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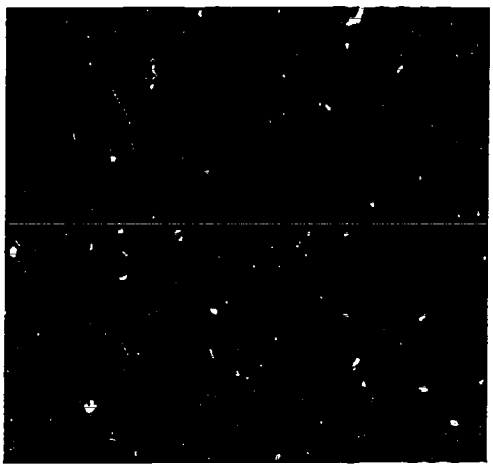
ABSTRACT

The Figure Location Test (FLT) developed by Donlon, Reilly and McKee to provide a machine-scorable test of the cognitive style called field dependence-field independence, was administered as the experimental section of the October 1976, Graduate Record Examination (GRE) Aptitude Test at about one third of the centers in the United States. Initial data analysis showed that the FLT was related to choice of majors: mathematics and chemistry having high mean scores while education, sociology, and nursing had low mean scores. In addition, those who responded that being people-related was an important consideration in choosing their major fields had lower mean scores than those who said it was unimportant. The converse was true for those who said they emphasized intellectuality. Analysis, including analysis of covariance and partial correlation to remove the effects of the GRE-Verbal and Quantitative scores, showed that most of these effects overlapped those of the other variables. That Witkin found some independent relationships between choice of major and a cognitive style test is perhaps due to the fact that he was studying undergraduate rather than graduate students, or to the fact that he was studying students in a single, rather selective, college. (Author/PN)



RELATIONSHIP OF THE FIGURE LOCATION TEST TO CHOICE OF GRADUATE MAJOR

Joel T. Campbell
Thomas F. Donlon

GRE Board Professional Report GREB No. 75-7P

November 1980

This report presents the findings of a research project funded by and carried out under the auspices of the Graduate Record Examinations Board.

EDUCATIONAL TESTING SERVICE, PRINCETON, NJ

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Abstract

The Figure Location Test was developed by Donlon, Reilly and McKee, (1978), to provide a machine-scorable test of the cognitive style called field dependence-field independence. This test was administered as the experimental section of the October, 1976, GRE Aptitude Test at about one third of the centers in the United States. Normative data for the FLT was thus obtained on over 12,000 students, for whom registration questionnaire data as well as the GRE Aptitude Test scores were available. A questionnaire designed primarily to obtain a permanent mailing address was sent to the students in the late fall of 1976. A second questionnaire designed to obtain information on the students' graduate school experience was sent in the late summer of 1978. This questionnaire also asked for self-ratings on personality and attitude factors which might be related to choice of majors.

Initial data analysis showed that the Figure Location Test was related to choice of majors. Those majoring in fields such as mathematics and chemistry had high mean scores, while those majoring in such subjects as education, sociology, and nursing had low mean scores. In addition, those who responded that being people-related was an important consideration in choosing their major fields had lower mean scores than those who said it was unimportant. The converse was true for those who said they emphasized intellectuality.

More complex analysis, including analysis of covariance and partial correlation to remove the effects of the GRE-Verbal and Quantitative scores, showed that most of these effects overlapped those of the other variables. That Witkin and his associates (1977b), found some independent relationships between choice of major and a cognitive style test is perhaps due to the fact that he was studying undergraduate rather than graduate students, or to the fact that he was studying students in a single rather selective college.

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Background

In recent years an increasing amount of research attention has been given to constructs concerning mental performance which are referred to as cognitive styles. These cognitive styles have been conceptualized as typical modes of perceiving, remembering, thinking, and problem solving (Messick, 1969). They have been referred to as "styles" because they are thought to represent an individual's typical approach to cognitive tasks. Although a fairly diverse range of cognitive styles have been identified (Impulsiveness-restraint, Flexibility-rigidity) the most heavily researched cognitive style by far has been field independence-dependence.

Most of the basic research on the field-independence construct has utilized individually administered and scored tests. The two most commonly used measures are: (a) the Rod and Frame Test (RFT), in which the subject is seated in a totally darkened room and must adjust to the upright a tilted luminous rod centered within a tilted luminous frame, while the frame remains in its initial position; a variation on this task is the Portable Rod and Frame Test (PRFT) which restricts the subjects' perceptual field without a requirement for darkening the room; and (b) the Embedded Figures Test (EFT) which requires the subject to locate a previously seen simple figure within a larger complex figure which has been organized so as to obscure the simple figure. Scores on the EFT are a function of the time taken to find the simple figure. The performance of subjects across two three tasks has been found (Witkin, Oltman, Raskin and Karp, 1971) to be relatively consistent. This finding is the basis for positioning the field independence construct as a perceptual style which reflects the tendency for a subject to be dominated by the overall organization of the surrounding field (field dependence) or to experience parts of the field as discrete from the surrounding context (Witkin, et al, 1971).

Witkin and his colleagues (1977a) have made a case for the relevance of field independence-dependence to educational problems. Up until fairly recently, however, application of cognitive style research was limited because of the individual nature of the measurement procedures. With the development of the Group Embedded Figures Test (GEFT) by Witkin and his colleagues, it became possible to obtain information about an individual's cognitive style in a group setting. The Group Embedded Figures Test consists of a set of complex figures within which a specific simple figure is located. The subject's task is to find and trace the simple figure directly in the test booklet. From the standpoint of a large-scale administration, however, the GEFT has the drawback of requiring trained personnel to score each item. Use of this dimension in a program like the Graduate Record Examinations required an instrument which

could be processed by machine. Accordingly, in 1974 development of a machine-scoreable test of field dependence-independence was begun (Donlon, et al, 1978) with the development of the Figure Location Test.

In their study, a total of 35 items, each consisting of a complex figure with an embedded simple figure, was generated and pretested on an individual basis. The pretest results showed the 35 items to have a good range of item difficulties (as measured by average time to find the simple figure) as well as reasonable item-total score correlations. The pretest demonstrated a practice effect which appeared to be linearly related to ordinal position within a series, with a decrement of about .75 seconds for each additional item attempted in the average time required.

Three response formats were developed: (1) the Hidden Letter (FLT-HL) technique--requiring the examinees to actually trace the simple figure; (2) the Overprinted Letter (FLT-OL) method requiring the examinee to find the simple figure and then record on an answer sheet the letters which lie within the simple figure; and (3) the Direct Machine readable (FLT-DM) approach, requiring the subject to find the simple figure and then to darken all the response locations (bubbles) which are contained within it. In the DM approach, the test booklet itself is then separated into its component pages as machine-readable sheets. Unlike the other methods, there is no need for a separate answer sheet.

A total of 307 College students were tested; missing data on one or more variables reduced the number of usable cases to 252 (103 males and 149 females). All subjects took the PRFT and the GEFT and one version of the FLT. Subjects were randomly assigned one of the three FLT response formats.

Because of the consistent sex differences found in measures of field independence (Witkin, et al, 1971), all reliabilities were estimated separately for males and females. Cronbach's alpha coefficient was used to estimate reliability. In the case of the GEFT and FLT the parallel subscores were derived from the seaprately timed sections. For the PRFT, the scores on the eight separate trials served as parallel subscores. Correlations between all measures were computed within FLT response format groups for males and females.

All of the reliabilities were above .80, with a high of .91 for males using the DM format. The data suggested that any of the three response formats could be used to yield an acceptable reliability. The convergent and discriminant validity of the FLT was assessed to a limited extent. A construct-valid FLT would show relatively high relationships with GEFT and PRFT and relatively low relationships with SAT scores.

The pooled results showed a picture for FLT which was quite consistent with that shown for GEFT. The correlation between GEFT and FLT was .60 for males and .63 for females. The correlations between FLT and other variables showed a pattern similiar to the pattern for the GEFT, suggesting that the FLT closely parallels the GEFT. On the strength of these findings, the DM method was selected.

Appendix A shows an example of the test format and instructions for responding. The person taking the test is instructed to study a sample form, then to locate a corresponding form of the same size and shape inside a complex figure, and to darken all of the ovals contained within the matching portion.

Because there did appear to be some practice effect, the test was lengthened to 40 items, divided into three separately timed sections. The first section of 8 items is not scored. The second and third sections, with 16 items each, are scored one point if all of the circles in the matching portion have been darkened, and no circles outside that portion are so marked.

Although the development of the Figure Location Test was guided by the cognitive style theory, it is possible to view the Figure Location Test as simply a measure of a cognitive ability, which might improve prediction of academic or other performance, over that which could be obtained with the present GRE-Verbal and Quantitative Tests.

This project was undertaken to discover the strength of such relationships.

Procedures

The Figure Location Test was administered as the experimental section of the GRE Aptitude Test in the October 1976 administration at approximately one-third of the test centers. These centers were chosen so as to provide a random sample of students taking the test in the United States.

About a month after the test administration, a questionnaire was sent to those students who completed the Figure Location Test. This questionnaire was designed primarily to get a permanent mailing address, but did contain some additional questions which had not been covered on the registration questionnaire. A duplicate questionnaire was sent a short time later to non-respondents. A copy is included in Appendix B. This questionnaire, as well as the one to be described below, was designed so that the computer could print the students' GRE registration number, in binary code, along with name and mailing address, directly on to the questionnaire, thus avoiding any problems of matching to other GRE test scores and questionnaire information. There were over 12,000 cases for whom

usable Figure Location Tests and registration questionnaires were available, and of these 8,000 responded to either the first or second request for a permanent mailing address. A second questionnaire was developed to obtain information about the students' graduate school program and his or her attitude toward it. The body of the questionnaire contained factual questions such as changes of major and grades received. It also contained questions related to attitudes toward the major selected, and some probes concerning underlying attitudes. Questions were included on sub-specialities within psychology and education, which were the only areas where the number of cases would seem to permit this kind of breakout. A copy is included in Appendix B.

This questionnaire was mailed in August 1978 to students who had furnished a mailing address in the earlier questionnaire, with a follow-up mailing to non-respondents in October 1978. These mailings included also the score received on the FLT, and an explanation of the project. About 5500 usable responses were received.

Data Analyses

The initial data analysis involved the relationship of the Figure Location Test, the Graduate Records Examination Verbal and Quantitative Tests, and undergraduate major and proposed graduate major as reported on the GRE registration questionnaire. These analyses involved slightly more than 12,000 students.

Intercorrelations

Table 1 shows the intercorrelations among the Figure Location Test and the GRE Aptitude Test scores, along with means and standard deviations, separately by sex and for the total group. Males in this sample scored slightly higher on the FLT than did females. However, this difference was less than the difference on the GRE Quantitative, where the males' mean score was one-half a standard deviation higher than that for females. On the GRE-Verbal the two groups had almost exactly equal mean scores.

The correlation of the FLT with the GRE-Quantitative was about equal to that between GRE-V and Q. The correlation between the FLT and GRE-V was substantially lower than the other coefficients. All three coefficients were slightly higher for the female sample than for the male sample. It appears that the FLT, while overlapping the other two measures, has additional independent variance.

