EFFECTIVENESS OF NEED MEASUREMENT IN IDENTIFYING STUDENT CHANGE IN A UNIVERSITY

by

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INTRODUCTION

A current trend in institutions of higher education centers on the question "What impact does a university have on a student as a result of his four years of college experience?" In other words, does a university change a person (a) in some significant manner or (b) in a way that he would or could not have changed elsewhere? Most educators and administrators will readily admit that they hope the university does change the student. Current research and writings indicate that this "hope" must be constantly evaluated and assessed.

Sanford (1963) has made one of the most concise statements concerning this problem.

> "If we are interested in predicting change, in understanding change in college, we have to know a lot about the entering student; we have to know a lot about influential factors in the college environment, and we have to have theory that relates to these two kinds of factors." (p.198)

There has been a lot of research aimed in the direction of knowing "a lot about the entering student." There has been considerably less research directed at finding out "a lot about influential factors in the college environment."

In order to study "influential factors," the factors must first be identified and defined in terms of number, source, and amount of influence. Prior to this, however, it is most expedient to determine areas within the university where these factors are most likely to be found.

The focus of this study is upon one college character-

istic which may be a potential source of some of the influential factors in a college. This characteristic is the curriculum, through which a student comes in contact with the most serious and concentrated effort of the college to prepare him for a more successful adult life.

The major hypotheses are concerned with what happens to students in various curricular groups. The emphasis is not only upon what happens, but also what may happen in one group that does not in another. To these ends, the following section contains the ideas, research, and theories which are relevant to the questions asked and the instrument used in this study.

Review of the Literature

The following section deals with research that has been focused on change during a student's years in college. There have been major contributions to this area by Newcomb, Eddy, Sanford, Jacob, and several others.

One of the pioneer studies was that of Newcomb (1943) at Bennington College. He found that the greatest change occurred in the development of less conservative social attitudes by some of the students. The greatest contributing factor to this change appeared to be the development of close ties by students in faculty-student relationships and among students in certain peer groups.

Another of the significant studies in this area was conducted by Sanford (1956) in a longitudinal study at

Vassar. His main conclusions were that students did change in the direction of becoming more critical of ideas and positions, more flexible in their ability to approach problems, and freer to express emotions. There was also some indication that students generally became less stable.

Jacob (1957) collected and analyzed the results of over 380 studies of college students. After reviewing this literature, Jacob stated:

> "The main overall effect of higher education upon student values is to bring about general acceptance of a body of standards and attitudes characteristic of college-bred men and women in the American community." (p.4)

He goes on to say that "changes are rarely drastic or sudden" and that they are noted primarily in a student's "application of values," rather than in a change of a student's basic value system.

The general direction of the change that Jacob noted was towards a greater concern with status, prestige and achievement. He found that students felt more self importance and became more tolerant. His conclusion was that many of these effects normally attributed to education are simply the effects of maturation. Further he suggested that college experience may have some effect in later life; however, this is not supported to any extent by the data available at this time.

The conclusions reached by Jacob have been criticized primarily because of his attention to the group as a whole rather than stressing sub-groups which have shown a somewhat

greater change. Although the criticisms do appear to be valid, Freedman (1960) reports that there is substantial agreement with Jacob's view "that the effects of college upon attitudes and values are often minimal."

In a study conducted under the sponsorship of the National Merit Scholarship Corporation, Nichols (1963) investigated change in students who were Merit Finalists. His sample contained 432 boys attending 104 different colleges and 204 girls attending 86 different colleges. He identified six change factors: Diversity of Interest, Femininity, Extraversion, Anxiety, Dominance, and Superego. In correlating these with college characteristics, he found "that the affluence of the college relatively increased extraversion, and that the realistic (practical) emphasis in the college curriculum relatively increased anxiety in both sexes." He also found that a "business emphasis" tended to increase masculinity in girls.

It is obvious that Nichols studied a highly select sample in relation to the general college population. However, his findings with respect to a curriculum effect suggest the feasibility of using this dimension as a basis for further study.

In another study by Stewart (1964), eighty-nine students were followed over a four year period. Through the use of a multivariate analysis technique, he established that change had occurred and that it was largely attributable to the impact of the college on students.

A study by Heath (1959,1964) also suggests that college has an impact on students. He followed thirty-six Princeton undergraduates for a four-year period as their advisor. The primary source of his information was interview data and the results of small group discussions with the students. He found that all of the students became more mature; in addition, he found that a small group became less self centered, more compassionate, and more distinct as individuals. This latter group he named "The Reasonable Adventurers." Although Heath's approach appears to lack in experimental glamour, the outcomes are useful as additions to the present understanding of student change during college.

In summary, then, there is reason to believe that college does bring about change in students, but the amount of change is small. It has been suggested that approaching the question of change with smaller, more homogeneous groups may result in identifying more change in some groups and less in others.

Webster, Freedman, and Heist (1962) suggest an effect due to the different climate existing in each school of a university.

> "It seems reasonable to assume that each school within the institution would possess a somewhat different culture or intellectual climate that would affect students differently, at least in some ways." (p.837)

While this does seem to be a reasonable assumption, Newcomb (1943) and Jacob (1957) report that differential effects

among the major field of studies are minimal and that students have similar values and attitudes no matter which curriculum they pass through. For example, Jacob reports that those who take social science courses tend to redirect their academic and vocational interests but undergo no specific personality change. Hence, even those students who attend courses leading to the greatest possible chance for interaction, involvement, and understanding do not seem to utilize this opportunity to re-organize and re-orient their personal value and attitude systems.

There are several problems with the traditional studies in this area in relation to the present study. First, there has been primary emphasis on attitudes and values with personality characteristics inferred from these. Very little work has been done to explore the effects of college directly on students' personalities. Although attitudes and values are certainly a significant aspect of what one uses to interact with his environment, there are other facets which are equally important. It is suggested that some of these aspects may be more sensitive to the effects of college than attitudes and values.

There has been a trend for most of this type of research to be done in highly select schools, i.e., Vassar, Bennington, Princeton, and Stanford. It is tenuous to say that students in these schools are representative of the "average" American college student. Additional information is needed from colleges such as state supported universities

and colleges.

And finally, there has been some evidence (Jacob, 1957, Nichols, 1963) suggesting that more homogeneous college environments have greater effect on students and change. This is particularly true where there exists an "espirit de corps" in the college with which students are able to identify and interact. This suggests that schools within the university may have a similar effect if their programs are compatable with students' needs.

For these reasons this study was selected. It employs an instrument which attempts to identify psychological needs of students rather than attitudes and values. The sample is from a large, state supported, mid-Western university. The background of the students is primarily related to agriculture and agricultural services. And the grouping of students does not follow the traditional use of curricula or of academic schools. Instead, a system of grouping curricula into more homogeneous groups is used to study the presence of change.

There has been some work using the Edwards Personal Preference Schedule (EPPS, the instrument used in this research) in studying various colleges and groups within a college. Most of this has been with freshmen and/or developing normative data (Satz and Allen, 1961; Krug and Moyer, 1961; Appley and Moeller, 1963; Singh, Huang, and Thompson, 1962; Kennedy, Cottrell, and Smith, 1964; Koons and Birch, 1964).

Others have used the EPPS to study college students on dimensions such as achievement (Bendig, 1958; Goodstein and Heilbrun, 1962) and under- and overachievement (Gebhart and Hoyt, 1958; Krug, 1959).

Another body of information has been developed concerning people and occupations using the EPPS. Among these studies, those by Izard (1960), Navran and Stauffacher (1958), and Gray (1963) are examples of studies which have studied differences among college graduates after they have been employed for a period of time in their fields. Gray, for example, studied fifty accountants (CPA's), fifty secondary teachers, and fifty mechanical engineers. He found no significant differences between the group of accountants and engineers. There were differences between the teachers and accountants with the teachers scoring higher on the needs for Deference, Affiliation, Intraception, Abasement, and Nurturance and accountants higher on the needs for Achievement, Exhibition, Dominance, and Endurance. In comparison to engineers the teachers scored higher on the needs for Affiliation, Intraception, Succorance, and Nurturance and engineers higher on Achievement, Order, Dominance, and Endurance.

However, there is a notable lack of information using the EPPS to assess change between the time a student enters as a freshman and when he graduates.

In a study by Izard (1962) the EPPS was administered to 134 men and women as freshmen and as seniors in the

schools of Arts and Sciences (n = 28 men; 24 women), Engineering (n = 63), and Nursing (n = 19) at Vanderbilt University. He noted that the direction of change was generally consistent among the groups and was particularly so across like-sex groups. He found consistent changes across groups in decreased needs for Abasement and Deference and increased needs for Autonomy, Aggression, and Heterosexuality. He interpreted these results as being consistent with those reported by Sanford in his Vassar studies. He also suggested that, in part, these changes reflected "personality development in the direction of social and emotional maturity."

The study by Izard (1962) was the only research which was found using the EPPS to identify change during college. Although the results which he reports are extremely useful in studying change, his sample is small and there are limitations due to questionable representativeness of part of his sample.

In summary, then, the purpose of this study is to add to the growing body of knowledge regarding change in college by investigating the presence of differential changes in several groupings of curricula.

Statement of Hypotheses

The hypotheses are divided into three groups; the first dealing with the representativeness of the sample, the second concerning the profile differences between men and

women, and the third with curricular group differences.

The following hypotheses are tested to provide basic information concerning the research group in relation to the population from which it was drawn.

I. H_o: There are no differences between psychological needs, as freshmen, of those students who persist to graduation and those who do not (i.e., withdrew or dismissed).

II. H_o: There are no differences between psychological needs, as freshmen, of those students who eventually graduated and responded to the request to take the retest, and those who graduated but did not respond to the request.

III. H_o: For those students who had taken the retest, there are no differences between psychological needs, as freshmen, of those who persisted in the same curriculum to graduation, and those who changed curricula one or more times before graduation.

The hypotheses to be tested concerning relative psychological needs of men and women during their college years are as follows:

IV. H_o: There are no changes in the relative psychological needs of male students between their freshmen and senior years.

V. H_o: There are no changes in the relative psychological needs of female students between their freshmen and senior years.

VI. H_0: There are no differential sex changes in relative psychological needs between freshmen and senior years.

The third group of hypotheses is concerned with curricular groups (major fields of study).

