NON-INTELLECTUAL INDICES OF ACHIEVEMENT IN THE SCHOOL OF AGRICULTURE

by

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B. S., Kansas State College
of Agriculture and Applied Science, 1949

A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE COLLEGE
OF AGRICULTURE AND APPLIED SCIENCE

1956

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INTRODUCTION

The prediction of academic success is one of the major problems of applied psychology. Knowledge of what will happen under certain circumstances would be of great benefit to the individual and to society as a whole.

This study is concerned with the prediction of academic success among entering freshmen in the School of Agriculture, Kansas State College.

A great many studies of prediction of college success have been made, only a few of which have been concerned with the problem as it applies to agricultural students. Most of the reported studies have been concerned with the prediction for all students or for students in curricula other than that of agriculture.

A large percentage of the prediction studies have been based on intellectual factors. The results have placed the major emphasis on scholastic aptitude and achievement variables as predictors of college success.

The studies using such intellectual variables have uniformly found a relatively high correlation between these predictors and college achievement. The results, however, have almost universally left over half of the variance in achievement unexplained, suggesting the possibility that other factors have an important place in more accurate prediction. There has been comparatively little work concerning non-intellectual factors and their relationship to academic success. The studies completed thus far have demonstrated the potential usefulness of such factors.

The present study is an attempt to deal with certain non-intellectual factors as they are related to the academic achievement of students in the School of Agriculture at Kansas State College. Specifically, this investigation is concerned with the relationship of self-concepts to achievement.

Enough studies in the areas of group dynamics, personality, and psychotherapy have been done to warrant the generalization that much behavior is explicible on the basis of how the individual perceives himself, irrespective of whether this concept of self has a strong basis in reality. Are these concepts a potent force in determining the academic performance of the entering freshmen in agriculture?

Should a significant relationship exist, two areas of application appear. First, a description, in terms of self-concepts, of agricultural students who differ on ability and achievement measures may be made available. Secondly, a new tool or tools which contribute to more adequate predictions may be developed.

The review of the literature which follows is intended to provide a research perspective to this problem and to bring it into sharper focus.

BACKGROUND AND REVIEW OF LITERATURE

Although many investigations concerned with the prediction of success in college have been reported, this study will not attempt to make an exhaustive review of them. Highlights from these studies will be reported, but details will be covered only for the most relevant researches.

Super (22) reported that high school grade average has been the best single predictor of college success with correlations clustering around .55. Aptitude and achievement tests have usually correlated around .45 or .50 with college success.

Several studies have been directed at the determinants of success in schools of agriculture (4,5,10,11,15,16,21). These studies have found in general that high school rank correlates with achievement in the .45 to .55 range. General ability tests have, as a rule, been somewhat less closely

related to achievement in agriculture (correlations have varied from .31 to .48). Science tests have shown more promise than general ability tests in one study (DiVesta, 4) but the reverse was true in another study (Mathison, 15).

The most relevant of the studies concerned with agricultural students is one recently completed by Hardy (10). He found that the Iowa Test of Educational Development #6 - Ability to Interpret Reading Materials in the Natural Sciences was slightly superior to the American Council of Educational Psychological Examination, 1952 Edition, as a predictor of first semester grade point average of agricultural freshmen at Kansas State College. For this sample the correlation between the Iowa test and achievement was .598, which is higher than any previously reported zero-order correlation.

These studies suggest the importance of intellectual characteristics in scholastic achievement. The correlations reported point to a definite relationship between intellectual factors and academic progress in college.

On the other hand, these correlations also underscore the fact that the largest proportion of variance in grade point achievement is not accounted for by such intellectual factors. Thus they suggest, indirectly, that non-intellectual factors might profitably be considered in prediction problems.

Non-intellectual factors have been investigated in a few studies. Borow (2) was unable to distinguish under- and over-achievers on the basis of personal adjustment (as measured by the Minnesota Multiphasic Personality Inventory). Schofield's study with medical students (20) contradicted this conclusion. Gough (7) was able to report different personality characteristics for achieving and non-achieving students. The former tended to be dominant, self-sufficient, motivated, liberal, and well-adjusted. Non-achievers were characterized as immature, socially extroverted, free from emotional tension,

and disinclined to admit personal problems.

While existing inventories have pointed to some relationship between measured personality characteristics and achievement, more success has been had when special empirical scales have been developed. Altus (1), for example, developed a non-intellectual scale on the MMPI which correlated .39 with grades in psychology. Gough (6) developed similar scales on the California Psychological Inventory which have been relatively independent of intellectual factors but which have predicted achievement at both the high school and college levels. In the area of study habits and attitudes, Brown and Holtzmann (3) published a test with similar characteristics.

Several investigators have dealt with situational factors (to be distinguished from the personal factors reviewed above). Nemzek (18) failed to find any relationship between academic performance and measures of father's education, mother's education, or occupation of father. McQuary (17) reported that size of community and degree of extra-curricular participation in high school were related to college performance. Patterson (19) reviewed a number of studies showing, in general, that a variety of situational, non-intellectual factors do have some effect upon grades earned in college.

Three studies were found which were concerned with the relationship between non-intellectual factors and success in agricultural curricula. The first, by DiVesta et al. (4), included the Johnson Science Application Test and a locally devised measure of motivation (the Orientation Inventory) as part of a battery to predict success of students entering the New York College of Agriculture. The Orientation Inventory contained 17 multiple choice items. Each item produced a score from one to five, one indicating little hindrance to the individual's achievement and five indicating that the factor would hinder achievement considerably. The inventory correlated -.22 with the

first semester grade point average. The negative correlation was the result of the scoring.

An item analysis was made of the student responses to the items. Following the analysis, seven of the items were combined to yield a part-score. Of the seven items, two referred to the individual's satisfaction with his curriculum, two dealt with time spent in extra-curricula activities, two items dealt with study habits, and one dealt with the personal adjustment of the individual. This part-score correlated -.33 with grade point average.

Combining the Ohio State Psychological Test, the Johnson Science Application Test, the part score on the Orientation Inventory, and the high school grade average resulted in a multiple correlation of .64 with grades in agriculture. Except for the high school grade point average, the Orientation Inventory was found to add more to the correlation than any other variable in the study.

A second study of non-intellectual factors with agricultural students was done by Mathison (15). He concluded that results obtained from the Strong Vocational Interest Test could not be used as reliable predictors of success in an agricultural training program. Correlations between the scores on the Farmer key and grades ranged from .25 to -.08 among various groups of freshman agricultural students at the University of Wisconsin.

The most recent and relevant study of this type was that done by Hardy (10). He found that a number of non-intellectual measures contributed significantly to the prediction of success in agricultural studies at Kansas State College. The Interest Maturity Scale of the Strong correlated .42 with first semester grades. Occupational scores were, for the most part, independent of achievement, however. Scores on the Farmer key, for instance, correlated only

.05 with these grades.

In the area of personality, the Honor Point Ratio Scale of the California Psychological Inventory correlated .435 with grade point average. At the same time, this measure correlated only .36 with the A.C.E. Similarly, the Brown-Holtzman correlated .33 with achievement, but only .30 with ability as measured by the A.C.E. More than any other study, Hardy's investigation has offered strong encouragement to the search for non-intellectual correlates of achievement.

This brief review is intended to highlight three generalizations: (1) Intellectual measures of aptitude and achievement, while providing better than chance predictions of academic success, leave much to be desired as predictors. (2) Non-intellectual factors, while investigated less frequently, have shown enough promise in the past to merit continued examination. (3) The most promising of these measures have been empirically derived specifically for the purpose of contributing significantly to better predictions.

These three generalizations provided the impetus to the present investigation.

EXPERIMENTAL PROCEDURE

Purpose

With the foregoing investigations in mind, the purposes of this study can be stated. Primarily, the goal was to develop non-intellectual indices which will contribute to the prediction of academic achievement among entering freshmen in the curricula of the School of Agriculture. A secondary goal of this study was to describe various groups of Agriculture freshmen in terms of their self-concepts.

Samples

Two groups of entering freshmen in the School of Agriculture at Kansas State College were involved in this study. The entering freshmen in the fall of 1954, Hardy's (10) sample, and the entering freshmen in the fall of 1955.

Hardy (10) reported that 247 students were involved in the testing program of 1954-55. Of this total number 19 transfer students from other schools, one student who failed to complete 10 hours of college credits, and seven students for whom complete data were not available were all dropped, leaving 220 students in his study. All were male freshmen in agriculture and the fall semester of 1954 was their first semester in college.