Table 1

Intercorrelations and Means and Standard Deviations for Figure Location Test and GRE Aptitude Test Scores by Sex

	Figure Location Test	GRE Verbal	GRE Quantitative
	Males N = 6300		
FLT		.34	.53
GRE-V			.56
Mean	16.6	513.4	564.5
Standard Deviation	8.3	131.7	132.5
	Females N = 6381		
FLT		.38	.57
GRE-V			.61
Mean	15.7	513.1	492.7
Standard Deviation	7.7	127.4	126.2
	Total N = 12681		
FLT		.36	.55
GRE-V			.56
Mean	16.1	513.2	528.4
Standard Deviation	8.0	129.6	134.2

Relationship With Major Field of Study

The questionnaire completed by most of those who registered in advance for the GRE Aptitude Test included questions asking for the student's undergraduate major and proposed graduate major. This permitted computation of mean FLT scores for each major field separately. Table 2 shows the means and standard deviations for the FLT and the GRE Aptitude Test scores for each of the undergraduate majors where the N was 200 or higher. (Mean scores for all undergraduate majors are shown in Appendix C-1.) As would be expected from previous research, those majoring in mathematics and chemistry, which emphasize abstract reasoning, had high mean scores on the FLT. Similarly, those majoring in "people related" fields, such as sociology, education, and nursing, had low mean scores. Psychology, which has some specialties emphasizing people relatedness and others closer to laboratory science, has a mean score exactly equal to the overall mean score.

Table 3 shows the means and standard deviations of the FLT and GRE Aptitude Test scores for those proposed graduate majors having 200 or more cases. (Mean scores for all proposed graduate majors are shown in Appendix C-2.) Veterinary medicine is the only "hard science" represented here, and has a score 2.5 points above the mean. Educational Administration, in contrast, has a mean score 3.5 points, almost half a standard deviation, below the overall mean. Guidance, Education, and Nursing also have mean scores below the overall mean, while Psychology again has a mean score almost exactly coinciding with the overall mean. Thus, it can be seen that the mean scores differ for both undergraduate and proposed graduate majors in the expected directions. The total FLT distribution is shown in Appendix C-3.

Principal Data Analyses

The principal data analyses involved those students who responded to the questionnaires and for whom scores on the Figure Location Test and the GRE Verbal and Quantitative Test were available.

Intercorrelations

Table 4 shows the intercorrelations among the three test scores, overall and major field graduate grade average as self-reported in the follow-up questionnaire, and major field and last two years undergraduate grade point average as self-reported in the registration questionnaire, along with means and standard deviations.

Table 2

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test for Undergraduate Majors with more than 200 Cases

		FLT		GRE-V		GRE-Q	
MAJOR AREA	N	Mean	SD	Mean	SD	Mean	SD
Agriculture	223	16.4	7.7	452.9	115.0	550.5	110.2
Biology	794	17.9	7.6	536.6	109.7	579.0	111.0
Business	271	14.9	8.1	440.7	116.0	515.0	117.6
Chemistry	270	19.7	7.4	541.3	123.4	642.3	105.1
Economics	233	17.3	7.8	544.6	137.1	603.8	117.1
Education	927	13.6	7.4	448.2	110.2	441.1	110.4
English	620	15.2	7.6	599.6	121.3	496.5	118.5
Government	368	14.7	7.4	533.7	120.4	517.2	121.2
History	450	15.0	8.5	562.2	127.1	506.8	127.5
Mathematics	272	21.3	7.5	538.1	136.8	677.3	92.2
Nursing	247	13.6	7.6	504.5	96.8	471.2	106.4
Psychology	1300	16.1	7.4	546.4	113.9	536.4	115.0
Sociology	277	13.1	7.4	498.5	123.1	474.4	125.4

Table 3

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test for Intended Graduate Majors with more than 200 Cases

		FLT		GRE-V		GRE-Q	
MAJOR AREA	N	Mean	SD	Mean	SD	Mean	SD
Business	267	16.6	7.6	476.4	129.0	558.4	120.1
Education	999	14.3	7.7	459.9	114.7	454.9	116.6
Educational Administration	265	12.6	7.8	446.8	116.3	446.8	138.8
English	309	15.8	7.6	617.7	111.1	505.2	122.6
Guidance	290	14.0	7.8	479.1	113.6	460.8	119.2
History	218	15.5	7.9	584.6	120.5	518.8	125.5
Nursing	232	14.3	7.8	513.2	100.5	481.1	108.7
Psychology	967	16.2	7.4	557.5	115.5	542.7	117.2
Veterinary Medicine	452	18.6	7.3	507.3	101.1	588.1	97.0

Table 4

Intercorrelations of Figure Location Test Scores, Graduate Record Examination Verbal and Quantitative Test Scores and Self-Reported Undergraduate and Graduate Grade Averages

N = 3,344

	FLT	GRE-V	GRE-Q	Overall graduate grade average	Major field graduate grade average	Major field undergraduate grade average	Grade average last two undergraduate years
		.31	.54	.05	.04	.16	.15
E-V			.52	.13	.09	.28	.24
-Q				.05	.04	.25	.23
rall graduate rade average					.89	.21	.23
or field graduate rade average						.18	.20
or field undergraduate rade average							.70
n	18.3	544.8	562.0	6.7	6.9	5.6	5.6
ndard Deviation	7.5	120.9	127.8	1.1	1.2	1.1	1.0

The intercorrelations of the tests were slightly lower than those for the larger sample reported in Table 1. The lower correlations probably are due to the restricted range, which can be noted in the higher mean scores and smaller standard deviations. (As in other studies, persons with higher test scores are more likely to return questionnaires than are those with lower scores.) Correlations between all three tests and both graduate grade averages were very low. Correlations with the two undergraduate grade averages were higher for all three tests scores, with the FLT considerably lower than either the GRE-V or Q. Whatever is being measured by the Figure Location Test is less important to academic performance as reflected by grades than is either the GRE Verbal or Quantitative Test.

The unusually low correlation coefficients between grades and test scores are probably due to several factors. For one thing, these are self-reported grades, and some persons with low grades probably chose not to respond. More important, these grades come from many different departments and different schools, reflecting widely different standards of grading. Supplementary analyses concerning this are reported in Appendix D.

Relationship of Graduate Major to Figure Location Test and to Other Tests

Table 5 shows means and standard deviations for the Figure Location Test and the GRE-Verbal and Quantitative Tests for each graduate major having 30 or more cases.

Figure 1 shows the Figure Location Test score mean and the GRE-Quantitative score mean for those major fields with 30 or more students. As would be expected, physics, mathematics and computer sciences fall in the upper right quadrant, with high scores on both tests, since these fields require high mathematical ability and usually are not "people related." Geology, chemistry, electrical engineering, and biochemistry similarly fall in this quadrant, as seems reasonable from the nature of these fields. Medicine and architecture are also in this quadrant.

Those in "people related" fields such as education, social work, journalism, and speech, have low means on the FLT, and as can be seen in Figure 1, they tend to have low means on the GRE-Q also. The low mean FLT score for sociology majors could mean that those going into this field consider it to be "people-related" rather than an analytical scientific area.

Figure 2 shows the FLT means in relation to GRE-Verbal means for each major field with 30 or more students. Physics and medicine once again are in the upper right hand corner, with high mean scores

Table 5

Means and Standard Deviations of Figure Location Test, and GRE-Verbal and GRE-Quantitative Tests for Graduate Majors with more than 30 Cases

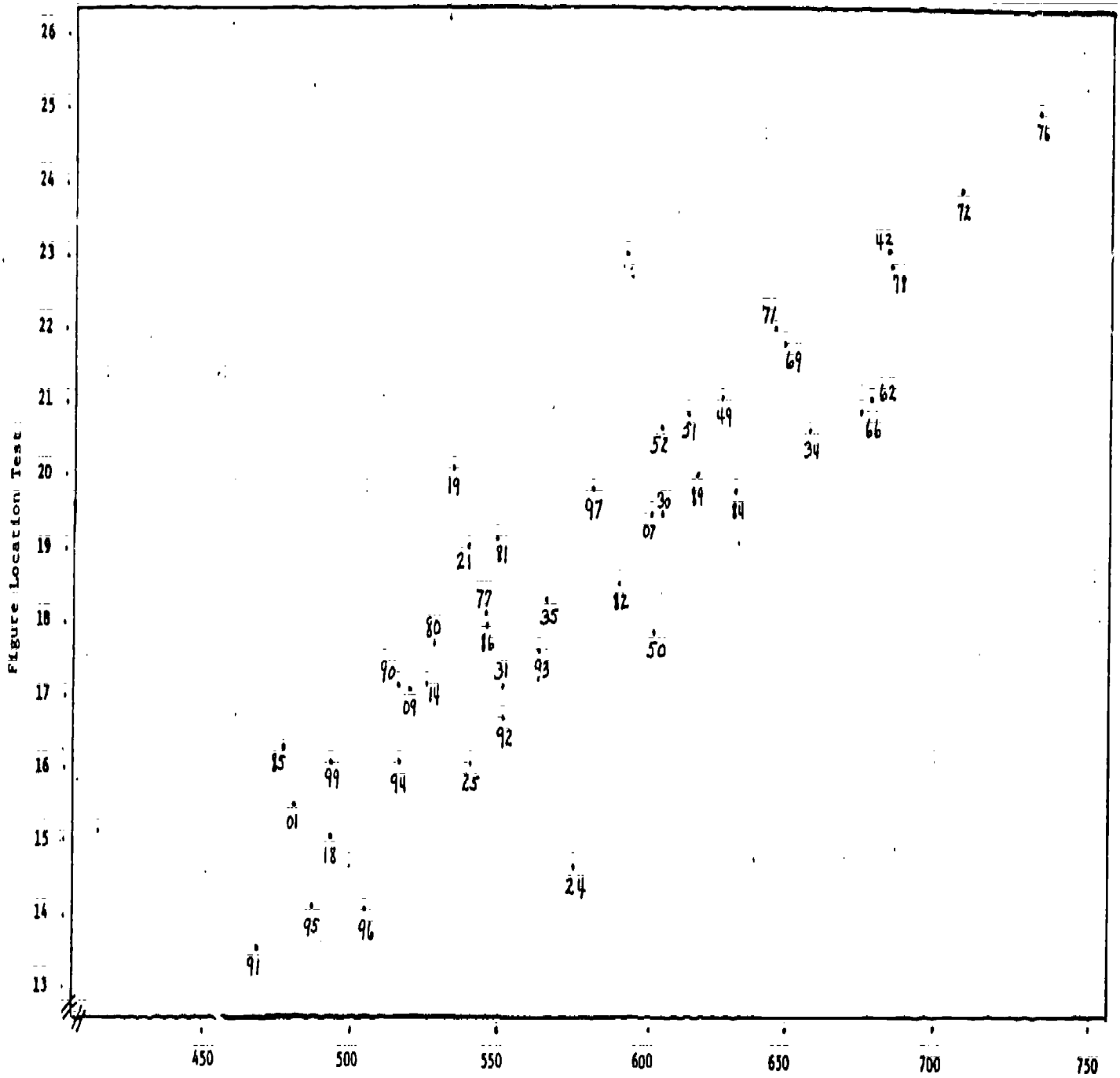
MAJOR	ID	N	FLT		GRE-V		GRE-Q	
			Mean	SD	Mean	SD	Mean	SD
Agriculture	31	65	17.2	7.2	459.2	119.2	551.1	88.6
Anthropology	81	33	19.1	8.1	602.2	88.9	547.8	145.9
Architecture	12	32	23.1	6.5	540.9	124.2	593.4	86.8
Biochemistry	34	52	20.6	6.9	588.6	105.5	657.4	79.4
Biology	35	75	18.4	6.6	544.0	127.5	565.5	112.5
Business & Commerce	82	153	18.6	7.6	519.5	114.7	591.6	117.4
Chemistry	62	75	21.1	7.0	560.7	100.2	678.2	94.2
Computer Sciences	78	67	23.0	7.2	575.0	152.4	685.0	105.9
Economics	84	62	19.8	7.3	572.6	129.8	631.1	109.9
Education	85	478	16.4	6.9	478.1	109.4	477.2	115.5
Educational Administration	01	101	15.5	7.5	465.1	111.2	480.7	120.3
Educational Psychology	09	43	17.2	6.6	533.2	113.8	519.6	114.8
Electrical Engineering	66	59	21.0	7.7	511.1	129.3	673.6	96.4
English	14	94	17.2	7.9	636.6	120.7	525.8	129.3
Geology	71	52	22.0	6.9	581.6	106.6	644.7	84.0
Guidance & Counseling	99	135	16.0	7.9	515.1	113.0	494.2	117.7
History	86	68	18.0	7.8	601.4	115.3	545.8	124.2
Hospital & Health Sciences	25	54	16.0	7.6	528.2	105.8	540.6	122.7
Journalism	18	43	15.1	7.0	552.5	114.2	493.9	136.9
Law	89	88	20.0	7.4	619.1	112.5	617.3	110.0
Library Science	90	88	17.2	7.2	594.4	122.5	514.1	118.2

