THE PREDICTIBILITY AND FACTORED DIMENSIONS OF THE M-SCALES FOR ELEVENTH GRADE PAROCHIAL SCHOOL STUDENTS

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Mark K. Kipfmueller

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This is to certify that the

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Mark K. Kipfmueller

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Glenn W. Farquhar
Major professor

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By

Mark K. Kipfmueller

AN ABSTRACT OF A THESIS

Submitted to the College of Education,
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MARK K. KIPFMUELLER

This study was concerned with (1) the assessment of an experimental objective measure of motivation, the Michigan M-Scales, as a predictor of academic achievement for parochial school male and female eleventh grade students, and (2) a factor analysis of the male responses to the Generalized Situational Choice Inventory, a sub-scale of the M-Scales, to determine the underlying motivational structure of the parochial school student. The results of the factor analysis were then compared logically with a previous analysis based on a public school eleventh grade sample.

An aptitude test score (Differential Aptitude Test - Verbal Reasoning), grade point average, and scores on the four sub-tests and total M-Scales were obtained for each eleventh grade student from two Class B Michigan parochial schools in the Lansing and Jackson area. The mean scores for the male and female samples were compared with the mean scores from the public school sample studied by Farquhar. A regression analysis was conducted for both male and female sample to estimate grade point average when the M-Scales were added to the DAT-VR. Male responses to 22 selected items and 45 valid items of the GSCI were factor analyzed by the principal axis solution; the normal varimax method of rotation enabled an interpretation of the factors.

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In this study, significant mean differences were found in GPA and DAT-VR test scores in favor of the parochial school students. The parochial school male sample had higher mean scores in total score, GSCI and Word Rating List sub-tests of the M-Scales. Public school males had significantly higher mean scores on the Human Trait Inventory. The "t" test indicated significant differences in all but the Preferred Job Characteristics Scale mean scores. The parochial school female had significantly higher mean scores in the WRL. No significant differences were found for the other scales.

The regression analysis indicated that the precision of estimation of GPA was significantly improved when the GSCI, the WRL, and total M-Scales were added to the DAT-VR for both males and females. The HTI sub-scale also improved the precsion of estimation for females. The PJCS did not improve the precision of estimation for either males or females.

The factor analysis of the male responses to selected items of the GSCI indicated that although two factors were held in common by the public and parochial school samples, one factor was apparently unique to the parochial school student's motivational structure. The factors held in common were (1) unique versus common accomplishment, and (2) long-term versus short-term involvement. The factor unique to the parochial school sample was outer versus inner directedness. The public school male GSCI factor, competition with versus ease of meeting a standard, did not

appear as an identifiable factor for the parochial school students of this study. However, neither the unique nor the exclusion finding were given much weight because they most likely were traceable to the differences in rotational procedures.

It was concluded that the M-Scales have predictive validity for estimated grade point average of the parochial students of the sample.

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CHAPTER I

THE PROBLEM

Researchers have made great advances in the assessment of achievement and aptitude. There is agreement that academic motivation facilitates use of ability, but the exact nature of facilitation is unclear. To more completely understand academic achievement the need exists to understand academic motivation.

Attempts have been made by researchers to predict academic achievement in terms of intellectual factors. The studies by Scannell,[1] Garrett,[2] Juola,[3] Klugh and Bierly[4] are characteristic of this attempt.

Recent emphasis has been an attempt to relate non-intellectual factors to academic achievement, such as studies by Chahbazi,[5]

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[1] Scannell, Dale P., "Prediction of College Success from Elementary and Secondary Performance," Journal of Educational Psychology, 51, 1960, pp. 130-135.

[2] Garrett, Wiley S., "Prediction of Academic Success in A School of Nursing," Personnel and Guidance Journal, 38, 1960, pp. 500-503.

[3] Juola, Arvo E., "Predictive Validity of Five College Level Academic Aptitude Tests at One Institution," Personnel and Guidance Journal, 38, 1960, pp. 637-641.

[4] Klugh, Henry E. and Bierly, Robert, The School and College Ability Test and High School Grades as Predictors of College Achievement," Educational and Psychological Measurements, 19, 1959, pp. 625-626.

[5] Chahbazi, Parzi, "Use of Projective Tests in Predicting College College Achievement," Educational and Psychological Measurements, 20, 1960, pp. 839-842.

Hackett,[6] Ahmann,[7] and McClelland[8] where some relationship has been shown.

These studies point out the need for an objective measure of academic motivation not yet developed. The Michigan M-Scales is an attempt to meet this need.

Regardless of the approach used in the efforts to predict academic achievement, Farquhar[9] found the researcher fortunate if 50 per cent of the variance of the criterion scores was accounted for. Farquhar and his associates have demonstrated that it is possible to account for a large segment of the residual variance in predicting achievement. It was demonstrated that academic motivation increases precision in predicting academic achievement. However, the research of Farquhar, along with the studies previously mentioned, was restricted to public school students.

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[6] Hackett, Herbert, "Use of MMPI Items to Predict College Achievement," Personnel and Guidance Journal, 39, 1960, pp. 215-217.

[7] Ahmann J. Stanley; Smith, William; and Glock, Marvin, "Predicting Academic Success in College by Means of A Study Habits and Attitude Inventory," Educational and Psychological Measurements, 18, 1958, pp. 853-857.

[8] McClelland, D. (editor), Studies in Motivation, New York: Appleton-Century-Crofts, 1955.

[9] Farquhar, William W., A Comprehensive Study of The Motivational Factors Underlying Achievement of Eleventh Grade High School Students, Cooperative Research Project No. 846 supported by the U. S. Office of Education, in cooperation with Michigan State University, Final Report, 1963.

