

A STUDY OF INTELLECTUAL AND
PERSONALITY CHARACTERISTICS
OF MEDICAL STUDENTS

by

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A STUDY OF INTELLECTUAL AND
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INTRODUCTION

Occupations in general and the professions in particular have come to be recognized as one of the more significant focal points in the organization of our society. A great share of men's waking hours is devoted to their occupational activities; men's aspirations, interests, and sentiments are largely organized around their occupations. Particularly in the professions, one of the major formative forces in creating and fixing these aspirations and interests is the professional school. Yet, there is little systematic knowledge about the sociological and psychological nature of men in the different occupations and professions, the nature of their interactions with their environment, or the influence of their educational experiences upon them (Merton, 1957, p. 36).

Medical students are engaged in learning the professional role of the physician by combining their past experiences and personal characteristics with the knowledge, skills, values, and attitudes of the profession. The result is a physician who has the motivation and ability to perform his role in a professionally and socially acceptable manner. It would seem of particular value to attend systematically to the less conspicuous and more easily neglected processes and characteristics of the medical students and of their environment, as they are in their formative stage. Such an undertaking has taken many channels. Some

have studied the learning processes going on in medical schools (Comroe & Berry, 1954; Gee & Richmond, 1959; Jackson, 1955; Jackson, 1956; Merton, 1957). Some have analyzed the faculty structure of our colleges and graduate schools (Caplow & McGee, 1958; Lazarsfeld & Thielens, 1958). Others have scrutinized the role of the student in medical school and his attitudes toward it (Becker, Geer, Hughes, & Strauss, 1961). Finally, some have studied the nature of the individual being taught in medical school (Gee & Cowles, 1957; Gee & Glaser, 1958). There are innumerable articles appearing today in the Journal of Medical Education and in other professional and lay periodicals concerned with many aspects of medical education.

Until recently, with the appearance of some of the studies mentioned above, the great majority of articles have been concerned with the identification of those qualities of medical school applicants which have predictive value in relation to academic success (Merton, 1957). Gottheil and Michael (1957) have reviewed 95 such articles dealing with methods used to predict medical school success--intelligence tests, aptitude tests, interviews, interest tests, personality tests, biographical variables, and past grades. The general method used in these studies is to measure the qualities of prospective medical students by the use of one or more standardized tests (or one specially constructed for the particular study). Then correlations are computed between these measures and measures of subsequent academic performance in medical school.

However, there has been an increasing concern by many (Eron, 1955; Gee & Cowles, 1957; Gee, 1959; Gottheil & Michael, 1957; Merton, 1957) that academic ability and proper motivation for academic achievement in

medical school are not enough. What is a "good" physician or a "good" medical student? The ideal medical student might be described as "intellectually gifted, physically strong, and emotionally stable--one who is also personable, service-oriented, and broadly educated--a person of transparent integrity whose motivation for the study of medicine is both keen and self-inspired" (Geithaal, 1962). How close does the average medical student come to these high standards? How much individual variability is there among medical students in terms of ability, interests, personalities, and motivations? How many are really guided by "humanitarian" motives? Is there a distinct association between personality, the requirements of a profession, and the choice of a particular field of study?

Many people have been concerned with these questions. A result has been a series of national teaching institutes, sponsored by the Association of American Medical Colleges, two of which were concerned with a description and evaluation of modern medical students--their abilities, their attitudes, their interests, their problems, and their backgrounds (Gee & Cowles, 1957; Gee & Glaser, 1958). At these institutes there was general agreement that a certain minimum of intellectual ability was necessary for completion of the studies required in medical schools. There was also general agreement that the intellectual capacities of the students could be measured quite accurately and reliably by the use of the Medical College Admission Test and by intelligence tests. There was much less agreement on how best to measure the nonintellectual factors, or even which of these factors are the most important, despite the fact that in the year 1956 medical school admissions committees viewed

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"character and integrity" as being of more importance than intellectual ability, with emotional and personality characteristics only slightly behind (Ceithaml, 1957). Actually, relatively little data on the intellectual and personality characteristics of medical students were presented at these institutes. Much of the discussion centered on methodology and on inferences gained from studies made of non-medical student groups (Gee & Cowles, 1957; Gee and Glaser, 1958). Evidently few investigators have studied the intellectual and personality characteristics of a given group of medical students in a comprehensive, systematic manner, with the possible exception of Gee (1959). Even in Gee's study the measure of intelligence used (Medical College Admission Test) is more a measure of "achievement" than of "intelligence."

In many of the studies conducted in an attempt to describe the characteristics of medical students, certain common shortcomings are evident.

1. Many, if not most, studies done in this area are only tangentially concerned with the description of either the average medical student or the variation among medical students. Most have the ulterior motive of improving medical school selection procedures (Gottheil & Michael, 1957; Merton, 1957).

2. Two investigators rarely use the same assessment instrument to measure the same thing. In the review by Gottheil and Michael (1957) findings are scattered over 14 different intelligence tests, 3 different interest tests, 12 personality inventories, and many other techniques, some well standardized and validated, others new with yet-to-be-proven validity. The semantic problem alone becomes extremely complex. One variable may have several names; several variables may have the same name.

3. In most studies use is made of only one or two instruments, measuring only a small part of the total makeup of that particular sample of medical students.

4. Samples are often of inadequate size, or of a composition not characteristic of the population from which the subjects are drawn. Some reports are based on as few as six students (Stern, Stein, & Bloom, 1956). In others no attempt is made to compare the composition of their samples with the composition of the entire class, student body, or other referent population on such variables as age, marital status, or academic standing.

5. A control group is rarely employed. In the exceptional case, when a control group is used, such variables as sex, age, and marital status are not held constant; e.g., comparing medical students to student nurses (Eron, 1955). Associated with this shortcoming is the problem of a reference point from which to interpret findings. For example, the amount of apparent similarity between a surgeon and a pediatrician depends on one's perspective, on his reference point. If they are compared to physicians in general, they will differ in many ways. On the other hand, if they are compared to a random sample of men in our society, their differences will be submerged in the common characteristics of physicians.

6. Rarely are suggestive initial findings cross-validated on other samples from the same school. Particularly when multiple analyses are done, there is a fairly high probability that apparent findings may be due only to chance variation. Cross-validation is essential to determine which differences represent stable differences and which represent chance fluctuation.

The current study is an attempt to describe in breadth the intellectual and personality characteristics of a known population of medical students. As will be discussed in the Method section, the methodology of the present study was designed to correct some of the deficiencies of such studies as have just been described.

Certain broad expectations were present at the start of this study. For example, medical students should show a basic common pattern; i.e., a relative homogeneity of both intellectual and personality characteristics. At the same time, these characteristics should differentiate medical students from other young men of the same age. In addition, a considerable degree of individual variability among the medical students could be expected, meeting the multitude of actual positions open in medicine (Gee, 1959; Stern & Scanlon, 1958).

In an extensive study of this nature the interaction of variables becomes very complex. To make this paper more meaningful, the findings of this study have been arbitrarily divided into types of characteristics studied; i.e., intelligence, interests, etc. A review of the pertinent literature, as well as its discussion in relation to the findings presented, has also been compartmentalized in the same manner, just as others have found necessary when studying such a variety of variables (Gee, 1959). A final synthesis and over-view will follow the presentation of all findings.

SUBJECTS

With these broad goals and expectations in mind, 80 male medical students, 40 from each of two successive classes (1961 and 1962) at the University of Oregon Medical School were given a battery of objective psychological tests. The 40 students from the Class of 1962 can be considered to be a cross-validation sample for the Class of 1961. Thus, a direct examination of the reliability of findings on the Class of 1961 was possible.

Of the Class of 1961, half were examined at the completion of their second year.¹ The other half of these same class were examined within three months of graduation, at the end of their fourth year. Statistical analysis revealed no real differences between these two sub-samples of the Class of 1961.

The Class of 1962 was examined during the summer following their third year of medical school.

Because of the small number of female medical students in each class (4 in the Class of 1961; 2 in the Class of 1962), no women were included in either of the samples studied. Five-year students, students electing to take an extra year in research, (11 in the Class of 1961 sample, 8 in the Class of 1962 sample) were included with the class with which they started medical school, since they were associated academically and socially with that class for most of their time in medical school.

The sample from the Class of 1961 did not differ significantly from

¹The half of the Class of 1961 sample which was examined near the completion of their second year were examined by a staff psychologist at the medical school as part of another study. The other half of this class sample and all of the sample from the Class of 1962 were examined by Delbert M. Kole, a medical student and concurrent graduate student in psychology. These subjects consisted of essentially all medical students who were within 400 miles of Portland during the summer when data was being collected. Only four students refused to participate.

Extensive analysis revealed the following: (a) there were no significant differences on any of the variables examined in this study between the 20 medical students examined by the staff psychologist and the 60 students examined by the medical-graduate student; (b) in both the 1961 and 1962 classes, the 40 students were a representative sample of their total respective classes in terms of age, marital status, grade point average, etc.

the sample from the Class of 1962 on such possible confounding variables as age, marital status, or number of years of medical school at the time of examination. Mean age for the sample from the Class of 1961 was 26.6; for the sample from the Class of 1962 it was 25.6. On the average, both groups had completed their third year of medical school. Twenty-four of the 40 students from the Class of 1961 and 31 of the students from the Class of 1962 were married at the time of examination. None of these differences was significant. Thus, the manner of sampling prevented bias between cross-validation samples on the basis of age, marital status, or educational experience.

As shown in Table 1, the entire classes from which these samples were drawn were contrasted with each other on these and other possibly pertinent background variables. As shown, there was no difference between total classes in respect to size at start of medical school or at the time of examination for this study, in number of students married at the start of medical school and at the time of this study, or in the number of students entering the five-year program. The samples examined were found to be characteristic of their classes as a whole at the time of examination on age and marital status. In addition, the samples were large enough, relative to the size of the classes, (about 55 percent in each class) to make a scholastic bias unlikely. Samples were selected by examining nearly everyone available in the area during the summer months that this study was under way.

Since the description of the intellectual and personality characteristics of medical students depends on the reference point, at least one comparison group is needed to give perspective to the findings.

In a pilot phase of this study, enlisted men and noncommissioned officers at a nearby Air Force base were examined with the hope that they might serve as an appropriate control, or reference, group. However, it turned out that this group was not available for a period of time long enough to complete all of the assessment procedures, and so was discarded for use as a possible control group in the study proper.

Table 1

Background Variable	Frequency	
	1961	1962
No. starting each class	73	80
No. at end of this study	71	71
No. married at admission	26	23
No. married at end of this study	52	57
No. women at start in each class	4	2
No. entering 5-year program	11	11

A group of civil service applicants, a group of young men of about the same age as the Air Force group, was substituted as a control group for the medical students. At about the time the present study was getting under way, applicants for the civil service positions of policeman and of fireman began to be examined in the Department of Medical Psychology at the University of Oregon Medical School in conjunction with research then being undertaken by that department. These subjects were made available for the present investigation.

Thus, the control group consists of 80 civil service applicants. 40 were applying for jobs as policemen. Another 40, applying for jobs as firemen, may be considered to be a cross-validation sample for the police applicants. Subjects were selected by the use of random numbers

from 60 police and 42 fireman applicants then undergoing selection and research procedures in the Department of Medical Psychology. These 80 civil service applicants were pre-screened by a physical examination, a security check, and a personal interview by the Civil Service staff--procedures roughly comparable to those required for admission to medical school.

As additional referrent or control groups for the medical students, published norms for male college students and other medical student samples were used whenever possible.

Mean age for all 80 medical students was 26.1, compared to 25.5 for the civil service applicants. The age range was 22 to 35 for the medical students, 22 to 33 for the civil service applicants. 69 percent of the medical students and 74 percent of the civil service applicants were married at the time of examination. Neither of these differences were statistically significant. Mean years of education was 12.7 for the civil service applicants as compared to a mean of about 19 years for the medical students, a difference which is highly significant (p of .001). As is well known, this is one characteristic that differentiates medical students from most men of the same age.

The police applicants did not differ significantly from the fireman applicants on age (means of 26.0 and 25.0, respectively), education (means of 12.7 years and 12.8 years, respectively), or marital status (77.5% and 70.0% married, respectively).

In summary, we had two groups--medical students and civil service applicants--of young adult males of the same age and marital status but with widely different educational attainments and present occupational

goals. We also had comparable and representative cross-validation samples for both the medical students and the control group of civil service applicants. One group, the civil service applicants, were taking the examinations as part of an application for a job. The other group, the medical students, took identically the same test battery after having been admitted to medical school.

METHOD

As previously described, other studies of medical students have typically been piece-meal, often with examination being made of only single aspects of the characteristics of medical students (Gottlieb & Michael, 1957). The purpose of this investigation was to combine in one study an examination of many aspects of the intellectual and personality characteristics of the same individual medical students.

To do this, a broad battery of standard objective psychological tests was selected to measure the intelligence, emotional adjustment, reported physical health, personality traits or needs, and interests of the medical students and their civil service applicant controls.

An attempt was made to select the most promising instrument in each area of measurement by referring to authorities in the area of assessment of individual characteristics (Buros, 1959; Cronbach, 1960). If no one test appeared to be outstanding in its area, those tests were used on which there had been important research related to the present investigation.

The following tests were selected for use.

1. The Wechsler Adult Intelligence Scale (WAIS). This instrument is the most widely used and best standardized test available for the measurement of general mental ability in adults (Quartin, 1959; Quartin, Rabin, Frank, & Laski, 1962). The WAIS is arranged into eleven subtests of various types. Six (Information, Comprehension, Digit Span, Similarities, Arithmetic, and Vocabulary) are included in a Verbal I.Q. scale.

Five (Picture Arrangement, Picture Completion, Block Design, Object Assembly, and Digit Symbol) are included in a visual-motor Performance I.Q. scale. All eleven subtests are included in computing the Full Scale I.Q. Test-retest reliability coefficients range from .90 to .97 for the Full Scale I.Q., and from .84 to .96 for the Verbal and Performance I.Q. scores (Wechsler, 1955; Wechsler, 1958).

2. The Cornell Medical Index. This is a 195-item self-report questionnaire designed to obtain a standardized medical-psychiatric history. It covers by body systems bodily symptoms, past illnesses, family history, habits, and mood and feeling patterns. The authors of the Cornell have found that the presence of a large number of positive replies (symptoms) scattered throughout the medical and psychiatric sections is indicative of psychiatric disturbance (Brodsan, Erdmann, & Wolff, 1956).

3. The Taylor Manifest Anxiety Scale. This is a 50-item self-report questionnaire covering both psychological and physiological symptoms of anxiety. Test-retest reliability is .81 to .89, depending on the time interval (Taylor, 1953). The Taylor scale has been shown to differentiate medical patients from psychiatric patients (J.D. Matarazzo, Guze, & R.G. Matarazzo, 1955; R.G. Matarazzo, J.D. Matarazzo, & Saslow, 1961). The ability of the Taylor scale to differentiate the emotionally maladjusted from those not emotionally disturbed is not surprising since anxiety is one of the major symptoms of psychiatric disorders.

4. The Saslow Psychosomatic Screening Inventory. This 46-item instrument requires the subject to check the number of psychological and physiological symptoms which he experiences in situations where anger and aggression or anxiety and discouragement are provoked. The number of

such reactions has been shown to differentiate psychiatric patients from "normals" (Saslow, Counts, & DuBois, 1951; Uleser & Ulett, 1952).

5. The Strong Vocational Interest Blank for Men. This 400-item test is the outstanding empirically scored interest inventory (Cronbach, 1960). The interests of the subject are compared to those of successful members of 45 different occupations. In addition, scales are available to measure Interest Maturity, Occupational Level, and Masculinity-Femininity. Scales were constructed by weighting the differences in the way successful members of a particular occupation (the criterion group) respond to the 400 items, compared to the responses of a group of men-in-general. The subject is required to mark whether he likes, dislikes, or is indifferent to the object or activity in each item. Items cover a variety of vocational and avocational activities (Strong, 1943).

The Strong is unusually reliable. Using the "odd-even" technique, the mean coefficient of reliability is .88 with over one-third of the scales having coefficients of .90 or higher (Strong, 1943). The interest profiles of a group of college students from 1927 to 1930 correlated .72 to .75 with the interest profiles of these same individuals in 1949, about 20 years later (Strong, 1951b).

6. The Edwards Personal Preference Schedule. This is a forced-choice personality test consisting of 210 item-pairs. It is based on Murray's (1938) system of manifest personality needs. One of the advantages of this test over most previous personality inventories is that the subject is not asked merely to mark whether a statement is characteristic of himself or not. It has been shown that, in such situations, people tend to put themselves in their best light, to respond

the way that is "socially desirable," rather than the way the item really describes the person (Edwards, 1953). In the construction of this test Edwards first found the social desirability of each item alone. He then paired items with the same measured social desirability so that the subject had to choose one item or the other of each pair as being most descriptive of himself. At the same time, the two items in each pair represented different personality needs and were counted on different scales. A copy of this test is included in Appendix 1. A breakdown of this test for the convenience of the reader is included in Appendix 2. As shown in Appendix 2, there are 15 personality subscales in this test, each measuring a different personality need. Each scale is intended to measure individual variability in common traits (or personality needs) in normal individuals. Each scale contains 9 items. The relevance of these items will be discussed later.

A brief definition of each of the Edwards scales follows:

1. Achievement--to be successful, to do one's best.
2. Deference--to accept the leadership and suggestions of others.
3. Order--to be neat, orderly, and well organized.
4. Exhibition--to be the center of attention.
5. Autonomy--to be independent and unconventional.
6. Affiliation--to cultivate friendships, to do things in groups.
7. Intropection--to be interested in the feelings of others.
8. Succorance--to be dependent on others for emotional support.
9. Dominance--to dominate, to be the leader of groups.
10. Abasement--to feel timid, guilty, or inferior.
11. Nurturance--to help others in trouble.

12. Change--to try new and different things.
13. Endurance--to stick with difficult tasks until completed.
14. Heterosexuality--to be interested in the opposite sex.
15. Aggression--to be assertive, aggressive, or hostile toward others.

In addition to these regular scales, 15 item-pairs are repeated to give an estimate of the individual's Consistency in taking the test.

Raw scores may be converted to standard (T) scores for male college students to compare the results with a norm group.

Test-retest reliability coefficients, with a one-week interval between administrations, range from .74 to .88 on the various scales (Edwards, 1959).

Each of the 80 medical students and the 80 civil service applicants took the entire test battery described above. An analysis of differences between the medical students and the civil service applicants (the experimental and the control groups), between the two classes of medical students (cross-validation samples for the medical students), and between the police and fireman applicants (cross-validation samples for the civil service applicants) was done on each variable. In addition, the experimental and control groups were compared to published norms, or to the findings of other investigators whenever relevant and whenever possible.

Each of the 160 subjects in this study was examined individually on the entire battery of psychological assessment instruments. The total time of examination per individual averaged between 3 and 4 hours.

In essence then, the design of this study permits the following:

1. a study of the intellectual and personality characteristics of one class of medical students (the Class of 1961);
2. the cross-validation of findings with this group of medical students on a second class of medical students (the Class of 1962);
3. a comparison of these two samples, constituting the experimental group, with a group of 80 civil service applicants (the control group) of the same age, marital status, and sex as the medical students;
4. a study of the characteristics of civil service applicants; the findings on half of this group, the 40 police applicants, could be cross-validated by the results of the 40 fireman applicants, the other half of the civil service applicants.

RESULTS

A. Intelligence.

As expected, the I.Q. scores of the medical students, as measured by the Full Scale WAIS, were found to fall in the "bright-normal" to "very superior" ranges. As shown in Table 2, the mean I.Q. of the 80 medical students was 126.18 with a standard deviation of 6.32. This is comparable to a median of 127 for medical students reported by Wolfle (1957), although he did not cite the source of his finding. The average I.Q. of 126 is also exactly the same as that found (although unpublished) for medical students coming to the Student Health Services of three different medical schools.¹ The average medical student in the present study (Table 2), with an I.Q. of 126, has an I.Q. higher than 96 percent of the population; i.e., he scores in the upper 4 percent of all persons of his age.

The total range of I.Q. scores among the medical students was from 111 to 149. Excluding the highest individual at 149 and the lowest individual at 111, the range was 116 to 138 on the Full Scale WAIS, placing the medical students in the top 14 percent of all men their age; i.e., higher than 86 percent of all people their age. Even the student with an I.Q. of 111 scored higher than 77 percent of the population.

That the distribution of I.Q. scores found for this group of medical

1. J.D. Matarazzo, Ph.D., Personal Communication. January, 1962.

students is a reliable finding can be deduced from the fact that the same level of intelligence was found in the two classes of Oregon Medical School students. Mean Full Scale I.Q. for the Class of 1961 was 126.35, compared to a mean of 126.00 for the Class of 1962. In addition, no significant differences were found between these two classes on Verbal (means of 130.13 for the Class of 1961, and of 127.88 for the Class of 1962) or Performance (means of 118.18 for the Class of 1961, and of 120.03 for the Class of 1962) I.Q. scores.

The reliability of these findings is further substantiated by the marked similarity between the above findings and the I.Q. scores of psychiatry residents at the Mamminger Foundation (Holt & Luborsky, 1958). The psychiatry residents had a mean Full Scale Wechsler I.Q. of 128 with a range from 110 to 145. In addition, these residents in psychiatry scored higher on the verbal subtests than on the performance subtests of the Wechsler. The average Verbal I.Q. was 131, with a range from 115 to 145. Performance I.Q. scores were not given. Both means and ranges, then were nearly identical to those of the medical students in the present study.

With this range for the medical students, restricted as it is to the upper 14 percent of all persons their age, it is not surprising, though possibly contrary to the beliefs of some faculty and most students, that there are probably no demonstrable differences in I.Q. between the students who rank at the top of their class and those at the bottom of the same class. In an earlier study at the University of Oregon Medical School, the mean I.Q. of the top ten students in a given class was 127, while that of the bottom ten men in the same class was

125 (J.D. Matarazzo, 1962).

Table 2

WAIS I.Q. Scores of 80 Medical Students and 80 Civil Service Applicants				
	Medical Students	Civil Service	F-test	p Level
Full Scale I.Q.				
Mean	126.18	113.09	152.24	.001
S.D.	6.32	7.06		
Range	111 to 149	86 to 131		
Verbal I.Q.				
Mean	129.00	112.85	160.51	.001
S.D.	7.13	8.95		
Range	115 to 149	88 to 130		
Performance I.Q.				
Mean	119.10	111.69	35.45	.001
S.D.	8.09	7.62		
Range	101 to 142	86 to 128		

Returning to the present study, Table 2 also contains the I.Q. scores of the 80 civil service applicant controls. As shown, this group earned a mean Full Scale I.Q. of 113.09, with a standard deviation of 7.06. The average civil service applicant, with an I.Q. of 113, earns a score above that of 81 percent of people of his age, in contrast to the average medical student who scores above 96 percent of people of the same age.

The mean I.Q. of these civil service applicants (113) compares quite closely to the mean I.Q. for college freshmen of 116.5 (87th percentile) reported by Plant and Richardson (1958), or to 115 (84th percentile) reported by Cronbach (1960), also for college freshmen. This is not surprising since 40 percent of these civil service applicants have had at

least one year of college.

Excluding one very low subject with an I.Q. of 86, the range in Full Scale I.Q. for the civil service applicants was from 100 to 131. This range places these men in the "average" to "superior" ranges (from the 50th to the 98th percentiles for people of their age).

One may accept the distribution of I.Q. scores (ranging in the upper 50 percent of the population) of the civil service applicants as a reliable finding, since the police applicants did not differ significantly from the fireman applicants in Full Scale I.Q. (means of 113.15 and of 113.03, respectively), in Verbal I.Q. (means of 113.55 and of 112.15, respectively), or in Performance I.Q. (means of 110.88 and of 112.50, respectively).

Table 2 shows that the differences between the medical students and the civil service applicants in I.Q. level were significant well beyond the .001 level of confidence for the Full Scale I.Q., Verbal I.Q., and Performance I.Q. In order better to visualize the extent of the differences in Full Scale I.Q. between the 80 medical students and the 80 civil service applicants of the same age group, each of the 160 individuals' I.Q. scores have been graphed in Figure 1. In this figure, and in each of the following figures, each individual's score is represented by a square at the appropriate level. Also, Figure 1 presents Median I.Q. for both groups, and not Mean I.Q. as shown in Table 2.

