PREDICTING PROGRAMMER PERFORMANCE AMONG NON-PRESELECTED TRAINEE GROUPS

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For those of you were in Chicago last summer at the last meeting of the Computer Personnel Research Group, at the conclusion of our paper we presented the research plan of an experiment we planned to conduct at Georgia Tech during the year which is now past. Our purpose today is to first describe the progress of the experiment during the past year, which I will do, and then, secondly, Dr. Malcolm H. Gotterer will briefly describe the work we plan to do for the following year -- work associated with the same area.

Before describing our experiment and its results, I would first like to describe the population and environment from which we have drawn our samples. First, the participants in our study have primarily been undergraduate students of the School of Industrial Management at Georgia Tech. The School of Industrial Management in some ways is unique; we are a non-engineering school on a predominantly engineering campus; however, we have many points which are common with the Engineering and the Basic Science schools. Our students are required to take a considerable amount of introductory and higher level mathematics, and are also required to complete two years of laboratory sciences. Thus they tend to be decidedly differentiated from the student one would expect to find in the typical school of Business Administration. The source of our sample is those students who have voluntarily enrolled in a course concerned not only with the applications of computers to managerial problems but also to some understanding of the basic theoretical concepts on which the computer operates. The course up until this year has been an elective, and thus enrollment was entirely voluntary. This voluntary action also was taken in the face of some rather ill conditions; first, the course had become well known to require an inordinate amount of the student's time,

and secondly, the instructor was quite unpleasant. These facts are the basis of our conclusion that they constitute a population of non-preselected trainees. The only prerequisite was an interest in the area. We generally preferred that the student be either of the junior or the senior level, primarily so that he would have the time to devote to the course; however, this was not a restriction that was rigorously enforced. The usual class also contained some 5 or 8% of the students at the Master's level. Also,3% of the sample were students in schools other than the School of Industrial Management, primarily from the School of Mathematics or from the Schools of Applied Sciences.

The reasons for our study can be based in three statements. The first was our amazement at the number of instances in which the truly marginal student, the student who is only barely managing to stay at Georgia Tech, was able to succeed in the programming and systems analysis portion of the computer course. This student could very often succeed in the programming systems portion of the course to an amazing degree while, at the same time, he was failing the theoretical portion. This led to the question -- are there truly personality characteristics that can be found common to college students in terms only of system analysis training and the application of programming to business types of systems which have been designed by the same student. Second, we had serious questions regarding much of the research in this area in that predominant research has been concerned with testing trained, working,and therefore, we must assume, at least partially successful, programmers. Little if any work has been done in terms of the identification of the true criterion for success in basic training. We thus have recognized the problem as being a two-faced problem. First, how do we identify the person who can successfully be trained, and secondly, how do we identify the successfully trained person who can successfully orient himself to the environment of the operating computer center. A third point of interest which we also mentioned in our earlier paper

presented in Chicago was an effort to discover the degree to which we might say creativity is an attribute of the computer programmer. Hypotheses in this field have been advanced by Dr. J. O'Brien of the University of Southern California and also by Dallas Perry at System Development Corporation.

The research procedure we have used is best described as a shotgun approach. We have used every test that we thought in some way had something in common with the attributes that we felt that the programmer possessed. The test batteries are composed of six cognitive and non-cognitive tests as follows: The Strong Vocational Interest Inventory, the same as that that was used in the RAND STUDY; secondly, the McQuarry Mechanical Ability Test; this is a very old test which supposedly discovers the skills of such occupations as sewing machine operators, shoe repairers, and such.) This test was of interest only in part, that is, parts 4, 5, and 6 -- all three of which are devoted to, in some sense, abstract spatial relationships. A third test was the Barron-Walsh Verbal Complexities Test. The Barron-Walsh test itself, (the original Barron-Walsh Test, at least) is an interpretive test which was designed in some way to evaluate the degree of creativity existing in a given individual. The Verbal Complexities Test is a pen and pencil version of the same type of test; that is, it is non-interpretive, instead merely asks for attitude responses. The next test was the IBM Programmer Aptitude Test. We also worked with the National Cash Register E-51 Test. The E-51, which was described in detail at the Chicago Meeting of CPRG, is primarily concerned with the testee solving a problem that is presented to him in program form. The Watson-Glaser Critical Thinking Aptitude Test was another member of our battery. This test presents the testee with many situations in which his natural biases are brought into play. The prime requisite is to be able to follow a logical decision pattern rather than relying on biases. In addition to these cognitive and non-cognitive tests, we have used other indicators or predicators as follows:

First is the average math greades of the student during his tenure at Georgia Tech. Each of our students has taken a minimum of four quarters of mathematics, consisting of college algebra, trigonometry, differential calculus, and Finite mathematics. The majority of them, though, have enrolled in several higher level mathematical courses than these basic requirements. The second grade criterion was the grade earned in the Composition and Rhetoric series, which is contained in the freshman year; this is a two quarter sequence. We also have included the scores earned on the College Entrance Examining Board Tests, Math Ability and Verbal Abilities sections.

As our decision criterion have used two measures: First, an evaluation by the instructor of the student's success in both methods analysis and systems analysis and his ability in programming. The second criterion measure is the student's self evaluation, that is, his own opinion of his ability as, first, a system analyst, and secondly, as a programmer.

Looking at the data developed during the last year, Table 1 shows a comparison of the instructor's evaluation and the student's self-evaluation. You will note that these are quite similar: there is no statistical significance in the difference between the two. In both cases, they were calculated in a similar fashion; a numerical score between zero and four is assigned. In the case of the instructor's evaluation, it represents a subjective evaluation of the student's progress. In the case of the student's self-evaluation, this is determined from a six-question form in which the student is asked to evaluate himself in respect to, first, four different qualities, and second, by enumerating his difficulties in the various areas of systems analysis and programming, and a score between zero and four is developed from his answers. We feel that in some senses the student's evaluation can be interpreted as representing some measure of his motivation as far as this area is concerned.

We recognize, of course, that the student had to have some initial interest to enter the course, and thus, his motivation level should be fairly high. We were quite pleased to note that the two measures tended to be fairly approximate; thus we conclude that the motivation has been sustained as far as the course is concerned.

In regard to the Strong factors, Table II lists the means and standard deviations of the various occupational titles, while Table III is the profile for our data. When the means are compared to the results of the RAND Sample III the two groups are fairly comparable. There are, however, some major deviations. One statistic we think is of interest is the standard deviation of Group 8, 111 points, which as far as the Strong measures are concerned, is quite high. We feel that this relatively large standard deviation may well offer an area for further investigation in terms of developing a new scoring key using as specific criterion success in the dual fields of systems analysis and programming.

The profile of the mean scores earned, Table IV, are quite similar to the profile indicated in the RAND Report. The major deviations occur in Group 2, primarily in terms of the two occupational classes, physicist and mathematician. This, we believe, is rather easily explained; first, the majority of the students who enter Georgia Tech enter in an engineering school. They enter a curriculum with very little knowledge of what is actually required. The majority of the students who eventually enroll in Industrial Management are students who have become disenchanted with an Engineering curriculum and transfer. The point at which they most commonly transfer is that point at which they are introduced to a rigorous physics course and become exposed to much more rigorous mathematics than that which they have experienced prior to this time. Thus we do not feel that these two deviations are in any way substantial. Besides the occurances in Group 2, the two patterns are approximately identical.

We conclude from this comparison that it may well be that in both the RAND Study and our study we may have found a profile of the college graduate or the college trained student who is interested in entering the programming field. This, of course, can immediately be questioned. It may instead be that we have both discovered the general profile of the college student.

In terms of the simple correlations coefficients of the Strong factors with both the instructor's evaluation and the student's evaluation, Table II, we find no significant measures when tested at the 90% level. This, of course, is a major difference as far as the RAND Report is concerned. But again, we are working with different groups. The Georgia Tech group is comprised of non-preselected trainees, a group that is not even expected to know what a computer is when they enter the training program. The RAND Group is based upon a study of experienced working programmers. It may well be that in terms of the RAND Report that one of the objectives of the study has been accomplished -- the objective of finding a method of evaluating performance. We do not feel, based upon our data, that in any way has the RAND study found factors useful in selecting trainees in terms of selecting those trainees who can successfully complete a training course.