A total of 184 students were involved in the second sample. This number was reduced to 180 because of incomplete data on four students. Of these, 177 were male. The 180 subjects were all freshmen in agriculture and the fall semester of 1955 was their first semester in college.

The two samples appeared to be comparable on the basis of age, first semester grade point average, vocational goal, certainty of vocational choice, and father's occupation. The largest percentage of freshman students are usually 18 years old and these groups were no exception. The grade point average for the 1954 group was .867; for the 1955 group the average was .853. Over half of each group wanted to farm when they were through school and most of the others wanted work connected with farming. Most of the students were quite certain about their vocational goals. Over 80 percent of their parents were farmers or had jobs related to agriculture. The largest portion of the students was from Kansas and from rural areas. On all of these factors, the two groups were comparable.

The same battery of tests was administered to both samples during their

first semester of college residence. These tests included the Iowa Test of Educational Development #6 - Ability to Interpret Reading Materials in the Natural Sciences, the California Psychological Inventory, the Strong Vocational Interest Test, the Brown-Holtzman Survey of Study Habits and Attitudes, and the Gough Adjective Check List. Because of administrative difficulties, the tests for the second sample were not given until the first semester was nearly over. For the first sample, the tests were administered early in the semester. The test administrators reported a less favorable attitude toward the testing program on the part of the second sample. This was probably a function of the time at which the tests were given.

Experimental Tests and Criteria

To accomplish the objectives of the study, it was necessary to examine three gross characteristics of the subjects. First, knowledge of their intellectual ability was necessary. Secondly, information regarding their achievement was important. Thirdly, some measure of non-intellectual characteristics of these subjects was needed.

As the measure of intellectual ability, the Iowa Test of Educational Development #6 - Ability to Interpret Reading Materials in the Natural Sciences was selected. Hardy (10) found this test to be the best single predictor of grade point average for the 1954 sample. The Iowa test was designed to determine the student's ability to think competently about scientific matters. The test does not measure the student's store of scientific knowledge, but rather how well he can use this knowledge in interpreting what he reads about scientific matter written in a scientific style.

As the measure of non-intellectual characteristics the Gough Adjective

Check List was selected. As a new instrument, the Check List has not been investigated as a non-intellectual predictor. It is a self-concept measure and, as noted earlier, research in other areas has suggested such measures may indeed be predictive of behavior in any domain. The Check List contains 300 adjectives. The student is to choose one of three alternatives: the adjective applies to him, he does not understand the meaning of the word, or the word does not apply to him.

The measure of achievement used was first semester grade point average. It was computed by dividing the total number of grade points received by the total number of credit hours attempted. Three grade points were assigned for each hour of A, two for each hour of B, one for each hour of C, zero for each hour of D, and minus one for each hour of failure.

Experimental Groups

Four basic experimental groups from Hardy's (10) sample were defined. They were made up on the basis of (a) scores on the Iowa test and (b) first semester grade point average.

The first group, HH, were those whose Iowa raw score was above 43 and whose grade point average was above 1.00. A total of 69 students were included here.

The second group, LL, were those whose Iowa raw score was below 44 and whose grade point average was below 1.00. A total of 83 students were included here.

The third group, LH, were those students whose Iowa raw score was below 44 and whose grade point average was above 1.00. A total of 33 students were included here.

The fourth group, HL, were those students whose Iowa raw score was above

43 and whose grade point average was below 1.00. A total of 31 students were included here.

From the method of defining the groups, it can be seen that two (HH and LL) are composed of "normal achievers" - those students whose achievements corresponded to their measured ability. The HL and LH groups can be characterized as "under-achievers" and "over-achievers", respectively.

Development of the Indices

Before describing the indices developed in this study, it is desirable to consider some of the logic of prediction. The complexity of most human behaviors probably accounts for the fact that few zero order correlations exceed .60. The technique of multiple correlation has been devised to permit the investigator to combine optimally the predictive information contained in several variables.

In selecting variables for multiple correlation problems, the statistician usually advises the selection of tests such that all correlate significantly with the criterion but none correlate significantly with each other. For example, Tests A and B might be used in a hypothetical multiple correlation problem if each correlated .60 with the criterion and if they intercorrelated .00.

A second basis for selecting tests in multiple correlation problems has been described by Horst (12). He suggests that tests which are completely unrelated to the criterion may actually aid significantly in the prediction of that criterion under certain conditions. For example, if Test B correlated .00 with the criterion but .60 with Test A, and if Test A correlated .60 with the criterion, then Test B would significantly aid in the prediction problem when combined with Test A. Logically it can be seen that Test B predicts,

albeit not too accurately, performance on Test A. Since Test B does not predict the criterion, but Test A does, then Test B must predict that part of Test A which is unrelated to the criterion. The reason Test B contributes to the prediction problem is that it is able to suppress some of Test A's errors and thus, in a sense, make Test A more effective. For that reason, Horst has labeled variables such as Test B "suppressor variables".

The two methods described above are based on the pre-supposition that prediction can become increasingly accurate for any population as more and more variables are investigated. A third attack on the prediction problem accepts this assumption, but argues that for a substantial proportion of most populations, a relatively small amount of predictive information will provide a relatively accurate forecast of a criterion performance. This point of view assumes that people differ on the quality of "predictability", and suggests that if a measure of this characteristic were obtained, predictions for a large class of subjects could be significantly improved, while for a smaller class of "unpredictables", tests would have relatively little to say. Hoyt and Norman (13) supported this reasoning experimentally. They showed that grades could be predicted much more accurately for a "well-adjusted" group than for a "maladjusted" group, using the MMPI as a criterion of adjustment.

The preceding rationale provides three different suggestions in approaching the problem of improving the prediction of achievement: (1) Indices might be devised which would correlate with achievement but not with ability. (2) Indices might be devised to correlate with ability but not with achievement. (3) Finally, indices might be devised to identify "predictable" and "unpredictable" subjects, thus improving the accuracy of predictions for the former and cautioning against the use of traditional predictor variables for the latter.

As applied to the present data, these suggestions can be translated as follows: to develop indices related to achievement but not to ability, one should examine differences between students with comparable ability levels but with discrepant achievement records. Thus, the HH group might be contrasted with the HL group. Similarly, the LL group could be contrasted with the LH group. By examining the responses of each of these pairs to the Gough Adjective Check List, two indices were developed on this rationale. These indices were labeled, respectively, HH-HL and LL-LH.

To develop suppressor indices, one should examine differences between students with comparable achievement records but with discrepant ability levels. Thus the HH group might be contrasted with the LH group. Similarly, the LL group could be contrasted with the HL group. Two indices were developed from the Adjective Check List using this rationale. These indices were labeled, respectively, HH-LH and LL-HL.

Finally, to develop indices of predictability, one should examine the characteristics of students who perform about as might be expected, on the basis of ability scores, which differentiate them from those who perform much differently than expected. Thus the HH and LL groups combined, might be contrasted with the HL and LH groups combined. Unfortunately, a mechanical error was introduced in this study so that, instead of developing such an index, indices based upon the differential responses to the Adjective Check List of the HH and LL groups and of the HL and LH groups were developed. The error was discovered at a date too late to be corrected for inclusion in this thesis. The indices that were developed (HH-LL and HL-LH) would appear, logically, to be confounded measures of ability and achievement.

The criteria for selecting an item to be included in any of the six

indices were twofold. First of all, the percentages of the two comparison groups making a given response had to be significantly different from each other at the 10 percent level or better. Secondly, the absolute percentage difference had to be at least 15 percent. The latter criterion was included in order to add a note of practical significance to the statistical significance provided by the former.

In building scoring keys, the response category "Do not know the meaning of the word" was not considered, primarily because very few items met the double criteria for inclusion. All six keys were built in the same fashion. First, all items which differentiated the two comparison groups in terms of the self-descriptive response ("Yes, I am like this.") were included. Any additional items which differentiated these groups in terms of the second response category ("No, I am not like this.") were then added to this list. No adjective was scored twice, even if both the "endorse" and "deny" response significantly differentiated the two groups.

RESULTS AND DISCUSSION

Reliability of the Indices

An estimate of the reliability of each of the six indices was made by correlating scores made on the odd-numbered questions with scores made on the even-numbered questions. The resulting r's were then corrected by the Spearman-Brown prophecy formula (Guilford, 9). These figures are summarized in Table 1.