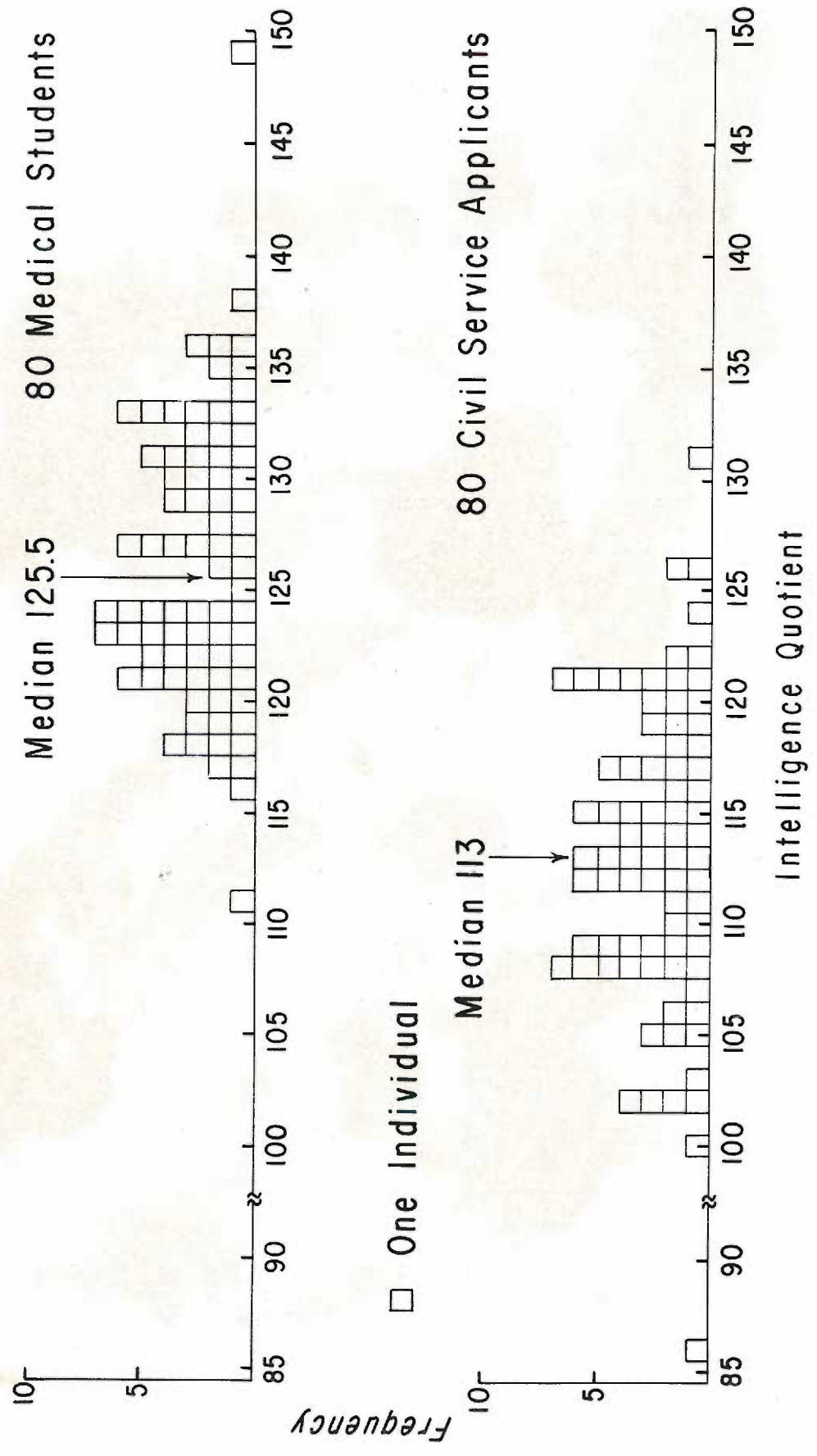
From Table 2 and from Figure 1 the following conclusions seem warranted:

1. both medical students and civil service applicants are above average in intelligence;

FIGURE 1.

I.Q.: Full Scale WAIS for 80 Medical Students and
for 80 Civil Service Applicants

I.Q.: FULL SCALE WAIS FOR 80 MEDICAL STUDENTS AND FOR 80 CIVIL SERVICE APPLICANTS



2. there are fairly wide individual differences among the medical students (range from 111 to 149) and among civil service applicants (range from 86 to 131) in I.Q. scores;

3. despite the existence of this individual variability in each of these two groups, there is little overlap in I.Q. between the medical students and the civil service applicant controls (only 3 of the 80 civil service applicants scored higher than the median medical student);

4. the difference between Verbal and Performance I.Q. scores is greater for the medical students (difference of 9.90) than for the civil service applicants (difference of 1.16).

As shown by Wechsler (1958), the average person in our society earns a Verbal I.Q. about equal to his own earned Performance I.Q. on the WAIS. However, Table 2 shows that the medical students earned a mean Verbal I.Q. of 129.00 and a mean Performance I.Q. of 119.10, a 9.90 point difference (p of .001). On the other hand, the difference between the mean Verbal (112.85) and the mean Performance (111.69) I.Q. scores of the civil service applicants was only 1.16 points. A Verbal I.Q. relatively higher than the Performance I.Q., similar to that found with the medical students, has been reported by Balinsky and Shaw (1956) for a high-ability managerial group. One may wonder whether these differences are due to the continual use of and familiarity with verbal activities by the medical students and the managerial group (but not by the civil service applicants), to a relative inability of the Performance subscales to measure higher levels of intelligence, to some concurrent nonintellectual variable of these specific groups, or to a combination of these factors.

Since Table 2 and Figure 1 have demonstrated a very clear-cut and highly significant difference between the medical students and their civil service applicant controls on overall I.Q., the possible effect of this potentially contaminating factor on all other analyses (personality needs, interests, etc.) has to be evaluated. This was done, as will be shown, by analysis of covariance.

B. Emotional Adjustment.

Much has been written concerning the stresses of medical school upon the student (Darley, 1953; Glaser, 1956; Hill, 1956; Saslow, 1956). Under such circumstances, one might expect a certain degree of manifest anxiety and a certain number of psychosomatic reactions (palpitations, headaches, panicky feelings, etc.), probably increased before major examinations. Saslow (1956), acting as a psychiatric consultant to a student health service in a medical school, found that 20 percent of the students seen by him in this capacity had anxiety reactions, including hypochondriacal preoccupations. (About one-third of the hypochondriacal student referrals were apparently precipitated in the second year at the time of the anatomical pathology course.) Anxiety reactions caused medical students to need the aid of the psychiatric consultant more than any other single reason.

Several questions can be raised by the findings of these writers. Are medical students more anxious than other groups of apparently normal people? Do they really have more psychosomatic reactions than other groups of men of the same age? Or, more properly, do they report more such physiological and psychological symptoms than do other presumably normal groups? If medical students have many such symptoms, is this a short-term situational reaction, or is this a long-term pattern of these individuals? How do medical students compare on these parameters with people whom one might expect to have many such manifestations; e.g., psychiatric patients? Is the medical student's emotional adjustment related to his intelligence? Does the student who has the most manifest anxiety also have the greatest number of psychosomatic symptoms?

Three short measures of emotional adjustment, the Taylor Manifest Anxiety Scale (Taylor, 1953), the Cornell Medical Index (Brodman et al., 1956), and the Saslow Psychosomatic Screening Inventory (Saslow et al., 1951) were used in the present study to answer the questions above. As previously described, the Taylor scale is a measure of manifest anxiety. The Cornell Medical Index inquires into a wide variety of physical and psychological symptoms, present, past, and in one's family. The Saslow Inventory is a measure of physiological and psychological responses to various stressful situations.

It should be pointed out that instruments of this sort deal with the way the individual answering the questionnaire reports he is; and not necessarily the conditions which actually exist. However, many important psychological events exist only in a person's mind; e.g., the sensation of pain (Cronbach, 1960). The way a person views himself becomes as important as the way he really is. Therefore, the use of this type of instrument is a legitimate way to explore this important area of personality.

As shown in Tables 3 and 4, the 80 medical students reported a mean number of positive responses on the 50-item Taylor Anxiety Scale of 7.19; 7.28 out of 195 possible symptoms on the Cornell Medical Index; and 3.31 psychosomatic reactions out of a possible 46 reactions on the Saslow Psychosomatic Inventory. The 80 civil service applicants, in comparison, earned a mean of 5.58 on the Taylor; 4.05 on the Cornell; and 2.68 on the Saslow. On all three tests, then, the medical students earned slightly higher scores than did the civil service applicants. These differences reached statistical significance on the Taylor (7.19 versus

Table 3

A Comparison of Self-Reports of Medical Students (N=60)
and Civil Service Applicants (N=60) on the Taylor,
Cornell, and Saslow Scales

Test	Medical Students			Civil Service Ap.			F-test Scores	P Level
	Mean	S.D.	Range	Mean	S.E.	Range		
Taylor	<u>7.19</u>	4.83	1-22	<u>5.58</u>	3.87	0-18	5.47	.05
Cornell	<u>7.28</u>	4.69	0-24	<u>4.05</u>	3.70	0-22	23.37	.001
Saslow	<u>3.31</u>	3.59	0-13	<u>2.68</u>	3.84	0-30	1.15	

Table 4

A Comparison of the Mean Scores on the Taylor, Cornell,
and Saslow Scales for Various "Normal" and Patient Groups

Group	Mean Scores		
	Taylor	Cornell	Saslow
Civil Service Applicants	5.58	4.05	2.68
Medical Students	7.19	7.28	3.31
College Students ^a	14.56		
Medical Patients ^b	14.81	33.50	5.50
Psychiatric Patients ^b	26.31	52.82	12.38

a--from Taylor, 1953.

b--from R.G. Matarazzo, J.D. Matarazzo, & Saslow, 1961.

5.58; p of .05) and on the Cornell (7.28 versus 4.05; p of .001).

However, when the medical students and the civil service applicants were compared on all three adjustment inventories to other "normal" and patient groups, the medical students and their civil service applicant controls scored much lower, indicating that they ascribed to themselves relatively fewer symptoms of the type measured by each of these three tests.

For example, as shown in Table 4 and as measured by the Taylor Anxiety Scale, the mean number of symptoms of manifest anxiety for general college students is 14.56 (Taylor, 1953) or 13.77 (Brockway, Gleser, Winokur, & Ulett, 1954); compared to the means in the present study of 7.19 for the medical students and of 5.58 for the civil service applicants on this 50-item scale. Again, the mean number of anxiety symptoms of medical outpatients on this scale is 14.81 (R.G. Matarazzo et al., 1961), about the same as for general college students. Psychiatric patients, in contrast, have a mean number of symptoms of 26.31 (R.G. Matarazzo et al., 1961), or of 25.65 (Brockway et al., 1954) on this scale. Thus, the medical students, with an average of 7 anxiety symptoms on this 50-item anxiety scale, had half the number of anxiety symptoms as did the average college student or the average medical patient, and fewer than a third such symptoms as the average psychiatric patient.

In like manner, the mean number of physical and emotional symptoms reported on the 195-item Cornell Medical Index by medical outpatients is 33.50 (R.G. Matarazzo et al., 1961); and by psychiatric outpatients is 52.82 (R.G. Matarazzo et al., 1961); compared to the much lower means for the medical students (7.28) and for the civil service applicants (4.05).

Again with the Saslow Psychosomatic Screening Inventory, the mean number of psychosomatic reactions ascribed to themselves by medical outpatients at 5.50 (R.G. Matarazzo et al., 1961) and by psychiatric outpatients at 12.38 (R.G. Matarazzo et al., 1961) were higher than the mean number of such reactions for the medical students (3.31) and for the civil service applicants (2.68).

These findings can be considered to be reliable since there were no significant differences between cross-validation samples for either the medical students or the civil service applicants on any of these three measures of personal adjustment. That is, the Class of 1961 did not differ significantly from the Class of 1962 on the Taylor (means of 6.73 and of 7.65, respectively), on the Cornell (means of 7.30 and of 7.25, respectively), or on the Saslow (means of 3.30 and of 3.33, respectively). Likewise, the police applicants did not differ significantly from the firemen applicants on the Taylor (means of 6.00 and of 5.15, respectively), on the Cornell (means of 4.78 and of 3.33, respectively), or on the Saslow (means of 2.67 and of 2.70, respectively).

In summary, relative to psychiatric patients and also to "normal" groups; e.g., "normal" college students and "normal" medical patients, the average medical student in this study was found to report himself at the low end on 1) a scale of overall manifest anxiety level, 2) a scale of psychosomatic reactions, and 3) a questionnaire of medical-psychiatric status. By these three criteria of emotional adjustment, the average medical student reports himself as unusually lacking in indices of psychological dysfunction. Thus, he either has less anxiety and psychosomatic reactions than individuals in other "normal" groups

or he may be merely reporting fewer such symptoms than individuals in other groups. Since the medical students represent a highly select group, both by their own selection of medicine as a career and by the selection of them by an admissions committee, they may indeed have less anxiety and fewer of the other symptoms studied than "normal" groups who have not undergone such stringent selection, such as college students or medical patients in an outpatient clinic.

The civil service applicants, constituting another group of highly select young men of the same age, reported themselves essentially in the same way as the medical students on these three measures of psychological status. While the medical students ascribed slightly more symptoms to themselves than did the civil service applicants on each of these three tests, both groups scored so much lower than other groups which have been reported (college students, medical patients) that this difference between them would appear psychologically meaningless.

Further evidence that the medical students and the civil service applicants report themselves in a way to suggest that they are psychologically healthier than other normal groups comes from an examination of the incidence of high scores on these three tests in each group. When these same three instruments are used as screening devices rather than as measures of emotional adjustment per se, a "cutting score" is typically used--a score which best separates the known maladjusted from the known "normals."

On the Cornell Medical Index no medical student or civil service applicant exceeded the suggested cutting score of 30 (Brochman et al.,

1956). The highest score obtained by a medical student on the Cornell was 24. For the civil service applicants the highest score on this test was 22. In contrast, 3 percent of general college students (White, Resnikoff, & Ewell, 1958), 3 percent of male N.Y. Hospital Employee "Normals," 23 percent of N.Y. Hospital Medical Patients, and 76 percent of V.A. Hospital Psychiatric Patients reached or surpassed this cutting score of 30 symptoms on the Cornell (Brodman et al., 1956).

While no "cutting score" has been determined for the Taylor, the distribution of the medical students' scores in relation to those of college students and of psychiatric patients again suggests that few, if any, of the medical students (or civil service applicants) had significant anxiety. The differences in distribution of scores of these groups on the Taylor are demonstrated in Figure 2. No medical student or civil service applicant scored higher than the median psychiatric patient (34), as shown in this figure, or higher than the mean psychiatric patient (26.31) reported by R.G. Matarazzo et al. (1961). In fact, only 10 medical students and 3 civil service applicants scored higher than the median college student (13) reported by Taylor (1953). The medical student scoring the highest on the Taylor had only 22 symptoms; the highest scoring civil service applicant had only 18.

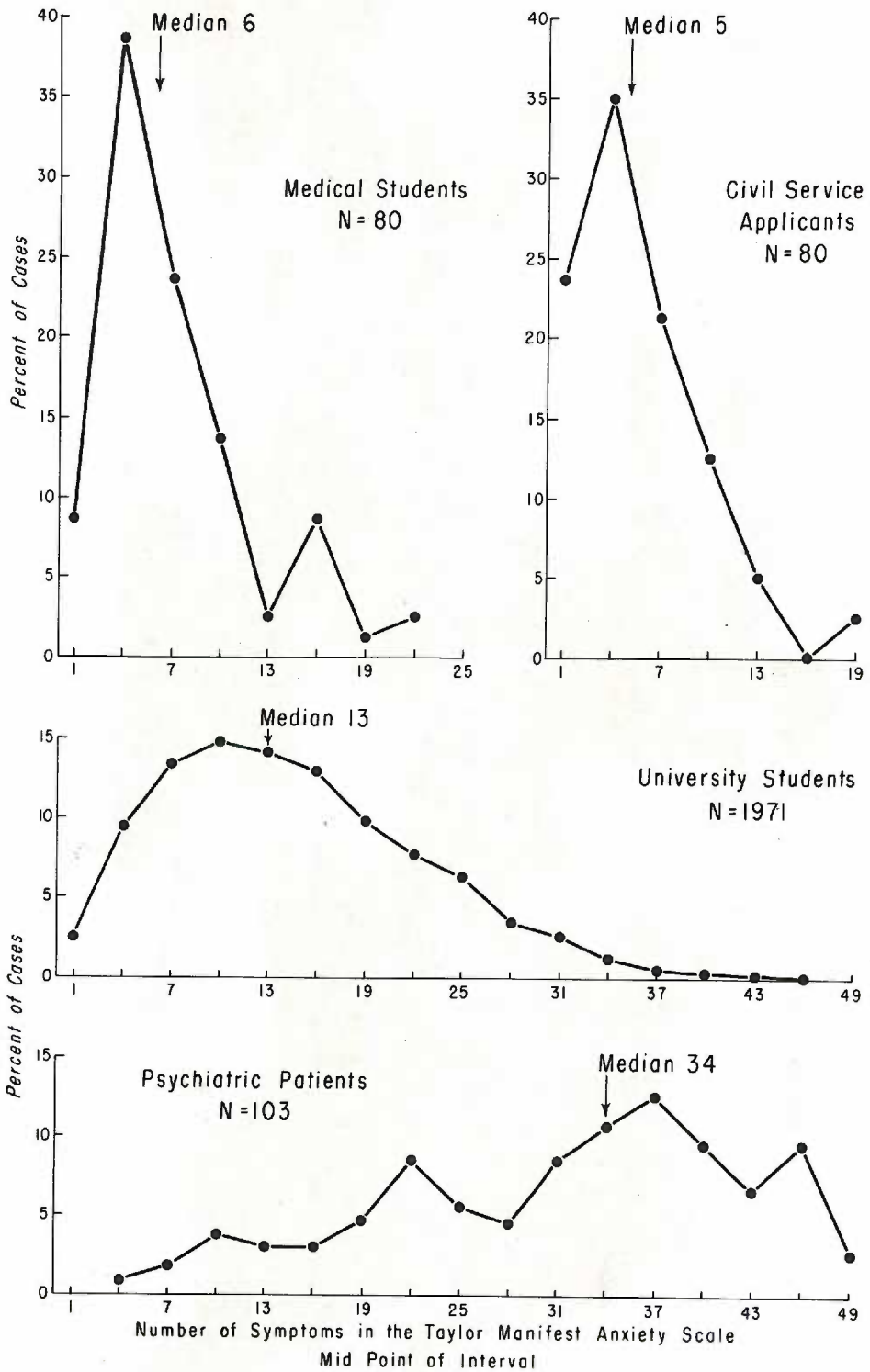
From the findings on the Cornell and the Taylor just reported, it appears that not only is the average medical student (and civil service applicant) an emotionally healthy individual but that very few, if any, members of either of these two groups have a significant degree of emotional maladjustment.

The scores on the Saslow Psychosomatic Screening Inventory suggest

FIGURE 2.

Frequency Polygons Showing Percent of Various Groups
Receiving the Indicated Scores on the Taylor
Manifest Anxiety Scale

FREQUENCY POLYGONS SHOWING PERCENT OF VARIOUS GROUPS RECEIVING THE INDICATED SCORES ON THE TAYLOR MANIFEST ANXIETY SCALE



a higher incidence of emotional maladjustment among both the medical students and the civil service applicant controls than that just described. 25 percent (20 out of 80) of the civil service applicants and 37.5 percent of the medical students (30 out of 80) surpassed the suggested critical "cutting score" of 4 psychosomatic symptoms (Saslow et al., 1951). This difference between groups on the Saslow is not significant ($\text{Chi}^2 = 2.90$). For certain reasons these percentages may be an artifact. One is the discrepancy between these figures and those for the Cornell and Taylor, which indicated that practically no medical student would have a significant emotional maladjustment. Second, the cutting score for the Saslow was so chosen as to identify 20 to 25 percent of medical students as needing psychiatric assistance, based on the findings in one class of medical students (Saslow et al., 1951). With the exception of that original class, Saslow reports (1956) that only from 4 to 15 percent of an entire medical school student body will seek psychiatric assistance during any one year, of which many will be referred in for scholastic problems or for psychophysiological reactions (e.g., duodenal ulcer, asthma, essential hypertension). Therefore, it seems safe to assume that the incidence of emotional maladjustment suggested by the Saslow Test is liberal.

One may wonder the extent to which these three adjustment inventories measure the same thing. Are anxiety, psychosomatic reactions, and other physical and psychological symptoms parts of a total adjustment level of the individual? As shown in Table 5, the three adjustment inventories do correlate positively and significantly with each other; the median correlation is .50. These correlations were slightly lower

Table 5

Intercorrelations among the Taylor Anxiety Scale, the Cornell Medical Index, and the Saslow Screening Inventory for 80 Medical Students and 80 Civil Service Applicants

	Medical Students			Civil Service Applicants		
	Taylor	Cornell	Saslow	Taylor	Cornell	Saslow
Taylor		.58***	.50***		.50***	.23*
Cornell			.44***			.54***
Saslow						

* Pearson r of .22 yields a p value of .05

*** Pearson r of .36 yields a p value of .001

Table 6

The Relationship between Full Scale I.Q. and Various Measures of Emotional Adjustment in 80 Medical Students and 80 Civil Service Applicants (Product-moment Correlations)

Adjustment Index	Medical Students	Civil Service Applicants
Taylor Anxiety Scale	.22*	.11
Cornell Medical Index	.08	.16
Saslow Screening Test	.20	.12

* Pearson r of .22 yields a p value of .05

than those reported (R.G. Matarazzo et al., 1961) for the same tests when used on a group of medical patients (median correlation of .63). All correlations, particularly those with the Saslow, were probably lowered by the limited range of scores within the psychiatrically healthy groups in the present study. Despite this restricted range of scores, most of the correlations approached .50, indicating a fair degree of predictability from one instrument to the others. Despite different names and different types of symptoms measured, these three tests apparently do measure a common (adjustment-maladjustment) dimension.

Certain possible contaminating or confounding factors must be considered in relation to emotional adjustment in our medical students and civil service applicants. One is the test-taking attitude or "set" of the subjects. Another is the possible relationship between emotional adjustment and intelligence.

As tests of self-report, the Taylor, Cornell, and Saslow are susceptible to an individual's attempt to "fake good;" i.e., to put himself in his best light, or to deny the existence of symptoms or characteristics he "really" has. Under many circumstances most individuals probably strive to create a favorable impression, as might be expected (to an unknown degree) with both the medical students and the civil service applicants in this study. Special circumstances, such as employment testing where the subject is primarily concerned with landing a job, not in giving an accurate self-report, may also influence scores on tests of this nature. The extent to which the latter factor was operating in the civil service applicants could not be determined in this study. Since both the medical students and the civil service

applicants were highly select groups before being included in this study, having passed an admissions or examining committee interview and a physical examination, the probability is that these individuals in both groups would have been psychiatrically healthy, regardless of their set at the time of examination.

The literature on the possible interaction between anxiety and intelligence has been reviewed by Taylor (1955). She concluded that there is little or no relationship between anxiety and I.Q. scores in a relatively homogeneous group, but that ^{anxiety} intelligence should be taken into account whenever groups being studied have widely different intelligence levels. While she was referring to the Taylor Anxiety Scale, this word of caution seems equally applicable to the Cornell Medical Index and the Saslow Psychosomatic Screening Inventory.

As shown in Table 6, the scores of the medical students and of the civil service applicants on the Taylor, Cornell, and Saslow were all correlated (Pearson r) low and positively (.08 to .22) with I.Q. scores. In general, these correlations were not significantly different from zero, suggesting that individual differences in I.Q. in the two groups of 80 subjects were not associated with differences in emotional adjustment within these same 160 individuals, and as determined by these three tests.

Since separate correlations between I.Q. and emotional adjustment were not significant, there was no need to use analysis of covariance to partial out the effects of I.Q. on emotional adjustment. (Analysis of covariance will be described and used in the section concerned with personality needs.)

From the preceding analysis of the emotional adjustment scores of Oregon medical students, the following conclusions appear warranted.

1. Contrary to the findings of other investigators (Eron, 1955; Eron, 1958) with other techniques of measurement with their medical students, the average Oregon medical student has a superior emotional adjustment, as determined by the Taylor Anxiety Scale, the Cornell Medical Index, and the Saslow Psychosomatic Inventory. That is, the average student-physician ascribes fewer symptoms of anxiety, fewer psychosomatic manifestations, and fewer medical and psychological symptoms to himself than do other "normal" populations. In addition, few if any of the medical students as individuals have scores high enough to suggest a maladjustment of serious magnitude, as determined by these same adjustment inventories.

2. That this was a reliable finding can be deduced from the lack of significant differences between classes of medical students on any of these three adjustment inventories.

3. The control group of civil service applicants also demonstrated a superior level of emotional adjustment, individually and on the average, with a minimum number of emotional symptoms of the various sorts examined. That this was a reliable finding can also be deduced from the lack of significant differences between the police applicants and fireman applicants on the three adjustment tests used.

4. In addition to the presumed "set" to give a favorable impression which they share with other groups, the job-seeking set of the civil service applicants may have resulted in a slight lowering of their scores on these inventories, relative to the scores of the medical

students; although the degree to which this occurred could not be determined in this study. To determine the influence of this variable, a group of men comparable to these applicants would have to be examined on these three adjustment inventories in a situation where their selection for a job was not dependent, in part, on the results (e.g., by examining these same civil service applicants or similar applicants after they have been appointed to the Force).

5. The most likely reason for the superior scores of both the medical students and the civil service applicants on these three measures of emotional adjustment is the high degree of prior selection each group has undergone.

6. An indirect validation of the usefulness of all three adjustment measures can be inferred from the fact of progressively higher mean maladjustment scores as one moves from the highly selected civil service applicants and medical students to the unselected college students and general medical patients and finally up to psychiatric outpatients (e.g., for the Taylor Anxiety Scale the mean scores were 5.6, 7.2, 14.6., 14.8, and 26.3, respectively; as shown in Table 4).