There is a need to study parochial school students to determine whether or not the M-Scales is applicable to this population and evaluate factors that seem to be a part of their motivational pattern.

Purpose of the Study:

The purpose of the study is to investigate the differential predictions and factored dimensions of an objective measure of academic motivation, the Michigan M-Scales, when applied to a sample of parochial male and female high school students. Not only was the study designed to measure the predictive efficiency of the M-Scales when applied to parochial school students, but also to study the underlying motivational structure by use of factor analysis. This seems particularly germane to this study because Farquhar and his associates have completed such an analysis of all the M-Scales for the public school sample.

Importance of the Problem:

According to Monsignor Frederick G. Hochwalt,[10] Director of the National Catholic Welfare Conference, Washington, D. C., the parochial school enrollment in 1961 consisted of 14 per cent of all children enrolled in elementary schools and nine and a half per cent of all high school students. In 2,376 secondary schools, there were 937,671 students; in 10,631 elementary schools, there were 4,445,288 students enrolled.

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[10] Hochwalt, Frederick G., "Catholic Education U.S.A. - 1963," The Catholic School Journal, 63, No. 1, January, 1963, pp. 12-14.

The image of the Catholic as a low achiever in intellectual activities is apparently changing. Low social class membership, ethnicity, and recent immigration have characterized American Catholics in many achievement studies.[11] Certain of these socio-economic variables do not appear to be relevant to the emerging picture of third and fourth generation Catholics in suburban America. The academic achievement of Catholic students and their general achievement orientation, reflected in their High School Inventory responses of Denny's study[12] do not parallel the low achievement picture of Catholic students in research studies such as the New Haven studies.[13]

The findings of Veroff, Gurin, and Feld[14] indicate that for Catholics n-Ach scores are negatively related to income and positively related to

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[11] Rosen, Bernard C., "Race, Ethnicity, and the Achievement Syndrome," American Sociological Review, XXIV, (February, 1959), pp. 47-60.

[12] Denny, Terry, "Achievements of Catholic Students in Public High Schools - II," The Catholic Educational Review, LX, October, 1962, pp. 442-469.

[13] McClelland, D., Baldwin, A., Bronfenbrenner, U., and Strodtbeck, F., Talent and Society, Princeton, New Jersey: D. Van Nostrand Company, 1958.

[14] Veroff, Joseph; Gurin, Gerald; Feld, Sheila; "Achievement Motivation and Religious Background," American Sociological Review, April, 1962, pp. 205-217.

family size. These findings were opposite to what McClelland, et.al.,[15] and Rosen[16] have found in previous research studies.

This study was conducted to provide additional knowledge relative to the academic achievement, aptitude and motivation of the parochial school student. With the rapid growth in enrollment of the parochial school in the past ten years it becomes increasingly important to understand the achievement and motivation underlying achievement of the parochial school student.

Theory:

McClelland[17] theorized that the need for achievement motivation may be indicated by the subject's responses to certain TAT cards. Interpretation is made on the basis of the subject's concern for long-term involvement, unique accomplishment, and competition with a standard of excellence.

Farquhar[18] polarized McClelland's theory by adding the constructs of short-term involvement, and common accomplishment. The third construct, competition with a standard of excellence, Farquhar adapted to include maximal and minimal competition. These constructs were viewed

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[15] McClelland, op. cit.

[16] Rosen, op. cit.

[17] McClelland, D., Atkinson, J., Clark, R. and Lowell, E., The Achievement Motive, New York: Appleton-Century-Crofts, 1953, pp. 110-113

[18] Farquhar, op.cit.

as being related specifically to the academic setting. Farquhar's theory assumes that the first three factors theorized by McClelland characterize the individual with the high n-Achievement, while the three factors added by Farquhar characterize the student who possesses the low n-Achievement. The hypothesized constructs of academic motivation are summarized in Table 1.1.

TABLE 1.1 SUMMARY OF A POLAR THEORY OF HIGH AND LOW ACADEMIC ACHIEVEMENT MOTIVATION.

High Academic Achievement Motivation	Low Academic Achievement Motivation
1. Need for Long-Term Involvement	1. Need for Short-Term Involvement
2. Need for Unique Accomplishment	2. Need for Common Accomplishment
3. Need to Compete with a Maximal Standard of Excellence	3. Need to Compete with a Minimal Standard of Excellence

From this theory, Farquhar and his associates developed the M-Scales, an objective measure of academic motivation which they hypothesized would increase the precision in predicting high school grade point average when added to an aptitude measure. The M-Scales is comprised of four sub-tests: (1) The Generalized Situational Choice Inventory which measures the student's need for academic achievement; (2) The Preferred Job Characteristics Scale which measures the occupational aspirations of the subject; (3) The Word Rating List which measures the student's self-concept in an academic setting; and (4) The Human Trait Inventory which

measures unique characteristics of high and low motivation students in an academic situation.

An attempt is made in this study not only to study the differential predictiveness of the M-Scales, but to examine the motivational structure of the parochial school student.

The Hypotheses:

The hypotheses to be tested in this study are:

1. There is a difference in the mean scores on the four sub-tests of the M-Scales between parochial and public school males and females.
2. There is a difference in mean scores on the total M-Scales between parochial and public school males and females.
3. There is a difference in mean grade point average between parochial and public school males and females.

Research by Farquhar and his associates indicated that the M-Scales, when added to an aptitude measure, increases prediction of grade point average. The following hypothesis, therefore, will be tested in this study:

4. The M-Scales, when combined with an aptitude measure, will increase the precision for predicting academic achievement (GPA) for parochial school males and females.

