R E P O R T R E S U M E S

ED 012 084 CG 000 246

NON-INTELLECTIVE PREDICTORS OF ACHIEVEMENT IN COLLEGE.

BY- NICHOLS, ROBERT C.
NATIONAL MERIT SCHOLARSHIP CORP., EVANSTON, ILL.

REPORT NUMBER NMSC-RR-VOL-1-NO-6 PUB DATE 65
EDRS PRICE MF-$0.09 HC-$0.96 24P.

DESCRIPTORS- *PREDICTIVE ABILITY (TESTING), COLLEGE STUDENTS, *ACADEMIC ACHIEVEMENT, *COCURRICULAR ACTIVITIES, COMPETITIVE SELECTION, HIGH SCHOOLS, BIBLIOGRAPHIES, ACHIEVEMENT RATING, *COLLEGE ENTRANCE, EXAMINATIONS, OBJECTIVE BEHAVIOR INVENTORY, NATIONAL MERIT SCHOLARSHIP QUALIFICATIONS TEST, VOCATIONAL PREFERENCE INVENTORY, ADJECTIVE CHECK LIST, CALIFORNIA PSYCHOLOGICAL INVENTORY, NATIONAL SCIENCE FOUNDATION, CARNEGIE CORPORATION, FORD FOUNDATION, EVANSTON

SCALES FOR PREDICTING 1ST-YEAR COLLEGE GRADES AND EXTRACURRICULAR ACHIEVEMENT WERE DEVELOPED BY ITEM ANALYSIS FROM EACH OF FOUR ITEM POOLS--THE CALIFORNIA PSYCHOLOGICAL INVENTORY (CPI), THE VOCATIONAL PREFERENCE INVENTORY (VPI), AN ADJECTIVE CHECK LIST (ACL), AND AN EXPERIMENTAL OBJECTIVE BEHAVIOR INVENTORY (OBI)--USING A SAMPLE OF 1,013 NATIONAL MERIT FINALISTS. THE SCALES WERE CROSS-VALIDATED USING SAMPLES OF 179 MALE AND 138 FEMALE MERIT FINALISTS AND 201 MALE AND 218 FEMALE STUDENTS OF AVERAGE ABILITY. THE CPI AND OBI SCALES HAD HIGHER VALIDITIES THAN THOSE DEVELOPED FROM THE ACL AND VPI. THE BEST PREDICTOR OF COLLEGE GRADES WAS RANK IN HIGH SCHOOL CLASS (HSR) FOLLOWED BY THE NONINTELLECTIVE GRADE SCALES AND FINALLY BY APTITUDE TEST SCORES. THE NONINTELLECTIVE SCALES ADDED TO THE PREDICTION OF GRADES IN A REGRESSION EQUATION INCLUDING HSR AND TEST SCORES. THE BEST PREDICTORS OF EXTRACURRICULAR ACHIEVEMENT IN A REGRESSIVE EQUATION INCLUDED THE NONINTELLECTIVE SCALES. (AO)

5: volume 1, number 6

Non-intellective Predictors of Achievement in College

Robert C. Nichols

NATIONAL MERIT SCHOLARSHIP CORPORATION

Non-intellective Predictors of Achievement in College

Robert C. Nichols

National Merit Scholarship Corporation

Selection of students in college admissions and scholarship programs is usually based in part on a prediction of the student's performance in college. The standard predictors are aptitude test scores and high school grades, often combined into a single index by a regression equation. The standard criterion for validation of these predictions is the college grade point average, usually for the freshman year. There is a well developed technology for making these predictions, and many colleges and scholarship agencies have developed formulas for optimum weighting of high school grades and test scores in their local situation.

The growing uniformity of selection practices might lead one to assume that the prediction of college performance has reached a state of stable maturity satisfactory to most practitioners. Instead, there is increasing concern and dissatisfaction with the current state of the art. This concern may be in part a reaction to the recently vocal lay critics of the testing movement, but there is also a recognition of the inadequacy of current selection methods to meet the demands being made of them. There are two major sources of dissatisfaction:

1. The popular colleges and most scholarship and honors programs have many more applicants than they can accept. After applicants with low grades or low test scores are eliminated, further discriminations must be made between the remaining highly qualified candidates. The selection committee can make these decisions on the basis of the remaining small differences in test scores and high school rank; they can look at other data, such as an interviewer's impression, a recommendation or an autobiography; or

they can flip a coin. These three methods of discriminating between students with good grades and high test scores are about equally valid when judged by the criterion of later student performance. Educational researchers have been busy searching for indicators of success other than grades and test scores (usually called non-intellective predictors) and some have been found. However, none has yet achieved enough demonstrated success to be widely adopted.