With the exception of the figure for the HH-LL group, these results are discouraging. Unless the reliabilities were increased, the use of such indices with individuals would be highly questionable. On the other hand,

Table 1. Reliability Coefficients (corrected) for six non-intellectual measures of achievement.

Index	Corrected r
HH-LL	.826
HL-LH	.591
HH-HL	.458
LL-LH	.682
HH-LH	.589
LL-HL	.784

they do appear to be high enough to justify certain gross group comparisons.

Zero-Order Correlations

The validity of the indices developed was tested by computing product-moment correlations between each index and both the Iowa test and grade point average. Data from the 1955 sample were used for these computations. It is important to note that this sample was not involved in the empirical derivations of the indices.

In addition to the correlations with the Iowa test and with grade point average, intercorrelations among the various indices were computed. Since the same rationale dictated the procedure to be followed in deriving each pair of indices, the correlations within each pair were of particular interest. In addition, the remaining intercorrelations were of general interest, and were essential if multiple correlations were to be computed. Table 2 presents the complete intercorrelation matrix.

The most striking generalization is that none of the indices correlates highly with either the Iowa test or with grade point average. Two of the

Table 2. Correlations among six measures of self characterization, the Iowa Test #6 and first semester grade point average.

	HH-LL	LH-HL	LL-LH	LL-HL	HH-LH	HH-HL	Iowa	G.P.A.
HH-LL		.360	.784	.529	.411	.540	.240	.241
LH-HL			.261	.546	.213	.529	.268	.090
LL-LH				.287	.459	.497	.094	.140
LL-HL					.040	.477	.305	.204
HH-LH						.309	.160	.087
HH-HL							.134	.049
Iowa								.467
G.P.A.								

Correlations at .149 or beyond are significant at the 5% level.

Correlations at .190 or beyond are significant at the 1% level.

indices (LL-LH and HH-HL) failed to correlate significantly with either measure.

A more detailed analysis of Table 2 is instructive. It will be recalled that both the LL-LH and HH-HL indices were developed on the assumption that they would be related to achievement but not to ability. In reality, they were independent of both. They did correlate with each other significantly (.497) indicating at least a degree of the expected communality. In general, it is necessary to conclude that the effort to build indices considered to be "ideal" for multiple correlation purposes failed decisively.

Two other indices (HH-LH and LL-HL) were designed to be suppressor variables. That is, ideally they should correlate high with the Iowa test but low with grade point average. From Table 2 it can be seen that each index showed a slight trend in the expected direction. The LL-HL index correlated

.305 with the Iowa, but unexpectedly correlated significantly with achievement (.204). The HH-LH index correlation with the Iowa test was barely significant (.160), and its .087 correlation with achievement was not significant. The inter-correlation of the two indices was only .040, indicating that the measures were independent of each other even though they were constructed from the same rationale. More will be said of this inconsistency later on in this report. In general, these indices showed only slight promise as the valid suppressor variables they were intended to be.

The other two indices (HH-LL and HL-LH) were constructed as confounded, non-intellectual correlates of both ability and achievement measures. From Table 2 it can be seen that the HH-LL index correlated .24 with both the Iowa test and grade point average. This correlation, while statistically significant, is not particularly impressive from the practical point of view. The other index (HL-LH) appeared to behave more like a suppressor than the two indices especially designed for that purpose. That is, it correlated significantly (.268) with the Iowa test, but nonsignificantly (.090) with grade point average. The two confounded indices intercorrelated significantly (.360), but low enough so that it is clear that distinctly different things were being measured.

A number of the other intercorrelations are significant. Of particular interest is the .784 correlation between the HH-LL and the LL-LH indices. Since LL-LH did not correlate significantly with either ability or achievement, but HH-LL correlated significantly with both, one might expect LL-LH to act as a suppressor to HH-LL and thus increase its usefulness in a multiple correlational analysis.

One other correlation is especially worthy of note, namely the .467

correlation of the Iowa test with grade point average. This figure represents a marked reduction over the comparable figure obtained by Hardy (10). It is possible that the lower motivation on the part of the 1955 sample noted by the test examiners may have played a significant part in producing these results.

Multiple Correlations

The real test of the usefulness of the new indices is whether or not they contribute significant predictive information over and above that provided by the Iowa test. It will be recalled from Table 2 that the Iowa test correlated .467 with first semester grade point average.

Since the indices for the most part did not work out in the manner expected, there was no clean cut rationale for selecting variables to be included in a multiple correlational analysis. It was finally decided to use (a) the two indices correlating highest with the Iowa test and (b) the two indices correlating highest with grade point average. Thus the LH-HL, LL-HL, and HH-LL indices were selected. In addition, the LL-LH index was selected because (a) it was the only index that correlated higher with grade point average than with the Iowa test and (b) it appeared to act as a suppressor to HH-LL.

These indices were combined, two at a time, with the Iowa test to determine if they could markedly raise the zero order r of .467 between that test and achievement. The results of these analyses are summarized in Table 3.

These correlations are not impressive. In the practical sense, one could not realistically recommend even the best combination of tests as offering a significantly improved prediction over that obtained by the Iowa test alone.

Table 3. Multiple correlations with first semester grades.

Variables	R
Iowa + LH-HL + LL-HL	.478
Iowa + HH-LL + LL-HL	.485
Iowa + HH-LL + LL-LH	.486
Iowa + LH-HL + LL-LH	.497

As a matter of incidental interest, the best combination (Iowa + LH-HL + LL-LH) does include a good measure of ability (the Iowa test), a suppressor for that measure (LH-HL), and the index which most closely approximates the traditional multiple correlation ideal (LL-LH). That is, the idea of searching for suppressors and for correlates of achievement unrelated to ability is encouraged. The failure in this study was due to inadequate suppressors and ability-free achievement measures.

Self-Concept Descriptions

A minor purpose of this study was to describe the four ability-achievement groups in terms of their self-concepts as measured by the Gough Adjective Check List. This description conceivably could take three forms: (1) adjectives which subjects say describe them; (2) adjectives which subjects deny as being self-descriptive; or (3) adjectives which subjects claim ignorance as to their meaning. For purposes of this part of the research, only the first two of these methods were utilized.

Presented in Table 4 are adjectives the LL subjects accept as being self-descriptive more frequently than other groups do. Table 5 presents those adjectives which LL subjects deny as being self-descriptive more frequently

than do other groups. Similar data for the HH, HL, and LH groups are found in Tables 6 through 11[1].

No attempt will be made here to interpret the adjective content of these scales. Such an exhaustive undertaking might well be the subject of future research.

It is difficult to escape commenting on the direction of response. In the LL group, only 14 adjectives were endorsed (said to be self-descriptive) more frequently than by other groups, while 35 adjectives were denied (said to be not descriptive) more frequently than by other groups. For the other groups, these figures were as follows: (a) HH group - 43 adjectives endorsed, 39 adjectives denied; (b) LH group - 52 adjectives endorsed, 16 adjectives denied; and (c) HL group - 23 adjectives endorsed, 70 adjectives denied.

The contrasts between the number of items endorsed and the number of items denied by each group is striking. Whenever a low achieving group is involved, there is a marked tendency for more adjectives to be denied than endorsed. The figures for the two low achieving groups were 35 versus 14 and 70 versus 23. Conversely, high achieving groups tend to endorse more adjectives than they deny. The figures here were 43 versus 39 and 52 versus 16.

An interpretation of this finding will be left to clinical psychologists. It is apparent that the productive (high achieving) groups tend to be more willing to say what they are than are non-productive groups. Perhaps this is an indication that they are more "open" psychologically, making them more

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[1] Included in the appendix is a list of all 300 adjectives, the percent of each group who responded in various ways to each adjective, and a list of the indices for which each adjective was scored.

Table 4. Adjectives the LL group endorses more frequently than comparison groups.

Adjective	Comparison Group		
	HH	HL	LH
confused	x		x
charming	x		
daring	x		
dependent	x		
hasty		x	
hurried	x	x	
intolerant		x	
opportunistic	x		
quiet		x	
self-denying		x	
self-pitying		x	
self-seeking	x		
sly		x	
stern	x		

Table 5. Adjectives the LL group deny more frequently than other comparison groups.