Table 5 (Continued)

MAJOR	ID	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Mathematics	72	43	24.0	5.6	555.9	112.3	708.5	86.3
Medicine	42	65	23.1	7.2	640.9	90.2	683.4	83.2
Microbiology	07	32	19.5	6.8	513.7	89.3	601.1	97.1
Music	19	57	20.1	7.5	534.2	122.0	521.2	113.5
Nursing	43	100	16.2	7.0	536.0	93.2	498.3	93.4
Nutrition	77	36	18.1	7.5	515.9	115.7	545.8	115.8
Other Biological Sciences	30	72	19.5	8.2	551.6	120.0	605.8	112.1
Other Engineering	69	39	21.9	6.5	534.3	115.0	647.1	92.6
Other Social Sciences	80	96	17.7	7.6	512.7	112.0	527.2	113.4
Physical Education	91	31	13.5	7.1	428.8	86.7	468.2	112.1
Physics	76	49	25.0	4.9	651.9	93.2	735.5	65.5
Physiology	49	33	21.1	6.6	561.4	87.8	626.1	94.8
Political Science	92	43	16.7	8.6	587.5	142.6	551.2	128.7
Psychology	93	281	17.6	6.9	585.2	114.5	565.0	108.1
Publication Administration	94	99	16.1	7.0	535.7	115.3	515.5	111.4
Public Health	50	33	17.9	6.9	567.2	108.4	603.2	111.8
Religious Studies or Religion	21	70	19.2	7.2	545.5	122.9	539.5	111.1
Social Work	95	96	14.1	6.7	526.1	114.4	487.2	107.0
Sociology	96	30	14.0	7.7	535.2	131.4	504.1	120.1
Speech	24	45	14.7	7.6	493.1	109.0	476.4	98.6
Urban Development	97	43	19.8	7.3	604.7	101.2	582.6	107.6
Veterinary Medicine	51	124	20.8	6.2	534.8	103.7	614.5	86.6
Zoology	52	35	20.7	6.5	571.4	98.9	605.0	73.8

Figure 1

Relationship of Figure Location Test and GRE - Quantitative Scores by Graduate Major

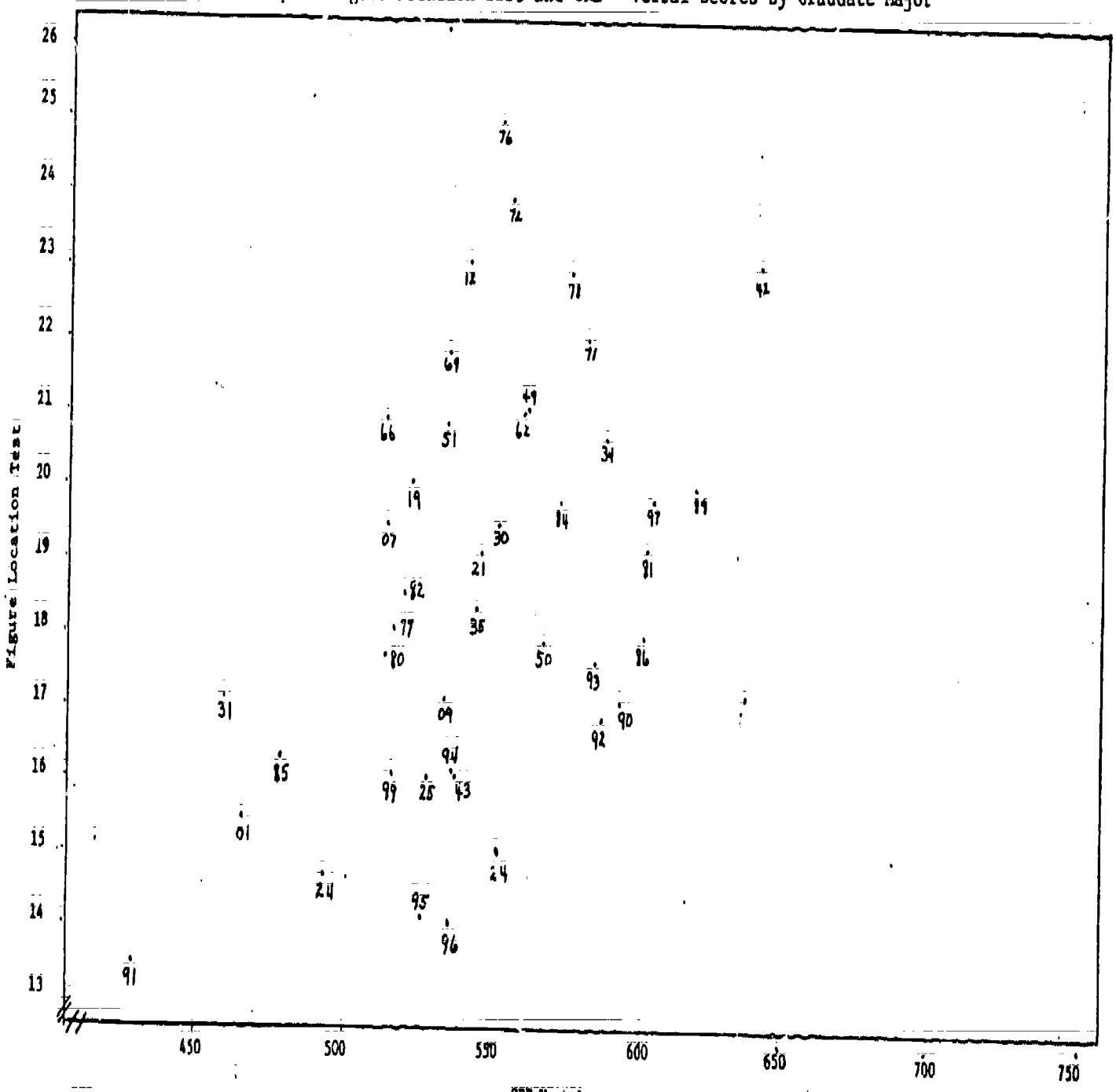


KEY

01	Educational Administration	34	Biochemistry	72	Mathematics	91	Physical Education
07	Microbiology	35	Biology	76	Physics	92	Political Science
09	Educational Psychology	42	Medicine	77	Nutrition	93	Psychology
12	Architecture	43	Nursing	78	Computer Sciences	94	Public Administration
14	English	49	Physiology	80	Other Social Sciences	95	Social Work
18	Journalism	50	Public Health	81	Anthropology	96	Sociology
19	Music	51	Veterinary Medicine	82	Business and Commerce	97	Urban Development
21	Religious Studies or Religion	52	Zoology	84	Economics	99	Guidance and Counseling
24	Speech	62	Chemistry	85	Education		
25	Hospital and Health Sciences	66	Electrical Engineering	86	History		
30	Other Biological Sciences	69	Other Engineering	89	Law		
31	Agriculture	71	Geology	90	Library Science		

Figure 2

Relationship of Figure Location Test and GRE - Verbal Scores by Graduate Major



KEY

01 Educational Administration
07 Microbiology
09 Educational Psychology
12 Architecture
14 English
18 Journalism
19 Music
21 Religious Studies or Religion
24 Speech
25 Hospital and Health Sciences
30 Other Biological Sciences
31 Agriculture
34 Biochemistry
35 Biology
42 Medicine
43 Nursing
49 Physiology
50 Public Health
51 Veterinary Medicine
52 Zoology
62 Chemistry
66 Electrical Engineering
69 Other Engineering
71 Geology
72 Mathematics
76 Physics
77 Nutrition
78 Computer Sciences
80 Other Social Sciences
81 Anthropology
82 Business and Commerce
84 Economics
85 Education
86 History
89 Law
90 Library Science
91 Physical Education
92 Political Science
93 Psychology
94 Public Administration
95 Social Work
96 Sociology
97 Urban Development
99 Guidance and Counseling

on both tests. Mathematics, architecture, and computer sciences, with around average mean scores on GRE-Verbal, moved out of the upper right corner. In the lower left quadrant, physical education, agriculture, education administration, education, and speech all have relatively low means on both tests. As noted earlier, social work, sociology, and journalism have low FLT means but since the GRE-V means fall close to the overall mean, they have moved out of the lower left quadrant.

Value Preferences and Personality Factors

A substantial portion of the follow-up questionnaire was devoted to questions or scales concerning personal values and personality factors.

Table 6 shows, for students who did not change majors, the values which governed their choice. For those who considered "People Oriented" to be a strong factor in their choice, all three test means were comparatively low, while for those who said it was "Little or no consideration" the three test means were comparatively high. In contrast, for those who reported "Theoretical Emphasis" to be a strong factor, all three test means are comparatively high, while for those who considered it unimportant the test means are comparatively low. FLT scores do not appear to be related to the three other characteristics in this section of the questionnaire. The GRE-V and Q means do relate to responses on several of these, sometimes in opposite fashions.

Table 7 shows, for the approximately 15 percent who reported that they had changed majors, the responses on the importance of several factors in relation to mean test scores. In this table, a seven step scale has been reduced to 5 steps by combining the two extreme positions on each end of the scale.

The very small number of persons who reported that their new major was less people centered had high FLT and GRE-V means and a relatively high GRE-Q mean. The FLT apparently had no relationship to responses to the other item scales.

Table 8 shows the responses to item scales concerning career goals in relation to test scores. Again a seven-point scale has been compressed to five steps.