2. There is growing dissatisfaction with the use of college grades as the criterion for evaluation of predictors. Leading educators are beginning to feel that the student who makes the best grades is not necessarily the most valuable student. For example, Stalnaker (1965) in discussing the National Merit Scholarship selection program, said, ". . .we want to find students who will succeed in college, but---much more important---will also use their college education in some socially desirable, productive way after graduation. How relevant are grades to this goal?. . . Do you inquire of your accountant, your physician or your lawyer the grades he received in college? Predicting grades has little social significance" (p. 134). Holland and Richards (1965) have pointed out that a student's extracurricular achievement may be more similar to achievement after graduation than is the academic achievement represented by grades. They demonstrated that academic and extracurricular achievement in college are not highly correlated and urged greater use of extracurricular achievement as an alternative criterion to grades in the development of selection devices.

The present study grew out of these two sources of dissatisfaction with current methods of predicting success in college. This study has two main goals: First, to find non-intellective predictors that will make effective

discriminations between students who have already been highly selected on test score; and second, to find predictors of extracurricular achievement which will, hopefully, be independent of the predictors of grades.

Method

Questionnaire materials were mailed to a sample of 1843 National Merit Finalists and National Merit Scholars in the spring of 1962, shortly before their expected graduation from high school, and also to a sample of 1383 students chosen at random from all students who took the National Merit Scholarship Qualifying Test (NMSQT) in 1961---the same time that this test was taken by the sample of Merit Finalists and Scholars. Usable returns were obtained from 86% of the Merit Finalists and Scholars (the Merit sample) and from 64% of the random sample of NMSQT participants (the normative sample).

A second questionnaire was sent to the respondents to the first survey in the summer of the following year, when the students in the sample who attended college should have finished their freshman year. This questionnaire inquired about their college grades, their extracurricular achievement and some additional items for another study. Returns were obtained from 92% of the Merit sample and 84% of the normative sample. Those who did not attend college for the entire year and those with missing data were discarded leaving a Merit sample of 1330 and a normative sample of 419 for the study.

Predictors

The first questionnaire obtained student responses to four groups of personality, attitude, interest and behavior items: (a) the California Psychological Inventory, a well known personality inventory consisting of 480 True-False items (Gough, 1957); (b) the Vocational Preference Inventory (VPI), an interest inventory consisting of 160 occupational titles to which the student responds Like-Dislike (Holland, 1958); (c) the Adjective Check List (ACL), adapted with

some additions and deletions from a checklist developed by Gough (1960) and in which the student checks from a list of 159 adjectives those he considers descriptive of himself; and (d) the Objective Behavior Inventory (OBI), developed for this study and consisting of 326 things that a student might do (hobbies, sports, leisure time activities, interaction with others, etc.). The student indicates whether he has engaged in each activity frequently, occasionally or not at all during the past year. In contrast to the other three inventories, which inquire about attitudes, opinions and feelings that are known only to the student himself, the OBI items refer to overt behavioral acts which could be seen by an external observer.

Criteria

Two criteria of college performance were used---academic achievement and extracurricular achievement: (a) Academic achievement was assessed by the student's self report of his freshman grades on a letter grade scale (A, A-, B+, B, B-, etc.). Nichols and Holland (1963) compared such self reported grades with grades calculated from a transcript and found the self reports to be quite accurate (r=.96). Davidsen (1963) found similar validity (r=.92) for self-reported high school grades obtained in a selection context.

The students attended a variety of colleges, and it seems likely that a given grade may mean quite different things in different colleges or even in different departments within a single university. To the extent that this is the case the grade criterion will be less predictable from student characteristics assessed before college entry. Thus, we would not expect to find validity coefficients as high as might be obtained when predicting them at a specific college. However, a sample of students attending many colleges offers two specific advantages: only predictors that have validity in a variety of college environments will be found; and the validity coefficients will give an indication of the practical utility of the predictors in a setting where predictions must be made before the student's college is known.