VII. H_0: For those students who had taken the retest, there are no differences among psychological needs, as freshmen, among the curricular groups being considered.

VIII. H_0: When the sample is divided by sex, there are no changes in the relative psychological needs of students between their freshmen and senior years within the curricular groups being considered.

IX. H_0: When the sample is divided by sex, there are no differential changes between curricular groups in the relative psychological needs of students between their freshmen and senior years.

PROCEDURES

This chapter describes the sample studied, the instrument used to measure psychological needs and procedures for collecting data. In addition the statistical tests used and difficulties related to their use with data such as those in this study are discussed.

Sample

A total of 2,639 students completed the Edwards Personal Preference Schedule in 1956 and 1957 as freshmen; 1,840 men and 799 women. Of this group 1,202 (869 men; 333 women) students eventually graduated and 1,437 (971 men; 466 women) did not graduate. All students included in the research group in this study did graduate.

The research group was selected on the basis of two criteria: (1) they responded to the request to take the retest as seniors and (2) their data were complete. There were 354 men and 166 women (a total of 520 students) who met these criteria, and consequently, became part of the research group. In other words, the sample contains 41% of the men and 50% of the women who eventually graduated and had taken the test as freshmen.

There are several difficulties created by selecting a sample in this manner. These will be discussed in the Results and Discussion chapters as they bear on specific questions.

Instrument

The Edwards Personal Preference Schedule (EPPS) is a forced choice personality test. There are a total of 225 items with two alternatives for each item in the test. The subject is asked to answer each item by selecting the alternative which is more characteristic of what he likes or feels. He is also asked to "make a choice for every pair of statements; do not skip any." Each pair of statements has been "scaled for degree of social desirability by the method of successive intervals." (Edwards, 1959)

The EPPS provides measures of 15 personality variables which are derived from a list of manifest needs suggested by Murray (1938). The names of these variables and their definitions are listed in Appendix I.

Each scale on the EPPS is made up of 14 items with a maximum of 28 possible points for each scale. In other words, a statement representing a particular personality variable is paired twice with statements representing each of the other 14 variables. There are a total of 210 items which account for a particular profile for each person. The other 15 items provide a measure of test consistency and do not contribute to scores on the personality variables.

It should be noted that the EPPS is ipsative in nature. When a choice is made on each item, the selection of one alternative necessarily means that the other is rejected. In other words, a high score on one scale must occur at the

expense of a correspondingly low score on another scale or scales. The average score over the 15 scales for any profile will always be 14 points. The ipsativeness of the test creates several difficulties both in the analyzing and interpreting of the data. These will be discussed as they are encountered in the text.

Data Collection

The EPPS was administered to freshmen who entered Kansas State University in the fall semester of the 1956-57 and 1957-58 academic years. All students who were given the test as freshmen and who were in school in the 1960-61 and 1961-62 school years were contacted through an academic dean's office. They were sent a letter (Appendix II) requesting that they come to the Counseling Center and take some tests "which they first took when they were freshmen." There was no stipulation that a student must do this; it was only on a volunteer basis. The EPPS was re-administered to those students who responded to the request. The students did not receive pay for their time on either testing.

There were several conditions that might have influenced performance on either the original testing or on the retest. Although no one was forced to take the test against his will as an entering freshman, there was certainly an implication that one should do this. The students were told at the time of the test, both original and retest, that they could see their results and talk them over with a counselor whenever

they wished to do so. Some students did accept this offer so that they would have had some knowledge of the test as they were retested later. Each of these conditions may have had some effect upon the student's motivation, interest, and involvement when they were tested, particularly on the retest as seniors. However, the implication that they should take the test when entering is a necessary one to get the original data, and the latter conditions were necessary because of the professional ethics of the people involved in the study. Although these conditions were present and could possibly have had some effect upon the test results, it is quite probable that the effects were slight and would tend to be obscured by the large number of people involved in the study.

Statistical Procedures and Problems

Each hypothesis was tested by an analysis of variance. Since there were unequal numbers in each group, an unweighted-means solution (Winer, 1962) was used.

The purpose of this study was to determine what relationship, if any, exists between the EPPS scales and the various groups on which data were available. The design, therefore, was not intended to predict an outcome or to demonstrate a causal relationship between the EPPS scores and the variables included in the study. No attempt was made to either (1) randomly select the sample or (2) randomly assign subjects to the various experimental groups.

The latter procedure was impossible to follow because of the lack of control over the conditions which resulted in the students being in a particular group. Hence, the analysis of variance was used to establish the presence or absence of real differences between the groups and not to determine the existence of a causal relationship.

The major difficulty encountered in using most statistical tests with personality test scores results from the nature of these test scores. The problem is with violating the assumptions of the scaling of these scores rather than violating the specific assumptions of the statistical test.

The most logical interpretation of the results of an analysis of variance is based on the assumption that the data are at least on an interval scale; i.e., the magnitude of the difference between 5 and 10 is the same as the difference between 15 and 20. However, on the need for Achievement on the EPPS, it is not possible to say that an interval between the scores of 13 and 15 represents the same amount of need as the interval between the score of 8 and the score of 10. It is also impossible to state that a score of zero on the need for Achievement represents zero need for an individual on this scale. In other words, using an analysis of variance on raw scores on the EPPS creates a problem from the start. How this affects the results and the usefulness of this statistic will be presented in the following paragraphs.

The data used in this study may be classified into three catagories: (1) raw scores for each of the fifteen EPPS scales, (2) change or difference scores for each of the fifteen scales, and (3) one composite change score for each person. The advantages and problems encountered with each of these forms as they pertain to the analysis of variance will be presented separately.

As was mentioned in the previous section, the EPPS scales are ipsative; i.e., a score on one scale is not independent of the scores on any of the other scales. Consequently, when the fifteen scales are used, the assumption of independent errors is not met. This difficulty combined with the scaling problems make the testing of raw scores for freshmen extremely difficult.

Since the knowledge of differences among the original scores is necessary to provide meaning to the hypotheses concerning change, an analysis was used in spite of the difficulties. Although the assumptions were not met completely, the test provides sufficient information concerning possible real differences that it is useful.[1]

The change or difference score is the value of the initial test score subtracted from the retest score. Although the score derived by this procedure has a true zero, the interval between any two sets of numbers cannot

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[1] Tukey, J. W. Personal Communication with Dr. Robert Haygood. May, 1966.

be equated in meaning with the same value for other scales or subjects. The assumption of independence of errors is not met with the fifteen change scores for each person, as was the case when using raw scores.

Therefore, the analyses using fifteen change scores for each person has much the same statistical difficulties as when raw scores were used. The primary advantage of using change scores is that more meaningful interpretations are possible because of the addition of a true zero in the scaling.

In addition to the problems which have been discussed, another problem arose when using this analysis with fifteen scores per person. No main effects can be computed for any treatments other than the profile effect. For example, when computing a main effect for sex, the fifteen scales are collapsed into one cell which results in the same value for both men and women; i.e., the sum of the fifteen scales for each subject is always 210. Consequently, a composite change score was calculated in order to determine the main effects.

A composite change score was defined as the squared sum of each of the fifteen change scores for each subject. All assumptions of an analysis of variance are met when the composite change score was used; i.e., the errors are independent as well as normally distributed with equal variances. The problem relating to the level of scaling did not change from that which was present for fifteen change scores per subject.

In summary, there are two main problems relating to the use of an analysis of variance on this data. The first deals with the level of scaling of the test scores, and the second deals with failure to meet the independence of errors assumption of the statistical test. The author has elected to accept the difficulties created by these for the following reasons: (1) no other statistical procedure appeared to provide more strength or meaning to the results without unduly magnifying the complexity of the issue, and (2) the analysis of the data was intended to aid the description of the groups, which the analysis of variance satisfactorily does.

RESULTS

Results of the statistical analyses and data relevant to each hypothesis are presented in the same order and groupings as the original statement of the hypotheses. The hypotheses and results will be reported along with a minimum of discussion. Chapter IV will present more extended discussion of the results.

Representativeness of the Sample

I. H_0: There are no differences between psychological needs, as freshmen, of those students who persist to graduation and those who do not (i.e., withdrew or dismissed).

A brief discussion of the boundaries of these groups will be given at this time before the results are presented. Those who were defined as graduates were freshmen who had graduated from or who were enrolled at Kansas State University by the end of the ninth semester after they started school, a total of 869 men and 333 women. These limits exclude those who (1) may have been out of school during the ninth semester but who later returned to graduate and (2) transferred to another school and graduated.

For the non-graduates the criterion of graduation from Kansas State University was also used; consequently, those considered as non-graduates for the purposes of this study

may have graduated from another college. This group contains students who withdrew or were dismissed at some time between their first and ninth semesters at Kansas State University, a total of 971 men and 466 women.

An analysis of variance (Appendix IV) yielded a significant F ($P < .01$) for graduates and non-graduates. Therefore, the hypothesis is rejected; there are differences between the profiles of those who graduate and those who do not.

The means, standard deviations, and differences between the means for these two groups are shown in Table I for men and Table II for women. Inspection of Table I indicates that the needs for Achievement and Dominance are higher for those men who graduated than for those who did not. There is a tendency for women who graduate to be slightly higher on the need for Dominance as can be seen from Table II. Therefore, the significance would appear to be accounted for by the two scales for men and one for women.

II. H_o: There are no differences between psychological needs, as freshmen, of those students who eventually graduated and responded to the request to take the retest, and those who graduated but did not respond to the request.

The 869 men and 333 women who were considered as graduates in the previous discussion were divided into two groups for the purposes of this comparison.

The students in the first group are ones for whom

Table I

Means, standard deviations, and mean differences on EPPS scores for graduates and non-graduates as freshmen.