In terms of the partial correlation coefficients of the Strong factors Tables V and VI with the two criterion measures, we find the following significant at the 90% level; (I would like to mention that our significance test, unfortunately, had to be based on Fisher's z transform, because we could not find a copy of David's tables yesterday, so we may be in error in some individual cases.) For the instructor's evaluation, Table V, those factors found to be significant are psychiatrist, forestry service man, printer, accountant, public administrator, purchasing agent, minister and advertising man. In terms of the self-evaluation, Table VI, those significant factors were physician, psychiatrist, forestry service man, musician, and the composite measure

of Group One. The most significant for both criterion measures, that is, in the case of the instructor's evaluation and in terms of the student's self-evaluation, was the occupation title, forestry service man. In both cases these are statistically significant at all levels. This may also provide a clue to developing a new scoring key.

In terms of the other tests we administered, the simple correlation coefficients (of the test scores and the instructor's evaluation) tended to be non-significant. The Barron-Walsh Test, the indicator of creativity, had a correlation of .13. For the PAT, part one is -.04, part two is -.005, part three is + .058, for the unadjusted total, .012, for the adjusted total, .024.

The National Cash Register E-51 Test was considered in two forms; (the total numerical score and the Binary Pass-Fail classification). The numerical score achieved on the test correlated -.341. We should note, however, that Herb Gross emphasized, at the Chicago CPRG meeting that NCR does not interpret the numerical score on this test as being in any way significant. Instead, they use a score of 7 as the basis of deciding if a person passed or failed. You may also recall that Gross stated that in their experience these binary classifications continued; that is, there were no reversals between pass and fail in terms of E-51 and success or failure in terms of completing the programming training. The student sample which took this test contained 26 individuals. There were 11 reversals. Of the 11 reversals, 8 were cases in which a student with a passing score on the E-51 earned an unsatisfactory score as far as his programming and systems analysis ability was concerned. The remaining three cases, the only three students who failed the E-51, all earned a score of 3 or better in terms of their programming and systems analysis ability.

As stated earlier, the only two factors that tend to be significant are numerical scores on the NCR E-51 and the relationship between part three of the PAT and the math achievement.

This concludes our description of our experiment and the analysis of the results.

Turning our attention now to possible future work on this research project, one of the first differences that is to take place is that shortly the course described earlier will become required for all students in the School of Industrial Management. The testing efforts will be continued, and it will be interesting to see if this will result in any major changes in our findings to date. There's another hypothesis in the same general topic area that we have started to investigate. That is the hypothesis of creativity which has been advanced by some people. We have used as an initial starting point that developed by Donald McKinnon. McKinnon, of the California Institute of Personnel Assessment and Research, has identified three forms of creativity. The first is an expression of a person's inner state, which is typified by the composer, the painter, the sculpturer, etc. The second is the person who spends his time meeting externally defined needs and goals; engineers, applied scientists, mathematicians, and this type. The third type McKinnon classified as cutting across the first two, such as architects and musical performers. McKinnon has made very intensive and detailed study of creativity amongst architects. Just as a preview of some of our initial results, if we take the results McKinnon has published concerning creativity in his third group, that is, creativity which is both an expression of the person's inner state plus externally defined needs and goals, and we believe that if there is creativity in systems work and programming that it would meet the two criteria. Using the Strong factors as initial starting place, the McKinnon study showed that people who are highly creative were high in the area of psychologists, architects, and author-journalist. In our study we found that psychologists fell in the C category; the RAND study showed C+. Architects, in our study was C, the RAND B-; Author-journalist we found C+; the RAND study indicated B-. Those Strong characteristics McKinnon

found creative people of the third type low were Purchasing Agent, in which the figures were B+ for our study, B- for the RAND, Office worker, B+ and B-, Bankers, B-, C+, Farmers, C, C, Policemen, B-, C+, Morticians, B, C+. We can draw a few obvious conclusions from this. First, this is just one, and we immediately state this and acknowledge it. This is just a start; we're making no claims about creativity from this, but this is the starting place for our future research in this area. You will notice that the RAND figures or ratings in terms of the Strong scale in almost every case were more favorable towards the creative individual than ours were. This may in some way relate to the ability and desire of the individual to both learn programming and systems work and further accomodate itself to the needs of a computing center. Now, the Barron-Walsh Verbal Complexities test that was mentioned earlier, the population norm for the verbal test is 15 among 54 of our subjects; however, in two recognized creative groups that we used as test groups by the authors of the test, the average scores were 27 and 31. So we feel that perhaps there's a need for individual rather than group research in this general area. We have already seen the Barron-Walsh correlation coefficient was only .128, not being significant. To conclude this, we'd like to reiterate what we have said before, and that is that we feel that research in this area has to be done in two stages. First is the ability of the humans to learn to communicate with computers, but this doesn't suggest that they will be able to accomplish their tasks within a computer center when transported from the classroom to the actual job environment. We know that in the new environment, that is, in the computer center, additional conditions resulting from the policies and the organizational concepts of that particular computer center may affect the performance of the successful trainee. So this means that there is a second part which we feel we owe to the study of successful programmers, and that is the policy of select-

computer centers in all types of establishments and the relationship of these policies to personnel practices and requirements, and it's in this direction that we will be working next year, hopefully, with a larger staff and more resources being devoted to it.