7. That manifest anxiety, psychosomatic manifestations, and other medical and psychological symptoms are a part of a more general characteristic of individuals which might be called their emotional adjustment can be deduced from the degree of relationship (Table 5) between the Taylor, Saslow, and Cornell tests.

8. For the two occupational groups studied here, intelligence level was not an important correlate of a person's level of emotional adjustment or of the number of physiological and psychological symptoms he experiences; a finding in keeping with other published findings in this area.

C. Reported Physical Health.

Granted that the medical students were an emotionally healthy group, what can be determined regarding their physical health? What is the nature of the few symptoms they do report? Are these situationally related to their experiences in medical school? To answer these questions, an item analysis of the Cornell Medical Index was done. The Cornell Medical Index can be used as a standardized medical (and psychiatric) interview, as well as a measure of personality adjustment as used in the previous section (Brodman et al., 1956). It has been shown that the Cornell will elicit essentially the same information as a comprehensive medical interview, and with comparable reliability (Brodman, Erdmann, Lorge, & Wolff, 1949). It may be used to compare the number of individuals with specific symptoms, medical disorders, or emotional reactions in one population with the number in another (Brodman et al., 1956).

For purposes of discussion, only the more common dysfunctions in our two groups will be considered. Table 7 shows those items from the Cornell on which 10 percent (8 out of 80) or more of either the medical students or the civil service applicants or both answered "Yes," indicating the presence of that symptom or disease. The first section (a) of this table contains those symptoms reported significantly more often by the medical students. The second section (b) contains those symptoms reported significantly more often by the civil service applicants. The third section (c) contains those items on which one or both groups had 10 percent or more "Yeses" but on which there was no significant difference between groups.

Table 7

An Item Analysis of the Cornell Medical Index on 80 Medical Students (M.S.) and 80 Civil Service Applicants (C.S.) of those Items Marked "Yes" by 10% or more of either Group.

Item No.	M.S. No.	C.S. No.	Chi Square	Significance Level	Statement
Section a: Items answered "Yes" significantly more often by the Medical Students.					
1	23	3	18.42	.001	Do you need glasses to read?
2	36	3	40.21	.001	Do you need glasses to see things at a distance?
6	8	1	5.89	.05	Are your eyes often red or inflamed?
20	22	7	9.52	.01	Do you get hay fever?
47	16	6	7.10	.01	Do you always gulp your food in a hurry?
134	13	0	14.24	.001	Are you definitely over weight?
140	26	9	10.61	.01	Do you find it impossible to take a regular rest period each day?
141	21	2	18.38	.001	Do you find it impossible to take regular daily exercise?
Section b: Items answered "Yes" significantly more often by the Civil Service Applicants.					
41	1	9	6.93	.01	Have you lost more than half your teeth?
88	25	38	4.42	.05	Were you ever knocked unconscious?
Section c: Items on which there is no significant difference between groups.					
46	16	12			Do you usually eat sweets or other foods between meals?
61	19	11			Have you ever had piles (rectal hemorrhoids)?
124	11	7			Did you ever have scarlet fever?
136	10	12			Did you ever have a serious operation?
137	10	8			Did you ever have a serious injury?
142	13	15			Do you smoke more than 20 cigarettes a day?
143	13	12			Do you drink more than six cups of coffee or tea a day?

In section (a) of Table 7 the medical students show a higher incidence of symptoms reflecting their busy schedules and lack of sleep; i.e., inflamed eyes, gulping food, going without regular rest or exercise. As one might expect, these symptoms were rare among the civil service applicants. The other area of greatest difference between groups was on such things as vision and obesity. Here the civil service applicants may be preselected by a more rigorous and more recent physical examination. Or, possibly, these may be "occupational hazards" of medical students.

In section (b) of this table, the only symptoms more frequent in the civil service applicants than the medical students possibly represent a lesser concern among the applicants with personal health care (dental care) and perhaps differences in experiences reflecting their probably different socio-economic backgrounds.

Both groups have in common (section (c)) a 10 to 20 percent incidence of the common "vices" of smoking too much, drinking too much coffee, and eating too many sweets, as well as a past history of common medical problems (scarlet fever, hemorrhoids, injuries, operations). Disabling or chronic diseases were markedly infrequent in either group. No psychiatric symptoms appeared frequently enough in either group to be included in Table 7.

Based on a standardized medical history, as taken by the Cornell Medical Index, the following conclusions seem evident concerning the reported health of the medical students:

1. Medical students report themselves to have excellent physical as well as psychological health, as determined from the Cornell Medical Index.

2. Most symptoms which the medical students do have seem related to the demands and stresses of medical school, rather than indicating the presence of chronic or disabling or psychiatric disease.

3. The control group of civil service applicants also report themselves to have excellent physical and emotional health. The specific symptoms they complain about differ in some respects (though not markedly) from those reported by medical students. Differences probably reflect differences in backgrounds and in past experiences, as well as differences in their present situations.

D. Personality Needs.

As described in the section on Method , the Edwards Personal Preference Schedule (Edwards, 1959) was used to study differences, if any, in personality needs (i.e., motivational traits or predispositions) between the medical students and other groups of young men of the same general age group. In addition, this instrument was used to study the relative intensity, or level, of the various personality needs within groups of subjects. For example, we wished to determine not only whether medical students have a greater need for Achievement than do college students or civil service applicants, but also whether a need for Achievement is a more common or more dominant characteristic of medical students than, say, a need for Autonomy.

Before presenting the results on the Edwards, a word of explanation on the construction of the 15 subscales (in addition to that in the Method section) making up this test might be useful. First, the individual items of each subscale are presented for the convenience of the reader in Appendix 2. As shown in Appendix 2, each of the 15 trait measures is itself composed of 9 items. Because Professor Edwards was interested in comparing the strength of each of these items against a need item from another scale, each of the 9 items making up each of the 15 trait scales was used more than once. Thus, for example, study of the Achievement scale in Appendix 2 shows that 8 of the 9 items were repeated 3 times in the 210-item Edwards test while 1 item (Item No. 4, Appendix 2) was used 4 times. With each person taking the test having 8 items presented to him 3 times and 1 item 4 times (albeit appearing to be presented "randomly" throughout the 210 item test), it will be

clear why the highest possible raw score on each of the 15 individual scales is 28.

In addition to providing means and standard deviations in raw score units (which range from a score of zero to a high of 28) for his male college student normative group, Edwards (1959) has converted the raw score distributions of this normative group on each scale into standard score distributions (T scores) with an arbitrary mean of 50 and a standard deviation of 10.

Two basic techniques, then, were used in the present study in the analysis of the findings on the Edwards: 1) differences between groups on each need were studied by means of analysis of variance (F-test) of raw scores; 2) by rank-ordering the mean T scores on the 15 needs in the medical student group, it was possible to compare the resulting profile of these needs in this group with a similarly resulting profile in the civil service group (and in other comparison groups).

Figure 3 and Figure 5 show the distribution of raw scores for the medical students and the civil service applicants on two typical Edwards scales--the Achievement scale and the Autonomy scale, respectively. The wide individual variation within each group on the Autonomy scale (Figure 5) is apparent. The scores of the medical students range from 3 to 25 on the Autonomy scale while the total possible range is from 0 to 28 raw score units. The range of the civil service applicants on this scale is very similar (1 to 22), despite very different medians (15 for the medical students and 10 for the civil service applicants). However, the scores of both groups are generally symmetrically distributed about their respective medians (and means) on this scale. The same general

characteristics of the distributions of raw scores of these two groups of subjects (the medical students and the control group of similarly-aged young men) is true on the Achievement scale (Figure 3) and on the other Edwards scales.

The major disadvantage of raw scores is that scores on one scale may not be comparable to scores on another scale. For example, 70 percent of a group may get a score as high as 14 on one need scale, whereas only 30 percent of this same group may reach this same raw score (14) on another scale. When comparing groups of subjects on the same scale this is unimportant.

The use of Edwards' T scores is one way to overcome this disadvantage of raw scores, to allow the comparison of scores on different Edwards scales against a known reference point (i.e., the mean of 50 T score points for the male college student norm group on each scale). For example, if a medical student gets a T score of 60, this is one standard deviation above the mean for male college students, regardless of which Edwards scale it is on.

The distribution of standard (T) scores of the medical students and the civil service applicants on the Achievement and Autonomy scales are presented in Figures 4 and 6, respectively. It will be seen that the shape of the distribution of T scores on these scales is comparable to the distribution of raw scores on the same scales and groups (Figures 3 and 5). Whereas the figures showing raw scores (Figures 3 and 5) demonstrate the extent of individual variation in each group of subjects over the possible range of scores (0 to 28), the figures using T scores (Figures 4 and 6) illustrate the position of individual scores relative

to the way male college students score on the same Edwards scales. For example, Figure 6 shows that the median (31) for medical students on the Autonomy scale is essentially the same as the median (30) for male college students. In contrast only 15 percent (12 of 80) of the civil service applicants reported a greater need for Autonomy than did the median male college student.

While it would be possible to give figures on the remaining 13 Edwards scales, the data on the Achievement and Autonomy scales, as shown in Figures 3, 4, 5, and 6, provide the reader with an introduction to the meaning of the scores on the 15 scales of the Edwards test. Table 8 gives the mean, standard deviation, median, and range for each of the 15 Edwards scales for the medical students and their civil service applicant controls. As shown in Table 8, compared to the civil service applicants the medical students' responses indicate significantly greater (significance levels of .01 or .001) need for Achievement, Autonomy, Change, Heterosexuality, and Aggression; and a significantly lower need for Deference, Order, Abasement, and Endurance. (These personality needs are defined in the Method section.) In addition, the medical students showed more internal Consistency in the way they scored the test than the civil service applicants.

The differences between male college students (norms) and both the medical students and the civil service applicants are shown in Table 9. If the name of a need is followed by a minus sign (-), that group (medical students or their civil service applicant control group)

FIGURE 3.

Achievement Scale: Edwards Personal Preference

Schedule - Raw Scores

ACHIEVEMENT SCALE: EDWARDS PERSONAL PREFERENCE SCHEDULE - RAW SCORES

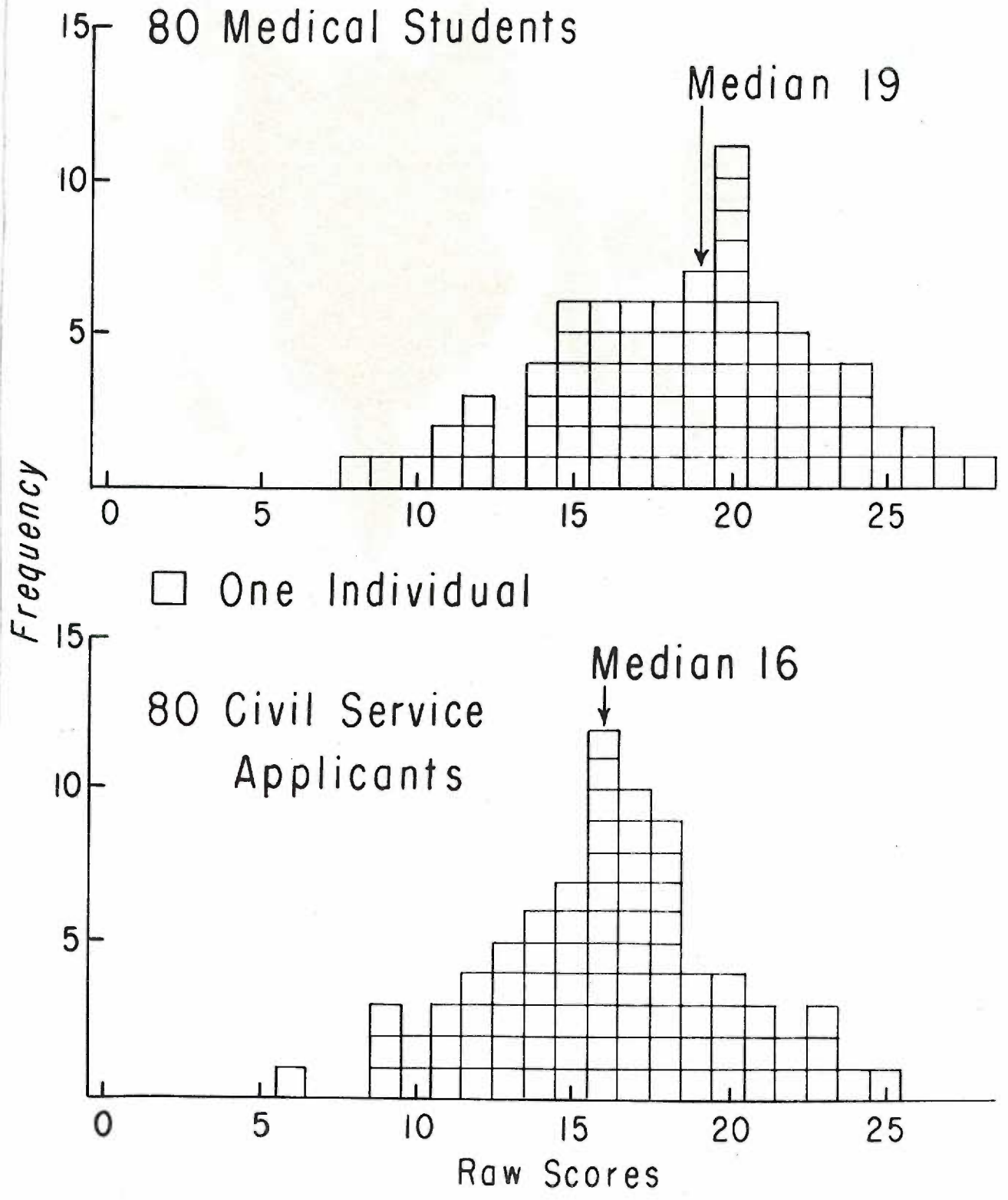


FIGURE 4.

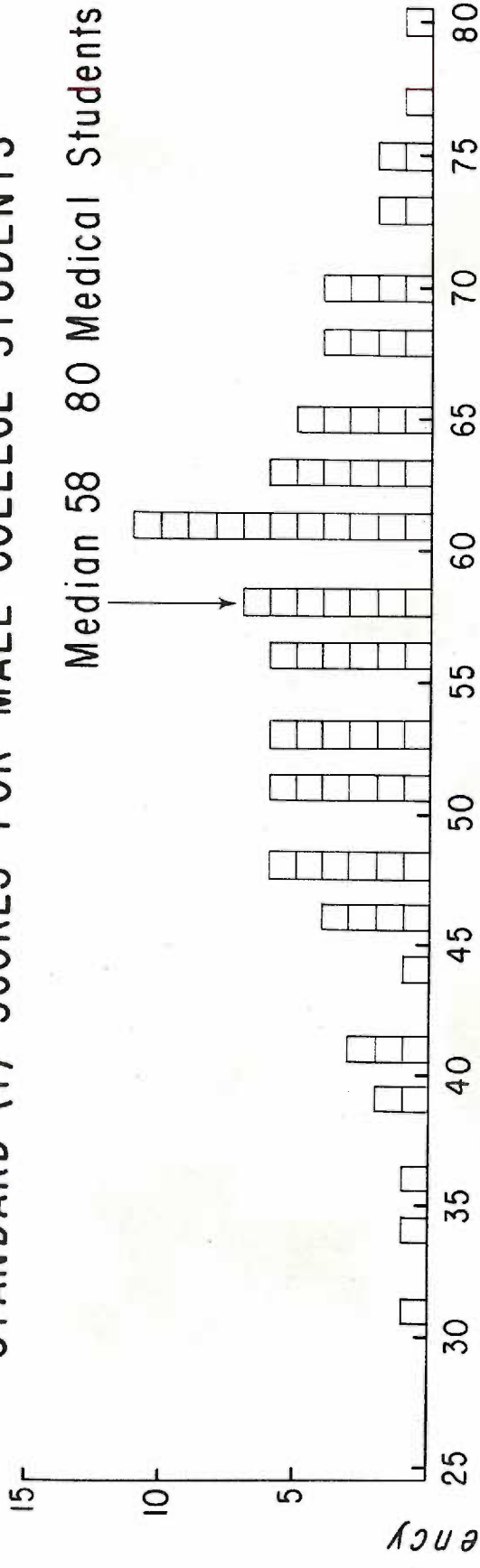
Achievement Scale: Edwards Personal Preference

Schedule Standard (T) Scores for Male

College Students

ACHIEVEMENT SCALE: EDWARDS PERSONAL PREFERENCE SCHEDULE

STANDARD (T) SCORES FOR MALE COLLEGE STUDENTS



□ One Individual

80 Civil Service Applicants

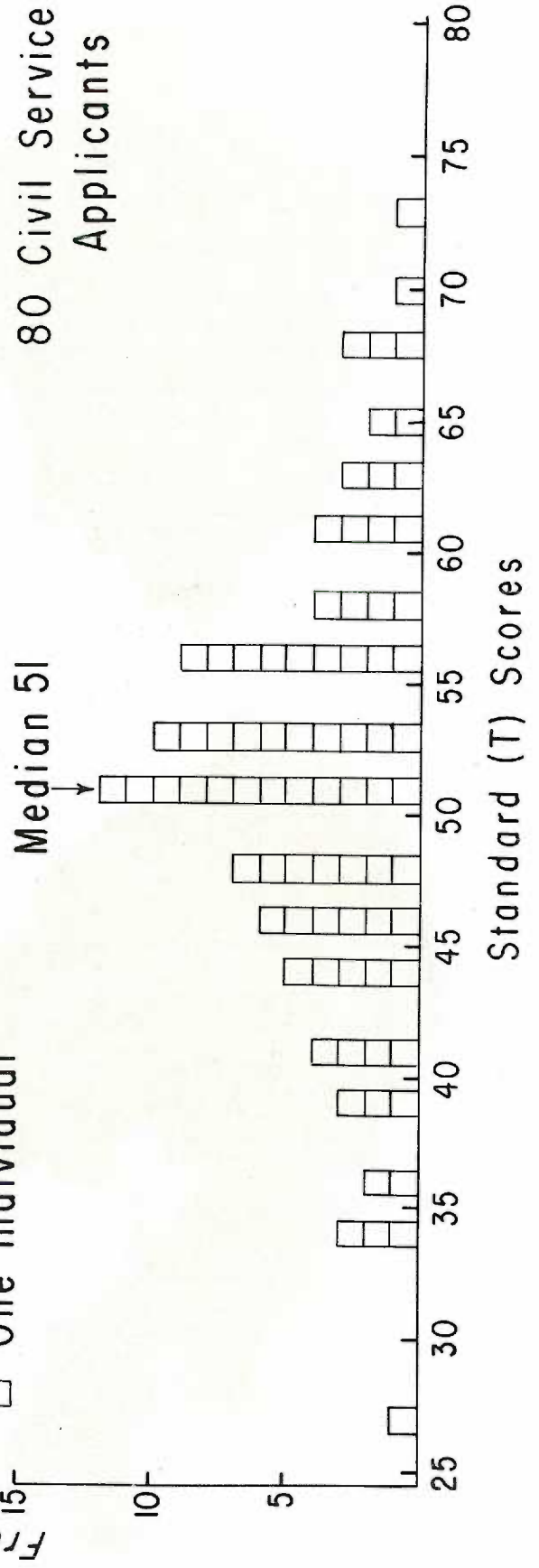


FIGURE 5.

**Autonomy Scale: Edwards Personal Preference
Schedule - Raw Scores**

AUTONOMY SCALE: EDWARDS PERSONAL PREFERENCE SCHEDULE - RAW SCORES

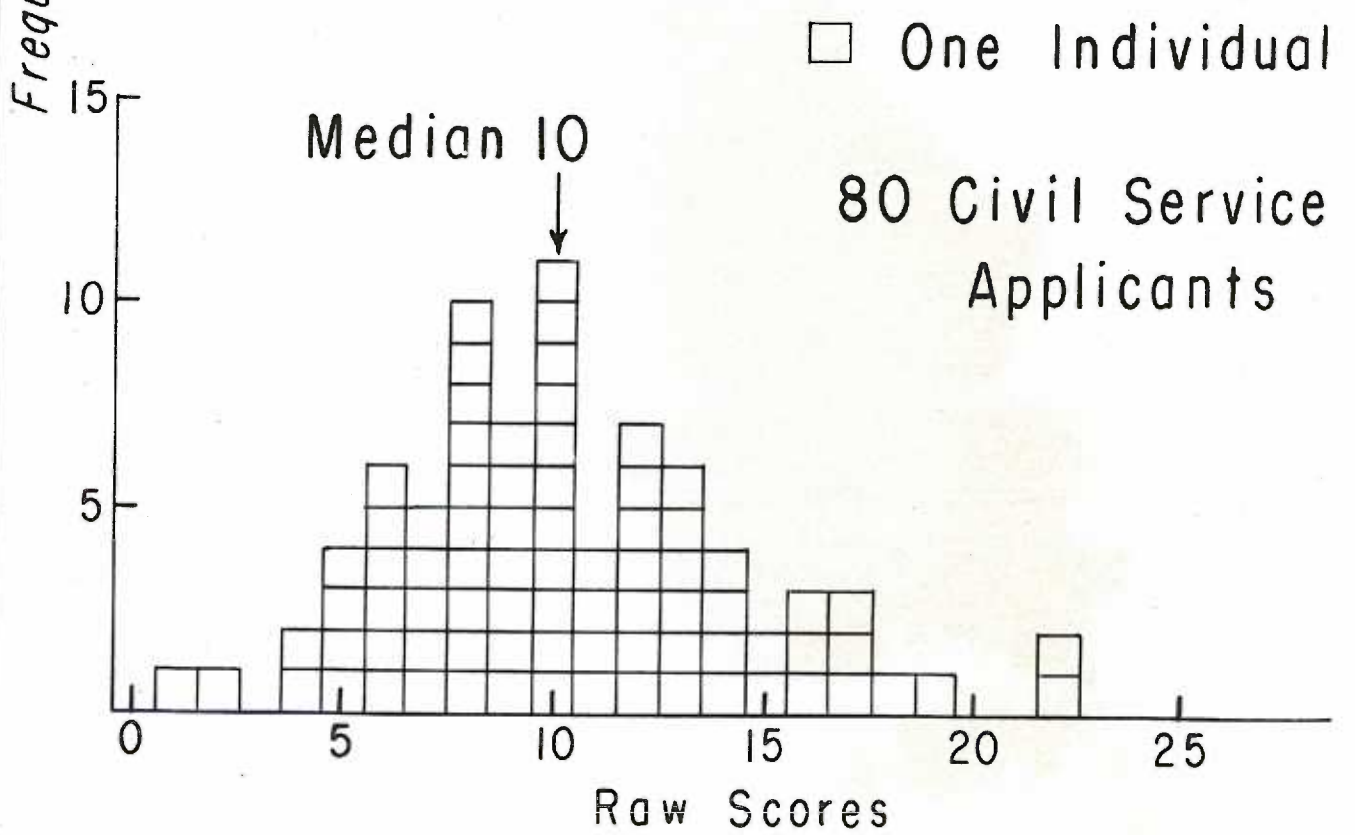
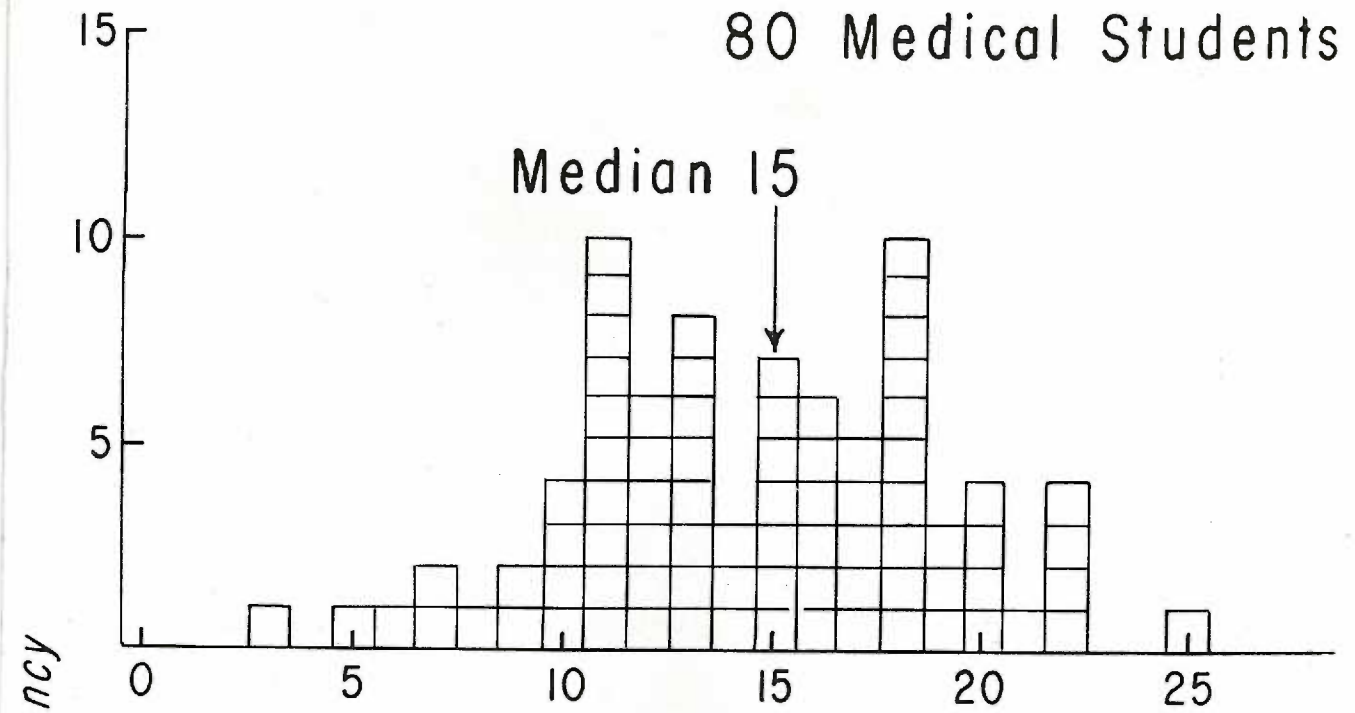


FIGURE 6.