(b) Extracurricular achievement was assessed from the student's report of his non-academic activities during the freshman year. The questionnaire asked the student to describe all achievements during the past year in the following areas: Leadership, Science, Art, Music, Writing, Speaking, Dramatics, and Athletics. Examples were given of possible achievements in each area and space was provided for the student to write in his achievements. This free response procedure is felt to be an improvement over the checklists used in previous studies (Nichols and Holland, 1963; Holland and Nichols, 1964)---the possibility of error from random and erronious checking of checklists of very rare events was reduced, and many achievements were obtained that had not been included on the checklists.

The responses in each area of achievement were coded on a three point scale: (1) no achievement, (2) achievement not involving outside recognition, (3) outstanding achievement receiving outside recognition of quality. These achievements were combined into a single three point extracurricular criterion scale by counting those students with no achievement in any area as non-achievers (scored 1), those with one or more outstanding achievement as achievers (scored 3), and the rest in between (scored 2). A few students with recognized leadership achievement, but no other achievement, were scored 2 instead of 3 to keep the criterion scale from being too heavily weighted with leadership. The extracurricular achievements were combined into a single scale because there were not enough outstanding achievers in the individual areas and the lower level achievements were not of sufficient social significance to warrant separate study. However, combining the achievements is justifiable on both empirical and logical grounds: achievements in the various areas tend to have low positive correlations with each other. Since time limitations make it

difficult for a student to achieve in more than one area, the low positive correlations seem to indicate a substantial general tendency to achieve. Roberts (1965) developed scales to predict specific extracurricular achievements and found similar content among the scales. His scales developed to predict achievement in one area also predicted achievement in other areas, and his achievement scales had much higher intercorrelations among themselves than did the actual achievements. Potential users of predictors of extracurricular achievement are more concerned with a general tendency to achieve than with the specific area of achievement, because, like grades, extracurricular achievements in college are of value mainly as a demonstration of a tendency to achieve which is expected to persist to some degree after college.

Analyses

Scales were derived by item analysis against grades and extra-curricular achievement using a portion of the Merit sample. After excluding students who did not attend college for a full year and those with incomplete data, 1013 Merit students (those with ID numbers ending with a digit less than seven) were assigned to the derivation group and the remaining 419 to the cross-validation group. No special separation of the sexes was made.

For item analysis against the grade criterion high and low groups of approximately the upper and lower 27% on first year college grades were used: the 262 students who reported a first year grade average of A or A- and also reported receiving some recognition for academic achievement (dean's list, honor society, etc.) composed the high group. The low group consisted of the 246 students with a first year grade average of B- or lower and who received no recognition for academic achievement. For item analysis against the extra-curricular achievement criterion, the high group consisted of the 229 students

who received outside recognition for one or more extracurricular achievements and the low group consisted of the 294 non-achievers.

Phi coefficients were computed for each of the 1125 items against each criterion. The OBI items, which used a three alternative response format, were dichotomized by combining the middle category with the smallest extreme category. Separate academic and extracurricular achievement scales for each of the four item formats were formed by combining all items significant at the .05 level. The validity of these scales and their usefulness in combination with test scores and high school rank were checked using the cross-validation group of Merit students and the normative sample.

Results

The characteristics of the scales derived from the four item pools[1] are shown in Table 1. Of the major item types the OBI and the ACL had the largest proportion of significant items and the CPI the smallest proportion. The OBI scales had lower internal consistency than the scales from the other three item pools. These data are not sufficient evidence to establish the superiority of one item pool over another. The validity coefficients of scales composed from the various item pools are the most important consideration, and these are discussed later.

Item Content

The item content of the scales gives an indication of the kind of person who is likely to achieve; although it is important to remember that the items are self reports and that they were identified by group comparisons so that all items do not necessarily apply to all students. With these qualifications

---

1. The items and scoring keys for the scales developed in this study are available to responsible persons from the author on request.