Previous research has indicated that the Generalized Situational Choice Inventory is most closely aligned to the initial theory upon which

the M-Scales are based. Also, the GSCI seems more applicable to males than females. If sex is not taken as a separate variable, the theory seems best reflected in male under- and over-achievement. Therefore, a factor analysis of male responses to the GSCI was used in the study. The following hypothesis will be tested:

5. The factor analysis of the male parochial school student's responses to the GSCI will yield an interpretable structure different than that found for the public school male.

Organization of the Study:

In Chapter II the review of literature concerning achievement, aptitude, and motivation of the parochial school student will be presented. The design and methodology used in the study are described in Chapter III. In Chapter IV the statistical analysis of the mean differences in scores and the Regression analysis will be presented. The results of the Factor analysis is found in Chapter V.

CHAPTER II

REVIEW OF LITERATURE ON APTITUDE, ACHIEVEMENT AND MOTIVATION OF THE PAROCHIAL SCHOOL STUDENT

Few studies of the parochial school students' achievement in relation to academic ability and motivation were found in reviewing the literature. The majority of the studies tended to be descriptive rather than statistical in nature. Furthermore, many investigations did not separate parochial from private schools in their analysis procedures. In the review which follows attention is given to descriptive as well as actuarial reports. In addition, relevant studies focusing on private schools which include parochial populations will be reviewed as well as the obviously pertinent church-based reports.

The Reverend C. Albert Koob[1], Associate Secretary, Secondary School Department, The National Catholic Educational Association, in response to a request for information regarding studies of achievement, ability and motivation conducted in the parochial schools replied that he did not have much to offer and that their office has not been able to do the kind of research that they would like to have done.

The Carnegie Corporation has made available $350,000. for an objective and factual study of Catholic elementary and secondary education.

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[1] Reverend C. Albert Koob, Personal Communication, National Catholic Educational Association, Washington, D. C.

Dr. William H. Conley, Notre Dame University, director of this study, outlined the following two purposes for the study: (1) to provide a profile of Catholic education, making available information about Catholic schools; and (2) to conduct investigations in depth in selected dioceses which will provide more detailed information to make judgments, decisions, and plans for the future of Catholic schools.[2] The results of the study, however, will not be available for at least another year.

Aptitude Measures:

Koos[3] and Hill[4] found parochial school students to be superior to public school students in scholastic aptitude as measured by the ACE Psychological Examination. Buegel[5] found no significant difference in school ability as measured by SCAT scores in a comparison of high school juniors

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[2] Conley, William H., "The Study of Catholic Education," National Catholic Educational Association Bulletin, LIX, No. 2, November, 1962.

[3] Koos, Leonard V., Private and Public Secondary Education, Chicago: University of Chicago Press, 1931.

[4] Hill, Robert E., Jr., "Scholastic Success of College Freshmen from Parochial and Public Secondary Schools," School Review, 69, No. 1, Spring, 1961, pp. 60-66.

[5] Buegel, Hermann F., "Comparison of SCAT Scores of High School Juniors in Parochial and Public Schools," Psychological Reports, 7, 1960, pp. 497-498.

in parochial and public schools. A bulletin[6] of the College Entrance Examination Board states that young people who prepared to take the College Entrance Board Examinations through public high school instruction scored, on the whole, a little better than seniors from private college preparatory institutions. Davis and Frederiksen[7] stated that on the average, public school students did better academic work during the freshman year at Princeton in relation to ability as measured by the Scholastic Aptitude Test - Verbal Section - than did private school graduates.

Achievement Measures:

Lathrop and Kieffer[8] studied 50 private school graduates and 50 public school graduates enrolled at Iowa State College in 1952 to determine if the public and private high schools in Iowa do equally well in preparing students for work at Iowa State College. The subjects were paired by sex, divisions of the college as well as previous high school course pattern, and as closely as possible on characteristics of aptitude as measured by total score on ACE Psychological Examination, high school grade point average, and high school size. They found that the difference in achievement

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6 Dyer, Henry S. and King, Richard G., "College Board Scores: Their Use and Interpretation. No. 2," Princeton, New Jersey: College Entrance Examination Board, 1955, pp. 151-159.

7 Davis, Junius A. and Frederiksen, Norman, "Public and Private School Graduates in College," Journal of Teacher Education, 6, March, 1955, pp. 18-22.

8 Lathrop, Irvin T. and Kieffer, Thomas J., "College Achievement of Public Versus Private High School Graduates," The Clearing House, Vol. 33, January, 1959, pp. 299-302.

between graduates of two types of high schools was not statistically significant at the end of the first or third quarter. However, the difference in achievement was significant at the time of leaving Iowa State College. It appears that the student who is a graduate of a public high school in Iowa enjoys a greater measure of academic success at Iowa State College than does a graduate of a private high school in Iowa. No evidence is available to explain why public high school graduates achieve higher grades.

Conant[9] said that the public high school graduate does better than the private school graduate in Harvard College though there may be considerable difficulty the first year. He did not support his statement with a presentation of empirical evidence.

Seltzer[10] compared the numbers of Harvard freshmen on the Dean's List and the numbers of failing and passing students and found that the students admitted from public schools presented considerably better freshman-year academic records than the private school students in spite of the fact that there was little or no difference in intellectual potential or in academic background between the two groups.

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[9] Conant, James Bryant, Education and Liberty, Cambridge, Massachusetts: Harvard University, 1953, p. 131.

[10] Seltzer, Carl C., "Academic Success in College of Public and Private School Students," Journal of Psychology, 25, 1948, pp. 419-431.

Wiggin[11] analyzed the top 100 and bottom 100 men in the classes of 1954 and 1955 at Yale University and concluded that it is more likely that the individual public-school graduate will achieve a good academic record than a private-school graduate.