Autonomy Scale: Edwards Personal Preference Schedule
Standard (T) Scores for Male College Students

**AUTONOMY SCALE: EDWARDS PERSONAL PREFERENCE SCHEDULE
STANDARD (T) SCORES FOR MALE COLLEGE STUDENTS**

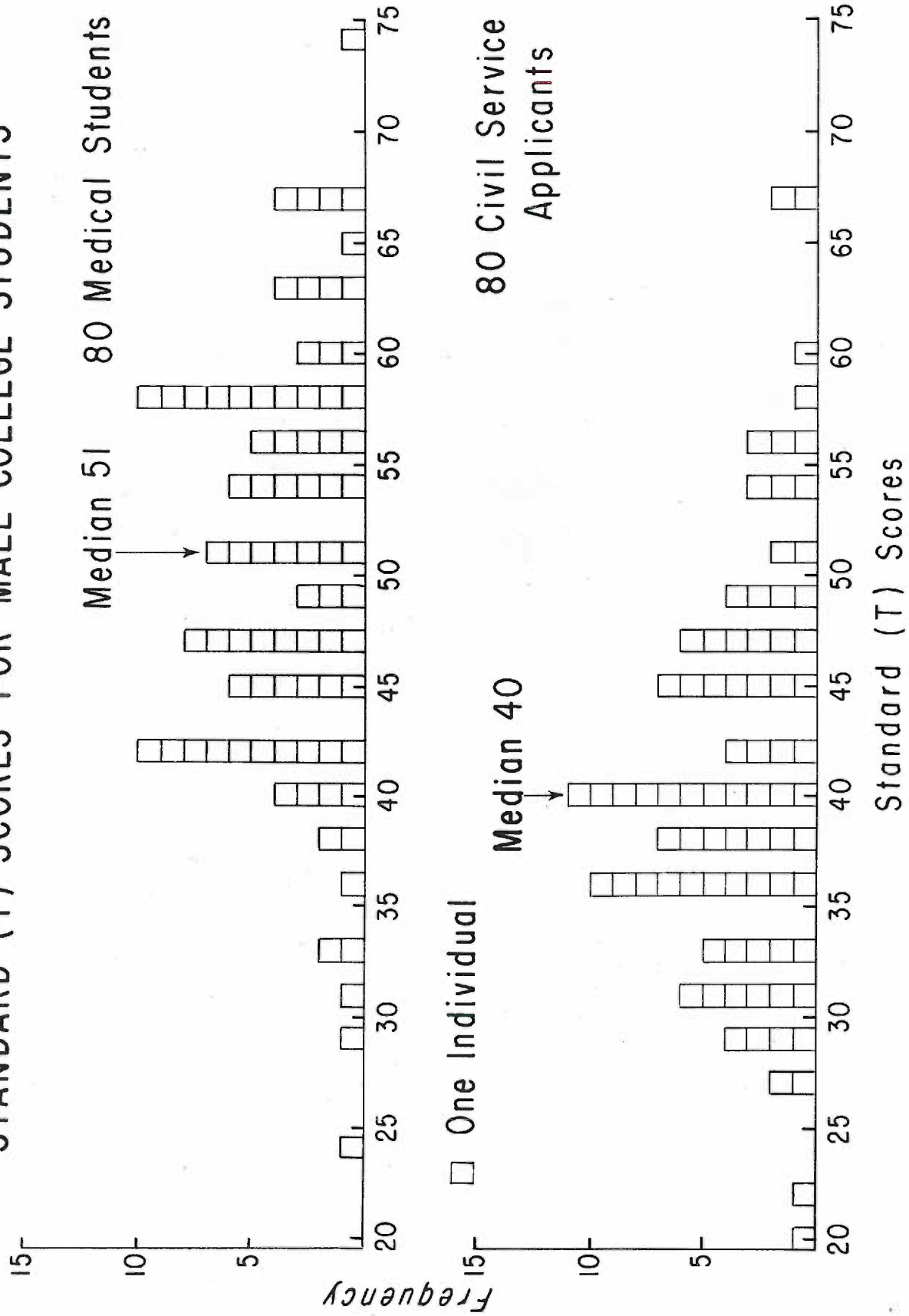


Table 8

Differences between Medical Students (N=80) and Civil Service Applicants (N=80) on the Edwards Personal Preference Schedule (Raw Scores)

Scale	Medical Students			Civil Service Applicants			F-test on Means	Sig. Level		
	Mean	S.D.	Med. Range	Mean	S.D.	Med. Range				
Achievement	<u>18.55</u>	4.27	19.0	8-28	<u>16.16</u>	3.76	16.0	6-25	14.07	.001
Deference	<u>11.48</u>	3.67	11.0	3-19	<u>13.92</u>	3.89	14.0	6-24	17.62	.001
Order	<u>10.36</u>	4.09	10.0	2-21	<u>13.24</u>	4.17	13.0	4-21	19.30	.001
Exhibition	<u>13.90</u>	3.70	14.0	6-24	<u>14.80</u>	3.29	15.0	7-22	2.60	
Autonomy	<u>14.49</u>	4.35	15.0	3-25	<u>10.34</u>	4.19	10.0	1-22	37.86	.001
Affiliation	<u>13.66</u>	4.32	14.0	5-26	<u>14.78</u>	4.15	15.0	5-24	2.74	
Introception	<u>16.40</u>	5.41	16.5	4-28	<u>16.03</u>	4.69	16.0	5-26	.23	
Succorance	<u>8.23</u>	3.87	8.0	1-19	<u>8.58</u>	3.96	8.0	1-19	.26	
Dominance	<u>16.74</u>	3.97	17.0	6-25	<u>16.74</u>	4.23	18.0	4-26	.06	
Abasement	<u>10.44</u>	4.71	10.0	3-24	<u>14.29</u>	4.48	14.5	3-24	27.86	.001
Nurturance	<u>13.60</u>	4.81	14.0	3-27	<u>14.11</u>	4.80	14.0	3-24	.48	
Change	<u>15.69</u>	4.47	15.5	5-28	<u>13.52</u>	4.08	13.0	4-25	9.67	.01
Endurance	<u>15.84</u>	4.81	16.0	5-26	<u>17.95</u>	4.65	18.0	7-27	7.95	.01
Heterosexuality	<u>17.50</u>	5.23	18.0	3-28	<u>14.72</u>	5.75	14.0	2-27	10.20	.01
Aggression	<u>13.18</u>	4.30	12.0	6-25	<u>10.66</u>	4.15	11.0	2-18	14.08	.001
Consistency	<u>12.00</u>	1.86	12.0	8-15	<u>11.16</u>	1.83	11.0	7-15	8.24	.01

Table 9

Personality Needs on which Our Two Groups Differ
from Male College Students

<u>Medical Students (N=30)</u>	<u>Civil Service Applicants (N=30)</u>
Achievement	Deference
Affiliation (-)	Order
Suocorance (-)	Suocorance (-)
Abasement (-)	Abasement
Endurance	Endurance
Consistency	Autonomy (-)
	Change (-)
	Heterosexuality (-)
	Aggression (-)

(-) indicates that this group (medical students or civil service applicants) was significantly lower than male college students on this need.

No sign indicates that this group was significantly higher than male college students on this need.

scored significantly lower than the male college students on that need scale, as determined by analysis of variance (F-test). The groups scored significantly higher than the male college students in the remaining needs included in Table 9. All differences reported in this table reached the .001 level of confidence, except those between the medical students and the male college students on the Affiliation scale (p. of .01) and on the Consistency scale (p of .05).

As shown in Table 9, the medical students reported significantly higher needs than the male college students for Achievement and Endurance,

and significantly lower needs than the male college students for Affiliation, Succorance and Abasement. In addition, the medical students showed more Consistency than the male college students in filling out the Edwards test.

In comparison, the civil service applicants showed significantly higher needs than the male college students for Deference, Order, Abasement, and Endurance, and significantly lower needs than the college males for Autonomy, Succorance, Change, Heterosexuality, and Aggression. (Again, definitions of these needs are furnished in the Method section.)

In comparison to the male college student norm group, both the medical students and their control group of similarly-aged young men reported significantly less need for Succorance and significantly more need for Endurance. The need for Abasement progressively decreased from the civil service applicants to the male college students and on to the medical students.

The preceding statistics have been based on raw scores. To give a better perspective to the meaning of these differences on the Edwards, the mean standard scores for the medical students and the civil service applicants are presented in Table 10. In addition, this table shows the mean standard (T) scores for the cross-validation samples--the Class of 1961, the Class of 1962, the police applicants, and the fireman applicants. The rank-order of means on all regular scales (excluding Consistency) for each group are also shown in this table. It will be recalled that the mean T score for male college students (norms) is 50 on each scale.

From Tables 8, 9, and 10, it becomes evident that a need to persevere

Table 10

Mean Standard (T) Scores and Rank-Order of the Edwards Personal Preference Schedule Needs for Medical Students and Civil Service Applicants

Scales	Medical Students				Civil Service Applicants					
	Class of '61		Both Classes		Police Aps.		Fireman Aps. All Appls.			
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank		
Achievement	55.25	2	58.83	1	52.43	5	50.13	8	51.28	5
Deference	52.90	3	48.63	11	58.63	2	56.93	2	57.78	2
Order	51.18	4	50.03	7	54.90	3	56.90	3	55.90	3
Exhibition	48.10	11	49.18	8	51.83	7	50.50	7	51.17	6
Autonomy	50.25	6	50.13	6	40.28	15	41.58	15	40.93	15
Affiliation	49.00	9	44.90	14	47.20	10	51.80	5	49.50	9
Introception	48.78	10	52.35	4	52.03	6	47.60	10	49.82	8
Successance	45.05	15	44.28	15	44.78	14	46.13	12	45.46	12
Dominance	48.05	12	48.90	9.5	48.10	9	48.85	9	48.48	10
Abasement	46.95	13	45.53	13	53.95	4	51.58	4	54.27	4
Nurturance	49.80	8	48.48	12	49.23	8	51.08	6	50.16	7
Change	46.43	14	52.88	3	44.98	13	46.93	11	45.96	11
Endurance	56.78	1	55.35	2	60.53	1	59.48	1	60.01	1
Heterosexuality	50.55	5	48.90	9.5	45.35	12	43.93	14	44.64	14
Aggression	50.03	7	51.60	5	45.50	11	45.18	13	45.34	13
Consistency	52.33		52.88		49.95		46.43		48.19	
rho		.44								.88
Range of Means	56.78 to 45.05		58.83 to 44.28		60.53 to 40.28		59.48 to 41.58		60.01 to 40.93	
Difference	11.73		14.55		20.25		17.90		19.08	

Note: Standard (T) scores are based on the distribution of scores of male college student norms.

with difficult tasks until completed (high Endurance), and a need to do one's best and to accomplish great things (high Achievement) were the most characteristic needs or traits of the medical students. Not only were these needs more characteristic (ranks of 1 and 2) of the medical students than any of the other needs measured, they were also more characteristic of the medical students than of male college students or civil service applicants (except for Endurance in relation to the civil service applicants). Others (Becker et al., 1961; Gee, 1959), in psychological and sociological studies of medical students, have found the same two predominant personality traits.

The medical students reported little need to receive sympathy or help from others (low Succorance, ranking 15th), or to feel guilty or inferior (low Abasement, ranking 14th), either in relation to other needs within themselves or in relation to these two needs in male college students and (for Abasement) civil service applicants.

The high needs to do one's best and to persist doggedly at the task of completing medical school must surprise no one. The reason for the relative absence of the low ranking needs shown in Table 10 is less self-evident. A low need for Succorance does fit the stereotype of the self-reliant physician, able to make critical decisions quickly and alone when the situation demands it.

There are several possible reasons for the relative absence of feelings of guilt or inferiority (low Abasement), reported by the medical students. This may be a part of the cynicism medical students are reported to have (Eron, 1955; Kelly, 1957). It may represent an academic detachment of the medical student from a feeling of responsibility

for his patients (Becker & Geer, 1958; Parker, 1960). It may be a protective reaction to the new responsibilities the medical students were assuming, a way of protecting them from an overwhelming sense of guilt or failure when something goes wrong with a patient. Or, relative to other young men of their age, it may reflect a real superiority in ability and past achievement of this group. Should this be true, the average medical student actually has less reason to feel guilty or inferior.

The low need for Affiliation (13th ranked, significantly lower than male college students), while not cross-validated (ranking 14th in one class, but 9th in the other), may represent an attempt of the medical student to restrict his inter-personal relationships so that he can better apply himself to the tasks at hand (medical school studies), as suggested by Schlageter and Rosenthal (1962).

The Nurturance scale is of particular interest for a medical group. This is the scale most closely related to social concern, to helping others in trouble, to sympathizing with the sick, and to having others confide in one---all things physicians are expected to do or be. Eron (1955), Gee (1959), Kelly (1957), and many others have questioned the extent to which young physicians have these qualities. They have expressed doubt that the average medical student is really concerned with the total welfare of his patients in the "humanitarian" sense. At the same time, they have wondered whether this is an effect of medical school selection procedures, an effect of experiences within medical school, or simply a reflection of the values and attitudes of a society which appears to be achievement-oriented rather than person-oriented.

As shown in part in Table 8, there was remarkably little difference among the means on the Maturity scale for the medical students (13.60), the civil service applicants (14.11), and the male college students (14.04), three very different groups of young men in some respects. This possibly supports the hypothesis that medical students may only reflect the values of our society.

The physician has been viewed in some of the lay press as one of the last of the rugged-individualists, an independent person who likes to do and say what he thinks, to be his own boss. There is evidence that medical students and physicians also view themselves in this way (Cahalan, Collette, & Hilmar, 1957; Kelly, 1957). If this were indeed true, one might expect medical students to have a high need for Autonomy. In point of fact, this group of medical students, at least, showed no greater need for independence of thought or action (Autonomy) than do male college students in general (means of 14.49 and 14.34, respectively). However, as shown in Table 8 and Figure 6, they did have a much greater need for Autonomy than did men planning a civil service career (mean of 10.34).

The medical students were more consistent (higher Consistency) in answering the questions on the Edwards than either the civil service applicants or the male college students (Tables 8 and 9). Schlageter and Rosenthal (1962) have reported that the typical medical student has an obsessive-compulsive personality pattern. If so, the greater Consistency of the medical students could have been due to a compulsive attention to detail. Or, it may reflect differences in intelligence, a possibility which will be explored later.

One may accept these last findings as reliable, since no significant differences between the Class of 1961 and the Class of 1962 were found on these Edwards scales. In fact, the differences between classes reached statistical significance (p of .02) on only one (Change) of the 16 (including Consistency) scales; with little doubt a chance rather than a reliable finding.

The relative ranking of the needs most characteristic (Achievement, Endurance) and least characteristic (Succorance, Abasement) of the medical students was consistent between classes. However, there was a great deal of discrepancy in the rankings of the remaining scales between the classes, reflecting the small differences between these means (Table 10). For example, the need for Deference was ranked third highest for the Class of 1961 with a mean of 52.90. This same scale ranked eleventh for the Class of 1962 with a mean of 48.63, although not statistically significantly different from the mean of the Class of 1961.

The civil service applicant control group present quite a different personality picture, on the average. Their responses suggest that they see themselves as having a very high need for Endurance (ranking 1st among the 15 needs). Their mean T score profile suggests a willingness to accept orders (high Deference), an acceptance of the routine and of conventional ways of doing things (low Autonomy, low Change). This low need for independence (low Autonomy) may be associated with low aggressiveness (low Aggression) and, perhaps, a sense of personal inadequacy (high Abasement).

The preceding speculation regarding the needs of civil service

applicants is not intended as a value judgment. The characteristics mentioned may be those required for optimal functioning in civil service work. For example, if civil service jobs can be characterized by a definite hierarchy of command, a high degree of organization, and a high degree of job security, applicants may be attracted who are willing to take orders (high Deference) and who have relatively little need for independence (low Autonomy) and change (low Change); the characteristics of the applicants described above. Picture a policeman or an Army private who was very independent (high Autonomy) and who would not follow orders (low Deference) without arguing (high Aggression)!

In cross validating these findings, the 40 police applicants were found to differ from the 40 fireman applicants on 2 of the 16 (including Consistency) scales at the .05 level of confidence. Police applicants showed a higher need for Introception; fireman applicants a higher need for Affiliation. These could well represent chance findings. However, firemen do work in groups, whereas police usually work alone or in pairs, giving face validity to the greater need for Affiliation among the fireman applicants (mean of 51.80 for the fireman applicants versus 47.20 for the policeman applicants on Affiliation, p of .05).

So far, we have considered the differences in personality needs between medical students and various other groups, one personality need at a time. A second way to compare groups of subjects is to study the similarity of entire profiles; i.e., all 15 Edwards scales of the medical students with all 15 in another group. Rank-order correlation (ρ) is the statistic usually used for this purpose (McNemar, 1959). By the use of this statistic, it is possible to express by a single number

the degree of concordance or similarity in the 15 ranks of the medical student group with the 15 ranks of the civil service applicant group (based on the rank-order of the mean T scores in Table 10). Each of these groups, in turn, could be compared with other groups on the same 15 Edwards scales.

The rank-order correlations between the medical students and the civil service applicants, as well as between cross-validation samples for each group, are presented in Table 11. In this table (Table 11) it is seen (last column on the right) that the police applicants' profile (Table 10) on the 15 scales of the Edwards is almost identical (r of .88, p of .01) to the 15-scale profile of the fireman applicants. While not surprising, this finding constitutes a clear cross-validation of the personality needs obtained in the civil service group.

Likewise, Table 11 shows a correlation of .44 (p of .05) between the needs profile of the Class of 1961 and the needs profile of the Class of 1962. Compared to the correlation between sub-groups of civil service applicants, this smaller r could suggest a greater difference in personality between the members of the two medical school classes. However, inspection of the means of the medical students and the civil service applicants, as these are shown in Table 10, suggests that the lower r between the medical student cross-validation samples may be a statistical artifact. Whereas the difference between the highest ranked mean (60.01) and the lowest ranked mean (40.93) for the civil service applicants represents a difference of 19.08 T score units, the difference between highest ranked (57.04) and lowest ranked (44.67) means for the medical students was only 12.37 T score units. The

Table 11

Rank-order Correlations of Need Profiles on the Edwards between Medical Students and their Civil Service Applicant Controls				
Comparison Group	Class of 1961	Class of 1962	Both Classes	Fireman Applicants
Civil Service Applicants (N=80)	.39	.10	.29	-
Police Applicants (N=40)	.50*	.19	.42	.88**
Fireman Applicants (N=40)	.32	-.11	.12	-
Class of 1961 (N=40)	-	.44*	-	-
N	40	40	80	40

Significance levels: * equals .05 level (and equals .44 or higher).
** equals .01 level (and equals .62 or higher).

ranges of means of the two classes of medical students were roughly comparable (11.73 and 14.55), as were the ranges of means for the police and fireman applicants (20.25 and 17.90). It is a statistical fact that the narrower the range of scores within a distribution, the smaller will be the correlation of this distribution with a second distribution (McNemar, 1959). Therefore, the smaller differences among the 15 means in either the Class of 1961 or the Class of 1962 may have contributed to the relatively low rho between their need profiles.

To return to Table 11, it is clear that the profile of 15 needs of the 80 civil service applicants has very little in common (rho of .29)

with the profile of the 80 medical students. This finding was cross-validated in both the Class of 1961 (.39) and in the Class of 1962 (.10). In the other direction, it was cross-validated for police applicants against both classes of medical students (.42) and for fireman applicants (.12). These findings, expressed by rho, are merely another way of showing the differences between the medical students and their similarly-aged control group, the civil service applicants, discussed earlier and shown in Table 8 and several other tables.

Since Gee (1959) used exactly the same method utilized in this study (i.e., standard scores for male college students), the 15-scale Edwards profiles of her medical groups can be correlated with the profiles of our medical students; the same rank-order technique used to compare our medical students with the civil service applicants. Table 12 shows a rank-order correlational analysis of our Oregon medical students (upper-classmen) in relation to Gee's group of first year medical students from 28 medical schools, and in relation to Gee's groups of medical school graduates aiming for seven different specialties.

From Table 12 it will be seen that the average profile of personality needs for both University of Oregon Medical School classes correlated most highly with those of Gee's medical school graduates who elected to go into research and teaching (rho of .93, p of .01 for both Oregon Medical School classes combined); or into internal medicine (.90, p of .01). To a slightly lesser extent, the members of both classes had the personality traits of those going into surgery (.71, p of .01). The average member of neither class had the characteristic needs of those entering psychiatry (.33, p not significant).

Table 12

Rank-order Correlations of Need Profiles on the Edwards between Oregon Medical Students and Certain Medical Groups Reported by Gee ^a			
Comparison Group	Class of 1961 (N=40)	Class of 1962 (N=40)	Both Classes (N=80)
First Year Medical Students (N=2492)	.56*	.21	.53*
<u>Specialty Choice Groups</u>			
Research and Teaching (N=68)	.77**	.71**	.93**
Psychiatry (N=55)	.13	.36	.33
Medicine (N=182)	.76**	.70**	.90**
Surgery (N=131)	.66**	.46*	.71**
Gen. Practice (N=319)	.53*	-.07	.39
Ob.-Gyn. (N=59)	.76**	.31	.71**
Pediatrics (N=51)	.54*	.14	.44*

Significance levels: * equals .05 level (and equals .44 or higher).
** equals .01 level (and equals .62 or higher).

a: from Gee (1959).

Whereas the similarity, or lack of similarity, of the need profiles of these four specialty-choice groups (research and teaching, internal medicine, surgery, psychiatry) with those of the Oregon medical students was cross-validated between the Class of 1961 and the Class of 1962, this was not true for the other specialty-choice groups shown in Table 12 (general practice, obstetrics and gynecology, and pediatrics), or for

the first-year medical students of Gee. Whereas the Class of 1961 had a significant similarity (.53, .76, .54, .56) in need profiles with each of these medical groups, none of these four correlations was cross-validated when compared to the Class of 1962 (-.07, .31, .14, .21).

The suggestion from these findings would appear to be that both classes of medical students shared some needs in common with other medical groups (research and teaching, internal medicine, surgery) and that they differed on other needs. One class (Class of 1961) also shared needs in common with those entering general practice, obstetrics and gynecology, and pediatrics, but the Class of 1962 did not show similar needs. Thus, there appears to be a common core to the needs of the two classes in our medical school and a demonstrable difference in other dimensions. Since the two classes did not differ on I.Q., anxiety level, or the other indices of personal adjustment, this finding suggests that analysis of more subtle motivational needs and attitudes may prove a profitable area of exploration in future studies of medical students. Faculties tend to view classes as a whole as cooperative, bright, hostile, etc. (Becker et al., 1961). With more subtle measurements it may be possible to validate these opinions objectively, as is suggested in Table 12.

Turning to possible contaminating factors, no information is available on the possible influence of differences in "set" of subjects on the Edwards test under test-taking conditions such as in the present study. As mentioned previously in the Emotional Adjustment section, self-report inventories (including the Edwards) are not expected to give a "true" report of an individual's typical behavior. It is assumed that

most subjects will attempt to put themselves in their best light, or otherwise "fake" their responses, and that none will have perfect insight into their own characteristics. Empirically these factors are generally unimportant, since these inventories still differentiate groups of people (patients from "normals," engineers from lawyers, medical students from college students, etc.) (Cronbach, 1960). Thus, determination of how closely an individual's self-report resembles his "actual" behavior (presumably there is some relationship), whether his published self-report is "really" the way he sees himself, or what effect a person's particular attitudes, motivations, and "sets" has on the way he reports himself to be is beyond the scope of this study.

Since in the original design of this study a group of civil service applicants was employed as a control group for our Oregon medical students and since there exists a clear-cut difference in I.Q. between these two groups (shown in Table 2), it became necessary to study the possible effect of I.Q. on motivational traits, as measured by the Edwards and as shown in Table 8. Table 8 shows clear-cut differences in personality needs between the medical students and the civil service applicant control group. Whether these differences represent true differences in motivational needs between these two groups, based on occupational choice (medicine versus police-work and fire-fighting) and all the concomitant variables that go into this choice, or whether they are by-products of the difference in intelligence between these two groups is not clear from Table 8. Fortunately, there is a statistical technique, analysis of covariance, which approximates an answer to this question.