GROUP I: 869 Male Graduates - Freshmen Scores

GROUP II: 971 Male Non-Graduates - Freshmen Scores

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	15.07	4.20	13.68	4.69	-1.39
DEF	12.55	3.74	12.16	4.20	- .39
ORD	11.42	4.48	11.22	4.57	- .20
EXH	14.22	3.92	13.56	4.42	- .66
AUT	13.17	4.37	12.57	4.70	- .60
AFF	15.11	4.41	14.91	5.01	- .20
INT	14.33	4.76	13.85	5.22	- .48
SUC	10.78	4.51	10.53	4.63	- .35
DOM	15.05	4.74	13.69	5.05	-1.36
ABA	15.51	4.89	15.19	5.42	- .32
NUR	13.88	4.69	14.29	5.25	.41
CHG	14.84	4.48	14.91	5.05	.07
END	15.27	5.17	14.54	5.83	- .73
HET	14.47	6.38	14.28	7.24	- .19
AGG	12.30	4.55	11.90	4.98	- .40

Table II

Means, standard deviations, and mean differences on EPPS scores for graduates and non-graduates as freshmen.

GROUP I: 333 Female Graduates - Freshmen Scores

GROUP II: 466 Female Non-Graduates - Freshmen Scores

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	13.18	3.87	12.28	4.11	- .90
DEF	13.09	3.33	12.27	4.00	- .82
ORD	10.85	4.15	10.55	4.70	- .30
EXH	14.77	3.46	14.37	4.07	- .40
AUT	10.57	3.77	10.87	4.39	.30
AFF	18.21	3.69	17.29	4.65	- .92
INT	16.59	4.24	16.78	5.30	.19
SUC	13.27	4.42	12.48	4.61	- .79
DOM	13.85	4.50	12.77	4.75	-1.08
ABA	17.49	4.15	17.23	5.18	- .26
NUR	16.26	4.00	16.25	4.80	- .01
CHG	16.18	4.31	16.29	4.99	.11
END	13.54	5.21	13.26	5.46	- .28
HET	12.03	5.37	12.00	6.02	- .03
AGG	10.05	4.26	10.30	4.54	.25

complete data were available for both the initial test and the retest. This group contains essentially all subjects who were retested; however, less than six percent were not included because the test was obviously not completed or the data were tabulated incorrectly and the original answer sheets were not available. The subjects omitted in this group were not included in the second group, which contains those students who did not respond to the request to return for the retest.

An analysis of variance (Appendix V) yielded a significant F ($P < .01$) for these two groups as well as for sex. Looking first at Table III for men, the greatest differences are noted on the needs for Deference (higher for retested graduates) and Heterosexuality (lower for retested graduates). However, the differences on the needs for Order, Affiliation, Abasement, Nurturance, and Endurance probably combined to contribute strongly to the overall significance level. The size of each difference for this latter group of scales is sufficiently small that it makes interpretation of these tenuous and difficult. Therefore, the primary emphasis has been placed upon the needs for Deference and Heterosexuality.

The results in Table IV for women indicate no apparent trends for women as there were for men. Consequently, the significance could be largely accounted for by the scales for the men.

III. H_o: For those students who had taken the retest,

Table III

Means, standard deviations, and mean differences on freshmen EPPS scores for graduates who were retested and who were not retested.

GROUP I: Graduated and Retested - 354 Freshman Males

GROUP II: Graduated But Not Retested - 515 Freshman Males

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	15.44	3.94	14.82	4.35	- .62
DEF	13.25	3.58	12.07	3.77	-1.18
ORD	11.98	4.61	11.04	4.34	- .94
EXH	14.15	3.55	14.26	4.15	.11
AUT	12.96	4.28	13.32	4.42	.36
AFF	15.64	4.26	14.74	4.47	- .90
INT	14.29	4.48	14.35	4.95	.06
SUC	10.81	4.38	10.75	4.60	- .06
DOM	14.67	4.53	15.31	4.86	.64
ABA	16.08	4.60	15.12	5.05	- .96
NUR	14.51	4.42	13.45	4.81	-1.06
CHG	14.67	4.25	14.96	4.63	.29
END	15.87	4.92	14.85	5.29	-1.02
HET	13.68	6.30	15.02	6.38	1.34
AGG	11.89	4.26	12.59	4.72	.70

Table IV

Means, standard deviations, and mean differences on freshmen EPPS scores for graduates who were retested and who were not retested.

GROUP I: Graduated and Retested - 166 Freshman Females

GROUP II: Graduated and Not Retested - 167 Freshman Females

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	13.03	4.07	13.32	3.65	.29
DEF	13.06	3.32	13.11	3.34	.05
ORD	10.87	4.19	10.83	4.12	- .04
EXH	14.81	3.62	14.73	3.29	- .08
AUT	10.84	3.80	10.29	3.73	- .55
AFF	18.40	3.56	18.01	3.82	- .39
INT	16.66	4.37	16.51	4.10	- .15
SUC	13.16	4.22	13.38	4.61	.22
DOM	13.86	4.45	13.85	4.54	- .01
ABA	17.61	3.89	17.38	4.40	- .23
NUR	16.01	4.21	16.50	3.78	.49
CHG	16.54	4.29	15.83	4.31	.29
END	13.50	5.13	13.57	5.28	.07
HET	11.89	5.43	12.16	5.32	.27
AGG	9.64	4.37	10.46	4.10	.82

there are no differences between psychological needs, as freshmen, of those who persisted in the same curriculum to graduation, and those who changed curricula one or more times before graduation.

The question concerning what differences may exist between students who persist in the same curriculum until graduation and those who change curriculums one or more times was directed only to the research group where test and retest information was available. These groups, containing a total of 354 men and 166 women, are subject to the same boundaries as described for Group I in the previous section.

The results of an analysis of variance indicate that there is no significant difference between those who persist in the same curriculum and those who change; hence, the hypothesis is accepted. This result was the same for both men and women (Appendices VI and VII).

Several trends are suggested by the data presented in Tables V and VI. Those men who remain in the same curriculum tend to score higher on the need for Endurance and lower on the need for Heterosexuality. Women, on the other hand, who persist in the same curriculum tend to score higher on the need for Nurturance and lower on the need for Autonomy.

Table V

Means, standard deviations, and mean differences on freshmen EPPS scores for graduates who persisted and changed curriculums.

GROUP I: Persisted in Same Curriculum to Graduation - 226 Male Freshmen
GROUP II: Changed Curriculum One Or More Times - 128 Male Freshmen

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	15.65	3.76	15.06	4.21	- .59
DEF	13.52	3.45	12.78	3.76	- .74
ORD	12.21	4.54	11.58	4.70	- .63
EXH	14.01	3.41	14.39	3.78	.38
AUT	12.88	4.44	13.10	3.98	.22
AFF	15.38	4.23	16.10	4.28	.72
INT	14.07	4.46	14.68	4.49	.61
SUC	10.68	4.23	11.06	4.62	.38
DOM	14.68	4.53	14.66	4.54	- .02
ABA	16.30	4.66	15.69	4.47	- .61
NUR	14.24	4.48	14.98	4.27	.74
CHG	14.53	4.45	14.92	3.85	.39
END	16.49	4.82	14.78	4.90	-1.71
HET	13.30	6.43	14.33	6.02	1.03
AGG	11.92	4.44	11.84	3.92	- .08

Table VI

Means, standard deviations, and mean differences on freshman EPPS scores for graduates who persisted and changed curriculums.

GROUP I: Persisted in Same Curriculum to Graduation - 97 Freshman Females
GROUP II: Changed Curriculum One or More Times - 69 Freshman Females

	GROUP I		GROUP II		MEAN
	M	SD	M	SD	DIFF
ACH	12.62	3.62	13.60	4.57	.98
DEF	13.05	3.24	13.08	3.42	.03
ORD	11.05	3.94	10.62	4.50	- .43
EXH	14.89	3.41	14.71	3.89	- .18
AUT	10.39	3.62	11.47	3.96	1.08
AFF	18.78	3.64	17.86	3.37	- .92
INT	16.42	4.28	17.01	4.47	.59
SUC	13.30	4.57	12.95	3.66	- .35
DOM	13.77	4.59	13.98	4.24	.22
ABA	17.99	3.68	17.07	4.10	- .92
NUR	16.49	4.34	15.34	3.91	-1.15
CHG	16.32	4.36	16.84	4.17	.52
END	13.44	5.08	13.59	5.20	.15
HET	11.57	5.82	12.33	4.78	.76
AGG	9.77	4.68	9.46	3.89	- .31

Differences Between Men and Women

(Note that no tables are presented in this section. The tables containing men and women's profiles also contain the profiles of curricular groups. Since the primary intent of this research is to study the effect of curricular groups, the tables have been placed in the Curricular group section.)

The following section is concerned with sex differences in psychological needs during college years. Since it has been reliably established that male and female profiles differ significantly (Edwards, 1959; Izard, 1962) no statistical tests were computed to test this difference. (The interested reader will note the significant F for all groups on the sex factor reported in the appendices.)

IV. H_o: There are no changes in the relative psychological needs of male students between their freshmen and senior years.

This hypothesis was tested by two statistical analyses. First an analysis of variance (Appendix VII) was computed for men only using a single change score for each person (a change score being the sum over the fifteen scales of the squared difference scores). Second, another analysis of variance (Appendix IX) was calculated using the fifteen difference scores for each person. Both analyses yielded a significant F ($P < .05$ using a single change score; $P < .01$ using the total difference profile of fifteen scales) indicating that there was change in the relative needs of men. Hence, the null hypothesis is rejected.

The average change for men is shown in Table IX,

column 8. An inspection of this table suggests that the majority of the significance can be accounted for by changes in the needs for Dominance (increase), Abasement (decrease), and Heterosexuality (increase).

V. H_0: There are no changes in the relative psychological needs of female students between their freshmen and senior years.

A separate analysis was not calculated for women. An analysis of variance computed for men and women combined (Appendix X) yielded a significant F ($P < .05$) on the sex factor. Inspection of Table X, column 12, indicates that at least two scales for women contribute to the overall significant change. These are the needs for Abasement and Heterosexuality.

The change which occurs in the relative needs for Abasement and Heterosexuality are in the same direction for women as for men. The magnitude of the change is similar for both sexes.

VI. H_0: There are no differential sex changes in relative psychological needs between freshmen and senior years.

An analysis of variance (Appendix XI) using the fifteen EPPS scales for men and women yielded a significant F ($P < .01$). Hence, men and women do change differentially with respect to their relative needs and the null hypothesis is rejected.

Inspection of Table X, columns 6 and 12, indicates

that the largest difference occurs on the need for Dominance. The magnitude of this difference was nearly two points, which is almost twice the size of the next largest difference.