COMPARISON OF INSTRUCTOR'S AND STUDENTS EVALUATION

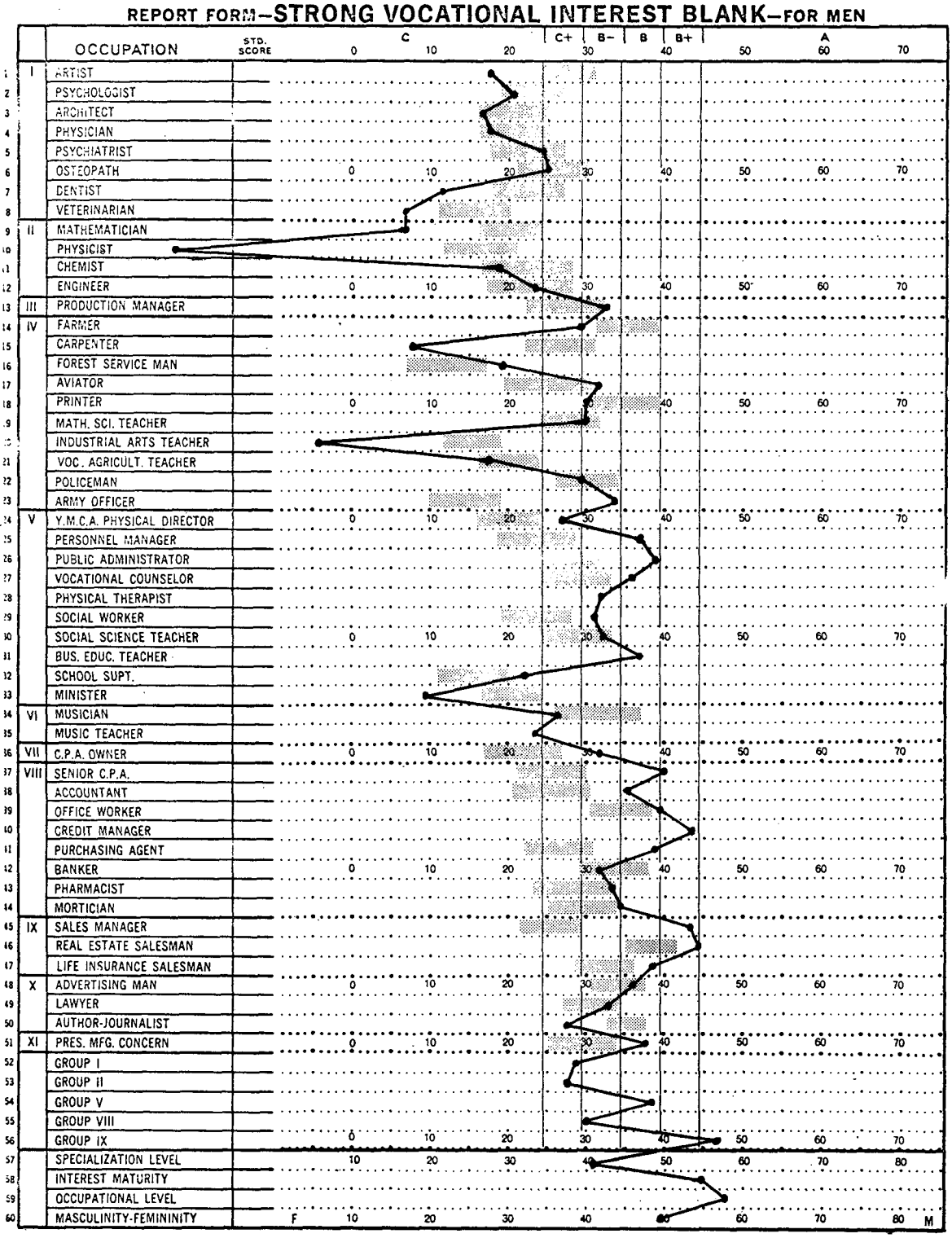
(N=115)