The records at the Phi Beta Kappa Headquarters in Washington, D. C., indicated that in 1954 more public-school than private-school students were initiated into Phi Beta Kappa in three leading universities (Harvard, Yale University, and Colgate University).[12]

Shuey[13, 14] found that public school graduates earned significantly higher grades, on the average, than did the private school graduates when she compared the academic achievement during the freshman and sophomore college year of 189 pairs for the freshman year and 245 pairs of females for the sophomore year. The public and private high school graduates were

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[11] Wiggin, Lewis M., "The Yale Undergraduate: One Man's Findings," Yale Alumni Magazine, May, 1954, pp. 7-9.

[12] National Education Association Research Bulletin, Vol. XXXV, No. 4, December, 1957, p. 148.

[13] Shuey, Audrey M., "Academic Success of Public and Private School Students at Randolph-Macon Woman's College. I. The Freshman Year," Journal of Educational Research, 49, 1956, pp. 481-492.

[14] Shuey, Audrey M., "Academic Success of Public and Private School Students at Randolph-Macon Woman's College. II. The Sophomore Year," Journal of Educational Research, 52, 1958, pp. 35-38.

paired by age, intelligence, academic load, same geographical background, and same community size. She concludes that there is no evidence that private schools prepare pupils more effectively for college than do public schools.

The most comprehensive study conducted on how public and private school graduates compare in academic achievement was conducted by Koos.[15] His findings generally favored the graduates of public schools, a result remarkable since intelligence measures favored private schools.

Hill[16] compared high school scholastic success of students from parochial and public elementary school backgrounds. Although his findings favored the public school, only the findings for Natural Science, Written Expression, and composite measures were significant at the .05 level.

In another study, Hill[17] compared the scholastic success of freshmen at Ball State University from parochial and public schools. He found the parochial school sample to be statistically superior in scholastic aptitude as measured by the ACE Psychological Examination. However, when

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[15] Leonard V. Koos, op. cit.

[16] Hill, Robert E., Jr., "An Investigation of the Educational Development of Selected Iowa Secondary School Pupils from Varied Elementary School Environment," 14th Yearbook, National Council on Measurements Used in Education, New York: National Council on Measurements Used in Education, 1957.

[17] Hill, Robert E., Jr. "Scholastic Success of College Freshmen from Parochial and Public Secondary Schools," School Review, 69, No. 1, Spring, 1961, pp. 60-66.

scholastic aptitude was controlled, the public school group at the end of the first and third term as well as for cumulative grade point average at the end of the third term was superior in scholastic achievement at the .05 level.

Denny[18, 19] studied the achievement of Catholic students in two Midwestern communities where there were no Catholic high schools. He found the general picture of academic achievement of Catholic students is one of equal achievement when compared with the non-Catholic contrast group's achievement. The academic achievement of Catholic students and their general achievement orientation, reflected in their High School Inventory (HSSI) responses, do not parallel the low achievement picture of Catholic students reported in research studies such as the New Haven Studies.[20] Denny suggests that any discussion of the achievement of Catholics should consider the socio-economic parameters of the Catholic and contrast group.

Discussion of Studies:

The majority of the studies reviewed in this chapter were descriptive rather than statistical. Many of the studies were found lacking in

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[18] Denny, Terry, "Achievements of Catholic Students in Public High Schools - I.," The Catholic Educational Review, LX, March, 1962, pp. 145-162.

[19] Denny, Terry, "Achievements of Catholic Students in Public High Schools - II.," The Catholic Educational Review, LX, October, 1962, pp. 442-469.

[20] Strodtbeck, Fred L., "Family Interaction, Values, and Achievement," Talent and Society, ed., David C. McClelland, Princeton, New Jersey: D. Van Nostrand Company, 1958.

hypothesis formulation, and control of external variables such as socio-economic factors. A number of the studies did not clearly specify the population from which the samples were drawn. Parochial schools were not separated from the private school classification in the discussion of findings related to private schools.

In some of the studies no empirical evidence was presented upon which the conclusions were based; the conclusions appeared to be logical rather than empirical. Theoretical formulations a priori and a posteriori were lacking. Inadequate sampling would necessarily limit the population to which generalizations could be made.

The evidence is not clear that the parochial school student achieves less than his public school counterpart. In fact, the findings are erratic, to say the least. This factor could probably be traced to such extraneous variables as the uncontrolled socio-economic variable where the selection effect in certain communities or the cost of education would tend to contaminate the data. Furthermore, the studies which lump parochial and private schools together introduce inseparable effects because of the image of ability and behavior problems encountered in the private school setting. Also, regional differences could make large differences in who does or can take advantage of a parochial school education.

In the final analysis, it does not appear that there is any conclusive study regarding parochial school students' achievement, aptitude, and motivation which accounts for the flaws in experimentation mentioned above. The need is paramount for such a study.

Summary:

Although there has been some research on Catholic adults' intellectual and cultural achievement, little is known about the achievement of Catholic youth until they leave the secondary school. The majority of the studies which concerned the parochial school student's achievement and ability tend to be inconclusive and contaminated with uncontrolled error. The Study of Catholic Education hopefully will provide an objective and factual study of Catholic elementary and secondary education.

In designing the study which follows particular attention was given to incorporating those features found lacking in the major share of the previous studies completed. Particularly an attempt was made to (1) state clearly the population from which the sample was drawn and (2) use valid statistical procedures in testing stated hypotheses.

CHAPTER III

DESIGN AND METHODOLOGY

The design of this study is described under three headings: (1) Sample Selection, (2) Nature of the Data, and (3) Analysis Procedures.

Sample Selection:

Two samples were involved in the analysis of this study. A parochial school sample, comprised of 100 males and 100 females, was randomly selected from a population of 280 eleventh grade students from two Michigan parochial high schools. These schools represent students from 15 cities and communities, and 20 parishes.