Table 1

Characteristics of Scales Derived from Four Item Pools

Item Pool	Grade Scale						Achievement Scale					
	Number of items in pool	Signif. items (p<.05) N	%	Mean[a]	SD	KR-21	Signif. items (p<.05) N	%	Mean[a]	SD	KR-21
Objective Behavior Inventory (OBI)	326	107	32.8	63.5	11.2	.80	107	32.8	50.7	11.1	.79
Adjective Check List (ACL)	159	50	31.4	31.2	8.1	.84	54	34.0	25.2	9.2	.86
Vocational Preference Inventory (VPI)	160	35	21.9	25.3	5.8	.82	52	32.5	22.3	9.6	.88
California Psychological Inventory (CPI)	480	110	22.9	69.7	12.1	.83	97	20.8	57.6	12.4	.86

a. Means, Standard Deviations and Reliability Coefficients were calculated from Merit Cross-validation sample, both sexes combined (N=302).

in mind the items significantly related to each criterion were grouped into what seemed to be homogenous content categories as follows:

Content of the grade scales. The high grade group, when contrasted with the low grade group, more frequently endorsed items suggesting that they are religious and involved in church activities; are interested in school and value school work highly; are interested in music and participate in musical activities; are hard workers with well established work habits; and are shy, socially withdrawn, and introverted. The low grade group on the other hand more frequently endorsed items suggesting that they are somewhat mischievous and thrill-seeking; are likely to engage in a long list of activities usually considered "fun" for young people; are erratic and undependable; and are interested in occupations which might be considered exciting or dangerous.

The following adjectives were selected as representative of the ACL items significantly differentiating the high and low grade groups: High grade students described themselves as ambitious, capable, conscientious, dependable, efficient, helpful, methodical, modest, patient, quiet, resourceful, self-confident, timid, well-adjusted, and withdrawn. Low grade students described themselves as boastful, carefree, careless, cynical, disorderly, high-strung, impulsive, irresponsible, lazy, messy, rebellious, and sophisticated.

A few individual CPI items deserve mention because they reinforce the general impression from the foregoing discussion that the student who gets good grades is likely to be compulsive and conforming. For example, the high grade group more frequently responded "True" to the following items: I am stricter about right and wrong than most people. I would disapprove of anyone's drinking to the point of intoxication at a party. I keep out of trouble at all costs. I consider a matter from every standpoint before

making a decision. I always like to keep my things neat and tidy and in good order.

Content of the extra-curricular achievement scales. The group of achievers, when contrasted with the non-achievers, more frequently endorsed items suggesting that they engage in a variety of extracurricular activities including music, speech, drama, science, art, etc. (all activities similar to the criterion achievements); are religious and involved in church activities; are outgoing and dominant in interpersonal situations; date frequently; are ambitious and hard working; and are interested in a variety of artistic and intellectual occupations. The non-achievers on the other hand more frequently endorsed items suggesting that they have a low energy level and are overly sensitive to the opinions of others.

The following adjectives were selected as representative of the ACL items significantly differentiating the achieving and non-achieving groups: Achievers described themselves as aggressive, alert, ambitious, artistic, attractive, clever, confident, cooperative, deliberate, dominant, egotistical, energetic, generous, helpful, independent, ingenious, mature, original, persistent, responsible, sophisticated, unconventional, versatile, well thought of, and witty. Non-achievers described themselves as lazy, quiet, shy, slow, and unambitious.

Cross-validation

The intercorrelations of the various scales, test scores, and high school rank (HSR) are shown for the Merit cross-validation group in Table 2 and for the normative group in Table 3.

The correlations shown in these two tables lead to the following conclusions:

Table 2

Intercorrelations of Predictors and Criteria in the Merit Cross-validation Sample

Males Below the Diagonal (N=179)

Females Above the Diagonal (N=138)