Analysis of covariance is a technique by which an investigator can answer the following question: if my two groups had not differed significantly on variable 1 (e.g., intelligence), would the difference that I obtained between the two groups on variable 2 (e.g., the Edwards' Achievement scale) still be a significant one? This statistical control may be necessary when an important variable cannot be controlled in the experimental design, and when it is not known from independent evidence the degree to which variable 1 (the potentially contaminating variable) is correlated with variable 2 (the variable under study). Following the statistical control of the potentially contaminating variable by this technique, a simple analysis of variance (F-test) can be done between groups of subjects on the adjusted distribution of scores on the variable under study. In addition, this technique gives an estimate of the degree of relationship between the two variables (within-groups Pearson r when only two groups of subjects are involved) (McNemar, 1959).

As shown in Table 13, adjustment of the means on the Edwards scales for the difference in I.Q. between the medical students (median I.Q. of 125.5) and the civil service applicants (median I.Q. of 113) resulted in a marked reduction in the difference between these two groups on the Achievement, Abasement, Endurance, and Heterosexuality scales. In each case, the originally significant differences were no longer significant after adjustment for I.Q. After adjustment for differences in I.Q., the differences between groups on the Deference, Order, Autonomy, Change, and Aggression scales still remained significant; although the level of confidence was reduced in each case. This represents a rather marked interaction between several of the Edwards needs and intelligence, with perhaps both tapping some more general unitary trait or process.

Table 13

Analyses of Covariance on Ten Scales of the Edwards PPS, Adjusting for I.Q. Scores
of Medical Students and Civil Service Applicants

Scale	Unadjusted Means & F-test Scores ^a		Means Adjusted for I.Q. & F-test Scores				
	Medical Students	Civil Service	Medical Students	Civil Service			
	F-test Scores	Sig. Level	F-test Scores	Sig. Level			
Achievement	18.55	16.16	14.07	.001	17.54	17.17	.20
Deference	11.48	13.99	17.62	.001	11.84	13.63	4.64 .05
Order	10.36	13.24	19.30	.001	10.90	12.70	4.00 .05
Autonomy	14.49	10.34	37.86	.001	13.55	11.34	10.22 .01
Abasement	10.44	14.29	27.86	.001	11.72	12.94	1.37
Change	15.69	13.59	9.67	.01	15.66	13.62	4.78 .05
Endurance	15.84	17.95	7.95	.01	16.82	16.97	.00
Heterosexuality	17.50	14.73	10.20	.01	16.82	15.41	1.37
Aggression	13.18	10.66	14.08	.001	12.98	10.86	5.00 .05
Consistency	12.00	11.16	8.24	.01	11.78	11.38	1.00

a: These unadjusted mean raw scores and F-tests are also shown in Table 8.

Note: Only those scales from the Edwards PPS are included in this table on which there was a significant difference between the 80 medical students and the 80 civil service applicants before analysis of covariance.

Table 14

Product-moment Correlations (Pearson r) between Full-Scale I.Q.
and all Edwards PPS Scales for 80 Medical Students and 80 Civil
Service Applicants

Scale	Within-Groups		Medical Students		Civil Service Apps.	
	r	p level	r	p level	r	p level
Achievement	.26	.001	.24	.05	.28	.05
Deference	-.10		-.16		-.04	
Order	-.13		-.19		-.08	
Exhibition			.15		.04	
Autonomy	.14		.04		.23	.05
Affiliation			-.10		.06	
Introception			.15		-.06	
Succorance			-.01		-.08	
Dominance			-.02		.25	.05
Abasement	-.25	.01	-.12		-.47	.001
Nurturance			-.07		.04	
Change	.01		-.01		.03	
Endurance	-.21	.01	-.16		-.26	.05
Heterosexuality	.13		.19		.08	
Aggression	.05		.05		.05	
Consistency	.12		.11		.13	

Note: N = 160 for within-groups correlations; N = 80 for each of the two separate groups, thus the difference in significance level for correlations of similar magnitude.

As shown in Table 14, the within-groups product-moment correlations between these Edwards scales and Full Scale I.Q. were fairly low (.01 to .26), superficially implying that there is little relationship between I.Q. and these Edwards scales. However, these low correlations may well be a statistical artifact, based on the small range of raw scores on the Edwards scales. As shown in Table 8, the standard deviations on most scales are only about 4 raw score units for both the medical students and the control group of civil service applicants. In view of the demonstrated effect (Table 13) of analysis of covariance on many Edwards scales (differences between means and significance levels were reduced on almost every scale investigated), the latter explanation seems more probable.

Since the within-groups correlation does not show whether intelligence and the personality needs were interrelated throughout the range of I.Q. of the medical students (111 to 149) and of the civil service applicants (86 to 131), correlations were done separately for these two groups of subjects, as shown in Table 14. As shown in this table, Achievement was the only need to be significantly correlated with I.Q. in both the medical students (.24) and in the civil service applicants (.28). In fact, this was the only need which significantly correlated with I.Q. in the medical student group. On the other hand, 5 of the 16 Edwards scales were significantly correlated with I.Q. for the civil service applicants. For Abasement this correlation (r of $-.47$) reached the .001 level of confidence, compared to a nonsignificant correlation of $-.12$ for the medical students on this scale.

In the absence of external validation and in view of the probability

that these correlations are artificially low, the following tentative conclusions seem tenable:

1. in both groups, individuals with a higher I.Q. tend to have a higher need for Achievement, and vice versa;
2. there are trends for individuals with higher I.Q. scores to have lower needs for Deference, Order, Abasement, and Endurance;
3. there are trends for individuals with higher I.Q. scores to have greater needs for Autonomy and Heterosexuality;
4. individuals with higher I.Q. scores tend to be more Consistent in the way they score the Edwards test;
5. the relationship between I.Q. and these scales may not be uniform at all levels of intelligence (as with Abasement).

The reader should be cautioned that a causal relationship between I.Q. and the Edwards scales is not implied, only that the two probably tap some unitary trait. Attempts to duplicate these findings and extension of the possible relationship between the Edwards scales and I.Q. to lower I.Q. scores (below 100) would prove most interesting.

From all these complex interactions on the Edwards Personal Preference Schedule the following seems clear:

1. The most dominant, all-pervasive personality needs reported by the medical students were the needs to do one's best, to accomplish important things (Achievement), and to continue with difficult tasks until completed (Endurance).
2. Medical students report little need to feel sorry for themselves, to feel guilty or inferior (Abasement), or to have others feel sorry for them (Succorance).

3. The need to help those in trouble, to sympathize with the sick, and to have others confide in you (Nurturance) was no more or less characteristic of the medical students than of other groups (male college students, civil service applicants) of young men in our society.

4. Since there were no more significant differences between the Class of 1961 and the Class of 1962 on the scales of the Edwards than those easily accounted for by chance, the preceding conclusions can be accepted as reliable.

5. Of the various medical specialties, the average personality needs of the Oregon medical students most closely resembled those of medical school graduates who were entering research and teaching (rho of .93), internal medicine (rho of .90) and, to a slightly lesser extent, surgery (rho of .71). The average Oregon medical student did not have a need profile similar to that of graduates entering psychiatry (rho of .39).

6. As one might expect, the medical students and their civil service applicant controls did not share a common pattern of Edwards personality needs (rho of .29).

7. The civil service applicants reported little need for independence (low Autonomy), a desire to do things in a routine and conventional way (low Change), and a higher willingness to take orders (high Deference); personality characteristics seemingly consistent with the requirements of civil service work.

8. That the preceding findings for the civil service applicants are reliable was demonstrated by the general lack of significant differences between the police applicants and the fireman applicants on

each Edwards scale, and by the high degree of similarity of their total profiles on the Edwards (rho of .88).

9. On the basis of analysis of covariance, it appears that intelligence has an important relationship with many of the Edwards scales. Of these needs, a higher need for Achievement appears to go with a higher I.Q. score, and vice versa. In the range of ability of the civil service applicants (I.Q. range from 86 to 131), differences in intelligence seem to make a difference in the individual's report of his sense of ability (superiority-inferiority) to cope with his environment (correlation between Abasement and I.Q. of $-.47$ for the civil service applicants). Possible relationships between I.Q. and other Edwards scales were suggested.

10. Despite distinct, statistically significant, and cross-validated differences between the medical students and their civil service applicant control group on many scales on the Edwards, on most scales there were individuals in both groups covering most of the range of possible scores.

E. Interests.

Each individual's dominant interest patterns were assessed by the Strong Vocational Interest Test. This test is described in the Method section. A copy of this test is in Appendix 1.

Three different types of scores must be considered in the analysis and interpretation of findings on the Strong Vocational Interest Blank: 1) standard (T) scores; 2) letter ratings; and 3) chance scores.

1. Standard (T) scores, as used also in the Edwards Personal Preference Schedule, are based on the distribution of scores on Strong's original validation sample (criterion group) of successful members of each occupation; the standard score mean being 50 and the standard deviation 10 for these "criterion groups" on their respective scales. Thus, by the use of standard scores, scores on all the various scales are comparable. In interpreting the Strong, it is necessary to remember that the higher the T score, the greater the likelihood that the individual, or group, has the interests of the average successful man in that occupation, and not necessarily those of the most successful member of that occupation (Strong, 1943, p. 67).

2. A second way to score the Strong is by letter ratings. Letter ratings range from "A" to "C." A letter rating of "A" or "B+" means that the individual has interests similar to those of persons successfully engaged in that occupation. A score of "C" or "C+" indicates that the individual does not have the interests of those in that occupation. Scores of "B" or "B-" are rather equivocal, but including those with a "B" rating with those with interests like those in a given occupation ("A" or "B+"), and including those with a "B-" rating with those who do

not have the interests of that occupation ("C" or "C+") is within the range of dependability of the test (Strong, 1943, p. 60).

The inter-relationships between standard (T) scores and letter ratings, and the approximate percent of each criterion group found in each letter score interval are shown in Table 15. As will be seen from this table, approximately 93.4 percent of a criterion group had a letter rating of "B" or higher, providing their scores were normally distributed. Only about 6.6 percent would be expected to have had a letter score of "B-" or below.

Table 15

The Relationship Between Standard (T) Scores and Letter Ratings on the Strong Vocational Interest Blank for a Typical Criterion Group ^a				
Letter Rating	T Score Equivalent	Relation to Criterion Group ^b		
		S.D. Equivalent	Percent	Cum. Percent
A	45 & above	-0.5 & above	69.2	69.2
B+	40 to 44	-0.5 to -1.0	15.0	84.2
B	35 to 39	-1.0 to -1.5	9.2	93.4
B-	30 to 34	-1.5 to -2.0	4.4	97.8
C+	25 to 29	-2.0 to -2.5	1.6	99.4
C	24 & below	-2.5 & below	0.6	100.0

a: This table was modified from Strong, 1943, p. 64.

b: Percentages and cumulative percent are based on the assumption that the scores of a criterion group will be normally distributed. In fact, this is a close approximation.

Letter ratings on the Strong are generally easier to interpret

than T scores, but T scores are more precise, since they make use of all measurements made whereas groups of T scores are combined in letter ratings. (Strong, 1943, p. 67).

3. A complicating factor is the possibility that a score on a given Strong scale may be obtained by chance; i.e., by answering the items on that scale at random. The chance score ranges (plus or minus one standard deviation) for all scales are represented by the shaded areas on the Harkes Report Form for the Strong, as shown in Figures 10 and 11. As shown in these figures, chance scores vary widely from scale to scale, extending as high as the "B+" range on the Real Estate Salesman scale. Scores falling in the chance range generally should be ignored, since they indicate neither possession nor nonpossession of interests compatible with those of persons in that occupation (Strong, 1943, p. 86). A group heterogeneous with respect to the interests of a given occupational group will have a mean score on that occupational scale near the mean chance score, whereas 96 percent of the criterion group of successful members of the same occupation (a homogeneous group with respect to the interests in that scale) will score above the mean chance score. This is true for each of the 45 occupations' scales (Strong, 1951a).

Of what importance is it to know what occupational groups' interests a specific individual's interests are like? Put differently, what does the Strong measure? What does knowledge of a score on the Strong allow one to predict? In a review of the literature on the Strong from 1950 to 1960, Berdick (1960) concluded that:

1. successful members of the various occupations today generally have interests very similar to those held by successful members of the

same occupations in years past (present form of the Strong came out in 1938);

2. students in training bear a marked resemblance in interests to persons in the occupations for which they are preparing (although there are exceptions and trends);

3. the Strong may predict grades or success in training, but not nearly as well as tests designed specifically to make such predictions (achievement tests);

4. despite relatively poor currently existing criteria of job satisfaction and few relevant studies, there is suggestive evidence (correlations as high as .46 between the relevant scale score and job satisfaction) that there is a rather significant relationship between Strong scores and job satisfaction, perhaps the highest of any test available today;

5. once an occupation is chosen (e.g., when a major field is selected in college), the Strong quite consistently predicts continuation in that occupation;

6. there is little relationship between interest test scores and ability test scores (they apparently tap quite different areas of a person's total make-up).

Strictly speaking, an interest score on a test such as the Strong measures the similarity of interests of an individual (or group) with a criterion group of successful members of an occupation. However, Strong (1960) reports that these scores can also be viewed as a measure of drive toward a certain end (a matter of direction, not of how hard an individual will work in that direction or how well he will do.) He

reports that the higher the score on a given Strong scale, the greater the chance of entering that occupation, and vice versa. However, the interest scales have predictive value only when an individual is motivated to earn a living and when interests are not outweighed by other values (financial returns, family influence, local opportunities, marital or military obligations, etc.). (Strong, 1960).

This background should make the findings on the Strong in the present study more meaningful for the reader. To turn to the findings on the Strong in our investigation, Figure 7 shows the mean profiles on the Strong of the 80 medical students and the 80 civil service applicants. Figure 8 shows the mean profiles of the 40 medical students from the Class of 1961 and the 40 from the Class of 1962. Figure 9 shows the mean profiles of the 40 police applicants and of the 40 fireman applicants. Occupational scales are grouped in these figures according to the method of Hagenah (1960) (in contrast to the method of Hankes which is shown in Figure 10 and Figure 11). Discussion will be based on Hagenah's grouping of scales. Both standard (T) scores and letter ratings are given in these figures to make scores more meaningful. By the use of analysis of variance (F-test) standard scores were analyzed on all scales, between experimental and control groups and between cross-validation samples. In the figures, the level of confidence of the difference between means on each scale, as measured by the F-test, are given near the top of the figure, above the means on that scale. It should be noted that the special scales of Interest Maturity, Occupational Level, and Masculinity-Femininity, at the extreme right of each of these three figures, are in terms of standard (T) scores only (not letter

ratings), and that they are shifted down 10 points on each of these three figures to show the high mean scores on these scales.

Each of these three figures (Figures 7, 8, and 9) shows relative differences either between medical students and civil service applicants, or between cross-validation samples. In addition these figures show the similarity of interests of any of these groups to successful men in each of 45 occupations.

The means, standard deviations, and ranges of the medical students and the civil service applicant control group are presented in Table 16. F-test scores and significance levels between these two groups are also included in this table. This table may be referred to when the reader desires more specific information than is available in Figure 7.

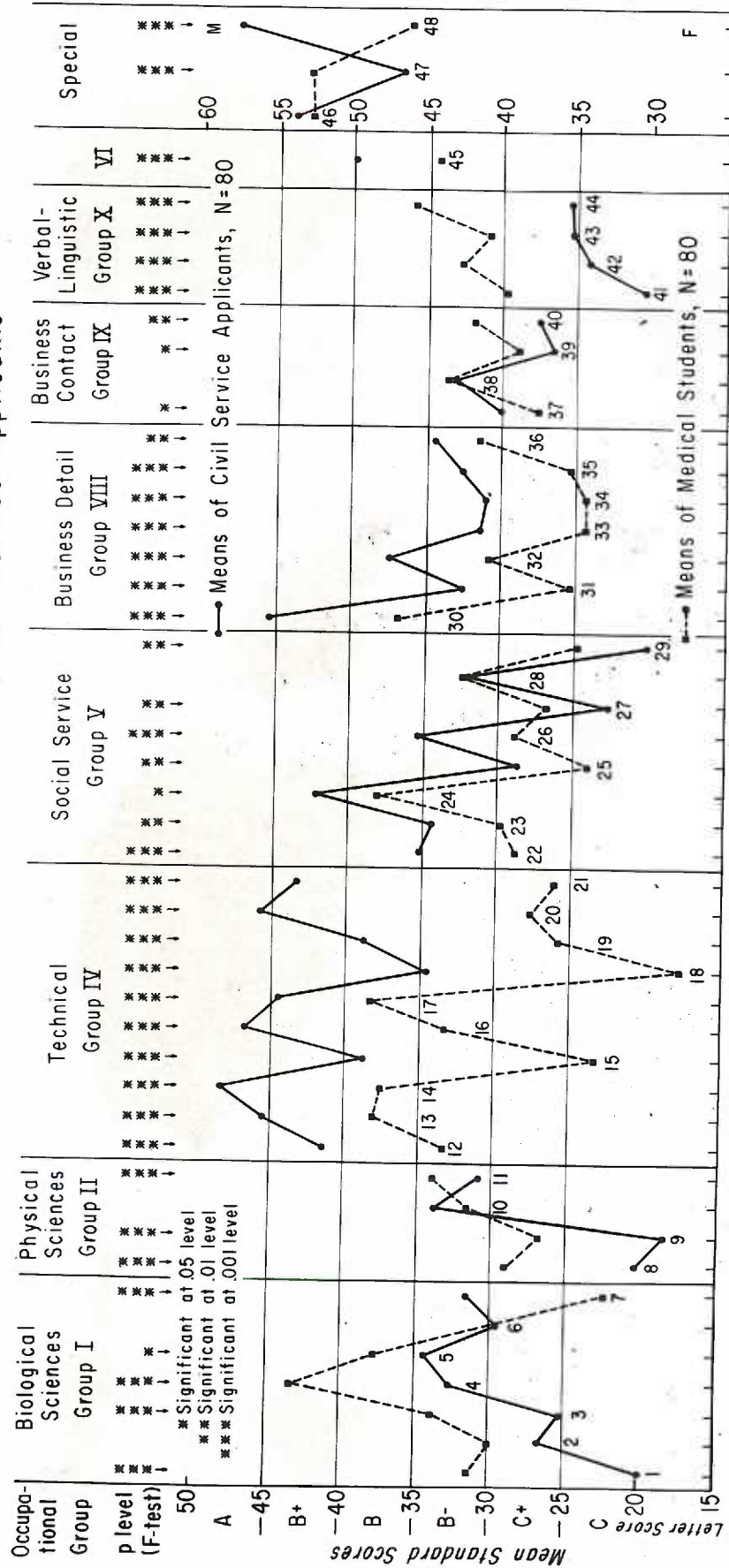
While profiles are more easily visualized in Figures 7, 8, and 9, Table 16 does show quite well the individual variation within each group on each scale, keeping in mind that the original criterion groups had T score means of 50 and standard deviations of about 10 on their respective scales. As shown in Table 16, the extent of individual variation among the medical students and the civil service applicant control group was quite comparable across the two groups on most scales. Both groups had restricted standard deviations on most of the business and verbal-linguistic occupations (see Figure 7 for these broad groupings of occupations), and standard deviations (Table 16) roughly comparable to those of the criterion groups on most of the science, technical, and social service occupations. There were specific individuals (varying in number from scale to scale) among both the medical

FIGURE 7.

Mean Standard Scores on all Scales: Strong Vocational
Interest Blank. A Comparison of Medical
Students and Civil Service Applicants

Mean Standard Scores on all Scales: Strong Vocational Interest Blank

A Comparison of Medical Students and Civil Service Applicants



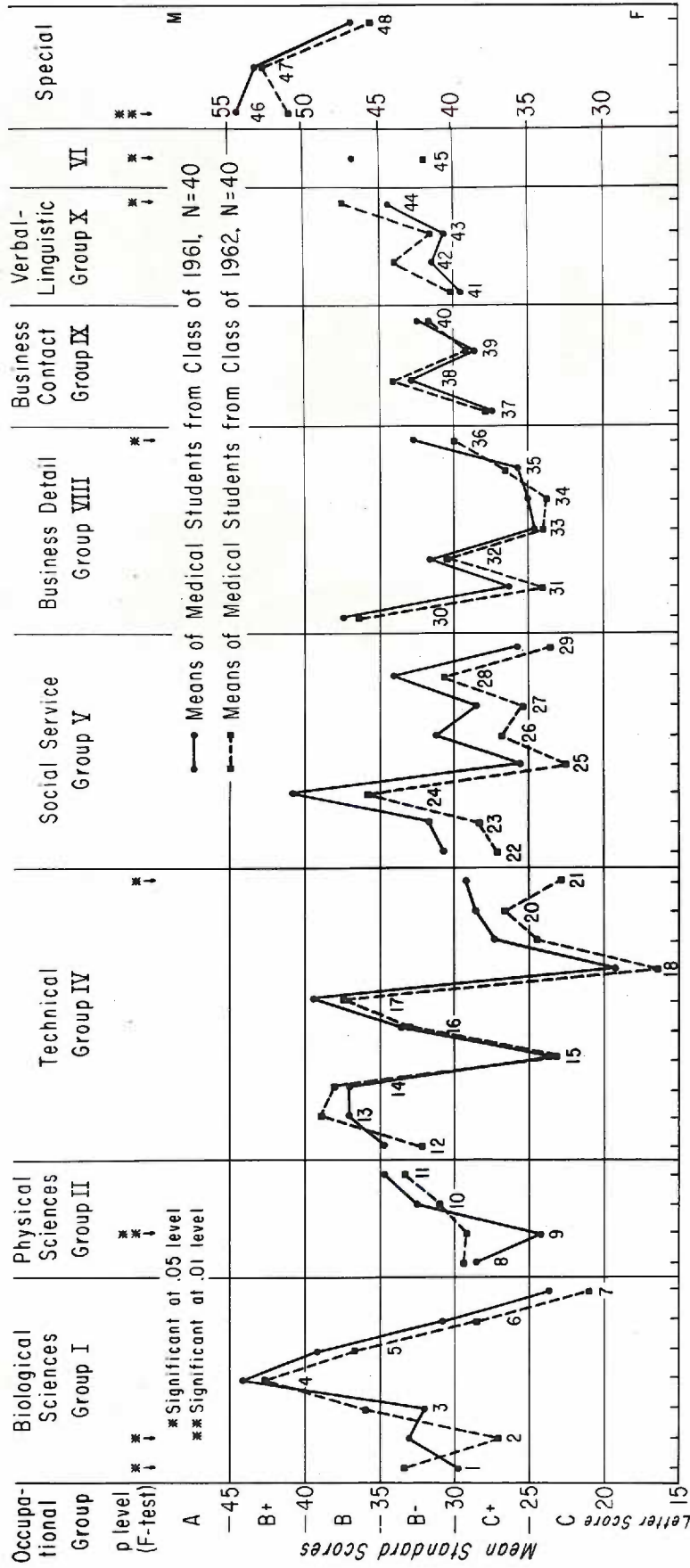
- 1. Artist
- 2. Psychologist
- 3. Architect
- 4. Physician
- 5. Osteopath
- 6. Dentist
- 7. Veterinarian
- 8. Mathematician
- 9. Physicist
- 10. Engineer
- 11. Chemist
- 12. Production Manager
- 13. Farmer
- 14. Aviator
- 15. Carpenter
- 16. Printer
- 17. Math-Phys. Sci. Teacher
- 18. Industrial Arts Teacher
- 19. Voc. Agriculture Teacher
- 20. Policeman
- 21. Forest Service Man
- 22. YMCA Phys. Director
- 23. Personnel Director
- 24. Public Administrator
- 25. YMCA Secretary
- 26. Soc. Sci. H.S. Teacher
- 27. City School Supt.
- 28. Social Worker
- 29. Minister
- 30. Senior C.P.A.
- 31. Accountant
- 32. Office Man
- 33. Purchasing Agent
- 34. Banker
- 35. Mortician
- 36. Pharmacist
- 37. Sales Manager
- 38. Real Estate Salesman
- 39. Life Ins. Salesman
- 40. Pres.-Mfg. Concern
- 41. CPA
- 42. Advertising Man
- 43. Lawyer
- 44. Author-Journalist
- 45. Musician
- 46. Interest Maturity
- 47. Occupational Level
- 48. Masculinity-Femininity

FIGURE 8.