There was a clear relationship between the responses to "intellectuality" and all three test means. Those who felt this characteristic was very important had higher scores on all three tests than did those who felt that it was not important. In contrast, those who felt "leadership" to be very important had low scores on all

Table 6

The FLT, GRE-Verbal, and GRE-Quantitative Test Means for Responses to Item Scales that Characterize Reasons for Choice of Graduate Major

		Strong Factor	Moderate Factor	Little or No Consideration	No Respons
People Oriented	N	1878	875	847	1778
	FLT Mean	16.86	18.77	20.76	18.85
	GRE-V Mean	524.92	543.15	574.81	543.59
	GRE-Q Mean	520.90	573.49	628.60	558.87
Theoretical Emphasis	N	808	1507	1253	1810
	FLT Mean	19.38	18.01	17.95	18.73
	GRE-V Mean	567.89	535.62	532.62	542.01
	GRE-Q Mean	593.38	554.86	545.41	556.42
Highly Structured	N	471	1174	1902	1831
	FLT Mean	18.41	17.97	18.48	18.72
	GRE-V Mean	514.77	517.74	563.43	542.05
	GRE-Q Mean	570.88	554.48	561.64	556.01
Opportunity to Contribute New Knowledge	N	1927	1255	421	1775
	FLT Mean	18.58	17.85	18.33	18.74
	GRE-V Mean	535.44	543.91	562.30	542.70
	GRE-Q Mean	566.20	552.09	554.16	557.12
Opportunity for Achievement through One's Effort	N	2529	830	239	1780
	FLT Mean	18.34	18.08	18.64	18.74
	GRE-V Mean	538.25	548.94	551.84	542.53
	GRE-Q Mean	560.33	556.13	569.54	556.94
Rewards Based on Outstanding Achievements	N	859	1537	1166	1816
	FLT Mean	18.31	18.41	18.15	18.72
	GRE-V Mean	535.51	536.71	552.02	542.87
	GRE-Q Mean	563.88	563.48	552.91	556.72
Emphasizes the Use of Intellectual Skills	N	2052	1261	283	1782
	FLT Mean	18.09	17.27	18.48	18.75
	GRE-V Mean	556.57	523.34	515.08	542.45
	GRE-Q Mean	576.36	536.63	545.04	556.97

Table 7

The FLT, GRE-Verbal and GRE-Quantitative Test Means for Responses to Item Scales that Characterize Reasons for Changes in Graduate Major

	More People Centered		Neutral		Less People Centered	No Response
N	327	76	285	51	43	4596
FLT Mean	18.40	18.32	18.40	18.69	20.09	18.44
GRE-V Mean	537.25	536.99	541.01	579.21	612.31	541.61
GRE-Q Mean	564.46	555.39	540.41	583.53	583.88	559.44
	More Popular		Neutral		Less Popular	No Response
N	169	98	366	65	77	4603
FLT Mean	17.31	19.24	18.81	19.71	17.48	18.43
GRE-V Mean	507.51	511.35	559.69	570.94	554.30	541.64
GRE-Q Mean	540.71	550.00	565.94	576.88	530.85	559.43
	Emphasizes Intellectual Skills		Neutral		Emphasizes Practical Skills	No Response
	241	63	235	83	144	4612
LT Mean	18.83	17.40	18.90	19.24	17.49	18.43
RE-V Mean	552.75	518.38	546.09	542.17	538.92	541.55
RE-Q Mean	557.59	543.68	565.04	564.52	547.93	559.18
	More Narrowly Defined		Neutral		More Inclusive	No Response
	168	74	186	66	282	4602
LT Mean	18.30	19.74	18.15	17.88	18.53	18.44
RE-V Mean	534.84	540.49	529.71	540.30	560.14	541.53
RE-Q Mean	538.89	564.58	557.93	551.81	564.37	559.36

Table 7 (cont'd)

	More Challenging		Neutral		Less Challenging	No Response
	427	85	225	21	23	4597
LT Mean	18.47	18.13	18.90	17.67	20.29	18.43
RE-V Mean	542.81	520.82	554.82	571.96	553.10	541.56
RE-Q Mean	550.08	554.34	571.12	566.34	577.67	559.40

Table 8

The FLT, GRE-Verbal, and GRE-Quantitative Test Means for Responses to Item Scales that Characterizes the Importance of Certain values in Relationship to the Respondent's Career Goals

		Important			Unimportant		
		Very	Moderately	Neutral	Moderately	Very	No response
Intellectuality	N	2605	1142	740	327	347	217
Dealing with abstractions or theories	FLT	19.55	18.20	17.24	16.50	15.57	17.13
	GRE-V	564.19	537.00	502.09	519.82	508.12	530.46
	GRE-Q	581.28	552.84	518.09	544.49	515.81	544.82
Productivity	N	4390	515	195	72	92	114
Getting things done, smoothly and well	FLT	18.47	19.27	18.20	19.53	17.71	17.33
	GRE-V	537.65	578.90	590.19	620.11	570.30	522.63
	GRE-Q	558.74	580.62	583.38	596.84	541.34	549.21
Aesthetics	N	2474	1133	840	377	443	111
Dealing with the beautiful, attractive	FLT	18.67	18.64	17.96	17.64	18.28	17.34
	GRE-V	548.11	533.11	536.78	544.51	539.84	520.56
	GRE-Q	550.89	560.06	566.09	574.11	570.43	549.64
Altruism	N	3285	890	567	249	273	114
Helping others, particularly those in need	FLT	17.83	19.41	19.66	20.29	19.71	18.25
	GRE-V	529.16	558.27	563.98	579.06	597.98	525.67
	GRE-Q	543.14	582.88	591.83	594.42	605.07	553.75
Leadership	N	2710	1070	734	333	421	110
Directing the activities of a group	FLT	17.70	18.94	19.05	19.07	20.19	18.25
	GRE-V	519.12	550.80	558.77	580.69	605.61	522.03
	GRE-Q	539.40	569.24	574.55	586.49	605.78	553.86
Integration	N	3955	578	406	114	205	120
Achieving a sense of personal oneness or wholeness	FLT	18.23	19.00	19.02	19.96	19.66	18.09
	GRE-V	536.80	534.57	547.99	582.12	579.15	532.59
	GRE-Q	551.03	573.98	591.67	630.78	602.57	557.09

three tests. The relation of FLT means, as well as the GRE-V and Q, to other characteristics is less clear-cut. Responses to "integration" do have some relationship, with higher means obtained by those who felt that this characteristic was moderately or very unimportant.

Table 9 shows the mean test scores associated with responses to questions relating to self-concept. Again, for convenience in presentation, a seven-step scale has been reduced to five steps by combining the two extreme positions at each end of the scale.

The FLT means have a clear relationship to responses on the "outgoing reserved" dimension, with those responding at the "reserved" end having the highest scores. This was true also for the two other test scores. The FLT means also are related to responses on the "teacher-researcher" dimension, with the highest scores obtained by those who responded at the "researcher" pole. GRE-Q means followed the same pattern. GRE-V varied in the same direction, but the relationship is not as strong.

A very small proportion responded to the "common" end of the "unique-common" dimension, but those who did had very low mean scores on all three tests. Most students apparently consider themselves unique. There was a slight association between scores on the three tests and responses on the "concentrated-distractible" scale, with higher test means at the "distractible" end.

The "confident-diffident" scale responses were associated with scores on the GRE-V and Q, and slightly associated with scores on the FLT. Those responding at the "diffident" end had higher scores on the GRE-V and Q, and lower scores on the FLT. The "easygoing-intense" scale is related to scores on the GRE-V, but not to the FLT, as is the "liberal-conservative" dimension, and the "thinker-doer" scale.

Thus, it appears that the Figure Location Test does relate to several of the attitude and personality scales. However, usually one or both of the GRE aptitude tests also relate to these scales. To test how much independent relationship there might be, correlation coefficients were computed between each of the scales and the Figure Location Test, and partial correlation coefficients were computed with the effects of GRE-V and Q removed. These values are shown in Table 10. Both zero-order and partial correlation coefficients are low. After the GRE-V and Q have been partialed out, no coefficient is higher than .09, and most are much lower.

Table 9

The FLT, GRE-Verbal and GRE-Quantitative Test Means for Responses to Item Scales Related to Self-Concept

	Easygoing		Neutral		Intense	No Response
	1722	838	744	860	1065	149
LT Mean	18.11	18.66	18.65	18.53	18.43	16.83
RE-V Mean	507.57	531.67	544.58	562.89	583.98	517.95
RE-Q Mean	546.72	559.30	560.76	553.99	568.98	532.92
	Leader		Neutral		Follower	No Response
	2568	1217	939	385	167	102
LT Mean	18.22	18.75	18.28	18.83	18.57	17.69
RE-V Mean	533.75	541.45	547.94	555.77	543.00	527.20
RE-Q Mean	550.18	563.64	564.42	566.96	554.58	547.24
	Liberal		Neutral		Conservative	No Response
	2052	1004	918	645	633	126
LT Mean	18.45	18.69	18.25	18.61	18.09	17.23
RE-V Mean	567.60	535.46	529.34	524.40	518.23	528.90
RE-Q Mean	561.12	556.18	555.88	563.18	553.59	542.64
	Outgoing		Neutral		Reserved	No Response
	2133	1057	754	779	549	106
LT Mean	17.80	18.35	18.32	19.45	19.33	17.25
RE-V Mean	526.67	535.81	536.98	560.55	578.49	528.09
RE-Q Mean	537.53	554.57	562.17	582.61	590.18	541.27
	Liked		Neutral		Disliked	No Response
	3747	1008	447	43	27	106
LT Mean	18.09	18.72	17.99	21.60	16.62	17.08
RE-V Mean	531.49	553.64	551.81	624.06	576.34	525.80
RE-Q Mean	545.90	574.43	565.43	630.34	584.33	528.05

Table 9 (cont'd)

	Teacher		Neutral		Researcher	No Response
N	2050	736	1272	461	713	146
FLT Mean	17.11	18.54	19.20	19.84	19.88	17.84
GRE-V Mean	521.38	546.76	556.16	558.11	556.07	538.58
GRE-Q Mean	522.14	564.94	582.84	592.26	592.42	546.23

	Unique		Neutral		Common	No Response
N	2987	1210	767	215	81	118
FLT Mean	18.90	18.47	17.56	17.04	15.25	17.61
GRE-V Mean	557.49	532.92	520.32	490.22	478.78	534.55
GRE-Q Mean	564.96	558.30	546.30	542.22	508.65	556.41

	Concentrated		Neutral		Distractible	No Reponse
N	2130	1204	941	598	384	121
FLT Mean	18.42	18.28	18.30	18.92	19.39	17.23
GRE-V Mean	547.29	529.77	531.91	557.28	573.40	519.07
GRE-Q Mean	556.76	556.18	553.37	573.89	575.56	531.21

	Confident		Neutral		Diffident	No Response
N	2891	1287	637	305	149	109
FLT Mean	18.50	18.43	18.07	18.05	17.74	17.55
GRE-V Mean	535.37	540.67	549.87	565.22	577.13	528.12
GRE-Q Mean	555.41	560.08	557.12	561.97	578.19	544.81

	Thinker		Neutral		Doer	No Response
N	1334	840	1571	701	784	148
FLT Mean	18.16	19.08	19.03	18.11	17.10	18.05
GRE-V Mean	551.47	551.67	551.38	525.54	507.51	530.19
GRE-Q Mean	554.90	573.89	570.43	551.79	523.13	552.40

TABLE 10

Correlations between Questionnaire Responses and Figure Location Test and Correlations with effects of GRE Verbal and Quantitative partialed out

Question Number	Question	Zero Order Correlations with FLT	Partial Correlation with GRE V and Q removed
7.	If you did not change majors, please characterize the values that governed your choice of major field.		
7-a	Is people-oriented	.21	.04
7-b	Has a theoretical emphasis	-.07	.01
7-c	Is highly structured	.02	.02
7-d	Gives opportunity to contribute new knowledge	-.03	-.01
7-e	Gives opportunity to achieve through one's own efforts	-.00	-.01
7-f	Rewards are based on outstanding achievements	-.01	.01
7-g	Emphasizes the use of intellectual skills	-.07	.00
9.	If you changed majors, please characterize the rationale for that change by using the scales below. Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2 or 3 in the appropriate direction. My new major is:		
9-a	More people centered/less people centered	.04	.04
9-b	Emphasizes my intellectual skills/ Emphasizes my practical skills	-.04	-.04
9-c	More popular/less popular	.04	.03
9-d	More narrowly defined/more broadly inclusive	-.01	-.04
9-e	More challanging/less challanging	.05	-.00
14	Which of the following have you done during the current academic year?		
14-1	Attended one or more meetings of a scholarly or professional society	-.08	-.04
14-2	Subscribed to two or more scholarly or professional journals.	-.09	-.05
14-3	Been author or coauthor of a scientific paper which was accepted for presentation at a professional meeting	.04	.01