	Criteria		Grade Scales				Extracurric.				NMSQT						SAT		HSR School		HSR Student	
																	V	M	raw	%	raw	%
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. College Grades		09	15	18	-12	24	06	04	12	12	08	05	01	03	-12	-03	01	-10	08	21	04	21
2. Extracurricular Ach.	23		15	15	13	17	17	03	-06	10	03	08	05	-11	-03	03	00	-06	09	05	07	10
3. OBI Grade Scale	29	06		47	07	63	-35	-07	-04	-04	11	12	-12	-05	-17	00	-09	02	14	15	14	18
4. ACL Grade Scale	17	09	27		11	70	-06	52	00	35	03	24	-18	-12	-18	-02	-22	-10	28	19	32	27
5. VPI Grade Scale	11	01	27	11		06	-07	03	-25	04	-09	-06	-09	-09	04	-12	01	-04	-07	-13	09	-16
6. CPI Grade Scale	34	10	68	58	24		-01	21	04	32	04	08	-15	-13	-17	-10	-10	-14	30	23	32	30
7. OBI Extracurricular Scale	04	24	-40	06	-01	-05		28	28	50	-12	-02	01	-06	-06	-10	-05	-17	14	05	10	10
8. ACL Extracurricular Scale	-01	18	-14	58	-06	23	40		15	57	-12	01	-06	-05	09	-05	04	-09	06	-03	10	04
9. VPI Extracurricular Scale	15	18	-08	14	-03	07	37	33		41	-05	00	-05	-03	-17	-11	-11	-08	-01	10	09	22
10. CPI Extracurricular Scale	14	23	03	44	-04	38	46	71	45		-13	01	01	-10	-10	-12	-13	-11	15	04	18	10
11. NMSQT English	15	13	10	13	13	20	18	06	12	04		-02	-05	00	14	46	08	09	-08	04	-09	00
12. NMSQT Math	09	12	00	-04	-01	00	-01	-01	-07	02	01		-11	08	-23	48	-16	50	16	01	09	-01
13. NMSQT Natural Science	03	07	-05	-11	-07	-17	-08	-09	04	-09	03	17		16	34	45	33	02	01	09	09	02
14. NMSQT Social Science	-01	04	-06	-01	-21	-06	-05	-03	-14	-11	-04	04	30		06	50	27	18	-12	-06	-17	-07
15. NMSQT Word Usage	-01	04	-01	-19	04	-07	-09	-07	16	-13	06	-04	29	07		45	61	01	-03	-04	-05	-07
16. NMSQT Composite	10	16	00	-08	-04	-03	-01	-05	03	-09	41	54	66	50	48		39	41	00	01	-10	-05
17. SAT Verbal	17	02	00	-18	00	-05	-08	-18	06	-14	07	10	38	29	51	49		18	-06	-05	-10	01
18. SAT Math	10	06	05	-06	02	-03	-09	-01	-14	-03	04	53	09	17	06	38	19		01	08	-10	-01
19. Raw HSR, School Report	14	02	09	23	05	25	06	19	10	19	12	15	03	04	-05	12	03	12		71	83	61
20. Percentile HSR, School Rep	25	04	17	27	14	22	08	22	13	21	09	22	02	-05	-12	09	01	06	57		53	82
21. Raw HSR, Student Report	27	-04	15	26	09	32	06	16	07	17	12	18	-02	-01	08	09	03	14	82	46		70
22. Percentile HSR, Stud Rep	39	03	24	24	20	28	06	16	12	20	11	22	-05	-14	-12	04	02	12	49	81	64	
23. Sex[a]	15	01	21	05	24	25	40	-05	28	08	28	-33	04	-20	24	-03	11	-38	15	18	11	17

a. Correlations with sex are point biserials, with male = 1 and female = 2, computed with the male and female samples combined.

Note: Decimals omitted.

Table 3

Intercorrelations of Predictors and Criteria in the Normative Sample

Males Below the Diagonal (N=201)

Females Above the Diagnoal (N=218)