Mean Standard Scores on all Scales: Strong Vocational
Interest Blank. A Comparison of Two
Medical School Classes

Mean Standard Scores on all Scales: Strong Vocational Interest Blank

A Comparison of Two Medical School Classes



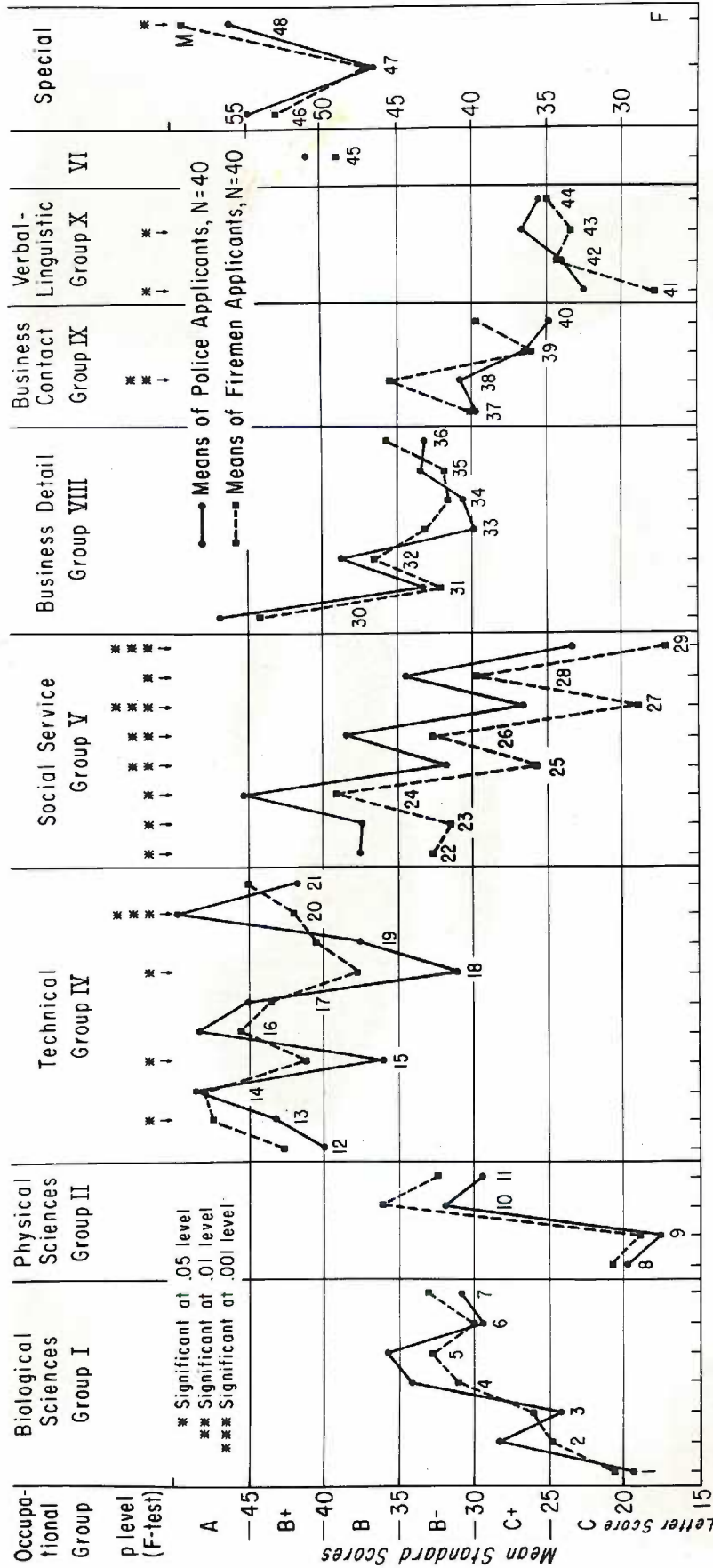
- 1. Artist
- 2. Psychologist
- 3. Architect
- 4. Physician
- 5. Osteopath
- 6. Dentist
- 7. Veterinarian
- 8. Mathematician
- 9. Physicist
- 10. Engineer
- 11. Chemist
- 12. Production Manager
- 13. Farmer
- 14. Aviator
- 15. Carpenter
- 16. Printer
- 17. Math-Phys. Sci. Teacher
- 18. Industrial Arts Teacher
- 19. Voc. Agriculture Teacher
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- 22. YMCA Phys. Director
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- 24. Public Administrator
- 25. YMCA Secretary
- 26. Soc. Sci. H.S. Teacher
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- 28. Social Worker
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- 30. Senior C.P.A.
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- 33. Purchasing Agent
- 34. Banker
- 35. Mortician
- 36. Pharmacist
- 37. Sales Manager
- 38. Real Estate Salesman
- 39. Life Ins. Salesman
- 40. Pres.-Mfg. Concern
- 41. CPA
- 42. Advertising Man
- 43. Lawyer
- 44. Author-Journalist
- 45. Musician
- 46. Interest Maturity
- 47. Occupational Level
- 48. Masculinity-Femininity

FIGURE 9.

Mean Standard Scores on all Scales: Strong Vocational
Interest Blank. A Comparison of Police
Applicants and Fireman Applicants

Mean Standard Scores on all Scales: Strong Vocational Interest Blank

A Comparison of Police Applicants and Firemen Applicants



- 1. Artist
- 2. Psychologist
- 3. Architect
- 4. Physician
- 5. Osteopath
- 6. Dentist
- 7. Veterinarian
- 8. Mathematician
- 9. Physicist
- 10. Engineer
- 11. Chemist
- 12. Production Manager
- 13. Farmer
- 14. Aviator
- 15. Carpenter
- 16. Printer
- 17. Math-Phys. Sci. Teacher
- 18. Industrial Arts Teacher
- 19. Voc. Agriculture Teacher
- 20. Policeman
- 21. Forest Service Man
- 22. YMCA Phys. Director
- 23. Personnel Director
- 24. Public Administrator
- 25. YMCA Secretary
- 26. Soc. Sci. H.S. Teacher
- 27. City School Supt.
- 28. Social Worker
- 29. Minister
- 30. Senior C.P.A.
- 31. Accountant
- 32. Office Man
- 33. Purchasing Agent
- 34. Banker
- 35. Mortician
- 36. Pharmacist
- 37. Sales Manager
- 38. Real Estate Salesman
- 39. Life Ins. Salesman
- 40. Pres.-Mfg. Concern
- 41. CPA
- 42. Advertising Man
- 43. Lawyer
- 44. Author-Journalist
- 45. Musician
- 46. Interest Maturity
- 47. Occupational Level
- 48. Masculinity-Femininity

Table 16

A Comparison of Medical Students (N=80) and Civil Service Applicants (N=80) on the Strong Vocational Interest Blank (T Scores)							
Scale	Medical Students			Civil Service Applicant			F-test Score
	Mean	S.D.	Range	Mean	S.D.	Range	
I Artist	31.44	7.44	13-51	19.85	8.75	3-39	81.49***
Psychologist (Rev.)	30.00	12.38	7-57	26.60	9.74	0-53	3.73
Architect	33.89	9.19	13-54	25.03	8.62	-2-46	39.56***
Physician (Rev.)	43.45	7.52	25-64	32.61	9.94	8-54	60.52***
Osteopath	37.83	9.18	18-63	34.22	12.36	10-67	4.41*
Dentist	29.65	6.77	11-44	29.63	8.01	7-46	.00
Veterinarian	22.32	8.42	4-38	31.76	11.07	3-54	36.36***
II Mathematician	29.00	7.61	11-46	20.13	10.13	-7-46	39.26***
Physicist	26.66	8.62	2-44	18.11	7.39	-2-33	44.76***
Engineer	31.60	8.51	11-56	33.98	9.86	12-53	2.66
Chemist	34.00	6.84	19-61	30.81	7.55	10-46	7.87**
IV Production Mgr.	33.45	8.21	9-62	41.35	9.19	21-64	32.90***
Farmer	38.00	8.09	19-57	45.26	9.31	23-63	27.73***
Aviator	37.45	8.60	16-54	48.28	9.54	23-68	56.86***
Carpenter	23.25	9.79	4-45	38.58	11.42	13-66	83.04***
Printer	33.20	9.10	8-60	46.89	8.87	25-68	92.80***
Science Teacher	38.43	8.49	15-56	44.23	8.76	20-65	18.07***
Ind.Arts Teacher	17.81	10.75	-4-51	34.36	12.37	4-61	81.55***
Voc.Agri.Teacher	25.79	9.42	1-46	38.93	10.58	15-66	68.81***
Policeman	27.64	7.63	11-44	45.86	10.75	19-71	152.80***
Forest Service	26.01	12.25	-2-52	43.29	11.41	20-75	85.24***
V YMCA Phys.Dir.	28.81	9.02	-2-50	35.13	9.93	12-63	17.72***
Personnel Dir.	29.89	14.41	-5-66	34.38	10.45	7-59	5.08*
Public Admin.	38.24	11.58	6-65	42.25	10.85	17-69	5.12*
YMCA Secy.	24.03	10.51	-17-45	28.60	10.09	7-50	7.89**
Soc. Sci. Teacher	29.01	9.99	0-56	35.49	9.07	15-52	18.42***
Social Worker	32.34	10.96	7-54	32.09	10.70	4-60	.02
Minister	24.75	9.58	-2-43	20.10	8.36	1-46	10.70**
VIII Senior CPA	36.95	10.93	-11-56	45.38	9.47	19-67	27.14***
Accountant	25.13	9.42	1-45	32.50	6.77	18-49	32.37***
Office Man	30.91	6.75	5-49	37.50	7.24	19-52	35.43***
Purchasing Agent	24.29	7.93	4-44	31.46	8.54	7-62	30.32***
Banker	24.39	4.68	13-38	30.91	5.46	18-42	65.83***
Mortician	26.11	6.22	11-43	32.60	8.04	12-55	32.59***
Pharmacist	31.44	5.95	17-50	34.40	6.57	20-55	8.94**
IX Sales Manager	27.61	6.60	14-45	29.89	7.91	14-54	3.90*
Real Estate Sales	33.54	5.19	22-49	33.16	6.95	19-49	.15
Life Ins.Salesman	28.89	6.65	15-45	26.20	8.09	11-48	5.27*
Fres.-Mfg.Concern	32.08	6.96	12-54	27.18	12.10	-1-62	9.72**
X CPA	29.80	5.71	19-48	20.19	8.87	4-44	66.43***
Advertising Man	32.68	6.47	17-52	24.06	7.40	-2-48	61.44***
Lawyer	31.06	4.75	17-42	25.13	6.41	12-46	44.32***
Author-Journalist	35.94	6.85	20-55	25.18	6.42	14-38	105.24***
VI Musician	24.43	9.18	7-53	40.11	7.23	14-59	19.02***
Interest Maturity	52.81	6.24	33-68	54.04	6.02	39-67	1.60
Occupational Level	53.03	2.77	43-65	46.79	4.83	36-60	100.31***
Masculinity-Fem.	46.19	6.67	24-64	57.79	6.95	36-73	116.06***

* = .05 level.

** = .01 level.

*** = .001 level.

students and the civil service applicants who had interests like those of each of the 45 occupations shown. Likewise, there were individuals in both groups who definitely lacked the interests of most occupations; although these were different individuals for different occupations.

Despite this individual variation, there were distinct modes for the medical students and the control group of similarly aged men. For simplification, the interests of the average member of each group will be discussed as if he represented the interests of the entire group. For example (Table 16), it can be said that the medical students, on the average, had few interests in common with psychologists (mean of 30.0). However, although not shown, 20 percent of these medical students had a "B+" or "A" score on the Psychologist scale, and 30 percent had a "B" or higher score (i.e., "B," "B+," or "A") on this scale. Future psychiatrists may well come from this 30 percent minority, since Gee (1959) has demonstrated that most medical school graduates entering psychiatry have high scores on the Psychologist scale while relatively few graduates entering other specialties score high on this scale.

Another way to understand the means to be presented in this discussion is that roughly 50 percent of a particular group will be more likely to have the interests of that occupation that the mean indicates; i.e., if one accepts scores of "B" or higher as indicative of the presence of the interests of a given occupation, and if the average (mean and median) member of any group scores at the lower border of the "B" interval (a T score of 35), then one-half of the members of that group may be said to have the interests of that occupation.

Another way to examine the interest profiles shown in Figures 7, 8, and 9 is to rank-order the mean T scores of the 45 occupations for each

group of subjects (medical students and civil service applicants); to show those occupations with which members of a group have the most interests in common and those occupations with which these members have the fewest interests in common. With this in mind, the upper half (in descending order by magnitude of mean T score) of Table 17 shows those occupations with which members of each group in our study were most likely to share interests (mean of "B" or higher). The lower half (in ascending order) of this same table shows those occupations with which each group was least likely to share common interests (means of "C").

As shown in Table 17, both classes of medical students had interests most like those of successful practicing physicians. Thus, our study serves the incidental purpose of providing an additional cross-validation for Strong's Physician scale. The medical students' other interests were highly selective. They had interests in common with such diverse occupational groups as Public Administrators, Math.-Science Teachers, Farmers, Aviators, and Author-Journalists. They rejected, or at least lacked, the interests of equally varied occupations, including Industrial Arts Teaching, Veterinary Medicine, Banking, and the Ministry.

This high selectivity of interests makes generalization to types or groups of occupations difficult; e.g., when the medical students had interests most like those of Physicians and least (second lowest mean) like Veterinarians (Table 17), it is hard to say that they either had or did not have the interests of men in the "healing arts" or the biological sciences (Group I, Figure 7). To determine which factors contribute to these differences was beyond the scope of this study.

In general, as shown in Figure 7, the Oregon medical students

Table 17

High- and Low-Ranked Strong Vocational Interest Blank Mean Scores of Medical Students and of Civil Service Applicants

Class of 1961	Medical Students		Civil Service Applicants	
	Class of 1962	Both Classes	Police Applicants	Fireman Applicants
Physician	Physician I	Physician I	Policeman	Aviator
Public Admin.	Farmer	Math-Sci. Teacher IV	Aviator	Printer IV
Math-Sci. Teacher	Aviator	Public Admin. V	Printer	Policeman IV
Osteopath	Author-Journalist	Farmer IV	Senior CPA	Senior CPA VIII
Senior CPA	Math-Sci. Teacher	Osteopath I	Public Admin.	Farmer IV
Farmer	Osteopath	Aviator IV	Math-Sci. Teacher	Math-Sci. Teacher IV
Aviator	Senior CPA	Senior CPA VIII	Farmer	Forest Service IV
Musician	Architect	Author-Journalist I	Forest Service	Public Admin. V
	Public Admin.		Musician	Production Mgr. IV
			Production Mgr.	Musician (VI)
			Office Man	Voc. Agr. Teacher IV
			Soc. Sci. Teacher	Carpenter IV
			YMCA Phys. Dir.	Office Man VIII
			Voc. Agr. Teacher	Soc. Sci. Teacher V
			Personnel Dir.	YMCA Phys. Dir. V
			Carpenter	
				Pharmacist
				Real Estate Sales

"B" or Higher Interests (Highest First)

Ind. Arts Teacher	Ind. Arts Teacher IV	Physicist	Minister	Physicist II
Carpenter	Veterinarian I	Artist	CPA	Artist I
Veterinarian	Carpenter IV	Mathematician	Physicist	Minister V
Physicist	YMCA Secy. V	CPA	School Supt.	Mathematician II
Purchasing Agent	Purchasing Agent VIII	Minister	Artist	CPA I
Banker	Banker VIII	Advertising Man	Mathematician	School Supt. V
	Minister V	Architect	Lawyer	Advertising Man X
	Accountant	Pres-Mfg. Concern	Advertising Man	
	Purchasing Agent	Psychologist		
	Voc. Agr. Teacher			

"C" Interests (Lowest First)

Ind. Arts Teacher	Ind. Arts Teacher IV	Physicist	Minister	Physicist II
Carpenter	Veterinarian I	Artist	CPA	Artist I
Veterinarian	Carpenter IV	Mathematician	Physicist	Minister V
Physicist	YMCA Secy. V	CPA	School Supt.	Mathematician II
Purchasing Agent	Purchasing Agent VIII	Minister	Artist	CPA I
Banker	Banker VIII	Advertising Man	Mathematician	School Supt. V
	Minister V	Architect	Lawyer	Advertising Man X
	Accountant	Pres-Mfg. Concern	Advertising Man	
	Purchasing Agent	Psychologist		
	Voc. Agr. Teacher			

had little interest in common with those in the "pure" sciences (Physicist, Mathematician), or with those in the social service occupations (Social Worker, Minister). On the other hand, they also had little interest in common with those in the business world, either those concerned with details (Banker, Accountant) or with business contacts (Insurance Salesman). These findings agree closely to those of Gee (1959) and of Kelly (1957) in their extensive studies of medical students at other medical schools.

Table 17 also shows that the interests of the two classes of Oregon medical students were quite similar, generally fitting the pattern just described.

As shown in Figures 7 and 9 and in Table 17, the control group of civil service applicants had interests most like those of men in the various technical occupations (Group IV in Figure 7). The police applicants (Table 17) had interests most like those of Policemen, thus also validating, in our study, Strong's Policeman scale.

The fireman applicants' interests were almost equally similar to those of Aviators and Farmers. To date, there is no Fireman scale on the Strong. One would expect a Fireman scale, if developed, to have characteristics in common with these technical occupations.

Both police and fireman applicants also shared the interests of those concerned with the details of business (Group VIII; Office Man, Senior CPA), though this was less characteristic of them than the technical interests. Only the police applicants had the interests of men in the social service occupations (Group V; YMCA Physical Director, Social Science Teacher, Personnel Director, Public Administrator). Neither

group of applicants had much interest in common with men in either the biological (I) or physical (II) sciences, or the business-contact (IX) and verbal-linguistic (X) occupations.

As also shown in Table 17, the medical students and the civil service applicants shared in common the interests of Math.-Science Teachers, Farmers, Aviators, Senior CPA's, and Public Administrators.

On superficial inspection of Table 17, the civil service applicants seemed to have had a much wider range of interests than did the medical students, since they had 15 scales with a mean of "B" or higher, compared to only 8 such scales for the medical students. However, closer inspection of Table 17 (in conjunction with Figure 7) shows that the high scores of the medical students were scattered over 5 of the 7 major (I, IV, V, VIII, X) occupational categories, compared to only 3 (IV, V, VIII) (excluding Musician) for the civil service applicants, indicating that the medical students actually had the wider range of interests.

As also shown in Table 17, this high selectivity of interests also appeared among those occupations with which the medical students and civil service applicants lacked common interests. Both groups had 7 occupational scale means in the "C" range, indicating lack of interest in common with persons in those seven occupations. In both groups these 7 occupations were scattered in 4 different occupational (I, IV, V, & VIII for the medical students; I, II, V, & X for the civil service applicants) groups.

As shown in Figures 10 and 11 (referred to early in this section), some of the mean T scores of the medical students and of their control group of civil service applicants fall in the chance range (e.g., the

Industrial Arts scale for the medical students), as shown by the darkened areas on the scales in these two figures. As Strong (1951a) has pointed out, means falling in the chance range indicate that that particular group of individuals is heterogeneous with respect to the interests of the occupation on that scale, even if the mean falls in the "B" or "B+" range (e.g., the Farmer scale for the medical students). Therefore, since the medical students' relatively high means on the Farmer (mean of 38.00) and Author-Journalist (mean of 35.94) scales fall in the chance range, the medical students should be considered to be heterogeneous with respect to the interests of Farmers and of Author-Journalists and not as characterized by the interests of these occupations. None of the high means of the civil service applicants fell in the chance range.

Looking again at Figures 10 and 11, the only Strong scale on which the mean of the medical students fell below the chance range was the Banker scale, indicating definite absence of the interests of that occupation. Only the interests of Artists, Advertising Men, and Author-Journalists were definitely not characteristic of the civil service applicants by this criterion.

As also shown in Figures 10 and 11, the biological sciences (Group I) and the physical sciences (II) were the only groups in which the mean scores of the medical students were higher than chance on every scale. In contrast, the technical occupations (IV) was the only such category, with means on all scales above chance, for the civil service applicants.

While the preceding analysis has characterized the major interests of the medical students and their controls, the differences between the

FIGURE 10.

Mean Profile of 80 Medical Students on the Strong
Vocational Interest Test in Relation
to Chance Scores

The mean chance score plus or minus one standard
deviation is indicated by the darkened area
on each scale.

STRONG VOCATIONAL INTEREST TEST-MEN

10

HANKES REPORT FORM FOR-

SEE OTHER SIDE FOR EXPLANATION

GROUP	OCCUPATION	STANDARD SCALE									
		0	10	20	30	40	50	60	70		
I	ARTIST	[Shaded area from 30 to 60]									
	PSYCHOLOGIST (REV.)	[Shaded area from 20 to 50]									
	ARCHITECT	[Shaded area from 20 to 40]									
	PHYSICIAN (REV.)	[Shaded area from 20 to 40]									
	OSTEOPATH	[Shaded area from 20 to 40]									
	DENTIST	[Shaded area from 20 to 40]									
	VETERINARIAN	[Shaded area from 20 to 40]									
II	MATHEMATICIAN	[Shaded area from 20 to 40]									
	PHYSICIST	[Shaded area from 20 to 40]									
	ENGINEER	[Shaded area from 20 to 40]									
	CHEMIST	[Shaded area from 20 to 40]									
III	PRODUCTION MANAGER	[Shaded area from 20 to 40]									
IV	FARMER	[Shaded area from 20 to 40]									
	AVIATOR	[Shaded area from 20 to 40]									
	CARPENTER	[Shaded area from 20 to 40]									
	PRINTER	[Shaded area from 20 to 40]									
	MATH. PHYS. SCI. TEACHER	[Shaded area from 20 to 40]									
	IND. ARTS TEACHER	[Shaded area from 20 to 40]									
	VOC. AGRICULT. TEACHER	[Shaded area from 20 to 40]									
	POLICEMAN	[Shaded area from 20 to 40]									
	FOREST SERVICE MAN	[Shaded area from 20 to 40]									
V	Y.M.C.A. PHYS. DIRECTOR	[Shaded area from 20 to 40]									
	PERSONNEL DIRECTOR	[Shaded area from 20 to 40]									
	PUBLIC ADMINISTRATOR	[Shaded area from 20 to 40]									
	Y.M.C.A. SECRETARY	[Shaded area from 20 to 40]									
	SOC. SCI. H.S. TEACHER	[Shaded area from 20 to 40]									
	CITY SCHOOL SUPT.	[Shaded area from 20 to 40]									
	SOCIAL WORKER	[Shaded area from 20 to 40]									
	MINISTER	[Shaded area from 20 to 40]									
VI	MUSICIAN (PERFORMER)	[Shaded area from 20 to 40]									
VII	C. P. A.	[Shaded area from 20 to 40]									
VIII	SENIOR C. P. A.	[Shaded area from 20 to 40]									
	ACCOUNTANT	[Shaded area from 20 to 40]									
	OFFICE MAN	[Shaded area from 20 to 40]									
	PURCHASING AGENT	[Shaded area from 20 to 40]									
	BANKER	[Shaded area from 20 to 40]									
	MORTICIAN	[Shaded area from 20 to 40]									
	PHARMACIST	[Shaded area from 20 to 40]									
IX	SALES MANAGER	[Shaded area from 20 to 40]									
	REAL ESTATE SALESMAN	[Shaded area from 20 to 40]									
	LIFE INSURANCE SALESMAN	[Shaded area from 20 to 40]									
X	ADVERTISING MAN	[Shaded area from 20 to 40]									
	LAWYER	[Shaded area from 20 to 40]									
	AUTHOR - JOURNALIST	[Shaded area from 20 to 40]									
XI	PRESIDENT-MFG. CONCERN	[Shaded area from 20 to 40]									
INTEREST MATURITY		[Shaded area from 20 to 40]									
OCCUPATIONAL LEVEL		[Shaded area from 20 to 40]									
MASCULINITY-FEMININITY		F									M
STANDARD SCALE FOR IM, OL, MF		20	30	40	50	60	70				

TESTED BY: [Illegible]

FIGURE 11.

Mean Profile of 80 Civil Service Applicants on
the Strong Vocational Interest Test
in Relation to Chance Scores

The mean chance score plus or minus one standard
deviation is indicated by the darkened area
on each scale.

STRONG VOCATIONAL INTEREST TEST-MEN

HANKES REPORT FORM FOR-

SEE OTHER SIDE FOR EXPLANATION

GROUP	OCCUPATION	STANDARD SCALE										
		0	10	20	30	40	50	60	70			
I	ARTIST											
	PSYCHOLOGIST (REV.)											
	ARCHITECT											
	PHYSICIAN (REV.)											
	OSTEOPATH											
	DENTIST											
	VETERINARIAN											
II	MATHEMATICIAN											
	PHYSICIST											
	ENGINEER											
	CHEMIST											
III	PRODUCTION MANAGER											
IV	FARMER											
	AVIATOR											
	CARPENTER											
	PRINTER											
	MATH. PHYS. SCI. TEACHER											
	IND. ARTS TEACHER											
	VOC. AGRICULT. TEACHER											
	POLICEMAN											
	FOREST SERVICE MAN											
V	Y.M.C.A. PHYS. DIRECTOR											
	PERSONNEL DIRECTOR											
	PUBLIC ADMINISTRATOR											
	Y.M.C.A. SECRETARY											
	SOC. SCI. H.S. TEACHER											
	CITY SCHOOL SUPT.											
	SOCIAL WORKER											
	MINISTER											
VI	MUSICIAN (PERFORMER)											
	C. P. A.											
	VIII	SENIOR C.P.A.										
		ACCOUNTANT										
		OFFICE MAN										
		PURCHASING AGENT										
		BANKER										
		MORTICIAN										
		PHARMACIST										
	IX	SALES MANAGER										
		REAL ESTATE SALESMAN										
LIFE INSURANCE SALESMAN												
X	ADVERTISING MAN											
	LAWYER											
	AUTHOR - JOURNALIST											
XI	PRESIDENT-MFG. CONCERN											
INTEREST MATURITY												
OCCUPATIONAL LEVEL												
MASCULINITY-FEMININITY		F									M	
STANDARD SCALE FOR IM, OL, MF		20	30	40	50	60	70					

TEST SCORER: MINNEAPOLIS, MINNESOTA FORM MRA S-55

medical students and the civil service applicants, between the two classes of medical students, or between police applicants and fireman applicants has not been discussed.