Table 10 (cont'd)

Question Number	Question	Zero Order Correlations with FLT	Partial Correlation with GRE V and Q removed
14-4	Been author or coauthor of a scientific paper which was submitted for publication to a professional journal	.01	-.03
14-5	Been author or coauthor of a scientific paper which was accepted for publication by a scholarly or professional journal	.04	-.00
14-6	Prepared a detailed proposal or plan for a dissertation, master's thesis, or other major research project	-.05	-.03
14-7	Conducted an independent research project	-.03	-.03
14-8	Conducted a research project in collaboration with another student or faculty member	.06	-.02
14-9	Taught a section of an undergraduate course	.02	-.03
14-10	Taught a section of an undergraduate class on one or several occasions	.03	.00
14-11	Frequently advised or tutored other graduate students on technical or statistical problems	.05	-.02
14-12	Assisted in editing of text or preparation of bibliographic material for a publication	.03	.00
14-13	Designed and built a piece of laboratory equipment	.08	-.00
14-14	Learned to operate or maintain a piece of electronic equipment	.05	-.01
14-15	Programmed a computer to analyze research data	.07	-.03
14-16	Held a student government office	-.01	-.02
15	Please evaluate each of the following values with respect to its importance to you in shaping your life's work		
15-a	Intellectuality. Dealing with abstractions, theory	-.16	-.08
15-b	Productivity. Getting things done, smoothly and well	.03	-.03
15-c	Aesthetics. Dealing with the beautiful, attractive or harmonious in life	-.03	-.09
15-d	Altruism. Helping others, particularly those in need	.13	.02
15-e	Leadership. Directing the activities of a group	.11	.01
15-f	Integration. Achieving a sense of personal oneness or wholeness	.06	-.02

Table 10 (cont'd)

Question Number	Question	Zero Order Correlations with FLT	Partial Correlation with GRE V and Q removed
16	Will you please characterize yourself on the following scales? Use the midpoint as a neutral position or when you are uncertain		
16-a	Easygoing/Intense	.02	-.03
16-b	Leader/Follower	.02	-.01
16-c	Liberal/Conservative	-.01	-.00
16-d	Outgoing/Reserved	.08	-.00
16-e	Liked/Disliked	.03	-.03
16-f	Teacher/Researcher	.15	.03
16-g	Unique/Common	-.08	-.05
16-h	Concentrated/Distractable	.02	-.00
16-i	Confident/Diffident	-.02	-.04
16-j	Thinker/Doer	-.03	.00

Relations Between Major Fields and Figure Location Test, With Effects of Other Tests Considered

Two approaches were used in considering the effect of the GRE-V and Q on the relationship of the Figure Location Test to choice of major. First, a covariance analysis was used to partial the effects of GRE-V and Q from Figure Location Test mean scores for those majors with 30 or more cases. These adjusted means are shown in Table 11. Music, hospital administration, and social work are the only instances where the adjusted mean for those choosing that major differed by more than 1.5 points from the "all other" category. Because of the large number of cases in the "all other" category, all differences are statistically significant but mean differences lower than 1.5 would not be practically important.

The second approach was to compute multiple correlations between the Figure Location Test, on the one hand, and the GRE-V and Q scores alone, and the GRE-V and Q with choice of major included as a dummy variable. These values are shown in Table 12. Music, geology, and social work are the only instances where the addition of the major field improved the correlation by as much as .02.

Analysis of the psychology and education sub-fields did not appear to be particularly productive and will not be reported here.

Stepwise Discriminant Function Analyses

For those students who reported that they had not changed majors, two discriminant function analyses were undertaken including the Figure Location Test and five other variables which related to choice of majors. The variables included GRE-V and Q, Question 7A (choice of major people related), Question 7B (choice of major for theoretical emphasis) and undergraduate grade point average. One analysis included the individual major fields, the second analysis included grouping of majors into nine Discipline Groups.

In the first analysis, GRE-V and Q, Questions 7A and 7B were selected and the Figure Location Test and undergraduate grade point average were not. The first three functions accounted for 94.5 percent of the variance between groups and the fourth function accounted for the remaining 5.5 percent.

In the second analysis, the Figure Location Test was again not selected while the other five variables were. Here the first two functions accounted for 91.5 percent of the variance and the third accounted for an additional seven percent. These analyses provide

TABLE 11

Figure Location Test Mean Scores and adjusted Mean Scores, with effects of GRE-V and Q removed by covariance, by graduate major field

	GRE-V		GRE-Q		FLT			
					Major		All Other	
	Major	All Other	Major	All Other	Actual	Adjusted	Actual	Adjusted
Educational Administration	465.117	543.387	480.727	560.467	15.505	18.063	18.500	18.452
English	636.581	540.233	525.787	559.560	17.202	18.035	18.466	18.451
Music	534.235	541.999	521.184	559.375	20.088	21.271	18.427	18.414
Religion	545.497	541.870	539.494	559.227	19.200	19.795	18.434	18.426
Hospital Administration	528.196	542.056	540.576	559.156	16.037	16.630	18.469	18.463
Other biological science	551.599	541.785	605.765	558.335	19.486	18.023	18.430	18.450
Agriculture	459.186	542.929	551.088	559.066	17.169	17.565	18.460	18.455
Biochemistry	588.585	541.461	657.369	558.009	20.635	17.504	18.423	18.453
Biology	544.028	541.887	565.493	558.878	18.373	18.168	18.445	18.448
Medicine	640.861	540.706	683.348	557.448	23.138	19.120	18.387	18.436
Nursing	536.031	542.028	498.312	560.119	16.150	18.030	18.488	18.452
Veterinary Medicine	534.806	542.085	614.474	557.660	20.823	19.129	18.388	18.428
Chemistry	560.704	541.651	678.199	557.284	21.107	17.377	18.407	18.459

TABLE 11 (Cont'd)

Figure Location Test Mean Scores and adjusted Mean Scores, with effects of GRE-V and Q removed by covariance, by graduate major field

Major	GRE-V		GRE-Q		FLT			
					Major		All Other	
	Major	All Other	Major	All Other	Actual	Adjusted	Actual	Adjusted
Electrical Engineering	511.117	542.258	673.610	557.698	20.966	17.472	18.416	18.455
Geology	581.600	541.529	644.735	558.133	22.038	19.320	18.409	18.436
Computer Science	574.961	541.500	684.992	557.380	22.955	19.011	18.387	18.437
Other Social Science	512.675	542.448	527.217	559.547	17.740	18.776	18.457	18.438
Business and Commerce	519.469	542.574	591.620	558.014	18.575	17.606	18.440	18.469
Economics	572.590	541.559	631.111	631.111	19.806	17.518	18.428	18.455
Education	478.087	548.144	477.157	566.951	16.356	19.028	18.648	18.387
History	601.434	541.155	545.793	559.139	18.000	18.291	18.450	18.446
Law	619.123	540.632	617.284	558.000	20.023	18.073	18.418	18.450
Library Science	594.410	541.044	514.096	559.716	17.193	18.477	18.465	18.440
Psychology	585.228	539.529	564.979	558.639	17.626	17.348	18.489	18.505
Public Administration	535.657	542.034	515.469	559.786	16.111	17.463	18.488	18.463
Social Work	526.100	542.204	487.242	560.274	14.104	16.334	18.523	18.483
Guidance	515.068	542.608	494.192	560.638	16.015	18.062	18.507	18.454

Table 12

Multiple Correlation between Figure Location Test and GRE-Verbal and Quantitative Tests and with Major Field

	GRE-V and Q	GRE-V and Q and major field
Agriculture	.50	.50
Biochemistry	.57	.57
Biology	.55	.55
Business and Commerce	.52	.53
Chemistry	.47	.48
Computer Science	.68	.68
Economics	.51	.52
Education	.52	.52
Educational Administration	.57	.57
Electrical Engineering	.49	.49
English	.62	.62
Geology	.55	.57
Guidance	.51	.51
History	.50	.50
Hospital Administration	.58	.59
Law	.63	.64
Library Science	.65	.65
Medicine	.52	.52
Music	.55	.60
Nursing	.45	.45
Other Biological Sciences	.57	.58
Other Social Science	.49	.49
Psychology	.53	.54
Public Administration	.55	.56
Religion	.50	.52
Social Work	.52	.55
Veterinary Medicine	.49	.49

additional confirmation that the Figure Location Test is not providing unique information related to choice of majors, over and above that available in other measures. Data from these analyses are in Appendix E-1 and E-2. Discipline Groups are listed in Appendix E-3.

Discussion and Conclusions

From the data available, it must be concluded that while the Figure Location Test taken by itself does relate to both choice of undergraduate and graduate major field, it adds a neglible increment when considered along with other predictors. The reasons for this became clear from the study by Ward, et al (1978) of cognitive factors. After extracting eight factors from a battery of 21 cognitive tests, they added several other tests to the analysis by extension. The GRE-Verbal and Quantitative Tests and the Figure Location Test were among those so added. One or both of the GRE Aptitude Tests had significant loadings on seven of the eight factors. The Figure Location Test also had significant loadings on these same seven factors.

These findings differ from those of Witkin, et al (1977b), where they concluded that the Group Embedded Figures Test mode an independent contribution to prediction of major field choice. The difference may be due in part to the fact that the Witkin study began with undergraduate students earlier in their academic careers, while the present study began with students entering or already in graduate school. A second factor is that the Witkin study dealt with students in a single rather selective college, while the present study included students from many different schools. The observed intercorrelation among test scores were much lower in the Witkin study, probably due to the restricted range, and thus the Group Embedded Figures Test could show greater effect.

Considering all of the data at hand, it does not appear that it would be useful to conduct further research on the Figure Location Test as a general predictor of academic choice or success in the context of the GRE.

APENDIXES

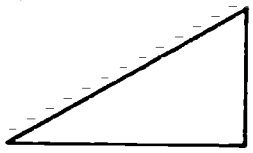
Appendix A

FIGURE LOCATION TEST

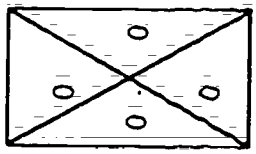
INSTRUCTIONS: This test consists of a series of problems which test your ability to find a simple form hidden in a complex figure.

Below is an example of a simple figure form (A) and its corresponding complex figure (B).

EXAMPLE 1.



A

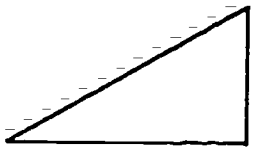


B

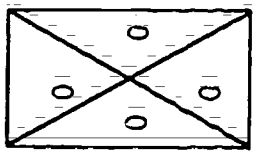
In order to solve each problem, you must locate the simple form within the complex figure. In each case the simple form will appear in the same size, in the same proportions and facing in the same direction, in the complex figure. To answer each problem you might go through steps similar to the following ones.

STEP

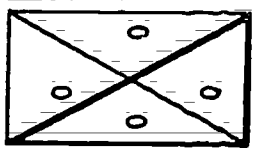
1. Study the simple form.



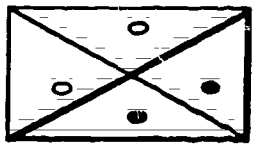
2. Inspect the corresponding complex figure for the hidden simple form.



3. Outline the hidden simple form either visually or with a pencil.



4. Blacken all of the ovals which appear in the hidden simple form.



47

GRE GRADUATE RECORD EXAMINATIONS: FIGURE LOCATION TEST QUESTIONNAIRE

DO NOT MAKE ANY MARKS IN THIS AREA.

USE ONLY A SOFT LEAD PENCIL (NO. 2) DO NOT USE INK OR BALL-POINT PEN.