	MEAN	STD. DEV.
INSTRUCTOR'S EVALUATION	2.42	1.22
STUDENT SELF EVALUATION	2.12	0.89

TABLE 1

OCCUPATION	STRONG VOCATIONAL INTEREST BLANK (N=115) MEAN	STD. DEV.	CORRELATION OF VARIABLES WITH INSTR. EVAL.	SELF EVAL.
ARTIST	17.30	16.21	-.026	-.015
PSYCHOLOGIST	20.68	20.40	-.055	-.033
ARCHITECT	16.37	19.78	-.015	-.011
PHYSICIAN	17.59	27.51	-.009	-.022
PSYCHIATRIST	24.91	16.24	+.087	+.064
OSTEOPATH	25.01	9.52	-.005	+.010
DENTIST	11.53	18.39	-.003	+.003
VETERINARIAN	6.49	109.40	+.003	.000
MATHEMATICIAN	6.92	36.35	+.001	-.001
PHYSICIST	-23.66	67.91	.000	.000
CHEMIST	18.45	24.99	+.021	+.005
ENGINEER	23.19	21.92	+.003	+.015
PRODUCTION MANAGER	37.41	7.62	-.003	-.001
FARMER	29.37	10.35	+.031	-.035
CARPENTER	7.72	35.59	+.005	-.007
FOREST SERVICE MAN	19.23	21.12	+.040	+.033
AVIATOR	32.46	18.35	.000	-.019
PRINTER	29.83	8.25	-.095	-.024
MATH. SCI. TEACHER	29.50	7.82	+.042	+.008
INDUSTRIAL ARTS TEACHER	-4.53	48.81	-.005	+.006
VOC. AGRICULT. TEACHER	17.44	23.91	-.017	-.015
POLICEMAN	29.15	7.46	-.040	-.043
ARMY OFFICER	33.75	11.42	+.050	+.021
Y.M.C.A. PHYSICAL DIRECTOR	26.85	16.21	-.043	+.027
PERSONNEL MANAGER	36.40	10.98	-.039	-.017
PUBLIC ADMINISTRATOR	38.30	9.56	-.080	-.038
VOCATIONAL COUNSELOR	35.31	9.28	-.075	.000
PHYSICAL THERAPIST	31.71	8.98	-.032	-.010
SOCIAL WORKER	30.84	26.20	+.073	+.002
SOCIAL SCIENCE TEACHER	32.93	10.85	-.019	-.036
BUS. EDUC. TEACHER	36.78	10.30	-.098	-.033
SCHOOL SUPT.	22.03	10.24	-.037	-.014
MINISTER	9.89	28.79	+.010	+.002
MUSICIAN	25.99	9.34	-.015	+.064
MUSIC TEACHER	23.29	16.75	+.035	-.030
C.P.A. OWNER	31.31	9.21	+.042	+.010
SENIOR C.P.A.	40.03	8.56	+.006	+.033
ACCOUNTANT	35.03	8.61	-.101	-.026
OFFICE WORKER	39.17	7.98	+.064	-.047
CREDIT MANAGER	43.39	10.51	-.019	-.021
PURCHASING AGENT	38.75	9.31	+.100	+.039
BANKER	31.68	7.98	+.042	+.010
PHARMACIST	33.57	8.72	-.003	+.042
MORTICIAN	34.67	9.86	-.029	+.011
SALES MANAGER	43.01	9.89	-.012	+.016
REAL ESTATE SALESMAN	44.17	7.72	-.104	-.009
LIFE INSURANCE SALESMAN	38.38	11.14	+.129	-.019
ADVERTISING MAN	35.49	7.42	+.145	+.003
LAWYER	32.91	7.92	-.030	+.053
AUTHOR-JOURNALIST	27.90	6.62	-.022	-.006
PRES. MFG. CONCERN	37.63	7.33	-.020	-.013
GROUP 1	28.67	8.42	-.040	-.013
GROUP 11	27.16	16.80	-.020	-.002
GROUP V	38.50	8.70	+.045	+.062
GROUP V111	30.02	111.6	-.002	.000
GROUP 1X	46.11	9.35	-.119	-.054
SPECIALIZATION LEVEL	40.41	8.39	+.037	+.036
INTEREST MATURITY	54.43	5.74	-.053	+.039
OCCUPATIONAL LEVEL	57.56	5.29	-.132	-.073
MASCULINITY-FEMININITY	49.55	9.58	+.058	+.026