	Criteria		Grade Scales				Extracurric. Scales				NMSQT						HSR	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. College Grades		17	34	22	13	28	-13	00	00	-06	19	16	25	17	11	23	-07	38
2. Extracurricular Ach.	12		02	-13	03	-09	15	07	07	13	16	02	02	-01	03	04	08	00
3. OBI Grade Scale	15	02		34	21	56	-39	-08	-16	-17	-02	-02	-02	-07	-09	-06	-02	26
4. ACL Grade Scale	06	-04	31		03	54	01	51	05	22	-05	-04	08	07	-08	00	-09	15
5. VPI Grade Scale	10	17	15	-12		10	-20	-10	-46	-21	-04	04	-04	00	-04	-02	-07	12
6. CPI Grade Scale	36	02	54	45	10		-06	12	-05	16	-01	01	07	02	-05	01	-07	27
7. OBI Extracurric. Scale	10	30	-42	-07	-07	-08		33	35	55	09	-08	03	01	08	03	13	-06
8. ACL Extracurric. Scale	05	16	-09	51	-16	07	32		24	57	02	-09	04	02	-02	-01	-02	02
9. VPI Extracurric. Scale	22	22	-05	-09	-13	-01	38	19		36	13	-06	20	08	17	13	03	02
10. CPI Extracurric. Scale	18	22	02	17	-08	32	50	48	41		06	-06	08	-02	06	03	02	07
11. NMSQT English	14	13	05	-01	03	-03	08	13	14	10		39	47	44	58	72	20	32
12. NMSQT Math	15	03	-01	05	-02	01	01	14	-02	-01	46		39	44	43	71	15	31
13. NMSQT Natural Science	15	21	-03	-09	19	-09	09	14	12	10	48	41		66	63	81	05	20
14. NMSQT Social Science	09	13	06	03	03	-04	09	16	06	08	60	58	67		59	82	06	25
15. NMSQT Word Usage	21	22	06	-07	18	-04	09	15	20	11	64	52	74	68		82	15	23
16. NMSQT Composite	18	18	03	-02	10	-05	09	18	12	09	77	74	81	82	88		16	34
17. Raw HSR, Stud. Report	31	05	04	-06	04	09	05	-03	11	03	12	07	14	10	15	14		21
18. Percentile HSR, Stud.	34	14	16	03	06	10	05	04	18	06	36	34	39	38	37	45	60	

Note: Decimals omitted.

(a) The two criteria had low positive correlations with each other for both sexes and both samples. These correlations are low enough for the grade and extracurricular criteria to be considered as independent for all practical purposes.

(b) Among the non-intellective predictors, the CPI scale was the best predictor of grades (except for Merit girls) and the OBI scale was the best predictor of extracurricular achievement. For both criteria the CPI and OBI scales were substantially better predictors (average validity .23) than were the ACL and VPI scales (average validity .11).

(c) The two criteria were differentially predictable by the non-intellective scales. In only five of 32 instances did a scale fail to correlate higher with the criterion for which it was derived than it did with the other criterion, and none of these five instances involved the CPI or OBI. The scales for the two criteria were negatively correlated in the OBI and VPI and positively correlated in the CPI and ACL.

(d) In the Merit sample the NMSQT and SAT had slight predictive validity for both criteria for boys and no validity for either criterion for girls, however, low correlations are to be expected in this instance because of restriction of range of test scores in the Merit sample. In the normative sample the NMSQT had some validity for both criteria for boys but was related only to the grade criterion for girls.

(e) HSR was related to the grade criterion for both sexes and both samples, but not to the extracurricular achievement criterion. It has been suggested that rank in high school class uncorrected for class size is as effective a predictor of college grades as is percentile rank. This was true for boys in both samples, but not for girls.

(f) Two reports of high school rank were available for the Merit sample, one from the school and one from the student. The correlation between these two reports was .81 for boys and .82 for girls. This is a somewhat lower validity for self reported grades than others have reported. A possible reason is that in this study students were asked to report both rank and class size, from which percentile rank was computed. This task may have been more difficult than the usual report of a grade average. The restricted range of class ranks among the Merit students is another possible reason. Whatever the source of error in the self reported HSR may be it is indeed a peculiar kind of error: the correlation with college grades for girls is the same for self reported HSR as for school reported HSR, but for boys self reported HSR has a substantially, but not significantly, higher correlation with college grades than does school reported HSR.

(g) It is possible to form a rough ordering of the three classes of predictors (test scores, non-intellective scales, and HSR) in terms of their validity for predicting the two criteria, and this order holds in general for both samples and both sexes. To give an indication of the relative size of the coefficients we will use the average validity of the OBI and CPI scales to represent the non-intellective scales, the NMSQT Composite to represent the aptitude tests, and percentile rank to represent HSR. For predicting college grades, high school grades were the best predictor (average validity .33), followed by the non-intellective scales (average validity .27), and finally by the aptitude test (average validity .12). For predicting extracurricular achievement the non-intellective scales were the best predictor (average validity .19), followed by high school

grades (average validity .10), and the aptitude test (average validity .07). Grades were predicted with higher validities by all three classes of predictors than was extracurricular achievement.