The public school sample of 254 males and 201 females came from an earlier study conducted by Farquhar.[1] This sample was selected from 4200 eleventh grade students from nine Michigan high schools and analyzed for the Farquhar project.

The parochial school sample used for the factor analysis was the same sample that was used in the correlational analysis. The public school sample for this analysis was also a part of the Farquhar study.[2]

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[1] William W. Farquhar, A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students, Research Project No. 846 (8458) supported by the U. S. Office Of Education, in cooperation with Michigan State University, Final Report, 1963.

[2] William W. Farquhar, op. cit.

Nature of the Data:

Three types of data were gathered on each student: (1) an aptitude estimate, (2) a grade point average, and (3) a motivational score.

Aptitude Measure: The aptitude measure was the Verbal Reasoning sub-test of the Differential Aptitude Tests (DAT-VR).[3]

Grade Point Average: The grade point average (GPA) was computed for each individual using grades received in ninth and tenth grade academic subjects, i.e., subjects requiring homework. To obtain an estimate of the GPA criterion reliability a correlation was calculated between ninth and tenth grade GPAs and was found to be .87 for males and .96 for girls.

Motivational Score: The motivational score was obtained from the student's responses to the Michigan M-Scales. This scale is comprised of four sub-tests: (1) Generalized Situational Choice Inventory, (2) Preferred Job Characteristics Scale, (3) Word Rating List, and (4) Human Traits Inventory.

> The Generalized Situational Choice Inventory was constructed to describe the academic motivation situation. Students are required to make a forced choice between two types of situations, one which depicts a high and one which depicts a low academic

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[3] A description of the DAT-VR may be found in the manual: The Psychological Corporation, Manual for the Differential Aptitude Tests, New York, 1959.

motivation situation. A high score on this scale indicates an individual who has a high need for academic achievement. A low score indicates an individual who chooses activities disassociated from the school's program.

The Preferred Job Characteristics Scale was designed to differentiate between the job aspirations of high-low motivated students. Students are required to make a forced choice between two types of jobs, one which depicts high and one which depicts low job aspiration. Students who score high on the scale tend to want jobs where their individuality is recognized, where their talents and skills are used, and where opportunities exist for change and advancement. Students who score low on this scale tend to prefer jobs where entry is easy, requirements are low, time restrictions are absent, and where one is "discovered" rather than worked into a position.

The Word Rating List was designed to measure the academic self-concept of the student. Students are asked to rate themselves on a series of descriptive phrases and words describing high and low motivated and achieving students. A high score indicates an individual with academic self-concept oriented towards the school environment. An individual who scores low on this scale has a fairly clear-cut picture that he is not academic.

The Human Trait Inventory consists of items from past personality tests that have been found to differentiate between high and low achieving and motivated students. Students are asked to rate how they feel about these statements. Individuals who score high on this scale tend to have personalities more similar to highly motivated students and those scoring low tend to have

personalities similar to low motivated students.

Reliability

A Hoyt's analysis of variance estimate for the total M-Scales was obtained for a sample of 100 parochial school males and a sample of 100 parochial school females. The reliability estimate for the male population was .62 and a reliability estimate of .79 for the female was obtained. The reliability estimates for all sub- and total scores are reproduced in Table 3.1.

TABLE 3.1 SUMMARY OF HOYT'S ANALYSIS OF VARIANCE RELIABILITY ESTIMATES FOR THE M-SCALES FOR PAROCHIAL SCHOOL SAMPLE.

Sub-Test	N	Parochial School Males Reliability Estimate	Parochial School Females Reliability Estimate
GSCI [1]	100	.83	.76
WRL [2]	100	.90	.90
PJCS [3]	100	.96	.85
HTI [4]	100	.48	.80
M-Scales Total	100	.62	.79

[1] Based on 45 items for males and 30 items for females.

[2] Based on 48 items for males and 48 items for females.

[3] Based on 20 items for males and 33 items for females.

[4] Based on 26 items for males and 25 items for females.

Analysis Procedures:

Three procedures were used in the analysis of the data: (1) mean test of significance, (2) multiple regression analysis, and (3) factor analysis.

Mean Test of Significance: The Student "t" was used to test the difference in uncorrelated means between the responses of the parochial school student and the public school student to the Michigan M-Scales, both the four sub-tests and the total M-Scales, as well as the difference between the grade point average and the DAT-VR scores.

Multiple Regression Analysis: A multiple regression analysis was performed to predict the Grade Point Average (GPA) from the (1) Generalized Situational Choice Inventory (GSCI), (2) Preferred Job Characteristics Scale (PJCS), (3) Word Rating List (WRL), (4) Human Traits Inventory (HTI), and (5) Differential Aptitude Tests-Verbal Reasoning (DAT-VR).

The multiple regression equations were solved using the general linear hypothesis and least squares estimates of the B's. This method is developed by Kempthorne in Design and Analysis of Experiments.[4] The Michigan State University high speed digital computer, MISTIC, with a K-16M program, was used in the analysis. The assumption is made that a multivariate-normal population has been sampled.

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[4] Oscar Kempthorne, Design and Analysis of Experiments, John Wiley and Sons Book Company, New York, 1952.

Factor Analysis:

A factor analysis of the parochial school male responses to 22 selected items for the GSCI were conducted and compared with the factorial structure of the public school male responses to the same test.[5] The entire scale (45 items) was also factor analyzed in order to more thoroughly understand the underlying structure of the GSCI.

The normal varimax method[6] of factor rotation was used to simplify the factor loadings to interpret the factors. Rotation was continued until at least three items loaded on a factor. No item was interpreted with a factor loading less than .35 for the 22 item analysis. For the 45 item analysis no item was interpreted with a factor loading less than .50.