TABLE II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OCCUPATION
STD. SCORE
C
C+
B−
B
B+
A
0
10
20
30
40
50
60
70
80
I
ARTIST
PSYCHOLOGIST
ARCHITECT
PHYSICIAN
PSYCHIATRIST
OSTEOPATH
DENTIST
VETERINARIAN
II
MATHEMATICIAN
PHYSICIST
CHEMIST
ENGINEER
III
PRODUCTION MANAGER
IV
FARMER
CARPENTER
FOREST SERVICE MAN
AVIATOR
PRINTER
MATH. SCI. TEACHER
INDUSTRIAL ARTS TEACHER
VOC. AGRICULT. TEACHER
POLICEMAN
ARMY OFFICER
V
Y.M.C.A. PHYSICAL DIRECTOR
PERSONNEL MANAGER
PUBLIC ADMINISTRATOR
VOCATIONAL COUNSELOR
PHYSICAL THERAPIST
SOCIAL WORKER
SOCIAL SCIENCE TEACHER
BUS. EDUC. TEACHER
SCHOOL SUPT.
MINISTER
VI
MUSICIAN
MUSIC TEACHER
VII
C.P.A. OWNER
VIII
SENIOR C.P.A.
ACCOUNTANT
OFFICE WORKER
CREDIT MANAGER
PURCHASING AGENT
BANKER
PHARMACIST
MORTICIAN
IX
SALES MANAGER
REAL ESTATE SALESMAN
LIFE INSURANCE SALESMAN
X
ADVERTISING MAN
LAWYER
AUTHOR-JOURNALIST
XI
PRES. MFG. CONCERN
GROUP I
GROUP II
GROUP V
GROUP VIII
GROUP IX
SPECIALIZATION LEVEL
INTEREST MATURITY
OCCUPATIONAL LEVEL
MASCULINITY-FEMININITY
F
M