Curricular Groups

Before presenting the data, it should be noted that the following hypotheses pertain to curricular groups and not to specific curricula (Engineering as a group rather than Electrical, Chemical, Civil, etc. separately). The purpose of combining related curricula into a single group was (1) to increase the size of each group for statistical purposes and (2) to reduce the number of groups as much as possible and retain meaningful catagories. This results in groups which are more easily dealt with in terms of analysis and interpretation. A more complete listing of what curricula are included in each curricular group is presented in Appendix III.

Since there were no women in the Engineering and General curricular groups in this sample, all analyses involving curricular groups are divided into two parts. The first analysis uses the four women's curricular groups and the four corresponding men's groups; i.e., this analysis is computed on the Business, Education, Humanities and Social Science, and Physical Science curricular groups. The second analysis includes only men's curricular groups; i.e., the four mentioned above plus the Engineering and General

curricular groups. There is a separate table presented for each of the analyses in each section on curricular groups. The first table includes all six curricular groups for men. The second table includes all four women's curricular groups and the four corresponding groups for men.

VII. H_o: For those students who had taken the retest, there are no differences among psychological needs, as freshmen, among the curricular groups being considered.

The analyses of variance for these groups yielded a significant F ($P < .01$) on the curricular group by profile interaction (Appendices IV and V). Hence, the freshmen curricular groups do differ significantly at some point or points on the profile.

In order to simplify the process of identifying what scales contribute most to the significance, the average score has been computed for each scale across curricular groups. Using this average as a base of comparison, the discussion of curricular groups will include scales on which the scale means for that group deviate most from this average.

In Table VII for men the greatest differences appear to be in the Engineering curricular group. The need for Nurturance is about 1.5 points less than the average, while the need for Endurance is approximately 1.7 points higher than the average. The Humanities and Social Science Group averages about 2.5 points higher than the average on the

Table VII

Means of EPPS Scores For Freshmen in Six Curricular Groups.
(Men)

	ENGR	BUS	ED	HUM & SOC S	PHYS SCI	GEN	TOTAL MALE	AVER MALE
	COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8
ACH	16.31	14.01	15.13	14.95	15.29	14.79	90.48	15.08
DEF	13.22	12.84	13.09	12.86	13.72	13.70	79.43	13.24
ORD	12.34	11.76	12.60	10.31	11.59	11.62	70.22	11.70
EXH	14.01	14.03	14.35	14.63	14.04	14.62	85.68	14.28
AUT	13.21	13.47	12.56	12.72	12.58	12.58	77.12	12.85
AFF	15.30	15.54	15.99	17.04	14.92	17.83	96.62	16.10
INT	13.61	15.21	14.25	17.40	14.18	13.87	88.52	14.75
SUC	10.36	12.23	11.86	9.49	10.55	10.20	64.69	10.78
DOM	14.26	14.96	14.39	14.72	15.49	14.87	88.69	14.78
ABA	16.04	15.62	16.21	15.81	16.46	16.16	96.30	16.05
NUR	13.54	14.54	15.23	15.45	15.07	16.16	89.99	15.00
CHG	15.27	13.70	14.25	15.95	13.95	14.91	88.03	14.67
END	17.03	14.41	15.15	13.27	15.92	15.95	91.73	15.29
HET	14.02	14.45	13.17	14.45	13.32	11.37	80.78	13.46
AGG	11.34	12.94	11.78	10.07	12.86	11.58	70.57	11.76

need for Intraception. The need for Heterosexuality is about 2.1 points lower than the average for the General Curricular group.

A brief inspection of Table VIII, columns 7 through 10 and 12, indicates that there are several more differences for women than for men. The Business group contains the greatest number of differences, all between 1.5 and 2.5 points different than the average. This group scored higher on the needs for Order, Succorance, and Endurance and lower on Exhibition, Dominance, and Heterosexuality. For the Education group the need for Dominance was about 1.5 points higher than average, and the need for Endurance was about 1.9 points lower. The Humanities and Social Science group scored 1.5 and 1.7 points higher than the averages on the needs for Intraception and Dominance, respectively, and 2 points lower on the need for Endurance. Finally, the Physical Science group scored 2.5, 1.6, and 2.0 points higher than the average on the needs for Achievement, Exhibition, and Endurance, respectively.

VIII. H_0: When the sample is divided by sex, there are no changes in the relative psychological needs of students between their freshmen and senior years within the curricular groups being considered.

Two analyses of variance were computed. First, an analysis of variance (Appendix X) of composite scores (one change score per person) for the four curricular groups for men and women yielded an insignificant F. Second, an

Table VIII

Means of EPPS Scores for Freshmen in Four Curricular Groups.
(Men and Women)

	MALE						FEMALE							
	BUS	ED	HUM & SOC S	PHYS SCI	TOTAL MALE	AVER MALE	BUS	ED	HUM & SOC S	PHYS SCI	TOTAL FEM	AVER FEM	TOTAL	AVER DIFF
	COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8	COL 9	COL 10	COL 11	COL 12	COL 13	COL 14
ACH	14.01	15.13	14.95	15.29	59.38	14.84	13.20	12.65	12.82	16.23	54.90	13.72	114.28	14.28
DEF	12.84	13.09	12.86	13.72	52.51	13.13	12.00	13.30	13.15	11.99	50.44	12.61	102.95	12.86
ORD	11.76	12.60	10.31	11.59	46.26	11.56	13.10	10.97	10.12	12.23	46.42	11.60	92.96	11.62
EXH	14.03	14.35	14.63	14.04	57.05	14.26	13.00	14.86	14.73	16.38	58.97	14.74	116.02	14.50
AUT	13.47	12.56	12.72	12.58	51.33	12.83	10.90	10.21	11.54	11.15	43.80	10.95	95.13	11.89
AFF	15.54	15.99	17.04	14.92	63.49	15.87	19.20	18.62	18.28	17.07	73.17	18.29	136.66	17.08
INT	15.21	14.25	17.40	14.18	61.04	15.26	15.30	16.03	17.79	15.99	65.11	16.28	126.15	15.77
SUC	12.23	11.86	9.49	10.55	44.13	11.03	15.50	13.68	12.26	12.61	54.05	13.51	98.18	12.27
DOM	14.96	14.39	14.72	15.49	59.56	14.89	10.10	14.20	14.37	12.15	50.82	12.70	110.38	13.80
ABA	15.62	16.21	15.81	16.46	64.10	16.02	19.10	17.79	17.06	18.07	72.02	18.00	136.12	17.02
NUR	14.54	15.23	15.45	15.07	60.29	15.07	16.40	16.21	15.95	14.84	63.40	15.85	123.69	15.46
CHG	13.70	14.25	15.95	13.95	57.85	14.46	17.30	16.17	17.43	13.76	64.66	16.16	125.51	15.69
END	14.41	15.15	13.27	15.92	58.75	14.69	16.80	13.01	12.92	16.84	59.57	14.89	118.32	14.79
HET	14.45	13.17	14.45	13.32	55.39	13.85	8.80	12.27	12.18	10.46	43.71	10.93	99.10	12.39
AGG	12.94	11.78	10.07	12.86	48.35	12.09	9.10	9.96	9.29	9.84	38.19	9.55	86.54	10.82

analysis of variance computed on men only with the two additional curricular groups did yield a significant F ($P < .01$) (See Appendix VIII).

Table X presents the scales for the first analysis. Although there were relatively large changes on several scales for most curricular groups, these changes were not sufficient to produce a significant F. The changes in the needs for Abasement and Heterosexuality, and in some cases, Dominance, indicate that further study and refined statistical procedures may lead to some significant, as well as interesting, results.

Table IX presents the scales of the six male groups used in the second analysis. Before looking at the table for men only, it should be kept in mind that four of these groups did not show significant change in the previous analysis. The fact that the six groups did show significant change may be explained in two ways; (1) when men and women were combined in the curricular groups, significant effects for men may have been canceled by the effects for women or (2) the two additional curricular groups contain the significant elements of change. It would appear that a combination of both of these factors resulted in the significance.

In Table IX the greatest change appears most consistently in the needs for Abasement and Heterosexuality for all male groups. The need for Dominance also showed a large amount of change for most of the curricular groups.

Table IX

Means of EPPS Change Scores For Six Curricular Groups.
(Men)

	ENGR	BUS	ED	HUM & SOC S	PHYS SCI	GEN	TOTAL MALE	AVER MALE
	COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8
ACH	.17	.93	- .78	1.10	1.01	.17	2.60	.43
DEF	- .49	-1.90	- .60	-1.36	-1.30	-1.41	-7.06	-1.18
ORD	- .21	- .70	-1.21	-1.90	- .99	- .33	-5.34	- .89
EXH	.23	.71	.53	.51	- .13	-1.29	.56	.09
AUT	- .09	- .37	- .39	2.64	.57	.30	2.66	.44
AFF	- .87	- .56	- .13	-2.63	- .35	-1.87	-6.41	-1.07
INT	.49	.02	1.65	- .59	.67	- .91	1.33	.22
SUC	-1.12	-2.60	-1.13	- .31	- .69	-1.95	-7.80	-1.30
DOM	4.15	3.59	2.12	2.91	1.39	1.80	15.96	2.66
ABA	-2.48	-3.11	-3.07	-3.59	-2.04	-2.37	-16.66	-2.78
NUR	- .69	-1.90	- .66	-2.31	-1.81	.21	-7.16	-1.19
CHG	.20	1.34	.61	-1.31	.74	- .33	1.25	.21
END	- .89	- .49	-1.17	-1.68	-2.03	1.67	-4.59	- .76
HET	2.47	3.06	4.02	5.01	4.53	4.76	23.85	3.98
AGG	.83	.73	.26	2.69	.39	1.21	6.11	1.02

Table X

Means of EPPS Change Scores for Four Curricular Groups.
(Men and Women)