(h) Girls tended to achieve at a higher level than boys in most respects. They made better grades in high school and college, they obtained higher scores in both groups on non-intellective scales, and they obtained higher verbal test scores. There was no sex difference in extra-curricular achievement, and boys obtained higher scores on quantitative tests. The achievement of boys was somewhat more predictable than that of girls: the non-intellective scales had higher validities for boys and in the Merit sample the test scores also had higher validities for boys.

Multiple Correlations

A number of multiple regression equations were computed for predicting each criterion from various combinations of predictors in the various samples. Since these equations showed little consistency from one sample to another and since the multiple correlation coefficients are subject to an unknown amount of shrinkage, they will not be reported in detail here. However, a few general patterns emerged consistently from the various analyses:

(a) The non-intellective scales derived from the four item pools did not contribute unique information. Once the scale with the highest correlation with the criterion was taken into account the partial correlations of the other scales with the criterion were non-significant. (b) The non-intellective scales added significantly in most instances to the prediction of the grade criterion that was possible with HSR and the SAT or NMSQT Composite. (c) HSR and the test scores in most instances did not add significantly to the prediction of extracurricular achievement that was possible with a single non-intellective scale.

Discussion

The scales to predict grades developed from the OBI and CPI pools add significantly to the prediction of college grades that is possible from test scores and high school rank. The extracurricular achievement scales seem to be the best available predictors of extracurricular achievement. Moreover, these scales appear to be particularly robust: developed on a sample of very able students of both sexes, they maintained their validity when applied to boys and girls separately and when applied to a sample of students considerably lower on the ability scale than the sample on which they were derived.

These results warrant tentative use and further trial of these scales in actual selection situations.[2] If the selection context does not greatly affect their validity, the scales will provide an increment in the accuracy of prediction of college performance.

Extracurricular achievement in this study was not as predictable as were grades. Moreover, the predictors of extracurricular achievement were primarily high school activities and extraversion---traits which may not be considered valuable in themselves. This raises the question of what weight should be given in college and scholarship selection programs to predictors of extracurricular achievement. It is conceivable that some admissions officers may wish to select potential extracurricular achievers to promote campus activities or to balance an overly studious student body. However, in most selection programs the justification for selecting potential extracurricular achievers must be based on the assumption that such achievers will make socially valuable achievements after college. Although this assumption seems reasonable enough, there is little good evidence either to support or to refute it.

There is a clear need for better criteria of success in college, and the lack of good criteria is one of the main difficulties in improving predictors. Since the criterion value of any index of college achievement depends in large

---

2. A test of the validity of the scales when used in the selection context of the National Achievement Scholarship Program for outstanding Negro students is now underway. The non-intellective scales may offer a special advantage in the NASP where the value of the traditional predictors may be attenuated by cultural factors.

part on its relationship to post college achievement, studies of the correlation of college behavior with socially significant achievement after college might help to clarify the criterion problem.

A specific finding which deserves comment is the low predictive validity of the aptitude tests in this study. This might be expected in the Merit sample with its restricted range of scores, but it was also true in the normative sample. The correlations between NMSQT Composite and college grades in the normative sample of .18 for boys and .23 for girls are far below the correlations in the .50's reported in the NMSQT Manual (Science Research Associates, 1964) for students attending particular colleges. This shrinkage in validity is undoubtedly due to the fact that the students in the present samples attended many different colleges, with the high scoring students attending colleges where the academic competition is greater than for the low scoring students. The shrinkage in validity for the test scores seems greater than for HSR (normative sample validities of .34 for boys and .38 for girls). The great differentiation of colleges on tested ability may effectively destroy the validity of test scores for predicting college grades in a heterogenous group of colleges, leaving the non-intellective factors, on which colleges are not so differentiated, as the best predictors. This reasoning would seem to indicate that those who deal with students attending a variety of colleges should develop ways of taking the college into account if they wish to use grades as an index of success.