Prodedure

1. After building the two responses matrices (22 x 100 and 45 x 100), the CCPA program was used to obtain the intercorrelation among the items as well as to factorize the matrix.[7]

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[5] William W. Farquhar, op. cit.

[6] Harman, Modern Factor Analysis, University of Chicago Press, Chicago, Illinois, 1960, pp. 294-308.

[7] The Correlation, Commonality, and Principal Axis program, designed by Charles F. Wrigley and Don Kiel, Department of Psychology and Department of Agricultural Engineering respectively, Michigan State University, was performed by the Michigan State University high speed digital computer, MISTIC.

2. The factors were then rotated to simple structure by the normal varimax method of factor rotation. The K-17M program was used for this part of the analysis.

Null Hypotheses:

The following hypotheses are restatements of the hypotheses in null form:

Ho_1 There is no significant difference in mean scores of the four sub-tests of the M-Scales between parochial and public school males and females.

Ho_2 There is no significant difference in the mean scores of the total M-Scales between parochial and public school males and females.

Ho_3 There is no significant difference in mean grade point average between parochial and public school males and females.

Ho_4 The M-Scales when combined with an aptitude measure will not increase the precision of prediction of academic achievement (GPA) for parochial school males and females.

The following hypothesis is stated in null form, but it should be understood that it is not tested against an exact probability error model.

Ho_5 The factor analysis of the male parochial school students' responses to the GSCI will yield an interpretable structure not different from that found for the public school males.

Summary:

A parochial school sample was drawn from two parochial high schools where students from 15 cities and communities, and 29 parishes

were in attendance. To study the predictive efficiency of the M-Scales, the design was based on correlational analysis while the factored dimensions of the M-Scales for males were studied through factor analysis. The results of this analysis were compared with the results obtained by Farquhar in a study based on eleventh grade public school students.

CHAPTER IV

MEAN DIFFERENCES AND REGRESSION ANALYSIS

In this chapter will be presented the analysis of (1) the mean tests of significance between parochial and public school male and female responses to the four sub-tests and the total M-Scales, and (2) the correlational and multiple regression analysis to evaluate the relationship between the M-Scales, the DAT-VR, and GPA.

Mean Difference Between Parochial and Public School Student Scores:

Mean scores, standard deviations, and t-ratios for public and parochial school male and female samples are presented in Tables 4.1 and 4.2. The null hypothesis tested for each of the sub-tests was:

Ho_1 There is no significant difference in mean scores of the four sub-tests of the M-Scales between parochial and public school males and females.

The t-ratios of 1.11 and -.27 for males and females respectively indicate non-significant differences in GSCI mean scores. The null hypothesis was accepted.

Responses to the PJCS produced a significant "t" of 2.74 in favor of the parochial school males, while the t-ratio of 1.36 for the females was not significant. The null hypothesis was rejected for the males with a higher mean being obtained by the parochial school male. The null hypothesis was accepted for the females.

TABLE 4.1. MEANS, STANDARD DEVIATIONS AND t TESTS FOR PUBLIC AND PAROCHIAL SCHOOL MALES.

Variable	Total Possible Score	Public School (N=254) Mean	S.D.	Parochial School (N=100) Mean	S.D.	d.f.	t
Grade Point Average	5.00	2.94	.72	3.32	.74	352	4.38*
GSCI	45	30.76	6.89	31.94	6.18	352	1.11
PJCS	20	16.20	4.32	17.30	2.96	352	2.74*
WRL	48	30.41	9.69	37.41	8.15	352	7.09*
HTI	26	18.97	4.41	16.04	2.76	352	-7.50*
Total M-Scales	139	96.39	20.01	102.90	14.76	352	3.36*
DAT (VR)	50	19.91	8.59	30.08	9.52	352	9.30*

* p. .05 $\pm$ 1.97

Significant differences in GPA, PJCS, WRL, HTI, Total M-Scales and DAT (VR)

TABLE 4.2. MEANS, STANDARD DEVIATIONS AND t TESTS FOR PUBLIC AND PAROCHIAL SCHOOL FEMALES

Variable	Total Possible Score	Caucasian (N-26) Mean	S.D.	Parochial School (N=100) Mean	S.D.	d.f.	t
Grade Point Average	5.00	3.27	.66	3.46	.74	359	2.25*
GSCI	30	20.45	5.11	20.30	4.54	359	- .27
PJCS	33	27.44	5.78	28.25	2.96	359	1.36
WRL	48	28.99	8.29	31.74	8.15	359	2.64*
HTI	25	17.51	3.60	17.34	2.76		- .35
Total M-Scales	136	94.93	18.69	97.50	14.76	359	1.16
DAT (VR)	50	20.00	7.76	26.26	10.18	359	5.56*

* p. .05 $\pm$ 1.97

Significant differences in GPA, WRL, and DAT(VR).

The HTI t-ratio of -7.50 was significant with the parochial school male scoring lower than the public school student, but the "t" for the females was not significant. The null hypothesis of no difference in mean scores was rejected for males with the public school male mean higher than the parochial school male. For females the null hypothesis was accepted.

Responses to the WRL produced significant "t"s of 7.09 and 2.64 in favor of the parochial school males and females respectively. The null hypothesis of no difference in mean scores was rejected.

The null hypothesis tested for the total M-Scales was:

Ho_2 There is no significant difference in mean scores of the total M-Scales between parochial and public school males and females.

The t-ratio of 3.36 in favor of the parochial school male indicated a difference in total M-Scales mean scores significant at the .05 level. The null hypothesis was rejected for the males with a higher mean score being obtained by the parochial school male. The "t" of 1.16 for the females was not significant. The null hypothesis of no difference in mean scores on the total M-Scales was accepted for females.