	MALE						FEMALE							
	BUS	ED	HUM & SOC S	PHYS SCI	TOTAL MALE	AVER MALE	BUS	ED	HUM & SOC S	PHYS SCI	TOTAL FEM	AVER FEM	TOTAL	AVER DIFF
	COL 1	COL 2	COL 3	COL 4	COL 5	COL 6	COL 7	COL 8	COL 9	COL 10	COL 11	COL 12	COL 13	COL 14
ACH	.93	- .78	1.10	1.01	2.26	.56	-1.30	- .77	.58	- .38	-1.87	- .47	.39	.05
DEF	-1.09	- .60	-1.36	-1.30	-4.35	-1.09	.90	- .55	- .70	.31	- .04	- .01	-4.39	- .55
ORD	- .70	-1.21	-1.90	- .99	-4.80	-1.20	- .30	- .12	.10	- .30	- .62	- .16	-5.42	- .68
EXH	.71	.53	.51	- .13	1.62	.40	-1.60	- .07	- .21	-1.15	-3.03	- .76	-1.41	- .18
AUT	- .37	- .39	2.64	.57	2.45	.61	.20	.74	1.50	2.54	4.98	1.24	7.43	.93
AFF	- .56	- .13	-2.63	- .35	-3.67	- .92	-2.20	- .65	-1.59	-1.99	-6.43	-1.61	-10.10	-1.26
INT	.02	1.65	- .59	.67	1.75	.44	- .30	1.21	.22	2.77	3.90	.98	5.65	.71
SUC	-2.60	-1.13	- .31	- .69	-4.73	-1.18	-1.00	- .97	-1.25	- .92	-4.14	-1.04	-8.87	-1.10
DOM	3.59	2.12	2.91	1.39	10.01	2.50	2.00	.27	- .50	.39	2.16	.54	12.17	1.52
ABA	-3.11	-3.07	-3.59	-2.04	-11.81	-2.95	-3.70	-1.68	-2.43	-4.76	-12.57	-3.14	-24.38	-3.05
NUR	-1.90	- .66	-2.31	-1.81	-6.68	-1.67	- .10	- .50	-1.18	- .53	-2.31	- .58	-8.99	-1.12
CHG	1.34	.61	-1.31	.74	1.38	.34	1.30	.71	1.52	2.31	5.84	1.46	7.22	.90
END	- .49	-1.17	-1.68	-2.03	-5.37	-1.34	-2.20	- .88	- .46	- .99	-4.53	-1.13	-9.90	-1.23
HET	3.06	4.02	5.01	4.53	16.62	4.15	4.80	2.89	3.80	1.77	13.26	3.32	29.88	3.74
AGG	.73	.26	2.69	.39	4.07	1.02	1.80	.18	.54	1.01	3.53	.88	7.60	.95

The needs for Heterosexuality and Dominance were greater for seniors, and the needs for Abasement were less for seniors.

IX. H_o: When the sample is divided by sex, there are no differential changes between curricular groups in the relative psychological needs of students between their freshmen and senior years.

An analysis of variance (Appendix IX) yielded a significant F ($P < .01$) for men on the profile by curricular group interaction. Hence, the six male curricular groups did change differently at some point or points on the profile. The following presentation is based on those scales which deviate most (1.5 points or more) from the average change profile for all male groups combined (see Table IX).

Three curricular groups did not change differentially; Business, Education, and Physical Science. The Engineering group changed about 1.5 points more than the average on the need for Dominance and about 1.5 points less on the need for Heterosexuality. The Humanities and Social Science group showed more changes with greater than average changes on the needs for Autonomy and Aggression and less than average changes on the needs for Affiliation and Change. The General group changed about 2.4 points more on the need for Endurance.

An analysis of variance (Appendix XI) for women yielded an insignificant F for the profile by curricular

group interaction. However, the major trends will be presented in the Discussion Section to give the reader an idea of what tendencies were present for women.

DISCUSSION

The results were presented in the previous chapter. This chapter will discuss these results and some possible interpretations as they relate to the questions being investigated.

Representativeness of the Research Sample

There are several questions concerning the representativeness of the sample in this study and the extent to which the data can be generalized. The first is centered on the question, "To how many groups can these results be extended meaningfully?" As no attempt was made to include scores for students other than those who were enrolled in Kansas State University, it is speculative to say that these results will be applicable to any other campus. To the extent that other mid-western state universities have similar student bodies and campus environments, these results can be meaningful. However, this consideration is beyond the scope of this study. Therefore, the first limitation which must be placed upon the results is that they should be extended only to those students and conditions which exist or have existed on the Kansas State University campus.

The next question is, "To what extent may these data be applied to the current student body?" Since the sample of students used in this study were freshmen in 1956 and

1957, a legitimate criticism can be raised if the results are to be applied without qualification to students who enter in 1966 as freshmen. However, a comparison between freshmen who entered in 1956 and those who entered in 1957 indicate that there is little difference in the overall profiles for the two years. This obviously does not prove the legitimacy of extending these results to 1966 entering freshmen, but it does suggest that we may not make a serious mistake by suggesting that the trends are still present. This inference is supported not only by the previously stated comparisons, but also by the fact that students and campus environments are not noted for sudden changes in their characteristics (Sanford, 1962).

A third concern, which is actually a group of questions, deals more directly with the representativeness of the sample within the population from which it was taken. These questions will be considered at this time with a brief summary of the data which are relevant to each. The reader should keep in mind the previous discussion in Chapter II concerning the problems involved with the statistical treatment of these data as he reads the text.

Graduates vs. Non-graduates

The greater relative need for Achievement would be the most frequently expected difference for freshmen students that eventually graduate as opposed to those who do not; that is, would be expected to be the best predictor of

graduation. Since the difference exists for men and not for women, the possibility is suggested that women may earn a degree for reasons other than "getting ahead."

The greater relative need for Dominance in men who graduated than for those who did not may be viewed in at least two ways. First, looking at both the needs for Achievement and Dominance, one hypothesis is that these two elements in combination are needed to succeed in college; that is, not only a desire to succeed, but also to succeed as a leader in a position of power and authority. Or, looking at Dominance independently, those having a greater need to dominate may see a college degree as a requisite and, hence, be more motivated. The greater relative need for Dominance for women who eventually graduate would certainly support the hypothesis that this is a desire that contributes to probable success in college.

Therefore, the needs for Achievement and Dominance would seem to distinguish most significantly graduate men from non-graduates. The need for Dominance would appear to be the greatest distinguishing element for women.

Retest vs. No Retest

The basic question in this section is concerned with "How representative of all students who graduate are those students who returned for the retest as seniors?"

The higher score for men who returned for the retest on the need for Deference suggests that this group would

generally tend to respond to other's requests as they did for the retest. The lower score on Heterosexuality indicates that this group tends to be less interested in and less involved with members of the opposite sex.

The sex difference on the Deference scale suggests several things. The first and most obvious is that responding to such a request would be considered more "normal" for a woman than for a man. This hypothesis would be partially supported by the ratio of the sample size; i.e., one out of every two women that graduated returned for the retest while only one out of every two and one-half men did so. Other possibilities might be that men will differ generally from women in this aspect or that the differences occurred by chance.

The Deference scale would appear to be the most significantly distinguishing element between these profiles. Although the research group was different, the difference does not appear to be large or seriously affect further analysis and interpretation of the data.

Persist vs. Change in Curricula

The tendency for a higher need for Endurance and a lower need for Heterosexuality characterizes men who persist in one curriculum to graduation. This group might be described as having a "singlemindedness" about them to stick to a task without being affected by other desires, particularly women.

Women who persist tend to score higher on the need for Nurturance and lower on the need for Autonomy. This suggests that this group is more supportive and helpful toward others and also less independent while doing it.

Since the greatest difference might be expected to occur between those students who do not change curricula and those who do, no attempt was made to quantify the number of curricular changes. There may be some relationship between test scores and the number of times that a student changes curricula, but this possibility was not basic to the questions asked in this study. Another possible relationship may exist between this persist-change dimension and whether or not a student returned to take the retest. However, this question is also not basic to the main hypotheses of this study.

Although no significant differences were established between these groups, the trends suggest that there may be some value in pursuing the question further.

In summary of this section, it appears that the research sample is fairly representative of the 1956 and 1957 entering freshman classes, as freshmen, with the exception of two scales for men. Men who were retested as seniors tended to have, as freshmen, higher average scores on two of the fifteen scales (Deference and Heterosexuality) than those who were not retested. There were no significant differences, as freshmen, between women who were retested as seniors and those who were not.

Of additional interest are the data indicating that as freshmen, men who did not drop tended to have higher average Achievement and Dominance scores with women who did not drop being higher on Dominance only. Also, there were no significant differences on freshman scores between those who persisted and graduated in the same curriculum and those who changed curricula.

Men, Women and Change

It should be noted at this time that any significant changes that occur in this section, as well as any of the following sections, may result from a variety of factors. Although it is implied that a significance occurs as a result of attending college and being in a particular group, one must keep in mind that there are other possible sources from which the causal factors may come. While a previous discussion (pg. 15) was concerned with the correlational aspects of this study, this discussion involves some factors which may affect item choice in a more incidental way.

When a student selected an alternative as a freshman, he may have been under the influence of a different moral code or may have seen society's influence upon him in a different way than when he was a senior. For example, when a student as a senior selected a greater number of responses leading to a significantly higher score on the Hetero-sexuality scale, he may have done so because; (1) he did

in fact feel a greater relative need for heterosexual activities, and companionship, (2) he felt a greater freedom to express the same level of need, (3) he felt an increasing pressure from his peers and society to talk about and express such thoughts and experiences, or (4) because of a re-evaluation of his moral code and normal experience, he was better able to express the same level of need more effectively.

Although it is an implicit assumption to account for the change by the first reason (1), this may lead to highly erroneous conclusions on the part of the reader. If any of the latter three types of factors were operating to any extent, a significant difference may have resulted that was only slightly associated with the psychological need being considered.

Do Men's Profiles Change?

The following scales accounted for the majority of the significance of the change for men.

The relative need for Abasement became less. By the types of items that make up this scale, it would appear that, as seniors, men are less likely "to accept blame when things go wrong," "to feel guilty when one does something wrong," or "to feel inferior to others in most respects." In other words they are more secure in what they do and less immobilized by feelings of failure with what they are unable to do.

The relative need for Heterosexuality increased. In general, this indicates that these students are feeling a greater need to become involved with members of the opposite sex in ways which are reflected by the following items from the test: "I like to engage in social activities with persons of the opposite sex," "I like to participate in discussions about sex and sexual activities," and "I like to become sexually excited."