Adjective	Comparison Group HH	HL	LH	Adjective	Comparison Group HH	HL	LH
conscientious	x			self-confident			x
contented			x	sensitive	x		
deliberate	x			sociable	x		x
dignified			x	spendthrift			x
distractible			x	stable	x		x
enterprising	x			steady	x		x
good-natured		x		stern	x		
handsome			x	strong			x
intelligent	x			sympathetic	x		
logical	x			tactful	x		
mild			x	thrifty	x		
moderate	x			tolerant			x
optimistic	x			unexcitable			x
persevering			x	uninhibited	x		
persistent	x	x		versatile	x		x
realistic	x			warm			x
reserved	x			wholesome	x		
resourceful	x						

Table 6. Adjectives the HH group endorse more frequently than other comparison groups.

Adjective	Comparison Group HL	LH	LL	Adjective	Comparison Group HL	LH	LL
aggressive			x	obliging			x
appreciative			x	optimistic			x
civilized			x	persistent			x
confident			x	realistic			x
conscientious		x	x	reserved	x		x
conventional		x	x	resourceful	x		x
deliberate		x	x	robust			x
dignified			x	self-confident	x		x
discreet	x		x	sensitive			x
energetic		x		shallow	x		
enterprising			x	sociable			x
idealistic	x			stable			x
individualistic			x	steady		x	
initiative			x	sympathetic			x
intelligent	x	x	x	tactful			x
intolerant	x			thorough			x
inventive	x		x	thrifty	x		x
leisurely			x	tolerant			x
logical			x	uninhibited	x		
methodical			x	versatile	x		x
moderate	x		x	wholesome			x
modest			x				

Table 7. Adjectives the HH group deny more frequently than other comparison groups.

Adjective	Comparison Group LL	LH	HL	Adjective	Comparison Group LL	LH	HL
aloof	x			fault finding			x
anxious		x		flirtatious		x	
arrogant	x	x		frivolous	x		
attractive		x		handsome	x		
blustery	x			hard-headed			x
charming	x	x		hard-hearted			x
cheerful			x	hurried	x	x	
conceited	x			infantile	x		
confused	x			intelligent	x		
contented		x		jolly		x	
cool			x	mild		x	
cynical	x			obnoxious	x		
daring	x			pessimistic	x		
dependent	x	x		praising		x	
despondent	x			prudish		x	
dissatisfied		x		severe		x	
dominant		x		spendthrift		x	
egotistical	x			stingy		x	
emotional	x		x	suggestible		x	
evasive	x	x					

Table 8. Adjectives the LH group endorse more frequently than other comparison groups.

Adjective	Comparison Group HH	LL	HL	Adjective	Comparison Group HH	LL	HL
affectionate		x		idealistic		x	
aggressive		x		indifferent		x	
ambitious		x		initiative		x	
anxious	x	x	x	intolerant			x
argumentative		x		inventive		x	x
assertive		x		jolly	x		
attractive	x			logical		x	
autocratic		x	x	mild		x	
charming	x			moderate			x
contented	x	x		opportunistic		x	x
dependent	x			prudish		x	
dignified		x		quiet			x
discreet		x	x	reflected			x
dissatisfied	x			self-confident		x	x
dreamy	x			self-controlled			x
easy going		x		shallow			x
enterprising		x		sophisticated			x
flirtatious	x	x		spendthrift	x	x	x
forceful			x	stable		x	
foresighted		x		strong		x	
formal	x			stubborn		x	
handsome	x	x		sympathetic		x	
hurried	x		x	tense			x

Table 8 (Cont.)

Adjective	Comparison Group		
	HH	LL	HL
unexcitable			x
unfriendly			x
uninhibited			x
unstable			x
versatile		x	
warm		x	x

Table 9. Adjectives the LH group deny more frequently than other comparison groups.

Adjective	Comparison Group		
	HH	LL	HL
conceited		x	
confused		x	
conscientious	x		
conventional	x		
cynical		x	
deceitful		x	
deliberate	x		
egotistical		x	
energetic			x
immature		x	
infantile		x	
intelligent	x		
masculine			x
obnoxious		x	
opinionated			x
reserved			x

Table 10. Adjectives the HL group endorse more frequently than other comparison groups.

Adjective	Comparison Group HH	LH	LL
appreciative			x
cheerful	x		
commonplace			x
cool	x		
deliberate			x
emotional	x		
energetic		x	
good-natured		x	x
hard headed	x		x
high strung		x	
initiative			x
jolly	x		
lazy			x
logical			x
loud	x		x
masculine		x	
opinionated			x
persistent		x	x
self-denying	x		
sharp-witted		x	
steady			x
tactful			x
tolerant			x

Table 11. Adjectives the HL group deny more frequently than other comparison groups.

Adjective	Comparison Group			Adjective	Comparison Group		
	HH	LL	LH		HH	LL	LH
aloof	x	x	x	idealistic	x	x	x
arrogant		x	x	infantile		x	
anxious			x	intelligent	x		
autocratic			x	intolerant		x	
awkward		x		inventive	x		x
charming			x	logical		x	
coarse		x		moderate	x		
cold		x		peculiar		x	
contented			x	persevering			x
demanding			x	pessimistic		x	
dependent			x	pleasure-seeking			x
distractible			x	prudish			x
distrustful	x	x	x	queer			x
dominant			x	quick			x
egotistical	x			quiet			x
evasive		x		quitting		x	
faultfinding	x			reserved	x		
forceful		x	x	resourceful		x	x
formal		x	x	sarcastic		x	
hard-hearted		x	x	self-confident	x		x
hasty		x	x	self-controlled			x
hostile		x		self-denying	x		
hurried	x	x	x	self-punishing			x

Table 11 (cont.)

Adjective	Comparison Group		
	HH	LL	LH
severe			x
sexy		x	
shallow	x		
sly	x	x	x
smug			x
spineless	x	x	x
stingy			x
strong			x
stubborn			x
suggestible			x
sulky			x
tactless	x		
tense			x
thrifty	x		
trusting			x
unambitious	x		
unassuming	x		
unexcitable	x	x	x
unfriendly			x
uninhibited	x		
unscrupulous			x
unstable			x
weak			x

receptive to the various elements of their environment. Further studies exploring this finding certainly appear to be warranted.

SUMMARY AND CONCLUSIONS

The major goal of this study was to develop non-intellectual indices which would contribute to the prediction of academic achievement among entering freshmen in the curricula of the School of Agriculture. A secondary goal was to describe various groups of agriculture freshmen in terms of their self concepts.

Two groups of entering freshmen in the School of Agriculture at Kansas State College were involved in this study. The first group consisted of 247 freshmen who entered the School of Agriculture at Kansas State College in the fall of 1954. The second sample consisted of 184 freshmen who entered the School of Agriculture at Kansas State College in the fall of 1955. These groups were given standardized tests of aptitude, personality, interests, and attitudes as well as a biographical information form.

The Iowa Test #6 - Ability to Interpret Reading in the Natural Sciences was selected as the measure of ability and the first semester grade point average was considered as a measure of college achievement. The results of the Iowa test and the grade point average were used to classify the students in the 1954 sample into four groups. The four groups were: high ability and high achievement (HH), high ability and low achievement (HL), low ability and high achievement (LH), and low ability and low achievement (LL).

An item analysis of the responses to the Gough Adjective Check List of the four ability-achievement groups of the first sample was performed. Six scales were derived, one to differentiate each of the possible comparison groups (HH-HL, HH-LL, HH-LH, LL-LH, LL-HL, HL-LH). Of the six scales, two

were designed to measure ability but not achievement (HH-LH and LL-HL). Two of the scales were designed to measure achievement but not ability (HH-HL and LL-LH). The other two (HH-LL and HL-LH) were designed to be confounded measures of ability and achievement.

The Gough Adjective Check List was scored on the second sample for the six new scales. A matrix of correlations involving these six scales, the Iowa test, and grade point average was developed.

In addition, an attempt was made to describe the four achievement-ability groups in terms of self concepts as measured by the Gough Adjective Check List.

Within the limits of the sample used, the following conclusions appear warranted:

1. The six indices had disappointingly low reliabilities as estimated by the Spearman-Brown prophecy formula. These ranged from .46 to .83. Three of the six reliabilities were estimated to be below .60.

2. The indices designed to be related to achievement but not to ability (HH-HL and LL-LH) failed to correlate significantly with either.

3. Suppressor indices (HH-LH and LL-HL) showed tendencies to behave in the expected manner, though neither correlated high enough with the Iowa test to offer strong encouragement along this line.

4. One of the indices designed to be related to both ability and achievement fulfilled this expectation fairly well (HH-LL). The other HL-LH) appeared to be functioning as a suppressor since it correlated significantly with the Iowa test but insignificantly with grade point average.