The null hypothesis tested for grade point average was:

Ho_3 There is no significant difference in the mean grade point average between parochial and public school males and females.

The grade point averages of 3.32 and 3.46 earned by parochial school males and females respectively were higher than the averages of 2.94 and 3.27 earned by public school male and female students. The

t-ratios of 4.38 and 2.25 were significant at the .05 level in favor of the parochial school males and females. The null hypothesis of no difference in mean grade point average was rejected.

Correlational Analysis:

Intercorrelations of the M-Scales with the DAT-VR, and with GPA are shown in Tables 4.3 and 4.4.

TABLE 4.3 INTERCORRELATIONS AMONG ACHIEVEMENT, APTITUDE AND M-SCALES SCORES FOR PAROCHIAL SCHOOL MALES

	GSCI	PJCS	WRL	HTI	DAT-VR	GPA
GSCI		.64*	.42*	.42*	.35*	.42*
PJCS			.19	.28*	.20*	.15
WRL				.24*	.29*	.43*
HTI					.17	.13
DAT-VR						.66*
Total M-Scales						.45*

* .05 for the rest that r = 0, if r > .195 at the .05 level

Intercorrelations between the sub-tests of the M-Scales range from .19 to .64 for the males and from .33 to .73 for the females.

The GSCI and the WRL sub-tests of the male sample correlated significantly from zero with GPA. The correlation of the PJCS and the HTI was insignificant.

For the female sample, only the PJCS did not correlate significantly from zero with GPA. The total M-Scales correlated with GPA significantly at .45 level for males and .48 level for females.

TABLE 4.4 INTERCORRELATIONS AMONG ACHIEVEMENT, APTITUDE, AND M-SCALES SCORES FOR PAROCHIAL SCHOOL FEMALES (N = 100)

	GSCI	PJCS	WRL	HTI	DAT-VR	GPA
GSCI		.62*	.59*	.66*	.15	.28*
PJCS			.33*	.48*	.11	.17
WRL				.73*	.43*	.59*
HTI					.27*	.40*
DAT-VR						.65*
Total M-Scales						.48*

* p .05 for the test that r = 0, if r > .195 at the .05 level

The GSCI, the PJCS, and the WRL for the males correlated significantly from zero with the DAT-VR. The correlation of the HTI was not significant.

The WRL and HTI for the female sample correlated significantly from zero with the DAT-VR, while the GSCI and the PJCS correlations with DAT-VR were insignificant.

The DAT-VR produced higher correlations with GPA than any of the sub-tests or the total M-Scales. The correlations for the males was .66 and for the females .65.

Regression and Multiple Correlation Analysis:

Both regression and multiple correlation analysis were applied to the data of the study.

Regression Analysis

The null hypothesis tested for each of the sub-tests and the total M-Scales was:

Ho_4 The M-Scales when combined with an aptitude measure will not increase the precision of prediction of academic achievement for parochial school males and females.

There was need for a method of testing whether or not a variable (M-Scales) when added to an aptitude measure (DAT-VR) sufficiently increased the precision of estimation of the criterion (GPA).

Several approaches were considered before finally selecting the F test advocated by Guilford.[1] The F tests the increase in multiple R resulting from an increase in the number of variables. An increase in multiple R is equivalent to an increase in predictive value (precision).

Another alternative which was given serious consideration was a t test of the regression coefficient of the variables in the regression equation. The t test would have indicated whether or not the correlation coefficient was significantly different from zero, i.e., whether or not the variable is sufficiently weighted to estimate the criterion. The t test does not measure the increase in precision obtained when a variable is added to the aptitude measure. The t test may contribute such useful information as indicating overlap or intercorrelations among variables.

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[1] The formula used for making this F test is found in J. P. Guilford, Fundamental Statistics in Psychology in Psychology and Education, McGraw-Hill Book Company, Inc., New York: 1956, p. 400.

The formula used is: $F(1, N-m_1-1) = \dfrac{(R_1^2 - R_2^2)\ (N-m_1-1)}{1 - R_1^2\ (n}$

Consider, for example, the case where the t test is significant and the F is not significant. The t test would indicate that the variable is useful as a predictor of GPA, but it does not add to the precision of the estimate. The t test indicates that a significant intercorrelation between variables exists. Because a table of intercorrelations is included in the study, Table 4.3 and 4.4, the t test was unnecessary. Therefore, only F tests on the multiple R were conducted because if a "t" is significant, the variable contributing to the precision must be weighted sufficiently. If "t" is not significant, the variable could not contribute to the increase in precision.

The results of the tests of significance are found in Table 4.5. Significant F's were found at the .01 level for males when the GSCI, the WRL, and the total M-Scales were added to the DAT-VR. The hypothesis was rejected for these scales. The F's for the PJCS and HTI for the male sample were non-significant and the hypothesis was accepted.

For the parochial school female sample, significant F's were found at the .01 level when the WRL, the HTI, and the total M-Scales were added to the DAT-VR; at the .05 level when the GSCI was added. The hypothesis was rejected when these scales were added to the DAT-VR. The addition of the PJCS scores to the DAT-VR did not increase the precision of prediction of academic achievement for females; thus, the hypothesis was accepted for female PJCS responses.