The relative need for Dominance increased. Therefore, men were more likely, as seniors, "to persuade and influence others to do what" they wanted, "to supervise and direct the actions of others," and "to argue for one's point of view."

The change seen for men has brought them closer to what is most commonly accepted as the adult masculine role in our society. The question of whether the EPPS measures how a person actually sees himself or if it measures how he would like to see himself takes on a special significance at this time. If we assume that the majority of the men answered this test on the basis of how they actually saw themselves at the time that they took each test, the significant changes which occurred suggest that these men were adequately equipped to enter and compete in the adult world. The male graduating senior was prepared to encounter his environment in a generally acceptable way.

On the other hand, if we assume that the majority of the men answered the tests in reference to what they saw as an ideal or desirable self, a different conclusion must

be considered. This assumption suggests that they became more aware of what was expected of them rather than equipping them with an actual need to respond to life in this manner. Whether the difference occurred as a result of an actual perceived change within each person, or it occurred as a result of an increased awareness of how they would like to see themselves change is not a direct concern of this study. In either instance it is obvious that something happened over the four-year span; i.e., there was change. And, though it may have been either a change in actual needs or only in how they saw themselves ideally, they were developing in the direction of equipping themselves to successfully encounter their environment on an accepted basis.

In summary there was a change in the needs of men between their freshmen and senior years; i.e., a decrease in Abasement and an increase in Dominance and Heterosexuality. However, as for all discussion concerning change, whether this in fact reflects an actual change in needs or a change for some other reasons is not clear.

Do Women's Profiles Change?

The change for women occurred on two scales with the Abasement score decreasing and the Heterosexuality score increasing. They became less willing to accept blame and more willing to engage in heterosexual activities.

The pattern for both men and women to become more

heterosexual and responsible for their actions may be interpreted in several ways. However, the most parsimonious is that they "grew up" a little during college. There is little reason to expect that their college experience had a significant effect on this maturing process; in fact, this change can be noted for most people in this age group.

There was change in women's profiles as well as in men's. The fact that the majority of this change is similar suggests that a university could probably have a greater impact on the study body as a whole where programs (i.e., co-educational living units and other socially oriented programs) were not segregated by sex.

Do Men's and Women's Profiles Change Differently?

Since the majority of the difference between these profiles occurs on the need for Dominance, the discussion will be directed primarily to this scale. It has been noted that men showed a definite increase for the need for Dominance while women showed essentially no change on this scale.

The meaning of this difference is obvious. Men express a gain in the need to dominate, to be "boss", and to control others. Typically, our society does not see as desirable, women developing or wanting to develop, a need for dominance. Consequently, the sex difference on the Dominance scale certainly is expected if not predictable.

The reader will recall (H_0 I) that women who graduate tend to have a slightly higher need for Dominance, as freshmen, than women who do not graduate. However, this need does not increase during the college years; i.e., college attendance at Kansas State University does not seem to nurture dominance needs. Further, the initial need is less for women than for men, and the men increased while the women do not.

A perennial question exists in our society concerning the effects of college on women. The concern is that higher education creates a change in women that makes them desire to be more of a "boss", particularly in marriage. However, these data suggest that women do not feel an increased need for dominance, particularly in relation to the increase for men. Since college educated women are likely to marry college educated men, these data do not support the contention.

Several other scales probably contributed to the overall significance level of the test, but the magnitude of the differences is small in comparison to that which was obtained on the Dominance scale. Taken separately these would add very little meaning to the present discussion due to their relative small size. And, taken together they add primarily confusion. Therefore, the reader may interpret or ignore these as he wishes.

A picture of the changes of students begins to emerge. The data from these last sections suggest that both men and

women change in Abasement (decrease) and Heterosexuality (increase). In addition, this section shows men, as opposed to women, also increase in Dominance. In the four years of college, students tend to show gains in confidence and security in what they do and to accept less blame for circumstances (lower Abasement), to want to be with members of the opposite sex more (increase in Heterosexuality), and for men to express more need for the dominant role (increase in Dominance).

Curricular Groups and Change

The reader will recall that the data relevant to this section were tested under three hypotheses. The first was concerned with the initial characteristics of the groups; i.e., as freshmen, the extent to which each group was dissimilar to the average profile. The second was concerned with the presence or absence of change over the four years for each of the groups. The third was directed at differential change; i.e., did any groups change differently than the others?

The present discussion deals with a composite of these sources of information. This section is divided into two major parts; the first dealing with the results for men and the second with women. For additional clarity, the discussion for each curricular group is presented separately. Each segment for men contains a summary table of the major differences. Since women did not show signifi-

cant change, no summary tables are included for their groups.

Men

Engineering. - As freshmen, the Engineering curricular group scored lower in comparison to the average male profile on the need for Nurturance and higher on the need for Endurance. At the time of the retest, they felt the greatest increased need for Dominance and Heterosexuality and a lower need for Abasement. In other words, they did not show the greatest change on the scales which they differed most on as freshmen.

Table XI

Significant Scales for the Engineering Curricular group. Summarized from Tables VIII & X

Scale	Initial Characteristic	Change	Differential Change
Nurturance	Low		
Endurance	High		
Dominance		Increase*	Greater+
Abasement		Decrease*	
Heterosexuality		Increase*	Less+

* A change of 2.0 points or more when retested as seniors.
\+ The amount of change for this curricular group is 1.5 points or more than the average change for all curricular groups on the scales indicated.

In comparison of the changes in the Engineering group with the average change for men, it is noted that this group had the greatest differential change on two scales. The relative need for Dominance changed almost 1.5 points more than the average, and the relative need for Hetero-

sexuality changed about 1.5 points less than the average. Hence, the Engineering group not only showed significant change in their relative need for Dominance, but also changed more on this need than men did on the average. This increase apparently occurred at the expense of the need for Heterosexuality which, while showing a large increase, increased less for this group than for men on the average.

Those students in this group might be characterized as needing to be in control of their environment. Their desire to operate in a position of authority is apparently stronger than the more usual desire to interact with women. This plus the other results suggest that their strongest needs are not for close interpersonal interaction and relationships, but instead, are centered more upon objects or processes in their environment. This orientation is similar to what other investigators (Roe, etc.) have found when describing the technological or engineering type of man.

In summary, the Engineering group started differently as freshmen and changed differently over the four years. The nature of the change appears to be consistent with what is generally known about this group.

Business and Education. - The Business and Education curricular groups are combined because of the similarities that exist in their scores. First, neither group differed in profile from the average male freshmen profile. Second,

Table XII

Significant Scales for the Business Curricular group.
Summarized from Tables VIII & X

Scale	Initial Characteristic*	Change	Differential Change+
Succorance		Decrease#	
Dominance		Increase#	
Abasement		Decrease#	
Heterosexuality		Increase#	

* No differences in initial characteristics.
\# An average change of 2.0 points or more when retested as seniors.
\+ No differential changes.

they showed similar change over the four year period. Third, neither group changed differently from the change profile for all men. Therefore, these two groups may be described in much the same way with only one exception.

Table XIII

Significant Scales for the Education Curricular group.
Summarized from Tables VIII & X

Scale	Initial Characteristic*	Change	Differential Change+
Dominance		Increase#	
Abasement		Decrease#	
Heterosexuality		Increase#	

* No differences in initial characteristics.
\# An average change of 2.0 points or more when retested as seniors.
\+ No differential changes.

Since these groups were basically the same as freshmen and in the fact that they did not change differently from the other curricular groups, the one distinguishing feature is concerned with the scales on which the greatest changes

have occurred within each of the two groups. Both the groups changed on the needs for Dominance, Abasement, and Heterosexuality. In these aspects they were similar to most of the other groups as well as to each other; i.e., the relative needs for Dominance and Heterosexuality increased and the relative need for Abasement decreased. In addition to these needs, the relative need for Succorance decreased for the Business group, a change which occurred in no other curricular group.

It would appear that the Business group differed from the Education group primarily on the basis of their need for contact and dependence on others. While both changed toward a greater need for leadership and heterosexual activities and a lesser need for accepting blame, the Business group changed toward a lesser need for encouragement from others. Therefore, one would expect that the Business group would not only persist when things were going wrong, but also persist longer without being provided a source of encouragement or support. A possible source for this orientation might be their ability to achieve this support more from the ongoing activity than from those around them. Their contacts with people would typically be more in a group setting, which provides less chance for close involvement and support. This is in contrast to the Education group where the orientation and structure is such that more encouragement and support is not only possible, but also rewarded.

In summary, these groups were quite similar in the needs being considered in this study. There did not appear to be any significant differential change for either group.

Humanities and Social Sciences. - This curricular group not only changed on more scales than any other group, but also had more differential changes than any other. There are some interesting changes that are special to this group only, and some interesting possibilities as to why these differences came about.

Table XIV

Significant Scales for the Humanities and Social Sciences Curricular group.
Summarized from Tables VIII & X

Scale	Initial Characteristics	Change	Differential Change
Intraception	High		
Autonomy		Increase#	Greater+
Dominance		Increase#	
Heterosexuality		Increase#	
Aggression		Increase#	Greater+
Affiliation		Decrease#	Less+
Abasement		Decrease#	
Nurturance		Decrease#	
Change			Less+

An average change of 2.0 points or more when retested as seniors.
+ The amount of change for this curricular group is 1.5 points or more than the average change for all curricular groups on the scales indicated.

As freshmen, this group differed from the average male profile on the need for Intraception. Their relative need was less which suggests that they had little desire to analyze or understand why they or others behaved or felt a

certain way. As a result, they were possibly more naive about the causes and results of what they did or saw others doing.

At the time of the retest, this group showed a significant increase in the needs for Autonomy, Dominance, Heterosexuality, and Aggression. They felt decreased needs for Affiliation, Abasement, and Nurturance. It is apparent from the number of changes that this group was actively involved with evaluation and re-evaluation of themselves and what they saw. They appear to have been much more actively involved with this process than any of the other curricular groups.

The outcome of this change is noted in the differential change for this group. They not only felt a greater relative need for Autonomy and Aggression, but this change was 2.2 points and 1.7 points more, respectively, than for the average male change. The relative needs for Affiliation and Change changed less, 1.6 and 1.5 points, respectively, than for the average male change.

