

PREDICTING ACADEMIC ACHIEVEMENT FROM INTELLIGENCE AND PERSONALITY DATA¹

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The ability to predict accurately the future academic achievement of students would be helpful to school personnel who aid students in planning their educational studies. Unfortunately, no one has unerring ability at this. Usually the prediction of academic achievement is based on the immediate intellectual ability of students and the obtained correlations between measured ability and subsequent achievement range from .45 to .70 depending on the particular courses and measures of ability which are involved. These coefficients indicate that about 20% to 50% of the variance in measured academic achievement can be explained on the basis of measured intellectual abilities. Thus, at best, at least half of the variance in achievement is not accounted for by measured intellectual ability. It has been suggested by many investigators that some of this unexplained variance might be accounted for if personal and social variables were also used in the prediction equation. The study reported here deals with determining whether the addition of a group of personality variables to intellectual ability in a regression equation results in accounting for more of the variance in achievement than do the measures of intellectual ability alone.

Procedures

Subjects

Three hundred forty-five white tenth grade students from three Florida secondary schools constitute the group on which the study is based. Although Ss were tested in intact classroom groups, and were not drawn randomly from the population of all white public school tenth grade students in Florida, their intelligence and achievement scores were

¹Statistical analyses of the data reported herein were partially subsidized by a grant to the Florida State University from the National Science Foundation, NSF Grant No. G17467.

such as to warrant the inference that the group could be regarded as a representative sample of the population.

Tests

All Ss were administered a test battery which consisted of the School and College Ability Test (SAT), Tests 3 through 7 of the Iowa Tests of Educational Development (ITED), and an inventory of eight personality variables. The latter is based on items described by Goldman-Eisler (1956).

The original items were factor analyzed by the principal-axis technique, and the factors were orthogonally rotated using the Varimax procedure. The items with heaviest loadings on each factor were selected to provide relatively homogeneous and independent scales. The resulting scales and factor loadings for each item are shown below, inasmuch as they are not generally available in published form.

Test 8: Oral Aggression

When your anger is aroused, do you tend to express yourself in "strong" language?	.63
Do you often act on the spur of the moment?	.58
Do you like colorful "cussing"?	.76
Rather than keeping still, are you apt to say anything--though you may regret it later?	.33

Test 9: Deliberation

Do you usually consider a matter from every standpoint before you form an opinion?	.68
When you have to act, are you usually quick to make up your mind?	.40
Do you usually make a plan before you start to do something?	.78
Do you feel that comfort is indispensable for a contented life?	.28

Test 10: Indolence

Do you wish for a life of ease and luxury?	.40
Do you feel that: "An idle life is the life for me, "Idleness spiced with philosophy"?	.50
Do you believe that good luck is more help than hard work?	.49
Do you feel that work has no place in paradise?	.45
Do you think it is better to do nothing than to make a mistake?	.53
Competition is not for me; it irritates rather than stimulates me.	.50
Do you feel that it is better to sit still than to rise and fall?	.13

Test 11: Impatience

Are you quick in commenting on most occasions?	.30
Are you considered aggressive by some of your acquaintances?	.25
Are you good at witty conversation, quick retorts, and snap judgments?	.63
Do you sometimes start talking without knowing exactly what you are going to say?	.55
Would you call yourself spontaneous in speech and action?	.66

Test 12: Inhibition

- Do you keep your emotions to yourself more often than you express them? .77
- Do you think much and speak little? .41
- Do you often do a thing in a hurry just to get it over? .35

Test 13: Deliberation (and Aggression)

- Are you slow in deciding upon a course of action? .41
- Do you find yourself frequently disagreeing with, and contradicting people? .39
- Can you endure monotony without much fretting? .29
- Do you usually do things slowly and deliberately? .76

Test 14: Rigidity

- Are you somewhat disturbed when your daily habits are disrupted by unforeseen events? .76
- Do you find that you react with a certain resistance to untried new things? .38
- Are you usually consistent in your behavior, going about your work in the same way, frequenting the same preferred places, following the same routes, etc? .46
- When you are confronted by a crisis, are you apt to become inhibited and do nothing? .36
- Do you dislike making hurried decisions? .37