5. When relationships between the members of each pair of scales designed to contribute to a single aspect of the prediction problem were examined, only low correlations were found. Further research is needed to

clarify this finding.

6. A combination of the most promising of the special indices with the Iowa test failed to produce a significant improvement in predicting grade point average.

7. Low achievers had a pronounced tendency to describe themselves negatively, i.e., by what they're not. High achievers tended more often to describe themselves positively.

8. While the specific results of this study failed to contribute to the problem of predicting academic achievement, the approach appears sound enough to recommend continued efforts in the same direction.

ACKNOWLEDGMENTS

The writer is deeply indebted to Dr. Donald P. Hoyt, major instructor, for help and encouragement throughout this undertaking.

A special gratitude goes to Dr. A. H. Brayfield, head of the Psychology Department, Kansas State College, for the opportunity to work on this investigation and for assistance in planning and organizing the study.

To Dr. Arlin M. Feyerhern and Dr. Jack Northam go sincere thanks for their efforts in performing the statistical analysis of the data.

The staff members of the Student Counseling Center deserve thanks for the administration and scoring of the test material.

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APPENDIX

Table 1. Percentage of responses of HH, LL, LH and HL groups to the adjectives in the Gough Adjective Check List and the Appropriate Scale.

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
absent-minded	78.3	75.9	69.7	77.4	18.8	15.7	24.2	22.6	
active	20.3	13.3	21.2	16.1	78.3	85.5	75.8	83.9	
adaptable	21.7	19.3	21.2	19.4	73.9	74.7	72.7	74.2	
adventurous	18.8	21.7	24.2	16.1	76.8	72.3	69.7	83.9	
affected	49.3	43.4	48.5	54.8	24.6	37.3	33.3	25.8	
affectionate	23.2	30.1	18.2	25.8	71.0	62.7	81.8	71.0	E
aggressive	20.3	24.1	18.2	22.6	76.8	60.2	81.8	74.2	E
alert	11.6	19.3	18.2	22.6	82.6	78.3	81.8	77.4	
aloof	65.2	44.6	48.5	71.0	5.8	10.8	9.1	6.5	A,B,C,D
ambitious	8.7	7.6	9.1	16.1	78.3	83.1	66.7	83.9	E
anxious	34.8	22.9	12.1	35.5	60.9	69.9	87.9	64.5	E,F
apathetic	43.5	33.7	33.3	41.9	18.8	15.7	21.2	12.9	
appreciative	13.0	16.9	18.2	16.1	81.2	67.5	66.7	83.9	A,C
argumentative	44.9	43.4	36.4	48.4	46.4	38.6	57.6	41.9	E
arrogant	65.2	33.7	33.3	58.1	7.2	7.2	3.0	3.2	A,B,C,F
artistic	76.8	62.7	66.7	71.0	17.4	21.7	21.2	19.4	
assertive	30.4	34.9	30.3	41.9	27.5	8.4	27.3	12.9	A,E
attractive	55.1	48.2	33.3	51.6	39.1	44.6	60.6	48.4	F
autocratic	39.1	32.5	24.2	48.4	14.5	9.6	24.2	3.2	B,E
awkward	79.7	69.9	81.8	87.1	15.9	24.1	15.2	12.9	C
bitter	81.2	80.7	84.8	80.6	11.6	13.3	12.1	12.9	
blustery	68.1	53.0	63.6	64.5	10.1	9.6	18.2	6.5	A
boastful	78.3	74.7	69.7	80.6	14.5	18.1	24.2	16.1	
bossy	81.2	75.9	81.8	87.1	15.9	16.9	12.1	12.9	
calm	20.3	19.3	21.2	19.4	78.3	78.3	75.8	80.6	
capable	2.9	8.4	3.0	12.9	97.1	91.6	97.0	87.1	
careless	60.9	67.5	69.7	61.3	34.8	26.5	30.3	38.7	
cautious	23.2	19.3	21.2	25.8	73.9	79.5	75.8	74.2	
changeable	30.4	34.9	30.3	25.8	66.7	57.8	63.6	74.2	
charming	78.3	62.7	51.5	74.2	14.5	31.3	39.4	25.8	A,B,F
cheerful	24.6	19.3	21.2	9.7	73.9	79.5	78.8	90.3	D
civilized	4.3	3.3	9.1	9.7	95.6	86.7	90.9	90.3	
clear-thinking	20.3	25.3	27.3	22.6	78.3	71.1	69.7	77.4	
clever	56.5	54.2	60.6	54.8	37.7	34.9	33.3	45.2	
coarse	84.1	62.7	69.7	80.6	7.2	16.9	15.2	6.5	A,C
cold	84.1	74.7	81.8	90.3	7.2	13.3	9.1	9.7	C
commonplace	46.4	49.4	48.5	45.2	34.8	24.1	36.4	45.2	C
complaining	71.0	67.5	60.6	77.4	24.6	25.3	39.4	22.6	
complicated	73.9	65.1	78.8	74.2	17.4	18.1	12.1	19.4	
conceited	82.6	69.9	84.8	74.2	11.6	18.1	12.1	19.4	A,E
confident	30.4	41.0	30.3	35.5	66.7	53.0	66.7	64.5	
confused	82.6	59.0	75.8	74.2	8.7	36.1	18.2	22.6	A,E
conscientious	20.3	41.0	42.4	32.3	73.9	39.8	48.5	58.1	A,F

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (cont.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
conservative	21.7	26.5	33.3	38.7	76.8	69.9	60.6	61.3	
considerate	18.8	19.3	24.2	19.4	79.7	75.9	72.7	77.4	
contented	43.5	42.2	24.2	45.2	46.4	48.2	69.7	54.8	B,E,F
conventional	37.7	48.2	60.6	38.7	43.5	22.9	21.2	35.5	A,F
cool	63.8	49.4	51.5	41.9	33.3	44.6	45.5	58.1	D
cooperative	8.7	16.9	18.2	16.1	78.3	75.9	75.8	83.9	
courageous	36.2	32.5	33.3	38.7	55.1	60.2	60.6	61.3	
cowardly	78.3	81.9	72.7	90.3	17.4	15.7	21.2	9.7	
cruel	87.0	84.3	93.9	96.8	4.3	8.4	0	3.2	
curious	30.4	28.9	27.3	19.4	69.6	68.7	69.7	80.6	
cynical	60.9	42.2	60.6	54.8	7.2	2.4	3.0	12.9	A,E
daring	62.3	37.3	45.5	58.1	34.8	55.4	51.5	38.7	A,C
deceitful	73.9	62.7	81.8	77.4	11.6	10.8	6.1	6.5	E
defensive	40.6	45.8	33.3	48.4	55.1	48.2	63.6	51.6	
deliberate	31.9	62.7	54.5	45.2	63.8	28.9	42.4	51.6	A,C,F
demanding	71.0	67.5	54.5	77.4	24.6	26.5	39.4	22.6	B
dependable	15.9	13.3	18.2	22.6	76.8	78.3	72.7	77.4	
dependent	63.8	43.4	39.4	61.3	31.9	53.0	57.6	38.7	A,B,F
despondent	50.7	33.7	42.4	51.6	23.2	19.3	30.3	12.9	A
determined	7.2	12.0	15.2	16.1	92.8	83.1	81.8	83.9	
dignified	40.6	55.4	36.4	51.6	56.5	36.1	60.6	38.7	A,E
discreet	34.8	39.8	36.4	51.6	30.4	7.2	27.3	9.7	A,B,D,E
disorderly	71.0	69.9	69.7	80.6	24.6	26.5	27.3	19.4	
dissatisfied	69.6	61.4	48.5	64.5	24.6	36.1	45.5	35.5	F
distractible	55.1	61.4	42.4	64.5	29.0	22.9	36.4	25.8	B,E
distrustful	78.3	80.7	75.8	96.8	14.5	8.4	6.1	0	B,C,D
dominant	65.2	57.8	42.4	74.2	23.2	27.7	36.4	22.6	B,F
dreamy	50.7	54.2	42.4	58.1	46.4	39.8	57.6	38.7	E
dull	76.8	75.9	69.7	80.6	11.6	12.0	21.2	6.5	
easy going	27.5	26.5	15.2	16.1	72.5	69.9	84.8	83.9	E
effeminate	39.1	43.4	45.5	32.3	7.2	10.8	15.2	16.1	
efficient	21.7	24.1	18.2	16.1	68.1	60.2	66.7	77.4	
egotistical	60.9	31.3	57.6	51.6	8.7	8.4	9.1	12.9	A,C,E
emotional	52.2	38.6	45.5	32.3	37.7	49.4	45.5	61.3	A,D
energetic	20.3	19.3	27.3	9.7	78.3	71.1	60.6	83.9	B,F
enterprising	18.8	47.0	33.3	54.8	55.1	26.5	48.5	35.5	A,B,D,E
enthusiastic	20.3	30.1	24.2	19.4	75.4	63.9	75.8	77.4	
evasive	68.1	41.0	42.4	61.3	17.4	8.4	9.1	12.9	A,C,F
excitable	60.9	50.6	57.6	48.4	34.8	43.4	30.3	51.6	
fair-minded	21.7	24.1	30.3	22.6	75.4	72.3	60.6	74.2	
fault-finding	62.3	65.1	63.6	80.6	34.8	27.7	27.3	19.4	D
fearful	72.5	65.1	60.6	74.2	23.2	28.9	36.4	25.8	
feminine	76.8	74.7	69.7	87.1	18.8	19.3	27.3	12.9	
fickle	82.6	73.5	66.7	67.7	5.8	9.6	9.1	16.1	