As a result of their four years of experience, they had some rather striking changes in comparison with the other groups. They became more critical and independent; apparently, at the expense of becoming involved in friendships and being more structured and routine. These characteristics are most usually seen in the "critical thinkers" in our society; i.e., those who can systematically attack a question with relative objectivity. They would be

better able to function independently from the influences of those around them and not become extremely uncomfortable doing so.

There are two subgroups in our society that are similar to this. First, there is the reactionary who may appear in a picket line, on a soap box, or in a Greenwich Village setting. Although this curricular group has much in common with this cultural subgroup, at least one important factor would appear to be missing. This is the need for Exhibition; i.e., they do not appear to desire an audience or personal acclaim for their activities. Second, there is the social reform group which is actively engaged in questioning, evaluating, and doing something about the inconsistencies in our way of life. This group is composed of educators, writers, American Association of University Professors, etc. It would appear that the Humanities and Social Science group corresponds much more closely to this element and contribute strongly to the ongoing process.

In summary, this curricular group started differently, showed more changes, and changed differently in comparison to the other groups. They became more independent and critical, but their needs were in general directed toward people rather than objects.

Physical Science. - The Physical Science curricular group did not differ from the average freshmen profile. There were three scales which changed significantly.

However, this group did not differ from the average change profile for men.

Table XV

Significant Scales for the Physical Science Curricular group.
Summarized from Tables VIII & X

Scale	Initial Characteristic*	Change	Differential Change+
Abasement		Decrease#	
Endurance		Decrease#	
Heterosexuality		Increase#	

* No differences in initial characteristics.
\# A change of 2.0 points or more when retested as seniors.
\+ No differential changes.

The relative needs for Abasement and Heterosexuality changed in a similar way to the other curricular groups. The decrease in the relative need for Endurance was special to this group only.

It is surprising that any graduate in any curricular group would feel less desire to endure after four years of college. The students in this group would be expected to be more persistent not only because of the content, but also because of the competitiveness of their field. When considering that this relative decrease may have been at the expense of a greater need for heterosexual activities, a more logical interpretation is possible; i.e., the actual level of need may have changed very little, and the difference on the Endurance scale resulted from the nature of the test. There are other possible

interpretations of the data, but each has serious limitations in accounting for the change.

In summary, there was no differential change noted for the Physical Science curricular group. Although this group showed changes on three scales, these changes did not differ significantly from the average change for all groups.

General. - The General curricular group not only started differently and changed significantly, but also changed differently than the other groups on one scale.

Table XVI

Significant Scales for the General Curricular group. Summarized from Tables VIII & X

Scale	Initial Characteristic	Change	Differential Change
Heterosexuality	Low	Increase#	
Abasement		Decrease#	
Endurance			Greater+

An average change of 2.0 points or more when retested as seniors.
+ The amount of change for this curricular group is 1.5 points or more than the average change for all curricular groups on the scales indicated.

As freshmen, this group differed from the average profile on the need for Heterosexuality. They were the only group which felt a lower need for heterosexual activities. They changed significantly on their relative needs for Abasement and Heterosexuality, the two scales on which all groups changed significantly.

The General group changed differently than the average on the need for Endurance. Their relative change was about 2.4 points more than the average; indicating that in relation to the other groups, they felt a relatively greater need to persist or endure on a particular task or undertaking. One hypothesis which would account for this would be that in order to complete a general degree, one would have to be more task oriented, as well as focused on the completion of a task, than those who have a more defined goal for their behavior. In other words, while other groups could see individual courses in terms of specific vocational goals, those in a general curriculum could sustain good study habits and college work mostly in terms of doing and completing what was before them at the time. Other possible interpretations would involve the expectations under which this group worked or possibly poorly defined goals for their future.

In summary, those in the General curricular group were low on the need for Heterosexuality as freshmen and changed significantly on this scale as well as on the Abasement scale over the four year period. They changed differently than the other groups on the Endurance scale with a greater than average amount of change.

Women

The presentation for women's curricular groups is not based on a statistical significance. It is provided (1) for

the reader's interest and (2) to indicate the strongest trends of differences. Hence, it is more concise and less formal than the presentation for men.

Business. - Since the Business curricular group contained only ten subjects, even the trends are highly speculative. As freshmen, this group differed from the average female profile on six scales. On two of these, the needs for Dominance and Heterosexuality, they were significantly lower, and also changed 1.5 points more than the average change for women on these. In other words, they apparently made up for at least part of the difference in their profile during the four years.

Education. - The Education curricular group, as freshmen, were lower on the Endurance scale and higher on the Dominance scale. Their change on the Abasement scale was about 1.5 points more than the average change. This differential change of feeling relatively more need to feel guilty and accept blame when something goes wrong is a curious one. This almost suggests that those in an education curriculum are making up for a childhood where the blame was always on their shoulders. There are obviously other interpretations of this differential change which range from the possibility that this difference occurred by chance to the possibility this is a constructive approach to use when dealing with children.

Humanities and Social Science. - The Humanities and Social Science group profile suggests no trends in terms of how they may have differentially changed.

Physical Science. - The Physical Science curricular group, as freshmen, were higher than average on three scales. None of the three showed any tendency to change differently in comparison with the other groups. There was differential change noted on two scales, the needs for Intraception and Heterosexuality. The relative needs for Intraception and Abasement changed about 1.8 and 1.6 points more than the average, respectively, and the need for Heterosexuality changed about 1.6 points less than the average. While they feel a lesser need to become more involved with men, they have relatively more desire to analyze and understand what they do and why. This latter need would seem to evolve most directly from the lack of the need for the former. The trend of the differential change on the Heterosexuality scale is certainly unique not only for the female groups, but also for the male groups with the exception of the male Engineering group.

In summary, although there were no statistically significant changes or differential changes, there were some interesting trends suggested by the data. It may be a fruitful area for future research with further refinements in procedure.

IMPLICATIONS

The results of this study suggest that students at Kansas State University did change significantly during their college years. In addition, they changed differently in different curricular groups. These differential changes support the assumption of Webster, Freedman, and Heist (1962) that the culture unique to each school in a university affects students differently.

In comparison with the results reported by Izard (1962) at Vanderbilt there are some distinct similarities. As was noted by Izard, there was a tendency for all groups to show considerable consistency in the scales on which they changed. While the needs for Autonomy and Deference changed significantly in Izard's sample, they were relatively inactive for the sample in this study. There were similar consistent changes in the needs for Abasement and Heterosexuality in both studies. There were also similar changes in the need for Dominance for most of the male groups.

The similarity of results between these two studies is encouraging. The EPPS appears to be a useful tool as an instrument for studying change in college students. There are indications that students may be having some similar types of experiences, part of which may be accounted for by a maturing process, but part of which may be unique to their college experience. It would seem useful to this author to begin studying these latter experiences in depth

to better understand what effect the university has upon its students.

Curricular Group and Change

The following discussion focuses on some implications which appear to be particularly productive areas of exploration in relation to the results of this research. Since the major hypotheses of this study are concerned with curricular groups, the implications will be limited to two areas in which differential change was found. First, it was noted that three curricular groups showed no differential change while three others did change differentially. This section will pertain to this particular area. Second, one curricular group, the Humanities and Social Science group, showed differential change on the greatest number of scales. Some possible implications will be presented in a following section.

Do curricular groups seem to have varying impacts on students? Obviously, this question cannot be answered directly in a descriptive study such as the present one. However, some inferences can be drawn.

No significant differential change occurred for students majoring in Business, in Education and in the Physical Sciences. On the other hand, there were significant differential changes for Engineers, for Humanities and Social Sciences and for General majors.

Two interpretations are possible. One, the

differential changes in the latter three groups are a result of the characteristics of the students and such change would have taken place regardless of their college experiences. Second, the changes that occurred were the result of something about the courses unique to these differential-change majors, the instructors under whom they studied had some influence, or a combination of these two.

This second possibility seems a viable one as any college catalog states goals which are aimed at bringing about student change as a result of attending college. If colleges take seriously their stated objectives, they then should be interested in identifying conditions under which changes do or do not take place (Engineering, Humanities and Social Sciences, General curricula versus Business, Physical Sciences and Education curricula are suggested as possible conditions by this study) and then studying the different characteristics in the differing conditions.

Change in One Curricular Group

Do the changes in a particular group suggest the presence of special conditions for change? As was noted earlier, the Humanities and Social Science curricular group showed more differential changes than any other. A closer look at this group may provide some additional insight into the question of change.

Three major sources of influence for change seem to

be: (1) the student, (2) the courses, and (3) the faculty. Since this group was similar to others as freshmen, the latter two sources appear to be the most logical choices.

The courses in this area have two things in common. First, they deal with humans, life and the two in relation to each other. Second, they systematically deal with a historical account of how others have viewed this interaction. Consequently, an ideal condition for change is set up for the student who interacts with this material.

The faculty in this academic area is noted for its agitation for reform and change, particularly at Kansas State University, in relation to the faculties of the other curricular groups (i.e., Business and Engineering). Therefore, the student may change towards reflecting typical professorial characteristics as seniors.

Once again, if a university intends to have an impact on students and help them to change, a closer look at the conditions existing in this curricular group might provide some meaningful and useful information. In relation to what happened in other groups, this curricular group appears to be an excellent resource for further study.

Additional Factors

There are obviously many other uncontrolled conditions that may have been sources of significant influence. The differential effect which was noted between the sexes is a potentially useful factor to consider. Other factors may

include the effect of (1) whether the student transferred from another curricular group or remained in this one for four years, (2) whether the student was at Kansas State for four years or transferred from another college, or (3) where he resided as a student (i.e., dormitory, Greek house, apartment, or at home).

Further work must be done in studying the meaning of change for a given EPPS scale. This must include work in establishing the behavioral outcome and usefulness of what is being measured. This is an area that must encompass both the instrument as well as the university.

And, with possibly the greatest significance, the curricular group must be broken down into its member curricula. An obvious area for this would be the Humanities and Social Science group where the greatest activity has apparently occurred.

Each of these plus more must be investigated before a university can establish its effectiveness as a significant element in an individual's life.

SUMMARY AND CONCLUSIONS

A review of current research and trends in higher education suggests the need for more investigation of the impact of colleges on students and student development. The present study was designed to investigate the relationship between changes in student personality, as measured by the Edwards Personal Preference Schedule (EPPS), and major fields of study, as classified by curricular groups.