Table III

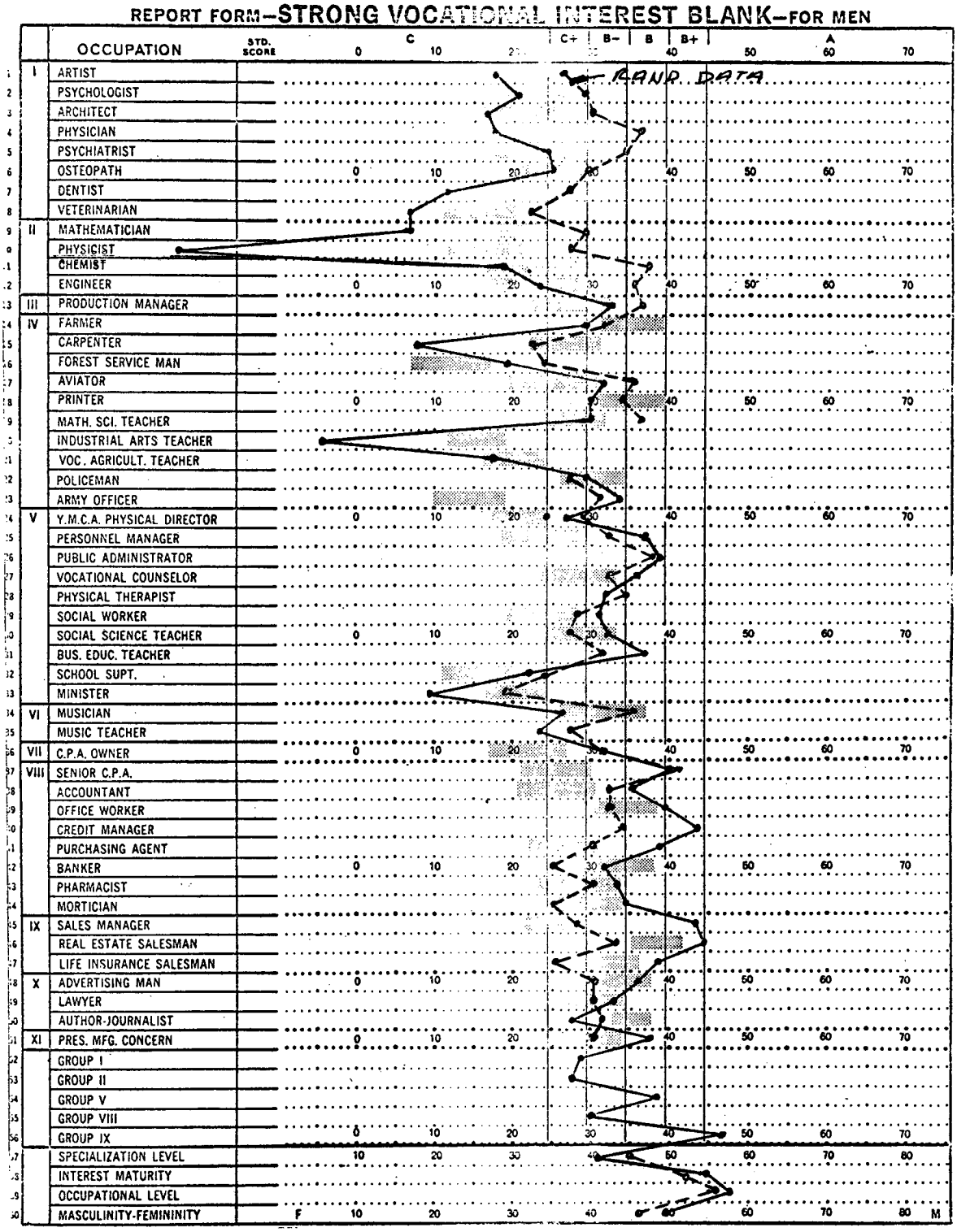
REPORT FORM—STRONG VOCATIONAL INTEREST BLANK—FOR MEN
OCCUPATION
STD. SCORE
C
C+
B−
B
B+
A
RAND. DATA
I ARTIST
PSYCHOLOGIST
ARCHITECT
PHYSICIAN
PSYCHIATRIST
OSTEOPATH
DENTIST
VETERINARIAN
II MATHEMATICIAN
PHYSICIST
CHEMIST
ENGINEER
III PRODUCTION MANAGER
IV FARMER
CARPENTER
FOREST SERVICE MAN
AVIATOR
PRINTER
MATH. SCI. TEACHER
INDUSTRIAL ARTS TEACHER
VOC. AGRICULT. TEACHER
POLICEMAN
ARMY OFFICER
V Y.M.C.A. PHYSICAL DIRECTOR
PERSONNEL MANAGER
PUBLIC ADMINISTRATOR
VOCATIONAL COUNSELOR
PHYSICAL THERAPIST
SOCIAL WORKER
SOCIAL SCIENCE TEACHER
BUS. EDUC. TEACHER
SCHOOL SUPT.
MINISTER
VI MUSICIAN
MUSIC TEACHER
VII C.P.A. OWNER
VIII SENIOR C.P.A.
ACCOUNTANT
OFFICE WORKER
CREDIT MANAGER
PURCHASING AGENT
BANKER
PHARMACIST
MORTICIAN
IX SALES MANAGER
REAL ESTATE SALESMAN
LIFE INSURANCE SALESMAN
X ADVERTISING MAN
LAWYER
AUTHOR-JOURNALIST
XI PRES. MFG. CONCERN
GROUP I
GROUP II
GROUP V
GROUP VIII
GROUP IX
SPECIALIZATION LEVEL
INTEREST MATURITY
OCCUPATIONAL LEVEL
MASCULINITY-FEMININITY
F
M

Table IV

PARTIAL CORRELATION COEFFICIENTS

STRONG VOCATIONAL INTEREST BLANK

(INDEPENDENT VARIABLE: INSTRUCTOR'S EVALUATION)

(N=115)