1. PERMANENT HOME ADDRESS

In the boxes below, indicate an address which will reach you in the spring of 1978. Below each box blacken the corresponding oval to indicate a space in address, blacken the corresponding diamond.

Street Address

City

State

U.S. Zip Code

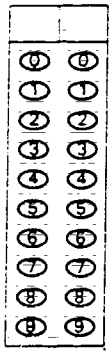
CONTINUED ON REVERSE SIDE

SIDE 1

2. Did you shift majors (including shifting from a preliminary major) during your undergraduate career?

- ○ No
- ○ Yes

If yes please code your original major according to the list below.



3. How satisfied were you with your undergraduate major field?

- ○ Well satisfied
- ○ Moderately satisfied
- ○ Dissatisfied

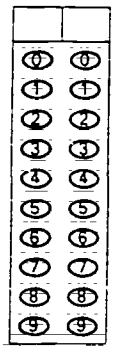
4. How certain are you that your intended graduate major is the one you really want?

- ○ Very uncertain
- ○ Somewhat uncertain
- ○ Fairly certain
- ○ Very certain

5. Did you have a designated minor field in your undergraduate program?

- ○ No
- ○ Yes

If yes, please code the appropriate field according to the list below.



6. How satisfied were you with your minor field in your undergraduate program?

- ○ Well satisfied
- ○ Moderately satisfied
- ○ Dissatisfied
- ○ Does not apply

7. How would you rate a test such as the Figure Location Test in comparison to a vocabulary test?

- ○ Much prefer the vocabulary test
- ○ Somewhat prefer the vocabulary test
- ○ About the same
- ○ Somewhat prefer the Figure Location Test
- ○ Much prefer the Figure Location Test

8. How would you rate a test such as the Figure Location Test in comparison to a test of mathematics?

- ○ Much prefer the mathematics test
- ○ Somewhat prefer the mathematics test
- ○ About the same
- ○ Somewhat prefer the Figure Location Test
- ○ Much prefer the Figure Location Test

FIELD CODE LIST

BIOLOGICAL SCIENCES

31 Agriculture
32 Anatomy
05 Audiology
33 Bacteriology
34 Biochemistry
35 Biology
36 Biophysics
37 Botany
38 Dentistry
39 Entomology
40 Forestry
06 Genetics
41 Home Economics
25 Hospital and Health Services Administration
42 Medicine
07 Microbiology
43 Nursing
77 Nutrition
44 Occupational Therapy
45 Optometry
46 Osteopathy
08 Parasitology
56 Pathology
03 Pharmacology
47 Pharmacy
48 Physical Therapy
49 Physiology
50 Public Health
51 Veterinary Medicine
52 Zoology
30 Other Biological Sciences

PHYSICAL SCIENCES

54 Applied Mathematics
61 Astronomy
62 Chemistry
78 Computer Sciences
63 Engineering, Aeronautical
64 Engineering, Chemical
65 Engineering, Civil
66 Engineering, Electrical
67 Engineering, Industrial
68 Engineering, Mechanical
69 Engineering, Other
71 Geology
72 Mathematics
73 Metallurgy
74 Mining
75 Oceanography
76 Physics
59 Statistics
60 Other Physical Sciences

HUMANITIES

11 Archaeology
12 Architecture
26 Art History
13 Classical Languages
28 Comparative Literature
53 Dramatic Arts
14 English
29 Far Eastern Languages and Literature
15 Fine Arts, Art, Design
16 French
17 German
58 Italian
04 Linguistics
19 Music
57 Near Eastern Languages and Literature
20 Philosophy
21 Religious Studies or Religion
22 Russian
23 Spanish
24 Speech
10 Other Foreign Languages
98 Other Humanities

SOCIAL SCIENCES

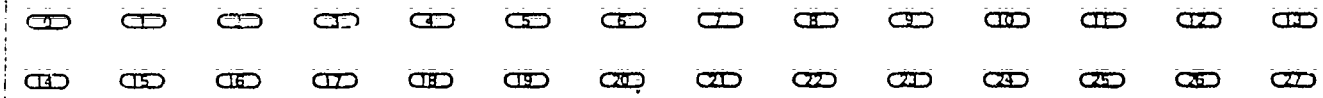
27 American Studies
81 Anthropology
82 Business and Commerce
83 Communications
84 Economics
85 Education (including M.A. in teaching)
01 Educational Administration
09 Educational Psychology
70 Geography
92 Government
99 Guidance and Counseling
86 History
87 Industrial Relations and Personnel
88 International Relations
18 Journalism
89 Law
90 Library Science
91 Physical Education
92 Political Science
93 Psychology
94 Public Administration
55 Slavic Studies
79 Social Psychology
95 Social Work
96 Sociology
97 Urban Development (Regional Planning)
80 Other Social Services

02 Not included in the above categories

GRE GRADUATE RECORD EXAMINATIONS: FIGURE LOCATION TEST QUESTIONNAIRE

SIDE 1

DO NOT MAKE ANY MARKS IN THIS AREA.



USE ONLY A SOFT LEAD PENCIL (NO. 2). DO NOT USE INK OR BALL-POINT PEN.

1. Did you enter graduate school?

   ① Entered fall 1977
   ② Entered prior to fall 1977
   ③ Entered after fall 1977
   ④ Did not enter

   (If you have entered graduate school, go on to question 5.)

2. If you did not enter graduate school, please indicate the reason below that most nearly describes your situation.

   ① I was not accepted by any school.
   ② I was accepted but basically was forced to let the opportunity pass.
   ③ I was accepted but chose not to enter at this time.

3. Do you plan to enter graduate school in the near future?

   ① No
   ② Possibly
   ③ Yes

4. If you do plan to enter in the near future, please select the most likely major field from the list provided, and code the corresponding number in the boxes to the right. Blacken the corresponding oval below each box.

MAJOR FIELD		
	⓪	⓪
	①	①
	②	②
	③	③
	④	④
	⑤	⑤
	⑥	⑥
	⑦	⑦
	⑧	⑧
	⑨	⑨

(If you did not enter graduate school, please answer only questions 15 and 16 concerning attitudes. Do not answer the other questions which deal with graduate school.)

5. Please indicate your present major field by coding the corresponding number, from the list provided, into the boxes to the right. Blacken the corresponding oval below each box.

MAJOR FIELD		
	⓪	⓪
	①	①
	②	②
	③	③
	④	④
	⑤	⑤
	⑥	⑥
	⑦	⑦
	⑧	⑧
	⑨	⑨

6. If you feel that the closest major field listing does not describe your major field very well, darken the oval below and write in a better description on the lines provided.

   ○

7. If you did not change majors, please characterize the values that governed your choice of major field.

   1 = Strong factor
   2 = Moderate factor
   3 = Little or no consideration

a. Is people-oriented	①	②	③
b. Has a theoretical emphasis	①	②	③
c. Is highly structured	①	②	③
d. Gives opportunity to contribute new knowledge	①	②	③
e. Gives opportunity to achieve through one's own efforts	①	②	③
f. Rewards are based on outstanding achievements	①	②	③
g. Emphasizes the use of intellectual skills	①	②	③

8. If you had an earlier, different graduate major, please indicate this field by coding the corresponding number, from the list provided, into the boxes to the right. Blacken the corresponding oval below each box.

MAJOR FIELD		
	⓪	⓪
	①	①
	②	②
	③	③
	④	④
	⑤	⑤
	⑥	⑥
	⑦	⑦
	⑧	⑧
	⑨	⑨

9. If you changed majors, please characterize the rationale for that change by using the scales below. Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2, or 3 in the appropriate direction.

   My new major is:

a.	More people-centered	①	②	③	Ⓜ	①	②	③	Less people-centered
b.	Emphasizes my intellectual skills	①	②	③	Ⓜ	①	②	③	Emphasizes my practical skills
c.	More popular	①	②	③	Ⓜ	①	②	③	Less popular
d.	More narrowly defined	①	②	③	Ⓜ	①	②	③	More broadly inclusive
e.	More challenging	①	②	③	Ⓜ	①	②	③	Less challenging

10. How satisfied are you that your present major field of study is the one you really want?

    ① Well satisfied
    ② Moderately satisfied
    ③ Dissatisfied

Questionnaire continued on side 2.

11. Approximately what is your overall grade average for your graduate work to date?

① A ④ B ⑦ C
② A– ⑤ B– ⑧ C–
③ B+ ⑥ C+ ⑨ no grades

12. Approximately what is your grade average for your graduate work in subjects in your major field only to date.

① A ④ B ⑦ C
② A– ⑤ B– ⑧ C–
③ B+ ⑥ C+ ⑨ no grades

13. What is the highest degree you plan to obtain?

① Bachelor's
② Master's
③ Ph. D.
④ Ed. D.
⑤ Other

14. Which of the following have you done during the current academic year? (Mark as many as apply.)

① Attended one or more meetings of a scholarly or professional society.
② Subscribed to two or more scholarly or professional journals.
③ Been author or coauthor of a scientific paper which was accepted for presentation at a professional meeting.
④ Been author or coauthor of a scientific paper which was submitted for publication to a professional journal.
⑤ Been author or coauthor of a scientific paper which was accepted for publication by a scholarly or professional journal.
⑥ Prepared a detailed proposal or plan for a dissertation, master's thesis, or other major research project.
⑦ Conducted an independent research project.
⑧ Conducted a research project in collaboration with another student or faculty member.
⑨ Taught a section of an undergraduate course.
⑩ Taught a section of an undergraduate class on one or several occasions.
⑪ Frequently advised or tutored other graduate students on technical or statistical problems.
⑫ Assisted in editing of text or preparation of bibliographic material for a publication.
⑬ Designed and built a piece of laboratory equipment.
⑭ Learned to operate or maintain a piece of electronic equipment.
⑮ Programmed a computer to analyze research data.
⑯ Held a student government office.

(#14 continued top of next column.)

⑰ Participated in a "special interest" organization, such as a biology club, drama club, etc.
⑱ Served on a student - faculty committee.
⑲ Held an assistantship or fellowship.
⑳ Held a job, other than an assistantship or fellowship.
㉑ Edited a student journal or similar publication.
㉒ Reviewed manuscripts for a publication.
㉓ Acted in a play.
㉔ Created a work of art.
㉕ Participated in a musical program.

15. Please evaluate each of the following values with respect to it's importance to you in shaping your life's work.

Scale: Important ① ② ③ ④ ⑤ ⑥ ⑦ Unimportant

a. Intellectuality. Dealing with abstractions, theory. ① ② ③ ④ ⑤ ⑥ ⑦
b. Productivity. Getting things done, smoothly and well. ① ② ③ ④ ⑤ ⑥ ⑦
c. Aesthetics. Dealing with the beautiful, attractive or harmonious in life. ① ② ③ ④ ⑤ ⑥ ⑦
d. Altruism. Helping others, particulary those in need. ① ② ③ ④ ⑤ ⑥ ⑦
e. Leadership. Directing the activities of a group. ① ② ③ ④ ⑤ ⑥ ⑦
f. Integration. Achieving a sense of personal oneness or wholeness. ① ② ③ ④ ⑤ ⑥ ⑦

16. Will you please characterize yourself on the following scales? Use the midpoint as a neutral position or when you are uncertain. Indicate degrees of appropriateness by blackening oval 1, 2, or 3 in the appropriate direction.

a. Easygoing ③ ② ① Ⓜ ① ② ③ Intense
b. Leader ③ ② ① Ⓜ ① ② ③ Follower
c. Liberal ③ ② ① Ⓜ ① ② ③ Conservative
d. Outgoing ③ ② ① Ⓜ ① ② ③ Reserved
e. Liked ③ ② ① Ⓜ ① ② ③ Disliked
f. Teacher ③ ② ① Ⓜ ① ② ③ Researcher
g. Unique ③ ② ① Ⓜ ① ② ③ Common
h. Concentrated ③ ② ① Ⓜ ① ② ③ Distractable
i. Confident ③ ② ① Ⓜ ① ② ③ Diffident
j. Thinker ③ ② ① Ⓜ ① ② ③ Doer

17. If your present field is psychology, which of the following best describes your intended area of specilization?

① Clinical
② Cognitive
③ Counseling
④ Developmental
⑤ Educational
⑥ Experimental, Comparative, or Physiological
⑦ Measurement
⑧ Organizational, Personnel
⑨ Personality
⑩ School
⑪ Social
⑫ Other: _____

18. If your present graduate field is education, which of the following best describes your intended area of specilization?