As shown in Figure 7 and Table 16, the medical students and the civil service applicant control group were significantly different on 42 of the 48 scales on the Strong by analysis of variance (F-test). By chance alone one would expect 2 or 3 out of 48 at the .05 level. In contrast to these 42 significant differences, only 16 of the 48 differences between the police and fireman applicants (Figure 9) and only 8 of the 48 differences between the medical school Class of 1961 and the Class of 1962 (Figure 8) were significant when analyzed statistically. As one would expect then, one group of medical students, the Class of 1961, differed from another group of medical students, the Class of 1962, on fewer (8) occupations than these same medical students differed from a group with widely different occupational goals and educational experiences--the civil service applicants (42). In like manner, men aspiring to two different civil service jobs, those of policeman and of fireman, had more (16) differences in interests than did two groups with the same occupational goal (8), the two classes of medical students.

Do these differences (8 and 16 out of 48) between cross-validation samples represent reliable differences or did they occur by chance? By definition, five out of 100 F-tests done would be expected to be significant at the .05 level by chance alone. The number of significant differences between the medical students and the civil service applicants (42 out of 48) and between the police applicants and the fireman

applicants (16 out of 48) were large enough so that there can be little doubt that there are real differences in interests between these pairs of groups. It should be pointed out that this is the first area in which statistically reliable differences have been demonstrated between the police applicants and the fireman applicants. They did not differ in I.Q., emotional adjustment, or personality needs. Probably this should not be surprising, since it is the area of interests that is most likely to be correlated with whether these men wanted to become either policemen or firemen.

Whether or not the 8 differences out of 48 between classes of medical students on the Strong represent real differences in interests is doubtful. Eight significant differences (6 at the .05 level and 2 at the .01 level) out of 48 tests done would occur by chance only about one time in a hundred (Sakoda, Cohen, & Beall, 1954). However, most of the differences between classes could still represent chance variation, since extensive psychological research, both during and since the second World War, has shown that, although 8 out of 48 differences between two samples is slightly more than expected by chance, cross-validation of this study on two other classes (e.g., the Class of 1963 and the Class of 1964) probably would result in the disappearance of many of these eight differences (and possibly the appearance of five to eight previously unobtained differences).

Because of the 16 statistically significant differences in interests between the police applicants and the fireman applicants (and the possibility of "real" differences between the two classes of medical students), the four samples were reanalyzed by means of another statistic,

the Duncan test (Duncan, 1951). In general, the differences between cross-validation samples were so small, relative to the size of the differences between the medical students and the civil service applicants, that one could still validly study differences between all medical students and all civil service applicants. For example, as shown in Figures 7 and 9, the police applicants had a mean of 49.8 on the Policeman scale. The fireman applicants had a mean of 42.0 on this scale, significantly lower than the police applicants at the .001 level of confidence. However, the medical students had a mean of 27.6 on this scale, significantly lower than either the police or fireman applicants at the .001 level. The two classes of medical students did not differ on the Policeman scale, means being 28.6 for the Class of 1961 and 26.7 for the Class of 1962. Exceptions to this generalization were those scales on which the medical students and the civil service applicants did not differ, as shown in Figure 7, and on many of the social service (V) and business-contact (VIII) occupations, where there was a good deal of overlapping among groups; e.g., the police applicants had a mean of 45.3 on the Public Administrator scale, significantly (p of .01) higher than the Class of 1962 who had a mean of 35.7. However, the Class of 1961, with a mean of 40.8, was higher than the fireman applicants who had a mean of 39.2. None of these differences were significant except that between the police applicants and the Class of 1962 (possibly a chance finding).

As shown in Figure 7, the 80 medical students were more likely to share the interests of men in the biological (Group I) and physical (II) sciences and in the verbal-linguistic (X) occupations than were the 80

civil service applicants, although there were specific reversals; e.g., the interests of Veterinarians. The civil service applicants had interest, much more like those of men in the Technical (IV) and business-detail (VIII) fields than did the medical students.

To illustrate these differences better, the frequency distributions of the 80 medical students and the 80 civil service applicants on the Physician and Policeman scales are presented in Figures 12 and 14, respectively. These figures demonstrate the marked differences between these two groups on these two scales. Only 10 percent (8 out of 80) of the civil service applicants scored higher than the medical students' median on the Physician scale. No medical student scored higher than the civil service applicants' (including the fireman applicants) median on the Policeman scale.

As again shown in Figure 7, there were no consistent differences between the medical students and the civil service applicants in the social service (V) and business-contact (IX) fields.

There was no difference between these two similarly aged groups in maturity of interests (Interest Maturity scale), the degree to which one's interests coincide with those of 25-year-olds compared to those of 15-year-olds. Interest Maturity has been shown to vary as a function of age, maturity in other areas, (intellectual, emotional, vocational), and occupational choice. It has been reported that there is little relationship between Interest Maturity and education (Super & Moser, 1960).

In comparing the medical students and the civil service applicants on Occupational Level (Figure 7), the medical students had interests on

FIGURE 12.

Physician Scale: Strong Vocational Interest Blank.
A Comparison of Medical Students
and Civil Service Applicants

PHYSICIAN SCALE: STRONG VOCATIONAL INTEREST BLANK

A COMPARISON OF MEDICAL STUDENTS AND CIVIL SERVICE APPLICANTS

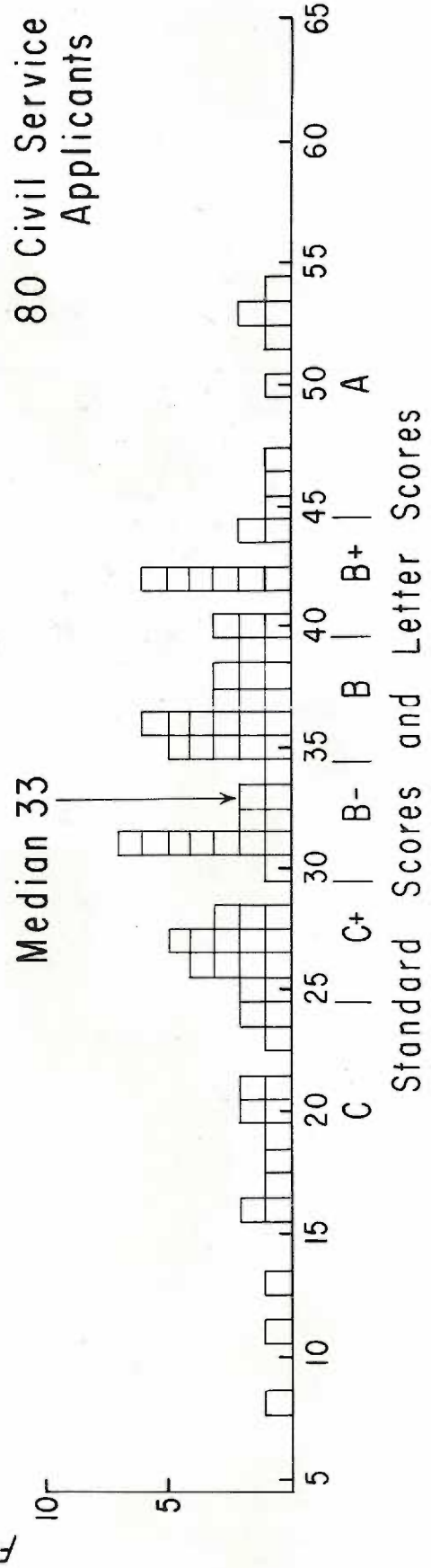
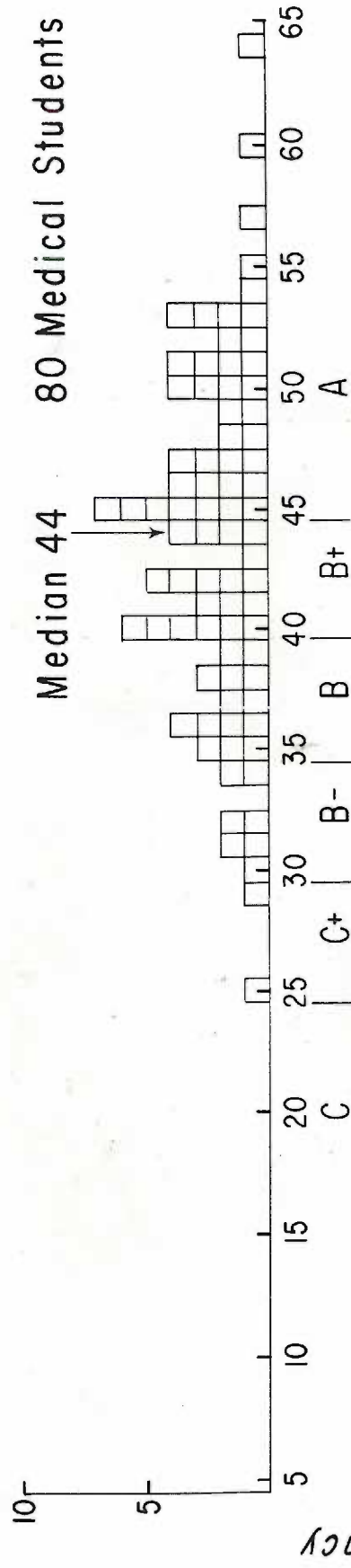
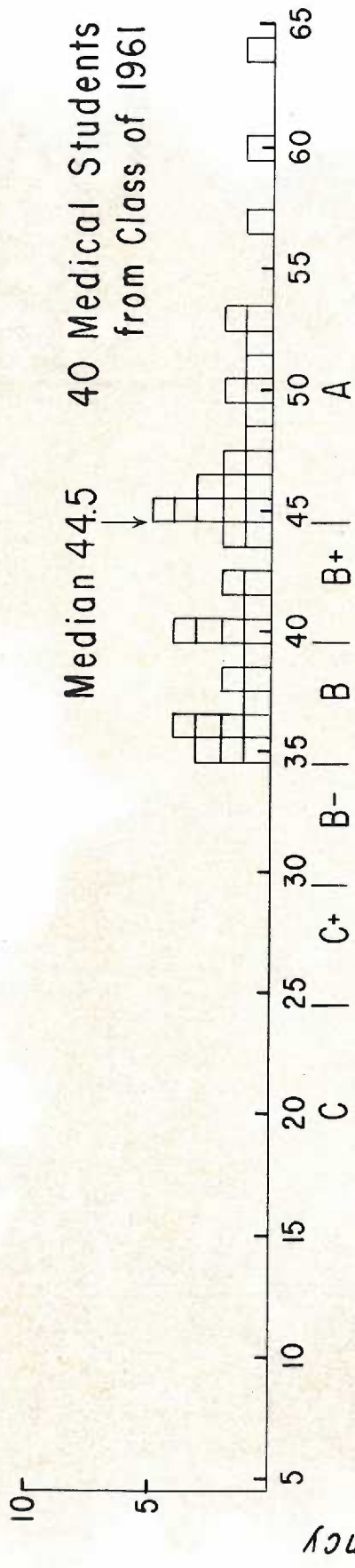


FIGURE 13.

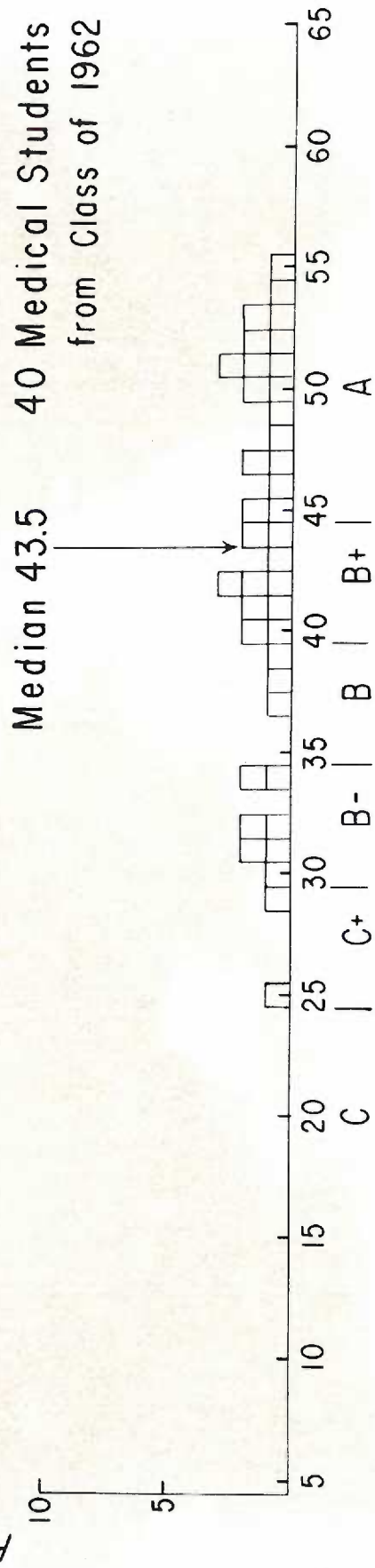
Physician Scale: Strong Vocational Interest Blank.

A Comparison of Two Medical School Classes

PHYSICIAN SCALE : STRONG VOCATIONAL INTEREST BLANK
 A COMPARISON OF TWO MEDICAL SCHOOL CLASSES



□ One Individual



Standard Scores and Letter Scores

FIGURE 14.

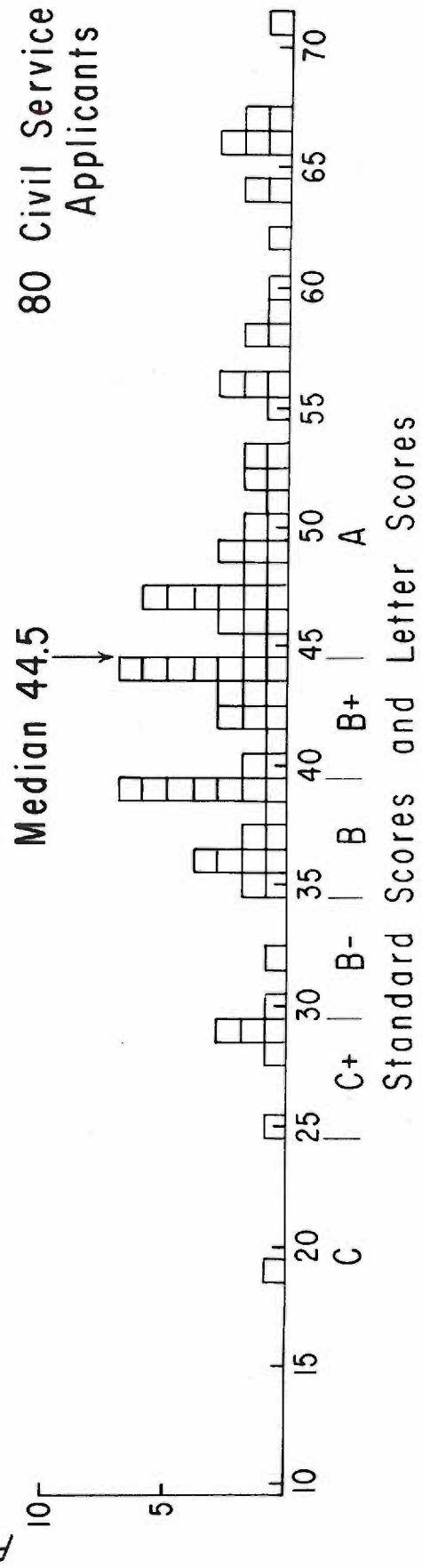
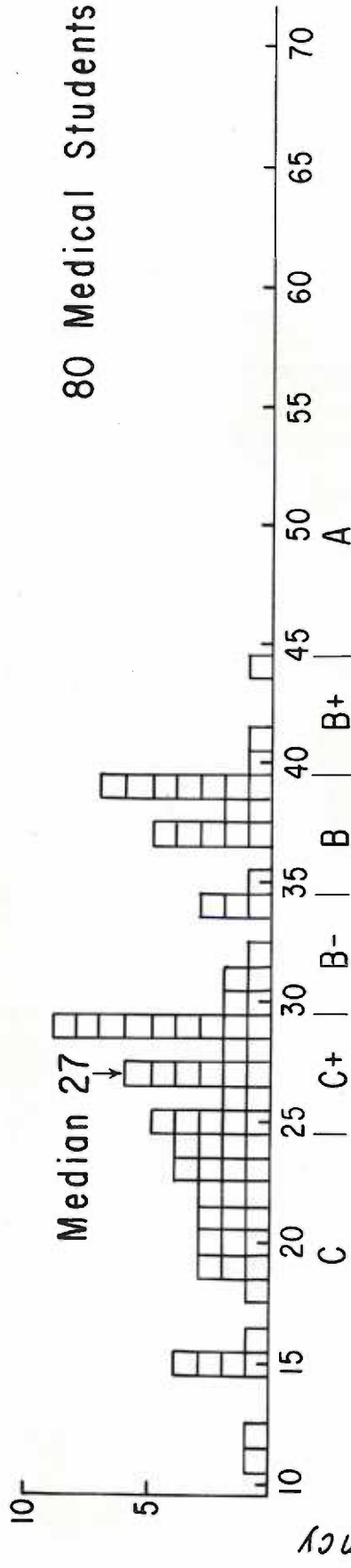
Policeman Scale: Strong Vocational Interest Blank.

A Comparison of Medical Students

and Civil Service Applicants

POLICEMAN SCALE: STRONG VOCATIONAL INTEREST BLANK

A COMPARISON OF MEDICAL STUDENTS AND CIVIL SERVICE APPLICANTS



Standard Scores and Letter Scores

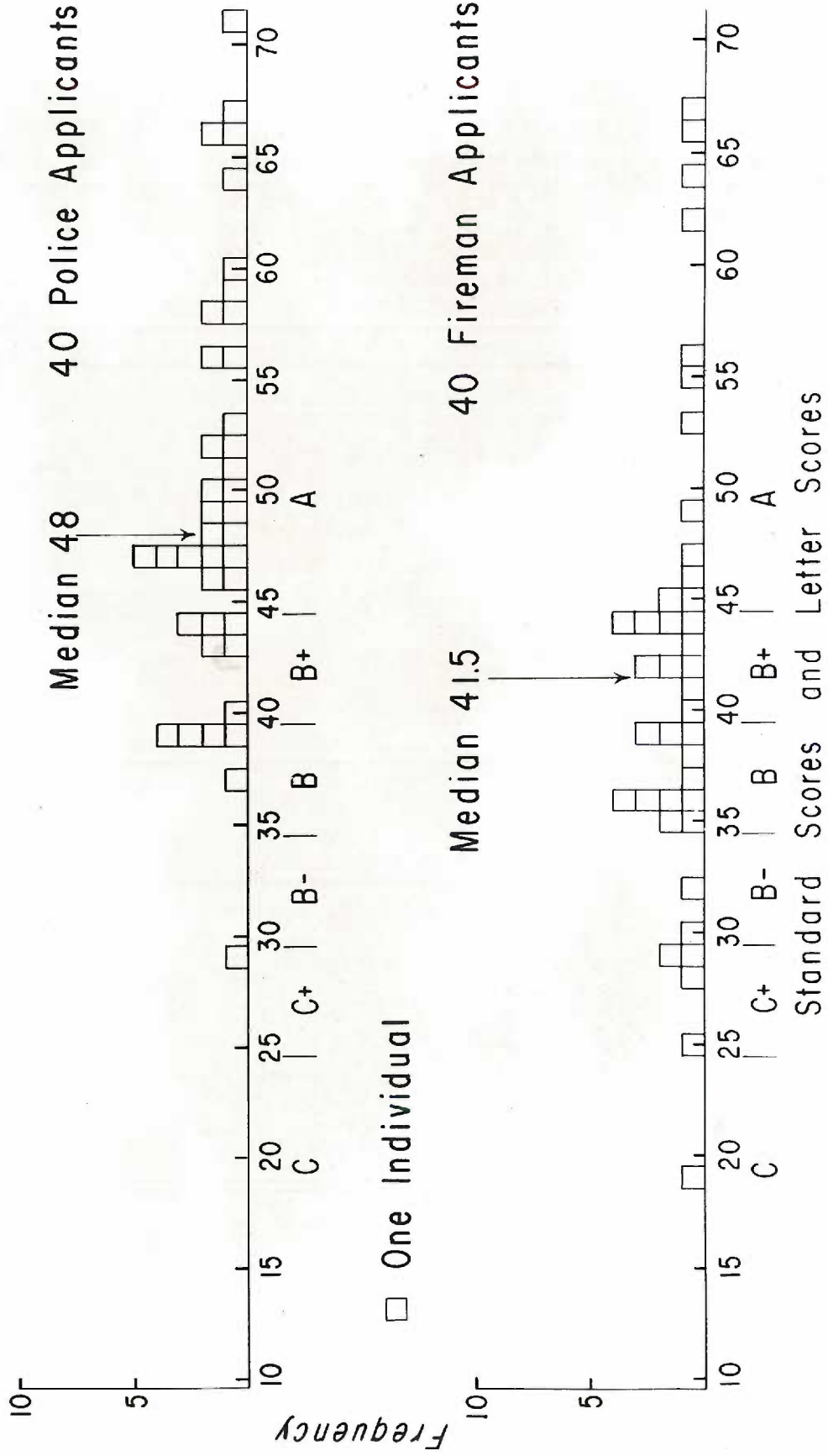
FIGURE 15.

Policeman Scale: Strong Vocational Interest Blank.

A Comparison of Police Applicants

and Fireman Applicants

POLICEMAN SCALE: STRONG VOCATIONAL INTEREST BLANK
A COMPARISON OF POLICE APPLICANTS AND FIREMAN APPLICANTS



this dimension more like those of business executives and of professional men, whereas the civil service applicants had interests more like those of skilled and unskilled workmen. Darley (1941) has defined Occupational Level as a measure of adult "level of aspiration," the extent to which a person's total background has prepared him to seek the prestige, status, income, and social responsibilities of men in the professions or of leaders in business. While Occupational Level may be considered to be a measure of the socio-economic level at which an individual's interests are most likely to find an outlet (Super, 1949, p. 388), it does not measure how hard a person will exert himself to reach the occupational level of his interests (Barnett, Handelsman, Steward, & Super, 1952). Interestingly, both the medical students (mean of 53.0) and the civil service applicants (mean of 46.8) had lower Occupational Level scores than did physicians (mean of 61.3) and policemen (mean of 50.0) of about 20 years ago (Strong, 1943, p. 324). The implications of this finding are beyond the purposes of this study.

The interests of the medical students were less masculine (Masculinity-Femininity scale, Figure 7), than those of the civil service applicants. This difference between men in the biological science (physicians) and those in the technical occupations (policemen) has been noted by Strong (1943, p. 234), who attributed this difference to the former group working with people, the latter with things.

As shown in Figure 8, the differences in interests between the average medical student from each of the two classes were generally small, particularly considering the amount of individual variation present (as shown in Table 16). Most of the statistical differences

follow no apparent pattern. That is, there is no obvious reason why two classes of medical students should differ on such isolated, scattered scales as the Artist, Physicist, Author-Journalist, Musician, and Pharmacist scales. Thus, the few differences shown probably represent chance or sampling error.

Of particular interest are the scores of the two classes of medical students on the Physician scale, as shown in Figure 13. While the medians for both classes were in the "B+" category on the Physician scale, the number of students who lacked the interests of physicians (scores of "B-" or below on the Physician scale) was significantly (p of .01, χ^2 of 10.2) different between the Class of 1961 (no student scoring "B-" or below) and the Class of 1962 (9 of 40 students scoring "B-" or below, representing 22.5 percent of that sample). About 6.6 percent of successful physicians would be expected to score "B-" or below on the Physician scale, as shown in Table 15. Strong (1943) reports that men who have low interest scores on the scale of the occupation which they enter tend to be dissatisfied with their occupation or to occupy an atypical position in their occupation; e.g., the physician who works as a hospital administrator.

As with the exploration of the personality needs of these two classes of medical students in relation to Gee's medical specialty choice groups (Table 12), one may wonder whether this subtle difference between classes on the Physician scale of the Strong (and, perhaps, others of the statistical differences between classes on the Strong, as shown in Figure 8) represents a subtle difference between these two specific classes in attitudes or motivations, despite the overwhelming

similarity between these cross-validation samples of medical students in I.Q., emotional adjustment, personality needs, and (most) interests. Are there subtle differences in motivation and attitudes from class to class in the same school? Are these differences, if they exist, subject to external validation?

To turn to the control group, as shown in Figure 9, differences in interest between the police and fireman applicants were primarily in two types of occupations--the technical (Group IV) and the social service (V) occupations. In the technical occupations the police applicants had interests more like those of Policemen than did the fireman applicants, understandably. The extent of this difference is shown in Figure 15. Only 20 percent of the fireman applicants scored higher than the median police applicant. The fireman applicants, in turn, had interests more like those of Farmers, Carpenters, and Industrial Arts Teachers than did the police applicants, although these differences were smaller than the one found on the Policeman scale. These differences on the technical scales probably reflect the closeness of the reference point, since the police and fireman applicants, both of which have interests most like those of men in the technical occupations, would be expected to appear more dissimilar relative to each other and to other technical occupations than when they were compared to a group with fewer characteristics in common with them. The effect of different points of reference was discussed in the section on Method.