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (cont.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
flirtatious	66.7	57.8	42.4	61.3	30.4	25.3	48.5	32.3	E,F
foolish	68.1	78.3	69.7	71.0	29.0	19.3	27.3	29.0	
forceful	68.1	56.6	54.5	80.6	29.0	38.6	42.4	19.4	B,C
foresighted	29.0	39.8	24.2	35.5	65.2	57.8	75.8	64.5	E
forgetful	53.6	50.6	51.5	45.2	44.9	45.8	45.5	54.8	
forgiving	13.0	12.0	9.1	6.5	85.5	86.7	87.9	93.5	
formal	76.8	63.9	60.6	80.6	17.4	28.9	33.3	19.4	B,C,F
frank	29.0	27.7	39.4	29.0	66.7	65.1	57.6	71.0	
friendly	15.9	14.5	12.1	16.1	82.6	84.3	81.8	83.9	
frivolous	58.0	42.2	42.4	51.6	13.0	7.2	15.2	16.1	A
fussy	82.6	83.1	78.8	87.1	14.5	10.8	15.2	12.9	
generous	21.7	20.5	24.2	32.3	76.8	74.7	75.8	67.7	
gentle	31.9	20.5	24.2	22.6	68.1	74.7	69.7	77.4	
gloomy	75.4	68.7	73.7	83.9	18.8	26.5	21.2	16.1	
good-looking	60.9	59.0	48.5	61.3	34.8	37.3	48.5	38.7	
good-natured	11.6	15.7	9.1	0	87.0	79.5	81.8	99.9	B,C
greedy	79.7	75.9	69.7	83.9	15.9	19.3	24.2	16.1	
handsome	69.6	59.0	36.4	58.1	26.1	37.3	60.6	41.9	E,F
hard-headed	68.1	62.7	54.5	45.2	27.5	31.3	39.4	51.6	C,D
hard-hearted	81.2	69.9	69.7	87.1	11.6	19.3	18.2	9.7	B,C
hasty	68.1	57.8	57.6	77.4	29.0	39.8	36.4	19.4	B,C
headstrong	69.6	65.1	60.6	67.7	24.6	27.7	27.3	29.0	
healthy	10.1	8.4	12.1	6.5	88.4	88.0	87.9	93.5	
helpful	20.3	16.9	24.2	22.6	78.3	80.7	69.7	77.4	
high-strung	81.2	79.5	81.8	71.0	14.5	16.9	9.1	29.0	B
honest	2.9	8.4	6.1	3.2	95.6	91.6	93.9	96.8	
hostile	87.0	75.9	75.8	90.3	1.4	8.4	9.1	3.2	C
humorous	37.7	30.1	30.3	35.5	60.9	66.3	69.7	64.5	
hurried	78.3	56.6	60.6	93.5	14.5	32.5	36.4	6.5	A,B,C,D,F
idealistic	43.5	55.4	48.5	74.2	42.0	33.7	48.5	22.6	B,C,D
imaginative	34.8	44.6	45.5	45.2	60.9	42.2	51.5	51.6	A
immature	73.9	72.3	87.9	87.1	20.3	24.1	12.1	12.9	E
impatient	50.7	44.6	39.4	48.4	43.5	53.0	60.6	51.6	
impulsive	69.6	62.7	57.6	64.5	21.7	16.9	30.3	29.0	
independent	30.4	44.6	30.3	35.5	62.3	43.4	57.6	61.3	
indifferent	59.4	66.3	54.5	67.7	36.2	26.5	45.5	32.3	E
individualistic	52.2	51.8	51.5	58.1	40.6	25.3	39.4	32.3	A
industrious	23.2	22.9	18.2	32.3	68.1	65.1	69.7	64.5	
infantile	76.8	49.4	75.8	80.6	7.2	8.4	0	3.2	A,C,E
informal	40.6	44.6	39.4	45.2	56.5	51.8	57.6	51.6	
ingenious	60.9	51.8	66.7	67.7	20.3	14.5	18.2	12.9	
inhibited	65.2	62.7	72.7	67.7	2.9	6.0	3.0	0	
initiative	40.6	50.6	36.4	45.2	53.6	26.5	51.5	48.4	A,C,E
insightful	62.3	59.0	63.6	67.7	23.2	18.1	18.2	16.1	

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (cont.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
intelligent	21.7	44.6	39.4	45.2	76.8	51.8	54.5	54.8	A,D,F
interests narrow	71.0	68.7	72.7	77.4	27.5	27.7	24.2	22.6	
interests wide	18.8	25.3	27.3	22.6	68.1	65.1	63.6	74.2	
intolerant	60.9	53.0	63.6	77.4	26.1	25.3	30.3	9.7	B,C,D
inventive	46.4	54.2	45.5	67.7	42.0	25.3	45.5	19.4	A,B,D,E
irresponsible	81.2	81.9	84.8	93.5	11.6	10.8	15.2	6.5	
irritable	66.7	66.3	66.7	67.7	29.0	25.3	30.3	32.3	
jolly	47.8	33.7	30.3	32.3	47.8	60.2	69.7	67.7	D,F
kind	8.7	6.0	6.1	12.9	89.9	90.4	93.9	87.1	
lazy	68.1	75.9	78.8	74.2	20.3	10.8	15.2	25.8	C
leisurely	40.6	51.8	57.6	54.8	59.4	37.3	42.4	45.2	A
logical	17.4	39.8	27.3	19.4	79.7	53.0	72.7	77.4	A,C,E
loud	79.7	80.7	69.7	67.7	15.9	14.5	27.3	32.3	C,D
loyal	18.8	25.3	21.2	19.4	81.2	74.7	78.8	80.6	
mannerly	27.5	30.1	27.3	35.5	71.0	69.9	69.7	64.5	
masculine	33.3	32.5	45.5	22.6	62.3	60.2	48.5	77.4	B
mature	33.3	30.1	36.4	38.7	65.2	66.3	57.6	61.3	
meek	75.4	74.7	75.8	74.2	20.3	14.5	15.2	22.6	
methodical	44.9	39.8	36.4	45.2	39.1	18.1	27.3	29.0	
mild	39.1	38.6	21.2	38.7	63.8	59.0	75.8	58.1	E,F
mischievous	46.4	44.6	48.5	41.9	53.6	51.8	51.5	54.8	B
moderate	24.6	47.0	36.4	58.1	71.0	50.6	60.6	38.7	A,D
modest	29.0	39.8	42.4	35.5	69.6	55.4	57.6	64.5	
moody	58.0	53.0	60.6	54.8	39.1	39.8	39.4	45.2	
nagging	75.4	74.7	75.8	80.6	20.3	18.1	21.2	19.4	
natural	23.2	31.3	21.2	25.8	66.7	59.0	60.6	67.7	
nervous	68.1	60.2	69.7	74.2	27.5	32.5	30.3	25.8	
noisy	73.9	69.9	75.8	64.5	21.7	24.1	21.2	35.5	
obliging	20.3	28.9	24.2	22.6	73.9	57.8	63.6	77.4	A,C
obnoxious	76.8	56.6	78.8	64.5	8.7	8.4	3.0	9.7	A
opinionated	50.7	37.3	51.5	29.0	20.3	18.1	18.2	35.5	B,C,D
opportunistic	36.2	36.1	24.2	41.9	52.2	34.9	69.7	41.9	A,B
optimistic	39.1	60.2	48.5	58.1	49.3	25.3	36.4	32.3	A
organized	40.6	37.3	39.4	41.9	58.0	59.0	57.6	54.8	
original	52.2	42.2	36.4	54.8	43.5	53.0	60.6	41.9	
outgoing	73.9	71.1	72.7	74.2	10.1	16.9	12.1	12.9	
outspoken	72.5	68.7	75.8	71.0	21.7	21.7	18.2	25.8	
painstaking	69.6	69.9	60.6	74.2	24.6	22.9	30.3	19.4	
patient	23.2	26.5	15.2	29.0	73.9	73.5	84.8	71.0	
peaceable	13.0	20.5	9.1	22.6	85.5	78.3	90.9	77.4	
peculiar	72.5	66.3	72.7	83.9	18.8	28.9	18.2	16.1	C
persevering	43.5	45.8	27.3	48.4	44.9	34.9	51.5	32.3	B
persistent	37.7	53.0	48.5	32.3	59.4	34.9	42.4	67.7	A,B,C
pessimistic	72.5	49.4	60.6	74.2	18.8	21.7	21.2	16.1	A,C