① Education of the mentally retarted
② Speech pathology
③ Media specialist - library and audio - visual services
④ Reading specialist
⑤ Foreign language instruction
⑥ Speech - communication and theatre
⑦ Home economics
⑧ Art education
⑨ Physical education
⑩ Business education
⑪ Social studies instruction
⑫ Science instruction
⑬ Mathematics instruction
⑭ English language and literature
⑮ Industrial arts
⑯ Early childhood
⑰ Guidance counselor
⑱ Administration and supervision
⑲ Audiology
⑳ Elementary education
㉑ Secondary education
㉒ Higher education
㉓ Adult education
㉔ Special education
㉕ Measurement
㉖ Curriculum design
㉗ Other: _____

SIDE 2

Table C-1

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test by Undergraduate Majors

		FLT		GRE-V		GRE-Q	
	N	Mean	SD	Mean	SD	Mean	SD
Aeronautical Engineering	17	22.4	6.4	554.5	103.5	684.5	82.0
Agriculture	223	16.4	7.7	452.9	115.0	550.5	110.2
American Studies	28	17.6	6.8	587.4	113.6	532.6	126.4
Anatomy	2	20.0	9.0	549.4	200.3	533.7	84.5
Anthropology	124	17.1	7.7	582.4	111.6	534.7	123.0
Applied Mathematics	25	20.9	5.4	582.6	92.3	702.7	74.7
Archaeology	6	23.2	4.4	546.4	153.0	571.9	107.2
Architecture	64	22.4	7.1	500.8	120.0	583.9	98.5
Art History	77	18.3	6.8	590.6	113.5	512.0	104.1
Astronomy	7	26.3	5.1	680.9	105.0	734.9	69.4
Audiology	34	14.8	4.9	477.7	92.0	451.3	97.5
Bacteriology	12	18.1	8.1	566.1	68.6	626.3	76.4
Biochemistry	95	19.7	8.0	591.2	101.2	663.8	93.3
Biology	794	17.9	7.6	536.6	109.7	579.0	111.0
Biophysics	13	22.9	6.8	559.5	92.6	690.9	99.4
Botany	42	20.7	6.0	560.9	121.4	609.9	88.9
Business	271	14.9	8.1	440.7	116.0	515.0	117.6
Chemical Engineering	53	20.3	6.7	507.0	123.8	671.4	95.6
Chemistry	270	19.7	7.4	541.3	123.4	642.3	105.1
Civil Engineering	99	21.6	7.2	467.3	119.3	653.0	102.4
Classical Language	29	20.3	9.2	663.2	103.7	569.7	108.1
Communications	74	15.3	7.5	469.4	107.5	467.8	113.9
Comparative Literature	27	19.4	7.9	657.6	97.7	546.8	111.9
Computer Science	78	21.5	6.9	539.9	127.0	685.2	91.1

Table C-1 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Dentistry	13	17.8	6.3	513.1	112.4	564.8	65.3
Dramatic Art	64	14.1	6.1	521.2	99.4	454.4	109.5
Economics	233	17.3	7.8	544.6	137.1	603.8	117.1
Education	927	13.6	7.4	448.2	110.2	441.1	110.4
Educational Administration	15	12.0	7.3	373.7	81.1	383.5	104.7
Educational Psychology	15	11.9	6.5	444.4	103.6	422.7	101.4
Electrical Engineering	175	19.5	8.3	495.2	134.6	659.6	102.7
English	620	15.2	7.6	599.6	121.3	496.5	118.5
Entomology	18	18.3	7.8	478.1	92.0	553.0	102.6
Far Eastern Language	10	14.0	7.2	515.3	132.1	523.6	127.8
Fine Arts	123	19.7	6.9	502.4	116.9	467.1	104.8
Forestry	35	16.8	7.0	461.3	111.4	568.3	83.3
French	80	15.3	8.0	560.3	117.7	492.6	116.5
Genetics	12	19.6	8.3	622.4	112.8	628.4	104.0
Geography	53	16.5	8.3	523.3	118.3	522.8	123.1
Geology	112	19.5	8.3	556.3	120.3	606.9	100.5
German	35	17.6	8.4	598.3	114.2	543.2	115.6
Government	368	14.7	7.4	533.7	120.4	517.2	121.2
Guidance	14	11.8	6.4	480.5	98.1	463.7	110.6
History	450	15.0	8.3	562.2	127.1	506.8	127.5
Home Economics	113	15.5	6.8	461.3	105.9	438.1	105.5
Hospital & Health Services Administration	23	12.3	7.0	427.3	103.1	467.9	95.7

Table C-1 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Industrial Engineering	26	18.2	9.6	464.8	149.8	595.4	154.9
Industrial Relations	15	13.9	7.5	478.4	104.6	522.6	118.1
International Relations	40	14.7	5.9	565.1	118.0	525.4	103.0
Italian	4	11.2	1.6	547.3	139.6	439.2	77.4
Journalism	62	14.7	7.2	512.3	111.9	470.0	113.1
Law	11	11.4	9.1	447.2	123.5	437.4	152.7
Library Science	16	11.7	6.6	457.8	108.1	422.8	81.5
Linguistics	18	18.5	8.8	639.1	129.5	590.5	124.3
Mathematics	272	21.3	7.5	538.1	136.8	677.3	92.2
Mechanical Engineering	82	19.9	7.5	480.2	139.4	651.5	119.8
Medicine	21	17.6	5.8	530.1	129.1	559.9	115.0
Metallurgy	7	18.3	6.9	474.6	143.2	627.1	130.8
Microbiology	104	18.5	8.2	512.0	107.5	591.8	96.7
Mining	1	12.0	0	213.1	0	195.6	0
Music	194	17.7	7.5	509.8	126.1	492.4	126.9
Near Eastern Language	3	16.7	5.2	584.5	128.0	486.9	73.3
Nursing	247	13.6	7.6	504.5	96.8	471.2	106.4
Nutrition	66	16.8	6.9	493.5	105.3	525.7	122.9
Occupational Therapy	8	13.6	6.0	442.5	136.0	446.0	116.1
Oceanography	4	23.8	5.1	629.9	79.7	594.8	91.4
Other Engineering	67	20.1	8.3	528.8	126.1	659.6	90.1

Table C-1 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Parasitology	1	23.0	0	434.9	0	775.2	0
Pathology	12	15.6	8.3	443.6	111.0	427.1	110.5
Pharmacology	5	8.2	8.5	503.9	67.6	532.0	121.1
Pharmacy	27	13.4	9.4	483.8	111.7	578.3	109.9
Philosophy	125	16.2	8.6	614.6	124.7	555.9	121.3
Physical Education	175	13.9	7.1	414.6	101.8	443.1	109.6
Physical Therapy	10	16.0	6.5	460.9	110.4	504.5	89.5
Physics	165	21.8	8.3	598.0	134.8	694.4	102.7
Physiology	17	19.9	7.8	561.1	95.2	615.1	104.5
Psychology	1300	16.1	7.4	546.4	113.9	536.4	115.0
Public Administration	31	14.2	7.5	476.7	119.7	488.0	136.1
Public Health	16	11.6	6.0	445.2	84.3	492.1	122.9
Religion	60	16.0	8.8	583.1	108.0	529.9	112.5
Russian	14	15.6	6.4	595.3	152.4	518.4	108.1
Slavic Study	2	21.0	1.0	520.8	50.1	660.5	6.0
Social Psychology	22	14.3	7.0	516.4	87.8	476.3	124.7
Social Work	109	13.0	7.6	454.3	111.0	443.5	118.1
Sociology	277	13.1	7.4	498.5	123.1	474.4	125.4
Spanish	66	14.3	7.9	512.4	121.2	461.4	109.4
Speech	172	14.7	7.1	479.3	106.2	466.3	103.5
Statistics	13	22.1	4.8	549.2	154.5	684.8	89.1
Urban Development	33	16.9	7.9	522.3	111.5	534.3	126.0
Veterinary Medicine	141	18.5	7.1	491.6	97.3	571.7	103.1
Zoology	198	18.9	7.4	534.8	94.1	594.1	82.7

Table C-2

Means and Standard Deviations of Figure Location Test and GRE-Aptitude Test by Intended Graduate Majors

		FLT		GRE-V		GRE-Q	
	N	Mean	SD	Mean	SD	Mean	SD
Aeronautical Engineering	12	22.4	7.8	560.8	105.3	670.3	89.6
Agriculture	126	15.5	8.2	449.1	122.5	539.2	112.9
American Studies	17	19.4	6.9	618.7	90.2	548.1	115.3
Anatomy	12	16.7	8.9	563.2	114.3	572.8	79.7
Anthropology	97	16.9	7.1	584.7	109.8	523.8	121.1
Applied Mathematics	16	21.7	7.1	557.2	100.7	705.9	67.9
Archaeology	28	20.3	7.3	565.9	129.3	536.2	108.0
Architecture	90	22.0	7.1	533.8	127.6	590.8	101.2
Art History	59	17.7	7.4	604.4	119.7	503.8	108.9
Astronomy	12	23.2	6.6	630.2	131.8	671.0	138.6
Audiology	42	14.4	4.9	460.2	95.5	434.8	91.1
Bacteriology	12	18.0	7.7	491.4	116.1	576.1	122.0
Biochemistry	117	19.5	7.8	579.7	112.2	651.6	108.5
Biology	155	18.3	7.8	545.6	121.2	592.7	108.2
Biophysics	20	21.8	6.5	618.9	117.3	692.4	83.4
Botany	37	21.5	6.7	571.8	96.0	606.1	87.2
Business	267	16.6	7.6	476.4	129.0	558.4	120.1
Chemical Engineering	52	20.6	7.5	512.5	121.8	684.3	98.6
Chemistry	159	19.8	7.0	544.8	119.4	645.9	99.5
Civil Engineering	85	21.5	7.4	446.3	125.6	638.7	108.2
Classical Language	21	19.9	8.1	655.7	105.0	597.5	86.9
Communications	89	16.1	6.7	510.3	117.9	503.3	107.4
Comparative Literature	32	17.0	9.1	655.4	113.5	539.5	94.4
Computer Science	157	20.1	7.8	529.3	150.4	661.9	99.8