Validity is often not the sole value in a selection program, and the use of non-intellective scales raises some issues which, although always present, are hidden when intellectual predictors are used. Stalnaker (1965) stated the issue well when he said (prophetically), "In a program very much in the public eye, predictive validity alone cannot rule. . .Suppose there should develop sound evidence that among the highly intelligent, the most conforming, compulsive,

dependent, unoriginal individuals do best in college. Should we then try to limit our selection to students having these characteristics" (p. 135)? Stalnaker's hypothetical example is only a slight exaggeration of the content of the non-intellective grade scales. The extracurricular scales on the surface would seem to select more the "All American Boy" type, but should a student be awarded a scholarship because of his broad interests and frequent dates?

The personality traits of the selected students become explicit with the use of non-intellective predictors, but selection for personality characteristics is implicit in all selection programs. For example, unpublished comparisons of the Merit and normative samples used in this study reveal that the NMSQT tends to select a socially withdrawn, studious, introversive character. Since the composition of social groups in our society is increasingly determined by centralized selection programs, more attention should be given to the type of person identified by the various selection strategies. The explicit recognition of the role of personality traits that is inherent in the use of non-intellective predictors may help focus attention on this problem.

References

Davidsen, O. M. Reliability of self-reported high school grades. Unpublished research report, American College Testing Program, 1963.

Gough, H. G. Manual for the California Psychological Inventory. Palo Alto, Calif.: Consulting Psychologists Press, 1957.

Gough, H. G. The adjective check list as a personality assessment technique. Psychological Reports, 1960, 6, 107-122.

Holland, J. L. A personality inventory employing occupational titles. Journal of Applied Psychology, 1958, 42, 336-342.

Holland, J. L., and Nichols, R. C. Prediction of academic and extracurricular achievement in college. Journal of Educational Psychology, 1964, 55, 55-65.

Holland, J. L., and Richards, J. M. Academic and non-academic accomplishment: Correlated or uncorrelated? American College Testing Program, ACT Research Reports, 1965, No. 2.

Nichols, R. C., and Holland, J. L. Prediction of the first year college performance of high aptitude students. Psychological Monographs, 1963, 77 No. 7 (Whole No. 570).

Roberts, R. J. The prediction of first year college performance of very able students with empirically constructed scales. National Merit Scholarship Corporation, NMSC Research Reports, 1965, I (No. 5).

Stalnaker, J. M. Psychological tests and public responsibility. American Psychologist, 1965, 20, 131-135.

Science Research Associates NMSQT Interpretive Manual. Chicago, Science Research Associates, 1964.

SOME RECENT NMSC STUDIES

Astin, A. W. Differential college effects on the motivation of talented students to obtain the Ph.D. Journal of Educational Psychology, 1963, 54, 63-71.

-----. Undergraduate institutions and production of scientists. Science, 1963, 141, 334-338.

-----. Some characteristics of student bodies entering higher educational institutions. Journal of Educational Psychology, 1964, 55, 267-275.

-----. The distribution of students among higher educational institutions. Journal of Educational Psychology, 1964, 55, 276-287.

-----, and Nichols, R. C. Life goals and vocational choice. Journal of Applied Psychology, 1964, 48, 50-58.

Holland, J. L. The prediction of academic, artistic, scientific, and social achievement of undergraduates of superior scholastic aptitude. Journal of Educational Psychology, 1962, 53, 132-143.

Nichols, R. C. The effect of various college characteristics on student aptitude test scores. Journal of Educational Psychology, 1964, 55, 45-54.

-----. Career decisions of very able students. Science, 1964, 144, 1315-1319.

-----. The inheritance of general and specific ability. NMSC Research Reports, 1965, I, No. 1.

-----. Personality change and the college. NMSC Research Reports, 1965, I, No. 2.

-----. The financial status of able students. NMSC Research Reports, 1965, I, No. 3. Science, in press.

-----, and Astin, A. W. Progress of the Merit Scholar: An eight-year followup. NMSC Research Reports, 1965, I, No. 4.

-----, and Davis, J. A. Some characteristics of students of high academic aptitude. Personnel and Guidance Journal, 1964, 42, 794-800.

-----, and Holland, J. L. Prediction of the first year college performance of high aptitude students. Psychological Monographs, 1963, 77 (7, Whole 570).

Roberts, R. J. Prediction of college performance of superior students. NMSC Research Reports, 1965, I, No. 5.

NMSC research is financed by grants from the National Science Foundation, the Carnegie Corporation of New York, and the Ford Foundation.