Of 2,639 students who completed the EPPS as freshmen, 1,202 graduated. Of those who graduated, 520 returned to take the test as seniors. The students were classified by curricular groups which resulted in six groups of men and four groups of women. The freshmen scores and change scores were analyzed by the use of an analysis of variance technique.

The sample was found to be representative of the larger group with few exceptions. Women tended to be more representative as a group than were men.

Both sexes showed significant changes with a decreased need for Abasement and an increased need for Heterosexuality. In addition men changed differently than women with an increased need for Dominance.

There were significant changes noted among curricular groups. The analyses revealed that male curricular groups not only changed, but also they changed differently; but women's curricular groups showed no change or

differential change. There was considerable consistency among all groups on scales which showed change; these were increased needs for Heterosexuality and Dominance and a decreased need for Abasement. Among the male curricular groups, the Humanities and Social Science groups showed the greatest number of changes.

Several interpretations of these data were presented and discussed in relation to the student and the university. Implications for further research were introduced and discussed as they pertain to the university environment.

The results of this research are similar to the findings of investigators at other universities. Although part of these changes can be accounted for by a maturing process, there is sufficient evidence of a curriculum effect to warrant further research in this area.

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APPENDIX I

Need Definition List

Ach (Achievement):	To be known as an authority on something, to accomplish something of significance, to be able to do things better than others.
Def (Deference):	To get suggestions from others, to follow the leadership of others, to do what is expected of you.
Ord (Order):	To like order, to aim for perfection in detail, to have things planned and organized.
Exh (Exhibition):	To be the center of attention, to make an impression, to have an audience.
Aut (Autonomy):	To be free to do what you want, to defy convention, to be critical of authority.
Aff (Affiliation):	To make many friends, to form strong personal attachments, to do things with friends rather than alone.
Int (Intraception):	To analyze oneself or other people, to understand why people behave as they do, to predict how others will act.
Suc (Succorance):	To want encouragement, have others interested in your problems, receive affection from others.
Dom (Dominance):	To dominate others, to be a leader, to influence others, to make decisions.
Aba (Abasement):	To accept blame when things go wrong, to feel guilty when one does something wrong, to avoid personal conflicts.
Nur (Nurturance):	To be helpful to others, to encourage others, to be affectionate toward others, to sympathize with others.
Chg (Change):	To do new and different things, to try a number of different jobs, to participate in new fads, to travel.

End (Endurance): To persist, to keep at a task until it is completed, to put in long hours of uninterrupted work.

Het (Heterosexuality): To date, to be interested in the opposite sex, to engage in social activities with the opposite sex.

Agg (Aggression): To be critical of others, to attack contrary points of view, to "get even" with others, to tell others what one thinks of them.

APPENDIX II

The following is the text of a letter sent to all seniors who had been tested as freshmen. The letter was reproduced on Dean's Office stationery of the student's academic college and signed by the Dean.

Dear Student:

This office is cooperating with the Counseling Center in an important research study concerning the development and change in certain student characteristics over a period of time. Students who entered Kansas State in 1956 are being asked to take two tests (interest and personality) which they first took when they were freshmen. About two hours will be needed.

Please fill out the enclosed card and return it to the Counseling Center within the next few days so that they can arrange to have the testing materials available.

We feel this project will be an important one and hope that you find satisfaction in participating. The Counseling Center has assured me that the results of these tests will be made available to you if you so desire.

Yours very truly,

APPENDIX III

Curricula contained in the curricular groups

Engineering

1. Chemical
2. Civil
3. Architectural
4. Agricultural
5. (All engineering and architecture curricula)

Business

1. Agricultural Economics
2. Business Administration

Education

1. Agricultural Education
2. Home Economics Education
3. Secondary Education
4. Elementary Education

Humanities and Social Science

1. Journalism
2. Humanities
3. Psychology
4. Philosophy
5. Sociology

Physical Science

1. Agriculture General
2. Entomology
3. Horticulture
4. Feed Technology
5. Milling Technology
6. Foods and Nutrition Research
7. Physics
8. Chemistry
9. Dietetics and Institutional Management
10. Home Economics and Nursing

General and other applied Home Economics

1. General Biological Science
2. General Social Science
3. General Humanities

APPENDIX IV

Summary of Analysis of Variance for Sex, Profile, and Graduate vs. Non-graduate (Freshmen scores)

SOURCE	df	SS	MS	F
SEX (S)	1	0.00*		
GRAD-NG	1	0.00*		
S x G	1	0.00*		
Ss / S x G	2635	0.00*		
Profile (P)	14	100,477.551	7,174.825	288.35* <.01
S X P	14	27,382.285	1,955.878	78.61* <.01
G x P	14	1,248.023	89.145	3.58* <.01
S x G x P	14	446.931	31.924	1.28
RESIDUAL	36,890	917,889.66	24.882	

*Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

APPENDIX V

Summary of Analysis of Variance for Sex, Profile and Retest vs. no Retest
(All students who graduated; Freshmen Scores)

SOURCE	df	SS	MS	F
SEX (S)	1	0.00+		
T2	1	0.00+		
S x T2	1	0.00+		
Ss / S x T2	1198	0.00+		
Profile (P)	14	44,370.869	3,169.348	143.69* <.01
S x P	14	13,618.356	972.740	44.10* <.01
T2 x P	14	686.940	49.067	2.22* <.01
S x T2 x P	14	619.201	44.229	2.01* <.05
RESIDUAL	16,772	369,935.430	22.057	

+Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

APPENDIX VI

Summary of Analysis of Variance for Curricular Group, Profile, and Persist vs. Change
(Male students; Freshmen scores)

SOURCE	df	SS	MS	F
PERSIST-CHANGE(PC)	1	0.00+		
CURR. GRP. (G)	5	0.00+		
PC x G	5	0.00+		
Ss / PC x G	342	0.00+		
Profile (P)	14	8,075.488	576.821	27.11* < .01
PC x P	14	294.997	21.071	0.99
G x P	70	2,077.152	29.674	1.39* < .05
PC x G x P	70	1,044.351	14.919	0.70
RESIDUAL	4788	101,888.01	21.280	

+Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

APPENDIX VII

Summary of Analysis of Variance for Curricular Group, Profile, and Persist vs. Change
(Female students; Freshmen Scores)

SOURCE	df	SS	MS	F
PERSIST-CHANGE(PC)	1	0.00+		
CURR. GRP. (G)	2	0.00+		
PC x G	2	0.00+		
Ss / PC x G	150	0.00+		
Profile (P)	14	7,281.748	520.125	27.06* < .01
PC x P	14	205.085	14.649	0.76
G x P	28	1,186.975	42.392	2.21* < .01
PC x G x P	28	686.678	24.524	1.28
RESIDUAL	2100	40,362.45	19.220	

+Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

APPENDIX VIII

Summary of Analysis of Variance for Curricular Group
(Male Students; One Change Score per Person)

SOURCE	df	SS	MS	F
Curr. Grps.	5	153,130.312	30,626.062	9.84* < .01
Ss / CG	348	10,829,431.77	3,111.906	

APPENDIX IX

Summary of Analysis of Variance for
Curricular Group and Profile
(Male Students; Change Scores)

SOURCE	df	SS	MS	F
CURR. GRPS. (G)	5	0.00+		
Ss / G	348	0.00+		
Profile (P)	14	9,412.435	672.317	27.39* < .01
G x P	70	2,464.361	35.205	1.43* < .01
RESIDUAL	4872	119,574.60	24.543	

+Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

APPENDIX X

Summary of Analysis of Variance for Sex and Curricular Group
(Eight of Ten Curricular Groups; One Change Score per Person)

SOURCE	df	SS	MS	F
SEX (S)	1	112,353.419	112,353.419	3.96* < .05
CURR.GRP. (G)	3	141,958.679	47,319.560	1.67
S x G	3	27,869.930	9,289.977	0.33
RESIDUAL	347	9,853,207.62	28,395.410	

APPENDIX XI
Summary of Analysis of Variance for Sex, Curricular Groups, and Profile
(Eight of Ten Curricular Groups; Change Scores)

SOURCE	df	SS	MS	F
SEX (S)	1	0.00+		
CURR. GRP. (G)	3	0.00+		
S x G	3	0.00+		
Ss / S x G	347	0.00		
Profile (P)	14	7,448.431	532.031	22.87* < .01
S x P	14	688.344	49.167	2.11* < .01
G x P	42	961.619	22.896	0.98
S x G x P	42	918.243	21.863	0.94
RESIDUAL	4858	113,013.36	23.263	

+Because of small rounding errors, these were not precisely zero in the analysis. Account of this fact was taken when computing the higher order interactions.

EFFECTIVENESS OF NEED MEASUREMENT IN IDENTIFYING STUDENT CHANGE IN A UNIVERSITY

by

DARYL DEAN JENKINS

B. S., Washington State University, 1962

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY
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A review of current research and trends in higher education suggests the need for more investigation of the impact of colleges on students and student development. The present study was designed to investigate the relationship between changes in student personality, as measured by the Edwards Personal Preference Schedule (EPPS), and major fields of study, as classified by curricular groups.

Of 2,639 students who completed the EPPS as freshmen, 1,202 graduated. Of those who graduated, 520 returned to take the test as seniors. The students were classified by curricular groups which resulted in six groups of men and four groups of women. The freshmen scores and change scores were analyzed by the use of an analysis of variance technique.

The sample was found to be representative of the larger group with few exceptions. Women tended to be more representative as a group than were men.

Both sexes showed significant changes with a decreased need for Abasement and an increased need for Heterosexuality. In addition men changed differently than women with an increased need for Dominance.

There were significant changes noted among curricular groups. The analyses revealed that male curricular groups not only changed, but also they changed differently; but women's curricular groups showed no change or differential change. There was considerable consistency among all groups on scales which showed change; these

were increased needs for Heterosexuality and Dominance and a decreased need for Abasement. Among the male curricular groups, the Humanities and Social Science groups showed the greatest number of changes.

Several interpretations of these data were presented and discussed in relation to the student and the university. Implications for further research were introduced and discussed as they pertain to the university environment.

The results of this research are similar to the findings of investigators at other universities. Although part of these changes can be accounted for by a maturing process, there is sufficient evidenceof a curriculum effect to warrant further research in this area.