort in the pit of my stomach every few days or oftener.
- R(T) 201. It is the slow, steady worker who usually accomplishes the most in the end.
202. At times my thoughts have raced *PJ(F), K(F)* ahead faster than I could speak them.
203. I am easily awakened by noise. *MA(T)*
204. I like to poke fun at people. *MH(T)*
205. I am always careful about my manner *MR(T)* of dress.
206. I am worried about sex matters. *MA(T)*
207. There are certain people I dislike so much that I am inwardly pleased *MH(T)* when they are catching it for something they've done.
208. I usually dislike to set aside a task that I have undertaken until it *MR(T)* is finished.
209. I get anxious and upset when I have to make a short trip away from home. *MA(T)*
210. I am inclined to go from one activity to another without continuing with *MR(F)* any one for too long a time.
211. It is safer to trust nobody. *MH(T)*
212. I feel uneasy indoors. *MA(T)*
213. I prefer to do things according to a routine which I plan myself. *MA(T)*
214. Horses that don't pull ought to be *MH(T)* beaten or kicked.
215. The future is too uncertain for a person to make serious plans. *MA(T)*
216. I always put on and take off my clothes in the same order. *MR(T)*
217. Sometimes I enjoy hurting persons I *MH(T)* love.
218. I am often afraid of the dark. *MA(T)*

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