In Figure 9, probably the most striking difference between the police applicants and the fireman applicants (statistically significant on all eight scales) was the greater similarity of interests of the

police applicants to the interests of men in the social service occupations (Group V).

The distribution of scores of the police applicants, as shown in Figure 15, is remarkably similar to that of the criterion group for the Policeman scale (approximated in Table 15). The mean (49.75) of our police applicants was as high as the mean (50.00) of the criterion group of successful policemen utilized by Strong, and on which the scale is based. 85 percent of our police applicants had a score of "A" or "B+" and only 2.5 percent of them scored below "B-," compared to an estimated 84.2 percent of "A's" or "B+'s" in the criterion group with 2.2 percent of that group getting a score below "B-." In a comparable study, DuBois and Watson (1950) found nearly identical results with a group of probationary patrolmen in St. Louis. 86 percent of their police applicants (compared to 85 percent of ours) scored "A" or "B+" on the Policeman scale and none (versus our 2.5 percent) scored below "B-."

The statements about the influence of "set" made in relation to the emotional adjustment inventories and the Edwards test are also applicable to the Strong.

To rule out the possible effect of differences in intelligence on the many significant differences obtained on the Strong, analysis of covariance was done on 4 selected scales (Physician, Policeman, Occupational Level, Masculinity-Femininity) against the Full Scale I.Q. of the Wechsler Adult Intelligence Scale. In each case the within-groups product-moment correlation was less than .20. On each of these scales, even after "adjusting" for the I.Q. differences in our two groups, the difference between the medical students and the civil service applicants remained

statistically significant at the .001 level of confidence on these 4 selected scales, indicating that interests were quite independent of intelligence. This finding has been reported by others many times.

Finally, the results on the Strong provide a finding of some possible incidental interest. Much has been written about the changing patterns of medical care. Many discussions contrast the physician of today with those of the pre-World War II period. With this in mind, the mean profile on the Strong of the medical students from our study was compared to the mean profiles of a group of medical students (N of 47) reported by Strong in 1943, and of the criterion group of successful physicians (N of 337) used in the construction of the Physician scale on the 1938 revision of the Strong. The mean profiles of these latter two groups were reported by Strong in 1943 in his major work, the Vocational Interests of Men and Women, pp. 418-419. While the Physician scale was revised in 1952 (the basic test remained the same), the correlation between this revision and the scale used on Strong's two medical groups is .85 (Strong & Tucker, 1952), about as high as the reliability of these scales (.89 for the original scale) (Strong, 1943), suggesting that it is as valid to study groups across the two Physician scales as it is to study two groups on the same scale. The mean 36-scale profiles of these three medical groups are presented in Table 18.

As shown in Table 18, the basic similarity of the three profiles is rather marked. The rank-order correlation (ρ) on 36 scales between the two medical groups of Strong, mentioned above, was .91. The rank-order correlation (ρ) on the same 36 scales between Strong's 1941 medical students and those of our study is .86. The rank-order correlation

Table 18

Mean Standard Scores of Two Groups of Medical Students and
a Group of Successful Physicians on 36 Strong Scales, Showing
Differences in Patterns over about 25 Years

Group	Scale	Med.St. 1961 ^a	Med.St. 1941 ^b	Difference (¹⁹⁶¹ - ¹⁹⁴¹)	Physicians 1938 ^b	Difference (¹⁹⁶¹ - ¹⁹³⁸)
I	Artist	31	32	- 1	32	- 1
	Psychologist	30	29	1	26	4
	Architect	34	33	1	33	1
	Physician	43	46	- 3	50	- 7
	Dentist	30	41	-11 (-2.6)*	42	-12 (-3.0)*
II	Mathematician	29	28	1	29	
	Engineer	32	35	- 3	37	- 5
	Chemist	34	38	- 4 (-2.0)	36	- 2 (-2.3)
IV	Production Manager	33	31	2	32	1
	Farmer	38	37	1	35	3
	Carpenter	23	19	4	20	3
	Printer	33	33		28	5
	Math.-Sci. Teacher	38	34	4	31	7
	Policeman	28	29	- 1	28	
	Forest Service Man	26	24	2 (1.7)	25	1 (2.9)
V	YMCA Phys. Dir.	29	29		26	3
	Personnel Dir.	30	24	6	23	7
	YMCA Secy.	24	18	6	19	5
	Soc. Sci. Teacher	29	24	5	21	8
	School Supt.	27	21	6	23	4
	Minister	25	21	4 (4.5)	22	3 (5.0)
VIII	Accountant	25	22	3	29	- 4
	Office Man	31	28	3	24	7
	Purchasing Agent	24	26	- 2	24	
	Banker	24	23	1 (1.3)	24	(0.8)
IX	Sales Manager	28	25	3	24	4
	Real Estate Sales	34	33	1	32	2
	Life Ins. Sales	29	28	1	28	1
	Pres.-Mfg. Concern	32	30	2 (1.8)	32	(1.8)
X	CPA	30	26	4	23	7
	Advertising Man	33	32	1	30	3
	Lawyer	31	36	- 5	36	- 5
	Author-Journalist	36	36	(0.0)	35	1 (1.5)
VI	Musician	34	34		26	8
Occupational Level	53	57	- 4	61	- 8	
Masculinity-Femininity	46	47	- 1	46		

a: Medical students from the present study, N=80.

b: From Strong (1943), pp. 418-419. Medical students with N=47, examined sometime before 1943. Physicians (N=337) were the criterion group for the 1938 revision of the Strong test. Dates examined, above, are estimates.

*: Denotes the mean difference (in parenthesis) for this Roman Numeral group.

Note: A difference of about 5 T score units is significant at the .05 level.

between our medical students and Strong's 1938 criterion group of physicians is .72, somewhat lower than the other two correlations but still representing a great deal of similarity in interests of these groups. In addition, all three groups scored highest on the Physician scale (means of 43, 46, and 50, going backward in time).

Another way to view the profiles shown in Table 18 is to examine differences between groups on specific scales, as shown. A positive difference in Table 18 means that the Oregon medical students from the present study had the interests of that occupation to a greater extent than did the older group of Strong, and vice versa for negative differences. Since the standard deviations (10 with T scores) and the size of samples (80, 47, and 337) are known, one can estimate the size of a difference between means which should be statistically significant (McNemar, 1959). For groups of this size (50 to 80 individuals) a difference of about one-half standard deviation, or 5 T score units, would be significant at the .05 level of confidence.

Thus, inspection of mean differences in Table 18 between the medical students of our study (most were examined in 1961) and Strong's medical students (examined about 1941) or his practicing physicians (examined about 1936) suggest certain trends in the interests of medical students (and physicians) over the years, despite the basic similarity over a 25 year period of the interest profiles of these three medical groups (rhos of .72 to .91). The recent medical students, at least at the University of Oregon, while (Figures 7 and 8, Group V) still not having much interest (means of 24 to 30) in common with men in the social service occupations, do have slightly more such (Group V) interests than

did the medical students or physicians of the pre-World War II era (means ranging from 18 to 29, and from 19 to 26). In fact, now reading across groups instead of within groups, the only occupations with which our medical students shared significantly more (5 or more T score units) interests than did the medical students of 20 years ago were those of Personnel Director, YMCA Secretary, Social Science Teacher, and School Superintendent--all social service occupations (V). The differences in profile across all 36 scales between the recent Oregon medical students and the successful physicians of the 1930's were generally larger, more varied, but in the same direction. Again, the recent students had more interests in common with the social services (V) than did the physicians of about 1936, largely due to the low scores of the latter group on these scales. In addition, our medical students have fewer interests like those of men in the specific professions--law, dentistry, even medicine itself--than did the medical students and the physicians of the past. This was accompanied by a declining Occupational Level score, indicating, according to Darley (1941), a declining "level of aspiration." Furthermore, these changes seem to have been progressive, since the Oregon medical students had lower scores on the Physician and Occupational Level scales than the medical students of 20 years ago. Strong's 1941 medical students, in turn, scored lower on these scales than did the physicians of 1936. At the same time, there appears to have been a progressive increase (31 to 34 to 38) in interest in teaching (Math.-Science Teacher).

Whether these differences really represent changes in the interests of medical students over time, or whether they represent geographical,

sampling, and school differences cannot be determined from this study. In addition, comparison with the criterion group of physicians may be influenced by differences in interests between students and practitioners, although others' experiences with the Strong would suggest that this is a minor factor (Berdie, 1960).

In summary then, as measured by the Strong Vocational Interest Blank, the following comments can be made about the interests of medical students and of their controls, the civil service applicants:

1. The interests of University of Oregon medical students are very heterogeneous (within each occupational scale and among different scales). There are individual medical students with the interests of businessmen, of scientists, of those in the social services, and of individuals in most other occupations for which scales are available. Despite this individual variability, the medical students are a relatively homogeneous and distinct group when compared to a nonmedical group (significantly different on 42 of 48 Strong scales)--the civil service applicants--a group which exhibited a comparable degree of individual variability.

2. The University of Oregon Medical School students, as a whole, have interests more like those of Strong's successful physicians than of any other occupation.

3. The Oregon medical students also have interests in common with Public Administrators, Science Teachers, Osteopaths, Aviators, and Senior CPA's. More accurately, 50 to 70 percent of the medical students have scores on these occupational scales of "B" or higher, reliably indicating the presence of the interests of that occupation.

4. Few Oregon medical students have interests in common with men in the "pure" sciences (Mathematician, Physicist), the social service

occupations (Minister, School Supt.), or, for that matter, with businessmen, either those concerned with the details of business (Accountant, Banker) or those concerned with sales and promotion (Sales Manager, Life Insurance Salesman), as shown by the low means on most occupational scales in these areas.

5. That the preceding findings are reliable can be deduced from the small number and small size of differences between the University of Oregon Medical School Class of 1961 and the Class of 1962 (the few differences found between classes should probably be considered to represent chance variation until proven otherwise).

6. A profile of interests similar to that of the Oregon students has been found with other groups of medical students in recent years (Gee, 1959; Kelly, 1957).

7. The civil service applicant control group has interests most like those of men in the various technical occupations and skilled trades. The police applicants have interests most like those of Policemen; the fireman applicants most like those of Farmers and Aviators.

8. Neither group of civil service applicants have much interest in common with the biological or physical sciences or with the business-contact and verbal-linguistic occupations.

9. The police applicants have more interests in common with the social service occupations than do the fireman applicants. Otherwise, there is a great deal of similarity of interests between these two civil service applicant groups.

10. In comparison with their similarly-aged control group of civil service applicants, the medical students are more likely to share the

interests of men in the biological and physical sciences and the verbal-linguistic occupations, and less likely than the civil service applicants to share the interests of the technical and business-detail occupations. The medical students have a higher Occupational Level ("level of aspiration") than do the civil service applicants. The civil service applicants have more masculine (Masculinity-Femininity scale) interests than do the medical students. There is no difference between these two similarly-aged groups in maturity of interests (Interest Maturity scale).

11. Differences in intelligence between the medical students and the civil service applicants were not found to be an important factor in influencing differences in interests.

12. There is a high degree of similarity (rhos of .72 to .91) between the pattern, or profile, of interests of our Oregon medical students and the pattern of medical students and physicians of the pre-World War II era. Despite this similarity, certain changes in interests seem to be occurring (whether these changes represent geographic, sampling, or temporal differences could not be determined). A tendency seems to be for present-day medical students to have less interest in common with the traditional professions (law, dentistry, medicine), although they still have more interest in common with 1936 vintage successful physicians than with any other occupation. At the same time, the Oregon medical students, while still having little interest in common with the social service occupations (YMCA Secretary, School Supt.), do appear to have more interest in common with these occupations than the medical students and physicians of 20 or more years ago (indicated primarily by the very low means of the latter groups on the social

service occupations' scales). In 1952 Strong and Tucker reported that "there was evidence of a slight change in interests of physicians tested today when compared to interests of those tested several years ago, but the similarity in interests of the two groups was far more impressive than the differences." Ten years later, the same conclusion seems applicable to our medical students.

DISCUSSION

How close have we come to our original objectives?

We have shown that the average medical student is indeed intellectually gifted (96th percentile of all persons his age), physically strong (by self-report), and emotionally stable. At the same time, he reports high personal needs (Edwards Personal Preference Schedule) for Achievement and Endurance, with a relative lack of a need to depend on others for emotional support (Suocorance), suggesting that (in terms of self-report) the motivation of the average Oregon medical student is largely self-inspired; that he has a high drive to do his best, and by implication, that he has the personal capacity to persevere with prolonged professional training without constant emotional assistance and prodding from others. Thus, we find that, as he sees himself, the average medical student in most respects does approach the ideal of the "good" medical student described by Geithaml (1962).

There is one area in which our medical students do not seem to approach Geithaml's ideal. That is the area of "service-orientation." As others have found (Gee, 1959; Kelly, 1957), our medical students did not score high on the Nurturance scale (the scale in the Edwards test which has to do with helping the needy, being sympathetic, etc.) or on the scales of the social service occupations in the Strong (The members of these occupations have been presumed by others to be primarily motivated by desires to serve other people for their presumed good.). What does this mean? The service-orientation of physicians has received

a good deal of attention in recent years (Ceithaml, 1957; Eron, 1955; Eron, 1958; Gee, 1959; Kelly, 1957; Schlageter & Rosenthal, 1962). A consistent theme has been a concern that the young physician of today is no longer concerned with the total welfare of his patients, that he no longer has the interests of those men in the "humanitarian" occupations, such as ministers or social workers, or even the old family physician. These authors have also been concerned with the causes of this alleged decline in "humanitarianism" among physicians, whether it is due to selection procedures or experiences within medical school, or whether it is a reflection of the values of our society.

The evidence from our study seems to suggest that the last hypothesis is correct--that medical students simply reflect the "achievement-orientation" of our society. Not only were there no differences between medical students, male college students, and civil service applicants (three rather different groups of young men in many respects) on the need for Nurturance (the personality need most obviously associated with working with people for their presumed good), but these three diverse groups of young men also did not differ on the needs for Exhibition and for Dominance, which have also been found to measure social orientation (Dunnette, Kirchner, & DeGidio, 1958). These three needs (Nurturance, Exhibition and Dominance) were almost the only personality needs measured by the Edwards test on which these three groups did not differ. The lack of consistent differences between the medical students and the civil service applicants on the social service occupations' scales on the Strong (almost the only group of occupations on which these two groups did not differ) lends further evidence that this is so. At the

same time, despite the low scores of many of the medical students on the scales of the social service occupations, our findings suggest that present medical students are not lower on the interests of these occupations than the medical students and physicians of the pre-World War II era, contrary to the opinions expressed by some. (This may represent a characteristic of this school, not a change in time.) If anything, there is suggestive evidence that slightly more medical students are becoming "service-oriented," if this is what these Strong scales are measuring. Two-thirds of our medical students had the interests ("B" or higher) of Public Administrators. Forty percent of them had the interests ("B" or higher) of Social Workers. However, one may wonder whether these findings really reflect "humanitarianism" or whether they are a manifestation of some other aspect of the differences between these occupations. An inspection of item weights on the Physician scale and the Social Worker scale may clarify this question.

Before comparing scales, one needs an introduction to the way items are scored on the Strong test. Weights on individual items on the Strong are derived empirically by comparing the percentage of the criterion group (e.g., successful physicians on the Physician scale) giving each answer (Like-Indifferent-Dislike, as shown in the sample test in Appendix 1) and the percentage of men-in-general giving the same answer. For example, physicians (the criterion group) Like "College Professor" item number 27, more commonly than other men (men-in-general); therefore, response "Like" to "College Professor" is assigned a positive weight in the Physician scale. Weights are proportional to the difference and range from +4 to -4 (Strong, 1943, p. 624).

Items cover a variety of topics--occupations, school subjects, amusements, activities, peculiarities of people, ratings of present abilities and characteristics, and others. Items within topics (e.g., activities) are so diverse that generalization is difficult. Relatively few items are obviously related to physicians (although liking "Physician" gets a +4 weight on the Physician scale). Few items are directly related to "service-orientation," to helping people for their presumed good. Thus, equating interests like those of the social service occupations with "humanitarianism" or "service-orientation" appears to be very risky. Physicians get a +4 weight for liking "Sick people" and for "Giving 'first aid' assistance." Likewise, Social Workers, a representative social service occupation (Group V), get +4 weights for liking "Social problem movies," "Sociology," "Social Worker," and "Adjusting difficulties of others." Any of these items might be thought by some to be related to "service-orientation." Yet, there is very little similarity in the weights physicians and social workers receive on these items.

Seemingly, many items have to do with what might be called a "liberal-conservative" dichotomy or an "individualist-organization man" axis. On these parameters the Physician scale and the Social Worker scale differ markedly. For example, a subject gets a - 1 weight for "liking" the "New Republic" on the Physician scale, while this same item and answer gets a +3 on the Social Worker scale. Liking "Progressive people" gets a - 2 weight on the Physician scale. Liking "Conservative people" gets a - 2 weight on the Social Worker scale. Liking "Civil service employee" gets a +3 weight on the Social Worker scale,

a zero weight on the Physician scale. Liking to "Do a job yourself" gets a + 2 weight on the Physician scale, a - 2 weight on the Social Worker scale.

Other dichotomies could be postulated. On some, physicians and social workers would resemble each other; on others they would not. In any event, the difference between having interests like those of physicians or of social workers is apparently much more than "service-orientation."

Strong (1943, p. 420) points out that (in the past) those students going into medicine, or another of the professions, generally had a rather clear-cut interest in that field, with few high secondary interest scores. He attributed this to selection of medicine as a career at an early age with a consequent limiting of the scope of interests. In contrast, men entering business, for example, were generally more heterogeneous, tending to have less definite but more widely distributed interests, and generally selecting their career field at an older age. This difference in pattern between the professions and the non-professions, at least as far as our medical students are concerned, apparently no longer exists. While the interests of the medical students were found to be still most like those of successful physicians, as previously discussed, the medical students shared only slightly less the interests of men in such diverse fields as public administration, science teaching, osteopathy, and aviation.

Undoubtedly, many factors have contributed to the changes in interests of medical students over the years and to the nature of their interests now. The increasing number of veterans and other older, often

married, students with their greater breadth of experience and their later selection of medicine as a career contributes to this broadened interest base. There are undoubtedly many other social, economic, and academic influences altering the group from which medical students come, compared to the era before World War II.

In addition, the requirements of medical practice have changed. The medical school graduate no longer looks forward only to solo practice in the traditional pattern of the family physician. He now finds himself in the position of leader of a medical-care team (Public Administrator) of an increasingly complex nature--including nurses, technicians, social workers, other physicians, and even the patients themselves, as the patients become more knowledgeable and participate more actively in their own treatment (Sheps, Wolf, & Jacobsen, 1961). At the same time there has been an increasing interest in medical education, both by physicians and lay people, an education which in the past 25 years has become increasingly scientific (Math.-Science Teacher). Others (Kelly, 1957) have stressed the high scores medical groups often show on the Farmer scale of the Strong test (we have shown that for our sample a better interpretation would be that medical students are heterogeneous with respect to the interests of Farmers). The college-trained farmer was described by Kelly (1957) as primarily concerned with the application of the latest scientific developments toward the goal of increased production. It is not surprising then that over the years many medical students (about one-third of our medical students scored above chance and in the "A" or "B+" range on the Farmer scale) and physicians (Strong, 1943) have scored high on the Farmer scale, since the practicing physician's major activity is the application of the latest medical

developments toward the goal of improved health. Likewise, the osteopath also can be thought of as applying his training toward improving health. Consistent with this thinking is the relatively higher ranking of the interests of Farmers and of Osteopaths among general practitioners, as compared to the interests of the other medical specialties (Gee, 1959).

In discussing the typical medical student--his interests, his motivations, his ability, or whatever--one must always keep in mind the variability among medical students. Others have pointed out that, as medical students assimilate a common background of knowledge, techniques, values, and methods of dealing with patients, upper-classmen become more homogeneous with respect to their interests, values, and motives than they were as entering freshmen (Becker et al., 1961; Stern & Scanlon, 1958). Stern and Scanlon (1958), in a study of two successive medical school classes, found a basic common personality pattern, characteristic of the average student in both classes and distinguishing him from members of other professions. Despite this homogeneity, they found a number of different personality patterns among these students within each class. Likewise, the medical students in the present study were distinctly different from their non-medical control group, the civil service applicants, on most variables studied, thus exhibiting a relative homogeneity. At the same time, the differences between two separate classes of medical students were inconsequential, again showing this homogeneity.

However, despite the upper-classman status and the relative homogeneity of our medical students, the individual variability (as seen in the large ranges for most variables) in both intellectual and

nonintellectual characteristics was striking. Only in the areas of emotional adjustment (compared to the adjustment of men-in-general) and reported physical health were the medical students uniformly superior, as judged from the Taylor Manifest Anxiety Scale, the Saslow Psychosomatic Screening Inventory, and the Cornell Medical Index.

Intellectually, there was a 38 point I.Q. range among the medical students (ranging in ability from the 77th to the 99.9th percentile of all persons their age). Yet, all had successfully completed medical school or were close to that goal. Of what importance is this I.Q. range? The correlation between I.Q. and grades at the graduate school level has been generally low (about .30) (Super, 1949). Some have questioned whether higher I.Q. scores, beyond a certain necessary minimum, add to the chances of performing satisfactorily in medical school (Gottheil & Michael, 1957). If so, it would appear to the writer that the minimum I.Q. required to complete medical school successfully would be roughly 115 (85th percentile), based on the findings in our study. However, looking at other criteria of the "good" physician, Holt and Laborsky (1958) found Wechsler Verbal I.Q. to be one of the best predictors, among many variables, of the performance of psychiatry residents on many major and minor criteria--of over-all competence, of diagnostic, therapeutic, and administrative ability, as well as of rated empathy, tolerance, and sensitivity--all this despite a (somewhat limited) range of intelligence comparable to the medical students of our study. Meer and Stein (1955), in a study of research chemists, concluded that, with equal opportunity, higher I.Q. scores beyond a certain point (about the 95th percentile, or an I.Q. of 124) have relatively little significance

for creative work. It will be recalled that over half of the Oregon medical students had I.Q. scores at or above the 95th percentile for all people of their age.

The variability in personality needs and in interests among the medical students was, if anything, even greater than the differences among them in intellectual ability. There were individual medical students with scores over almost the entire possible range on each scale on the Edwards Personal Preference Schedule. Likewise, there were individuals who definitely had ("A" or "B+") the interests of nearly every occupation for which a scale is available on the Strong. At the same time, there were individuals who definitely lacked ("C") the interests of nearly every occupation. While this diversity makes discussion of the "average" medical student rather artificial, it does have advantages. Today, medicine encompasses a wide variety of activities, functions, associations, and skills--from the rural general practitioner to the research pharmacologist; from the hospital administrator to the neuro-surgeon; from the medical missionary to the radiologist. Surely the many special niches within specialties and between specialties must require unique talents, interests, personality characteristics, and motivations. The diversity among medical students, then, may be a real asset. And, who can say which specific characteristics will or will not be necessary for optimal function in some, perhaps new, niche in medicine in the future?

SUMMARY

The purpose of the present study was to investigate the intellectual and personality characteristics of University of Oregon Medical School students.

Accordingly, 40 medical students from the Class of 1961 were studied by a wide variety of psychological assessment techniques. An attempt was made to cross-validate findings on this class by studying 40 students from the Class of 1962. In order to provide a control group for the understanding of the findings on the medical students, a group of like-aged young men (40 police applicants and 40 fireman applicants) were studied in the same manner as the medical students. In addition, where norms were available from other studies, other reference groups were used.

The major findings were as follows.

1. The medical students were of superior intelligence, with a mean Full Scale I.Q. of 126 (96th percentile) and a range from 111 to 149; in comparison to a mean I.Q. of 113 (81st percentile) and range from 86 to 131 for the control group of civil service applicants.

2. Both the medical students and their control group of civil service applicants describe themselves in a way which suggests superior emotional adjustment, as determined by the Taylor Anxiety Scale, the Cornell Medical Index, and the Saslow Psychosomatic Screening Inventory. Both on the average and as individuals these groups report less anxiety and fewer psychosomatic symptoms than college students and other

"normal" and patient reference groups.

3. Of the few physical symptoms medical students did report on the Cornell Medical Index, many seem to be associated with their full schedules (e.g., inflamed eyes) and with common "vices" (e.g., drinking too much coffee). Few symptoms seem to be related to chronic or serious illnesses.

4. As determined on the Edwards Personal Preference Schedule, the medical students' responses suggest high needs for Achievement and Endurance and low needs for Succorance and Abasement, both in relation to other needs within themselves and in relation to other groups of young men (civil service applicants, male college students). The medical students report a need for Nurture at a level equivalent to that reported by male college students and civil service applicants.

5. The medical students have interests (Strong Vocational Interest Blank) most like those of successful Physicians. They also shared the interests of a variety of other occupations, including Public Administrators, Math.-Science Teachers, and Osteopaths. They have little interest in common with men in the "pure" sciences, the social service occupations, or the business field. In these respects, their interests resemble closely the interests of other medical student groups which have been studied, both recently and in the past (before World War II).

6. When compared to the civil service applicant controls and other groups of young men, the medical students are a relatively homogeneous group in terms of intelligence, emotional adjustment, personality needs, and interests. Despite this relative homogeneity, the variability in interest profiles and personality need patterns among individual medical students is marked.

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