OCCUPATION	COEFFICIENT	OCCUPATION	COEFFICIENT
ARTIST	-.067	BUS. EDUC. TEACHER	-.168
PSYCHOLOGIST	-.167	SCHOOL SUPT.	-.084
ARCHITECT	-.073	MINISTER	+.194
PHYSICIAN	-.074	MUSICIAN	-.036
PSYCHIATRIST	+.246	MUSIC TEACHER	+.098
OSTEOPATH	-.014	C.P.A. OWNER	+.122
DENTIST	-.045	SENIOR C.P.A.	+.014
VETERINARIAN	+.190	ACCOUNTANT	-.225
MATHEMATICIAN	+.024	OFFICE WORKER	+.110
PHYSICIST	-.007	CREDIT MANAGER	-.059
CHEMIST	+.066	PURCHASING AGENT	+.215
ENGINEER	+.010	BANKER	+.110
PRODUCTION MANAGER	-.005	PHARMACIST	-.010
FARMER	+.008	MORTICIAN	-.070
CARPENTER	+.070	SALES MANAGER	-.022
FOREST SERVICE MAN	+.319	REAL ESTATE SALESMAN	-.156
AVIATOR	+.000	LIFE INSURANCE SALESMAN	+.154
PRINTER	-.229	ADVERTISING MAN	+.213
MATH. SCI. TEACHER	+.082	LAWYER	-.053
INDUSTRIAL ARTS TEACHER	-.078	AUTHOR-JOURNALIST	-.023
VOC. AGRICULT. TEACHER	-.163	PRES. MFG. CONCERN	-.052
POLICEMAN	-.094	GROUP I	-.049
ARMY OFFICER	+.118	GROUP II	-.031
Y.M.C.A. PHYSICAL DIRECTOR	-.133	GROUP V	+.057
PERSONNEL MANAGER	-.104	GROUP VIII	-.079
PUBLIC ADMINISTRATOR	-.202	GROUP IX	-.104
VOCATIONAL COUNSELOR	+.127	SPECIALIZATION LEVEL	+.098
PHYSICAL THERAPIST	-.057	INTEREST MATURITY	-.062
SOCIAL WORKER	+.117	OCCUPATIONAL LEVEL	-.158
SOCIAL SCIENCE TEACHER	-.036	MASCULINITY-FEMININITY	+.137

TABLE V

PARTIAL CORRELATION COEFFICIENTS

STRONG VOCATIONAL INTEREST BLANK

(INDEPENDENT VARIABLE: SELF EVALUATION)

(N=115)

OCCUPATION	COEFFICIENT	OCCUPATION	COEFFICIENT
ARTIST	+.057	BUS. EDUC. TEACHER	-.082
PSYCHOLOGIST	-.139	SCHOOL SUPT.	-.045
ARCHITECT	-.076	MINISTER	+.063
PHYSICIAN	-.243	MUSICIAN	+.205
PSYCHIATRIST	+.257	MUSIC TEACHER	-.117
OSTEOPATH	+.042	C.P.A. OWNER	+.039
DENTIST	+.064	SENIOR C.P.A.	+.009
VETERINARIAN	-.011	ACCOUNTANT	-.008
MATHEMATICIAN	-.044	OFFICE WORKER	-.115
PHYSICIST	-.010	CREDIT MANAGER	-.090
CHEMIST	+.020	PURCHASING	+.121
ENGINEER	+.064	BANKER	+.035
PRODUCTION MANAGER	-.003	PHARMACIST	+.177
FARMER	-.130	MORTICIAN	+.037
CARPENTER	-.153	SALES MANAGER	+.038
FOREST SERVICE MAN	+.378	REAL ESTATE SALESMAN	-.019
AVIATOR	-.008	LIFE INSURANCE SALESMAN	-.032
PRINTER	-.081	ADVERTISING MAN	+.006
MATH. SCI. TEACHER	+.021	LAWYER	+.132
INDUSTRIAL ARTS TEACHER	+.131	AUTHOR-JOURNALIST	-.010
VOC. AGRICULT. TEACHER	-.195	PRES. MFG. CONCERN	-.050
POLICEMAN	-.120	GROUP 1	-.216
ARMY OFFICER	+.076	GROUP 11	-.004
Y.M.C.A. PHYSICAL DIRECTOR	+.114	GROUP V	+.114
PERSONNEL MANAGER	-.064	GROUP V111	+.012
PUBLIC ADMINISTRATOR	-.110	GROUP 1X	-.067
VOCATIONAL COUNSELOR	-.001	SPECIALIZATION LEVEL	+.134
PHYSICAL THERAPIST	-.025	INTEREST MATURITY	-.065
SOCIAL WORKER	+.003	OCCUPATIONAL LEVEL	-.125
SOCIAL SCIENCE TEACHER	-.094	MASCULINITY-FEMININITY	+.088

TABLE VI