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (cont.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
planful	39.1	47.0	33.3	41.9	56.5	49.4	66.7	48.4	
pleasant	20.3	21.7	15.2	25.8	78.3	72.3	81.8	74.2	
pleasure-seeking	31.9	28.9	21.2	45.2	65.2	67.5	78.8	54.8	B
poised	68.1	60.2	51.5	67.7	24.6	28.9	39.4	32.3	
polished	73.9	65.1	60.6	67.7	20.3	24.1	30.3	29.0	
practical	14.5	21.7	21.2	19.4	81.2	74.7	72.7	80.6	
praising	52.2	50.6	33.3	38.7	46.4	45.8	63.6	61.3	F
precise	58.0	57.8	60.6	71.0	40.6	34.9	30.3	25.8	
prejudiced	69.6	73.5	69.7	71.0	24.6	13.3	27.3	25.8	
preoccupied	68.1	56.6	66.7	67.7	24.6	30.1	24.2	19.4	
progressive	27.5	30.1	24.2	38.7	65.2	63.9	69.7	61.3	
prudish	68.1	55.4	39.4	61.3	13.0	6.0	21.2	9.7	B,F
quarrelsome	78.3	78.3	78.8	87.1	14.5	13.3	9.1	12.9	
queer	82.6	84.3	78.8	96.8	5.8	4.8	3.0	3.2	B
quick	43.5	41.0	33.3	54.8	50.7	49.4	57.6	41.9	B
quiet	30.4	32.5	21.2	45.2	62.3	60.2	72.7	48.4	B,C
quitting	79.7	75.9	78.8	90.3	13.0	16.9	21.2	9.7	C
rational	66.7	67.5	66.7	64.5	27.5	14.5	18.2	25.8	
rattlebrained	78.3	78.3	75.8	83.9	17.4	15.7	18.2	12.9	
realistic	29.0	48.2	36.4	41.9	66.7	45.8	60.6	58.1	A
reasonable	13.0	16.9	24.2	19.4	85.5	78.3	72.7	80.6	
rebellious	85.5	81.9	75.8	80.6	7.2	7.2	18.2	16.1	
reckless	78.3	72.3	69.7	71.0	18.8	21.7	27.3	29.0	
reflective	59.4	65.1	60.6	74.2	27.5	20.5	33.3	16.1	B
relaxed	26.1	25.3	18.2	25.8	73.9	73.5	78.8	74.2	
reliable	15.9	14.5	21.2	16.1	84.1	83.1	78.8	83.9	
resentful	79.7	75.9	69.7	83.9	15.9	16.9	24.2	16.1	
reserved	36.2	57.8	48.5	71.0	58.0	32.5	42.4	35.5	A,B,D
resourceful	42.0	57.8	48.5	71.0	55.1	37.3	45.5	32.3	A,B,D
responsible	10.1	18.1	18.2	9.7	88.4	79.5	78.8	90.3	
restless	42.0	48.2	57.6	64.5	53.6	48.2	42.4	35.5	D
retiring	78.3	74.7	69.7	77.4	13.0	16.9	21.2	19.4	
rigid	69.6	73.5	63.6	74.2	24.6	22.9	30.3	22.6	
robust	59.4	65.1	69.7	67.7	26.1	10.8	15.2	22.6	A
rude	78.3	78.3	75.8	90.3	11.6	9.6	12.1	9.7	
sarcastic	75.4	66.3	72.7	83.9	23.2	20.5	18.2	16.1	C
self-centered	82.6	72.3	78.8	71.0	13.0	18.1	12.1	25.8	
self-confident	39.1	60.2	42.4	67.7	59.4	34.9	54.5	32.3	A,B,D
self-controlled	23.2	28.9	18.2	38.7	73.9	68.7	81.8	61.3	B
self-denying	59.4	66.3	60.6	77.4	34.8	22.9	33.3	16.1	D
self-pitying	81.2	83.1	81.8	87.1	14.5	9.6	15.2	12.9	
self-punishing	60.9	67.5	57.6	77.4	36.2	27.7	42.4	19.4	B
self-seeking	73.9	61.4	72.7	74.2	18.8	34.9	24.2	16.1	A
selfish	85.5	86.7	87.9	87.1	8.7	7.2	9.1	12.9	

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (cont.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
sensitive	31.9	48.2	39.4	38.7	60.9	45.8	48.5	58.1	A
sentimental	42.0	54.2	42.4	45.2	49.3	42.2	45.5	54.8	
serious	15.9	18.1	18.2	19.4	79.7	71.1	69.7	80.6	
severe	75.4	71.1	57.6	77.4	10.1	9.6	24.2	16.1	B,F
sexy	71.0	59.0	66.7	77.4	21.7	27.7	24.2	19.4	C
shallow	71.0	73.5	72.7	87.1	18.8	15.7	18.2	0	B,C,D
sharp-witted	56.5	55.4	57.6	71.0	37.7	39.8	42.4	22.6	B,C
shiftless	79.7	81.9	93.9	87.1	8.7	8.4	6.1	9.7	B
show-off	84.1	83.1	75.8	83.9	10.1	8.4	21.2	16.1	
shrewd	69.6	78.3	69.7	80.6	24.6	13.3	27.3	19.4	
shy	52.2	47.0	63.6	58.1	44.9	49.4	33.3	41.9	
silent	46.4	42.2	36.4	51.6	53.6	54.2	60.6	48.4	
simple	72.5	59.0	72.7	71.0	23.2	33.7	21.2	25.8	
sincere	23.2	32.5	21.2	32.3	69.6	63.9	75.8	67.7	
slipshod	65.2	61.4	60.6	67.7	15.9	7.2	15.2	12.9	
slow	71.0	57.8	69.7	74.2	21.7	31.3	21.2	25.8	
sly	72.5	68.7	72.7	93.5	20.3	26.5	21.2	6.5	C,D
smug	72.5	74.7	66.7	87.1	15.9	12.0	18.2	6.5	
snobbish	78.3	79.5	81.8	90.3	15.9	15.7	15.2	9.7	
sociable	21.7	36.1	21.2	32.3	76.8	61.4	75.8	67.7	A
soft-hearted	40.6	37.3	36.4	32.3	55.1	60.2	60.6	64.5	
sophisticated	72.5	62.7	63.6	80.6	21.7	19.3	33.3	12.9	B,C
spendthrift	79.7	77.1	57.6	74.2	14.5	16.9	60.6	25.8	B,E,F
spineless	79.7	77.1	81.8	96.8	13.0	4.8	6.1	0	B,C,D
spontaneous	63.8	59.0	69.7	64.5	15.9	8.4	18.2	22.6	
spunky	60.9	63.9	51.5	61.3	37.7	26.5	39.4	38.7	
stable	26.1	43.4	21.2	35.5	71.0	51.8	78.8	61.3	A,E
steady	20.3	39.8	18.2	25.8	72.5	53.0	66.7	74.2	A,C
stern	73.9	54.2	63.6	71.0	23.2	39.8	33.3	29.0	A,E
stingy	92.8	80.7	75.8	93.5	1.4	10.8	9.1	3.2	B,F
stolid	44.9	51.8	48.5	58.1	13.0	16.9	9.1	19.4	
strong	34.8	41.0	24.2	48.4	65.2	55.4	72.7	51.6	B,E
stubborn	59.4	67.5	51.5	74.2	36.2	27.7	45.5	25.8	B,E
submissive	65.2	69.9	60.6	64.5	15.9	3.6	12.1	12.9	
suggestible	62.3	50.6	39.4	61.3	36.2	42.2	54.5	32.3	B,F
sulky	76.8	78.3	63.6	87.1	14.5	8.4	21.2	9.7	B
superstitious	76.8	75.9	75.8	83.9	20.3	18.1	21.2	16.1	
suspicious	76.8	63.9	63.6	80.6	20.3	22.9	30.3	19.4	C
sympathetic	29.0	53.0	39.4	41.9	69.6	39.8	57.6	58.1	A,E
tactful	30.4	53.0	45.5	35.5	66.7	38.6	48.5	64.5	A,C
tactless	68.1	73.5	75.8	87.1	23.2	15.7	15.2	12.9	D
talkative	44.9	45.8	42.4	48.4	50.7	51.8	57.6	51.6	
temperamental	73.9	65.1	69.7	64.5	20.3	22.9	27.3	29.0	
tense	66.7	60.2	51.5	80.6	29.0	31.3	42.4	19.4	B,C