Test 15: Impulsive Aggression

If somebody annoys you, are you apt to tell him what you think of him?	.56
Do you try to get your own way regardless of opposition?	.45
Do you tend to make biting or sarcastic remarks when criticizing other people?	.53
If you come across a domineering person, are you inclined to put him in his place?	.43
Do you often act impulsively just to blow off steam?	.55
Do you often blame other people when things go wrong?	.40
Are you fond of arguing?	.30
Are you apt to express your irritation rather than to hold it back?	.54
When in a rage, do you stamp your feet, grind your teeth, push your fist in your mouth, or bite your fingernails or handkerchief or some other objects, or break or tear something, or do something similar?	.50
Are you apt to tell off your friends when you disapprove of their behavior?	.59
Are you easily carried away by an emotional impulse?	.47
Do you often let yourself go when you are angry?	.76
Do you like a debate to be hard-hitting?	.17
Are you inclined to express your wishes without much hesitation?	.19

The battery yielded the following specific measures:

School and College Ability Test

1. Verbal Ability
2. Quantitative Ability

Iowa Test of Educational Development

3. Correctness and Appropriateness of Expression
4. Ability to do Quantitative Thinking
5. Ability to Read Social Studies Materials
6. Ability to Read Natural Science Materials
7. Ability to Interpret Literary Materials

Personality Variables

8. Oral Aggression
9. Deliberation
10. Indolence
11. Impatience
12. Inhibition
13. Deliberation (and Aggression)
14. Rigidity
15. Impulsive Aggression

Analysis

Each set of ITED measures, separately, was predicted from (a) the two intelligence variables, SAT Verbal and Quantitative, and then from (b) the two intelligence measures and the eight personality variables. This procedure was executed three times; once for the entire sample, once for males, and once for females. The purpose of these analyses was to determine if the addition of the personality variables to the regression equation would result in accounting for a significantly greater amount of variance in each of the achievement measures than could be accounted for by the intellectual measures alone.

Results

The pairs of multiple correlation coefficients based on (a) the two intellectual variables and on (b) the two intellectual variables and eight personality variables, respectively, are reported in Table 1 (for the entire group), Table 2 (for males), and Table 3 (for females). Only in two instances, both for the entire group, did the addition of the personality

Table 1

Differences between R's for Total Group (N = 345)

Dependent Variable <u>ITED</u>	Independent Variables		
	V and Q	V, Q, and Personality	<u>F</u> ¹
Corr. and App. Expression	.6631	.6809	1.8606
Quant. Thinking	.7489	.7631	2.1390*
Social Studies	.7637	.7703	1.0368
Natural Sciences	.6081	.6195	.9486
Literary Materials	.7977	.8110	2.6231**

*Significant at .05 level.

**Significant at .01 level.

¹F's computed as follows:

$$F = \frac{R_t^2 - R_s^2}{1 - R_t^2} \times \frac{N - M_t - 1}{M_t - M_s}$$

Where R_t^2 = squared multiple correlation based on all independent variables

R_s^2 = squared multiple correlation based on the two intellectual variables

N = number of cases, 345

M_t = number of independent variables on which R_t based, 10

M_s = number of independent variables on which R_s based, 2

Table 2
Differences between R's for Males (N = 163)

Dependent Variable	Independent Variables			
	<u>ITED</u>	V and Q	V, Q, and Personality	<u>F</u>
Corr. and App. Expression	.6587	.6841		2.0034*
Quant. Thinking	.7105	.7344		1.5258
Social Studies	.7080	.7245		1.0121
Natural Sciences	.6363	.6698		1.6148
Literary Materials	.7726	.7937		1.8227

*Significant at .05 level.

Table 3
Differences between R's for Females (N = 160)

Dependent Variable	Independent Variables			
	<u>ITED</u>	V and Q	V, Q, and Personality	<u>F</u>
Corr. and App. Expression	.7860	.8045		1.6666
Quant. Thinking	.7860	.8008		1.3159
Social Studies	.8158	.8207		.4839
Natural Sciences	.5883	.6214		1.2380
Literary Materials	.8274	.8410		1.5437

variables result in accounting for significantly more of the criterion variance. This was true when "Ability to Do Quantitative Thinking" and "Ability to Interpret Literary Materials" were the dependent variables. When each sex was considered separately, no differences were found for females, and only one difference was found for males, which occurred when "Correctness and Appropriateness of Expression" was the dependent variable.

Conclusions and Discussion

Adding the eight personality variables to the set of predictors did not result in a pronounced increase in the relationship between them and the criterion tests. At best, the personality variables permitted accounting for about four per cent more of the criterion variance, but generally the increase was about two per cent or less. Thus one might conclude that, in this case, the increase in predictive efficiency resulting from the inclusion of the personality variables was negligible and hardly worth the trouble involved in collecting those measures and in incorporating them in the prediction. Because the personality variables used in this study were measures of very specific traits, similar studies should be conducted in which the personality variables are assessments of much broader characteristics of students.

References

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