Table C-2 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Dentistry	24	18.9	7.3	536.2	104.2	632.7	75.5
Dramatic Art	56	14.8	6.5	532.9	104.3	474.9	130.9
Economics	188	17.0	8.0	552.6	140.0	612.8	118.9
Education	999	14.3	7.7	459.9	114.7	454.9	116.6
Educational Administration	265	12.6	7.8	446.8	116.3	446.8	138.8
Educational Psychology	96	14.6	7.2	505.0	112.6	470.5	112.2
Electrical Engineering	138	19.3	8.2	495.2	137.7	653.4	103.0
English	309	15.8	7.6	617.7	111.5	505.2	122.6
Entomology	25	18.8	6.9	521.2	109.6	557.9	102.8
Far Eastern Language	5	18.4	5.7	523.7	144.1	586.8	85.6
Fine Arts	66	18.4	6.8	486.8	123.9	468.8	97.1
Forestry	28	17.8	6.1	488.2	119.8	569.0	85.8
French	24	16.1	7.4	534.9	116.5	493.0	110.4
Genetics	53	20.4	7.2	594.6	100.2	634.2	98.8
Geography	37	16.8	8.9	510.9	122.8	538.0	123.4
Geology	96	20.9	7.2	557.9	118.3	612.7	100.0
German	23	18.0	8.6	592.6	103.8	550.3	114.7
Government	145	13.6	7.8	543.4	142.3	524.3	130.6
Guidance	290	14.0	7.8	479.1	113.6	460.8	119.2
History	218	15.5	7.9	584.6	120.5	518.8	125.5
Home Economics	60	16.8	6.3	479.7	104.5	460.6	99.1
Hospital & Health Services Administration	104	13.0	7.8	479.4	121.9	503.4	121.3

Table C-2 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Industrial Engineering	37	16.8	9.0	421.5	135.5	562.9	143.0
Industrial Relations	43	14.2	8.0	512.7	108.0	502.6	130.8
International Relations Relations	108	14.9	7.1	558.5	118.2	525.5	119.4
Italian	3	10.3	0.5	546.6	161.2	456.1	82.8
Journalism	111	14.7	7.5	549.1	123.7	500.8	123.0
Law	46	16.4	9.0	522.0	117.2	506.1	130.8
Library Science	216	15.5	7.3	566.5	123.3	484.7	111.2
Linguistics	29	18.0	8.3	597.1	110.1	530.3	119.5
Mathematics	113	22.1	7.6	548.4	126.0	701.6	86.2
Mechanical Engineering	60	19.3	8.1	475.1	150.7	660.8	119.6
Medicine	53	18.8	7.8	548.7	120.4	616.5	117.4
Metallurgy	11	21.4	6.2	545.5	142.2	701.4	70.3
Microbiology	109	16.6	8.4	515.6	110.0	560.8	103.7
Mining	1	0.0	0.0	578.0	0.0	570.0	0.0
Music	138	18.5	7.1	509.7	121.7	496.4	124.6
Near Eastern Language	8	13.1	8.1	635.9	101.0	496.9	107.3
Nursing	232	14.3	7.8	513.2	100.5	481.1	108.7
Nutrition	74	17.8	6.4	495.2	89.7	537.9	105.2
Occupational Therapy	12	13.1	9.0	442.0	88.2	458.5	110.3
Oceanography	26	18.1	9.8	522.3	105.1	633.2	110.6
Optometry	1	27.0	0	399.2	0	569.9	0
Osteopathy	2	22.0	6.0	396.9	14.1	507.1	115.4
Other Engineering	77	20.3	7.1	512.6	123.7	650.1	102.5

Table C-2 (Continued)

	N	FLT Mean	FLT SD	GRE-V Mean	GRE-V SD	GRE-Q Mean	GRE-Q SD
Parasitology	2	11.0	5.0	581.6	39.3	606.1	24.2
Pathology	40	15.8	7.4	497.7	109.2	504.7	120.4
Pharmacology	30	18.6	8.5	534.1	124.6	636.8	122.4
Pharmacy	20	15.3	10.0	488.6	115.4	610.9	97.4
Philosophy	67	16.6	8.5	637.3	120.6	575.7	119.2
Physical Education	92	13.9	6.7	451.3	103.8	464.0	103.3
Physical Therapy	63	16.0	7.2	508.9	111.4	547.9	106.8
Physics	97	22.7	8.3	619.5	118.3	721.4	76.6
Physiology	71	18.3	7.5	529.9	104.7	602.6	110.4
Psychology	967	16.2	7.4	557.5	115.5	542.7	117.2
Public Administration	269	13.8	7.8	492.9	120.5	482.3	121.2
Public Health	112	15.3	7.5	530.3	110.8	540.6	126.9
Religion	135	17.5	8.3	555.8	118.0	523.2	113.8
Russian	8	18.1	4.8	521.7	167.4	473.7	83.2
Slavic Study	2	7.5	4.5	485.3	164.9	487.5	135.0
Social Psychology	30	15.2	9.2	513.6	109.1	514.9	136.9
Social Work	209	12.7	7.1	484.2	114.4	467.2	113.7
Sociology	94	13.7	7.2	516.5	103.4	505.2	112.5
Spanish	33	15.4	8.0	518.9	143.5	487.8	140.7
Speech	150	14.6	6.7	479.6	104.6	465.2	105.4
Statistics	29	21.0	6.1	527.1	134.1	664.2	85.5
Urban Development	116	16.4	7.9	527.8	121.4	530.7	113.8
Veterinary Medicine	452	18.6	7.3	507.3	101.1	588.1	97.0
Zoology	96	20.4	6.5	561.6	104.3	603.1	75.7

Table C-3

Figure Location Test Score Distribution

N = 12,799

Score	Percentage of Cases
29 - 32	6
25 - 28	11
21 - 24	15
17 - 20	18
13 - 16	18
9 - 12	14
5 - 8	9
0 - 4	10

Appendix D

Correlations of GRE scores with Grade Point Averages by Major Fields Separately

The correlations between the GRE scores and undergraduate and graduate grade-point averages reported in Table 4 are unusually low, and it was pointed out that this was probably due to several factors: that these were self-reported grades, that they were pooled across subject matter fields, and that they were pooled across schools. Data on schools attended was not available, but graduate major was. Supplementary analyses were made, correlating GRE scores with each of the four types of grade point averages for the major fields separately, where there was an N of 20 or more. Table D-1 through D-4 shows the distribution of these correlations for the 23 biological and physical sciences and the 24 humanities and social sciences.

As can be seen, some correlations were negative, but most were positive, with a few as high as the .50's and .60's. Correlations with the GRE-Verbal scores tended to be higher than those for the GRE-Quantitative scores for the Humanities and social sciences, while the reverse was true for the biological and physical sciences.

These findings are consistent with those reported by Miller and Wild (1969) and Wilson (1980). Wilson, for example, reports correlations between GRE-Verbal scores and first year graduate grade-point averages ranging from .20 to .64 in primarily verbal fields, and between GRE-Quantitative scores and first year graduate grade point averages ranging from .21 to .54 in primarily quantitative fields. He also was able to compare how well officially recorded and self-reported undergraduate grade point averages correlated with first year graduate grade point averages. For the most part, the officially recorded grades produced higher correlations than did the self-reported grades.

TABLE D-1

Frequency Distributions of the Correlations
between GRE Subscores and
Overall Graduate Grade Point Average

Correlation Coefficient	Biological and Physical Sciences (number of majors = 23)		Humanities and Social Sciences (number of majors = 24)	
	Verbal	Quantitative	Verbal	Quantitative
.50 .59		1	1	
.40 .49		1	1	1
.30 .39	3	3	4	6
.20 .29	6	2	5	3
.10 .19	5	8	8	4
.00 .09	2	3	3	8
-.00 -.09	3	3	1	
-.10 -.19	4	2		1
-.20 -.29				1
-.30 -.39			1	

TABLE D-2

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Graduate Courses in the Students' Major

Correlation Coefficient	Biological and Physical Sciences (number of majors = 23)		Humanities and Social Sciences (number of majors = 24)	
	Verbal	Quantitative	Verbal	Quantitative
.40 - .49		1	2	
.30 - .39	2	3	4	5
.20 - .29	4	2	5	4
.10 - .19	8	5	6	8
.00 - .09	3	7	4	4
-.00 -.09	3	2	1	1
-.10 -.19	2	3	1	
-.20 -.29	1			2
-.30 -.39			1	

TABLE D-3

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Courses in the Students' Undergraduate Majors

Correlation Coefficient		Biological and Physical Sciences (number of majors = 23)		Humanities and Social Sciences (number of majors = 24)	
		Verbal	Quantitative	Verbal	Quantitative
.60	.69	1			
.50	.59		2		
.40	.49	3	1	2	2
.30	.39	1	10	4	5
.20	.29	4	2	13	10
.10	.19	5	4	5	5
.00	.09	5	3		2
.00	-.09	4	1		

TABLE D-4

Frequency Distributions of the Correlations between GRE Subscores and the Grade Point Average for Courses taken during the last two years as an Undergraduate

Correlation Coefficient	Biological and Physical Sciences (number of majors = 23)		Humanities and Social Sciences (number of majors = 24)	
	Verbal	Quantitative	Verbal	Quantitative
.60 .69			1	
.50 .59	1			1
.40 .49	1	2	3	4
.30 .39	3	6	3	2
.20 .29	3	7	7	5
.10 .19	7	4	7	10
.00 .09	4	2	2	2
-.00 -.09	4	1	1	
-.10 -.19		1		

Table E-1

Discriminant Function Analysis
of all Majors

Variables (in order which they entered analysis)	F to Remove
GRE-Quantitative	12.9
GRE-Verbal	8.3
Question 7A	20.8
Question 7B	5.3

Function	Eigenvalue	Percent of Variance	Cumulative Percent
1	1.1647	69.97	69.97
2	.2290	13.76	83.73
3	.1786	10.73	94.46
4	.0922	5.54	100.00

Table E-2

Discriminant Function Analysis
of 9 Discipline Groups

Variables (in order which they entered analysis)	F to Remove
GRE-Quantitative	95.6
GRE-Verbal	37.9
Question 7A	116.6
Question 7B	14.0
Undergraduate Grade Point Average	8.8

Function	Eigenvalue	Percent of Variance	Cumulative Percent
1	.6669	82.16	82.16
2	.0758	9.34	91.50
3	.0571	7.04	98.54
4	.0095	1.17	99.72
5	.0023	0.28	100.00

Table E-3

Majors by Discipline Groups

Biological Sciences

Agriculture
Botany
Forestry
Home Economics
Hospital & Health Services Administration
Zoology
Other Biological Sciences

Medically-Related Sciences

Anatomy
Audiology
Bacteriology
Biochemistry
Biology
Biophysics
Dentistry
Entomology
Genetics
Medicine
Microbiology
Nursing
Nutrition
Occupational Therapy
Optometry
Osteopathy
Parasitology
Pathology
Pharmacology
Pharmacy
Physical Therapy
Physiology
Public Health
Veterinary Medicine

Physical Sciences

Astronomy
Chemistry
Geology
Mathematics
Oceanography
Physics
Statistics
Other Physical Sciences

Applied Physical Sciences

Applied Mathematics
Architecture
Computer Sciences
Engineering, Aeronautical
Engineering, Chemical
Engineering, Civil
Engineering, Electrical
Engineering, Industrial
Engineering, Mechanical
Engineering, Other
Metallurgy
Mining

Table E-3 (Continued)

Humanities

Art History
Classical Languages
Comparative Literature
Dramatic Arts
English
Far Eastern Languages and Literature
Fine Arts, Art, Design
French
German
Italian
Linguistics
Music
Near Eastern Languages & Literature
Philosophy
Religious Studies or Religion
Russian
Spanish
Speech
Other Foreign Languages
Other Humanities

Education

Education (including M.A. in teaching)
Educational Administration
Educational Psychology
Physical Education

Organization and Directions of Society

Business and Commerce
Communications
Economics
Government
Industrial Relations and Personnel
International Relations
Journalism
Law
Library Science
Political Science
Public Administration
Urban Development (Regional Planning)

Helping People

Guidance and Counseling
Social Psychology
Social Work
Other Social Services

Studying Society

American Studies
Anthropology
Archaeology
Geography
History
Psychology
Slavic Studies
Sociology

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