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

Table 1 (concl.)

Adjective	% Denying				% Endorsing				Scale*
	HH	LL	LH	HL	HH	LL	LH	HL	
thankless	84.1	84.3	87.9	96.8	10.1	8.4	6.1	3.2	
thorough	42.0	54.2	48.5	51.6	58.0	38.6	51.5	45.2	A
thoughtful	17.4	30.1	21.2	22.6	82.6	68.7	78.8	77.4	
thrifty	27.5	49.4	39.4	51.6	69.6	48.2	57.6	48.4	A,D
timid	76.8	71.1	75.8	83.9	21.7	21.7	18.2	16.1	
tolerant	27.5	56.6	36.4	38.7	69.6	37.3	54.5	58.1	A,C,E
touchy	81.2	73.5	75.8	87.1	13.0	20.5	18.2	12.9	
tough	82.6	74.7	75.8	77.4	10.1	21.7	18.2	19.4	
trusting	30.4	36.1	24.2	45.2	68.1	62.7	72.7	54.8	B
unaffected	75.4	73.5	72.7	80.6	17.4	18.1	24.2	16.1	
unambitious	75.4	79.5	81.8	90.3	17.4	13.3	15.2	6.5	D
unassuming	75.4	84.3	81.8	90.3	14.5	4.8	3.0	3.2	D
unconventional	72.5	68.7	75.8	77.4	13.0	2.4	12.1	9.7	
undependable	84.1	84.3	84.8	93.5	10.1	12.0	6.1	3.2	
understanding	21.7	25.3	24.2	16.1	75.4	73.5	72.7	83.9	
unemotional	85.5	84.3	78.8	93.5	10.1	9.6	12.1	6.5	
unexcitable	73.9	75.9	57.6	93.5	20.3	18.1	36.4	6.5	B,C,D,E
unfriendly	84.1	85.5	75.8	96.8	10.1	7.2	18.2	3.2	B
uninhibited	60.9	79.5	66.7	83.9	18.8	12.0	21.2	3.2	A,B,D
unintelligent	89.9	81.9	87.9	93.5	5.8	9.6	6.1	6.5	
unkind	92.8	89.2	90.9	99.9	2.9	6.0	3.0	0	
unrealistic	85.5	84.3	84.8	90.3	4.3	8.4	6.1	6.5	
unscrupulous	69.6	65.1	54.5	77.4	8.7	7.2	12.1	9.7	B
unselfish	40.6	48.2	42.4	51.6	56.5	48.2	54.5	48.4	
unstable	89.9	86.7	75.8	93.5	4.3	6.0	15.2	0	B
vindictive	50.7	49.4	33.3	51.6	2.9	2.4	9.1	6.5	
versatile	30.4	55.4	33.3	48.4	56.5	21.7	42.4	32.3	A,D,E
warm	29.0	33.7	18.2	35.5	69.6	62.7	81.8	58.1	B,E
wary	72.5	73.5	60.6	74.2	17.4	13.3	21.2	22.6	
weak	79.7	79.5	72.7	90.3	15.9	15.7	24.2	9.7	B
whiny	87.0	83.1	84.8	96.8	2.9	2.4	3.0	0	
wholesome	36.2	55.4	42.4	48.4	59.4	37.3	54.5	45.2	A
wise	55.1	57.8	48.5	41.9	40.6	39.8	48.5	58.1	
withdrawn	78.3	81.9	84.8	90.3	13.0	8.4	6.1	3.2	
witty	69.6	68.7	69.7	71.0	24.6	22.9	18.2	29.0	
worrying	59.4	57.8	51.5	74.2	37.7	34.9	45.5	25.8	
zany	47.8	49.4	51.5	41.9	18.8	14.5	15.2	25.8	

*Scale: A=HH-LL C=HL-LL E=LL-LH
B=HL-LH D=HH-HL F=HH-LH

NON-INTELLECTUAL INDICES OF ACHIEVEMENT IN THE SCHOOL OF AGRICULTURE

by

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B. S., Kansas State College
of Agriculture and Applied Science, 1949

AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE COLLEGE
OF AGRICULTURE AND APPLIED SCIENCE

1956

The major goal of this study was to develop non-intellectual indices which would contribute to the prediction of academic achievement among entering freshmen in the curricula of the School of Agriculture. A secondary goal was to describe various groups of agriculture freshmen in terms of their self concepts.

Two groups of entering freshmen in the School of Agriculture at Kansas State College were involved in this study. The first group consisted of 247 freshmen who entered the School of Agriculture at Kansas State College in the fall of 1954. The second sample consisted of 184 freshmen who entered the School of Agriculture at Kansas State College in the fall of 1955. These groups were given standardized tests of aptitude, personality, interests, and attitudes as well as a biographical information form.

The Iowa Test #6 - Ability to Interpret Reading in the Natural Sciences was selected as the measure of ability and the first semester grade point average was considered as a measure of college achievement. The results of the Iowa test and the grade point average were used to classify the students in the 1954 sample into four groups. The four groups were: high ability and high achievement (HH), high ability and low achievement (HL), low ability and high achievement (LH), and low ability and low achievement (LL).

An item analysis of the responses to the Gough Adjective Check List of the four ability-achievement groups of the first sample was performed. Six scales were derived, one to differentiate each of the possible comparison groups (HH-HL, HH-LL, HH-LH, LL-LH, LL-HL, HL-LH). Of the six scales, two were designed to measure ability but not achievement (HH-LH and LL-HL). Two of the scales were designed to measure achievement but not ability (HH-HL and LL-LH). The other two (HH-LL and HL-LH) were designed to be confounded measures of ability and achievement.

The Gough Adjective Check List was scored on the second sample for the six new scales. A matrix of correlations involving these six scales, the Iowa test, and grade point average was developed.

In addition, an attempt was made to describe the four achievement-ability groups in terms of self concepts as measured by the Gough Adjective Check List.

Within the limits of the sample used, the following conclusions appear warranted:

1. The six indices had disappointingly low reliabilities as estimated by the Spearman-Brown prophecy formula. These ranged from .46 to .83. Three of the six reliabilities were estimated to be below .60.

2. The indices designed to be related to achievement but not to ability (HH-HL and LL-LH) failed to correlate significantly with either.

3. Suppressor indices (HH-LH and LL-HL) showed tendencies to behave in the expected manner, though neither correlated high enough with the Iowa test to offer strong encouragement along this line.

4. One of the indices designed to be related to both ability and achievement fulfilled this expectation fairly well (HH-LL). The other (HL-LH) appeared to be functioning as a suppressor since it correlated significantly with the Iowa test but insignificantly with grade point average.

5. When relationships between the members of each pair of scales designed to contribute to a single aspect of the prediction problem were examined, only low correlations were found. Further research is needed to clarify this finding.

6. A combination of the most promising of the special indices with the Iowa test failed to produce a significant improvement in predicting grade

point average.

7. Low achievers had a pronounced tendency to describe themselves negatively, i. e., by what they're not. High achievers tended more often to describe themselves positively.

8. While the specific results of this study failed to contribute to the problem of predicting academic achievement, the approach appears sound enough to recommend continued efforts in the same direction.