TABLE 4.5 TESTS OF SIGNIFICANCE OF INCREASE IN PRECISION OF ADDING EACH OF THE SUB-TEST M-SCALES AND TOTAL M-SCALES TO THE DIFFERENTIAL APTITUDE TEST-VERBAL REASONING TO ESTIMATE GRADE POINT AVERAGE - MALES AND FEMALES

Hypothesis	Scale	F's Males df = (1 & 97)	F's Females df = (1 & 97)
Ho: $s_{e1}^2 - s_{e2}^2 = 0$	Generalized Situational Choice Inventory	7.140**	6.391*
	Preferred Job Character-istics Scale	.003	1.878
	Word Rating List	11.803**	25.407**
	Human Trait Inventory	.017	9.914**
	Total M-Scales	9.431**	15.076**

* F significant at the .05 level or greater.

** F significant at the .01 level or greater.

Multiple Correlation:

In Table 4.6 the multiple correlations for the sub-tests and total M-Scales and the DAT-VR estimations of the grade point average criterion are summarized. The increase in the multiple correlation over the zero order correlation is about the same for males and females except for the WRL and the HTI sub-tests of the M-Scales. Inspection of Table 4.4 reveals that the female WRL and HTI correlate highest with DAT-VR and GPA.

Summary:

In testing the differences in mean scores of the four sub-tests of the M-Scales between parochial and public school males and females, significant differences at the .05 level were found in the WRL in favor of both parochial school males and females. A significant difference in the HTI favored the public school male, while for the PJCS a significant difference was found in favor of the parochial school male. Significant differences were also found in the total M-Scales in favor of parochial school males, but no mean difference in total M-Scales for females was obtained. Significant differences in grade point average and DAT-VR were obtained with both parochial school males and females scoring higher.

Significant correlations of the M-Scales with grade point average were found in all of the sub-tests except the PJCS for female, and the PJCS and the HTI for males. The total M-Scales had a significant correlation from zero with GPA of .45 for males and .48 for females. The correlation

TABLE 4.6 MULTIPLE CORRELATION FOR SUB-TESTS OF THE M-SCALES AND TOTAL M-SCALES AND DIFFERENTIAL APTITUDE TEST-VERBAL REASONING (DAT-VR) ESTIMATION OF GRADE POINT AVERAGE - MALES AND FEMALES

Scale	Multiple Correlation	
	Males	Females
Generalized Situational Choice Inventory	.69	.68
Preferred Job Characteristics Scale	.66	.66
Word Rating List	.71	.74
Human Trait Inventory	.66	.69
Total M-Scales	.70	.71

Note: The zero order correlation between Grade Point Average and DAT-VR was .66 for males and .65 for females (supra, Tables 4.3 and 4.4, Pages 30 and 31).

of the DAT-VR with GPA was .66 for males and .65 for females, significant at the .05 level.

In the regression analysis significant F's were found at the .01 level for males when the GSCI, the WRL, and the total M-Scales were added to the DAT-VR for the prediction of academic achievement as measured by grade point average. The PJCS and HTI did not increase the precision of prediction when added to the DAT-VR.

For the parochial school female sample, significant F's were obtained at the .01 level when the WRL, the HTI, and the total M-Scales were added to the DAT-VR; at the .05 level when the GSCI was added. The addition of the PJCS to the DAT-VR did not increase the precision of prediction of grade point average.

CHAPTER V

RESULTS OF THE FACTOR ANALYSES

The purpose of the factor analysis was to understand the academic motivational structure of the parochial school male as reflected by his responses to the GSCI sub-test of the M-Scales. Several analyses were conducted on the same data for a variety of reasons. First, the 22 items of the GSCI were factored using a criterion similar to the one employed in the Farquhar study.[1] Second, the same 22 items were factored using a criterion altered to yield a more interpretable motivational structure. Third, all 45 valid items of the GSCI were factored to determine whether or not the factors derived in the 45 item analysis supported the factors derived in the 22 item analyses.

After the analyses were completed, a logical comparison of the three preceding analyses with the findings of the Farquhar study was made.

Results of the Twenty-Two Variable Factor Analysis Similar to the Farquhar Procedure:

To resolve the 22 variable problem, the principal axis solution was used for the unrotated factors. In an attempt to get a simpler factorial structure for interpretation, the normal varimax method of rotation was used rather than the quartimax method used by Farquhar. Each factor had to have a sum of squares (Eigen value) of 1.00 to be rotated, and each rotated

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[1] Farquhar, William W., A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students, Research Project No. 846, supported by the U. S. Office of Education in cooperation with Michigan State University, Final Report, 1963.

factor had to have at least three items with a minimum loading of .35 to be interpreted. The factors, their item content and factor loading are presented in Tables 5.1 and 5.2. Using the above criterion, two factors were identified.

TABLE 5.1* ITEM LOADINGS FOR THE GSCI MALE RESPONSES - Factor I **

Item Number and Content			Loading
11.	a.	Be well prepared for a job after graduation from high school, or	
	b.	Be well prepared to continue learning	.799
19.	a.	Wait ten years and receive fame throughout the nation, or	
	b.	Receive fame in my community overnight	.776
59.	a.	Study to go to college, or	
	b.	Study to get out of high school	.698
13.	a.	Have the teacher give everyone the same grade at the beginning of the term and know I passed, or	
	b.	Take chances on getting a higher or lower grade at the end of the course	.468
9.	a.	Have the best teachers in the state in my school, or	
	b.	Have a large recreation center in my school	.414

* Tables 5.1 and 5.2 pertain to the 22 item Factor Analysis, 2 factor rotation, sum of squares in excess of 1.00.

** Labeled long-term versus short-term involvement.

TABLE 5.2 ITEM LOADINGS FOR THE GSCI MALE RESPONSES - Factor II*

Item Number and Content			Loading
66.	a.	Be very happy, or	
	b.	Have lots of money	.719
50.	a.	Do what I think is right, or	
	b.	Do what others think is right	.577
38.	a.	Have everybody in the class get a "C" at the beginning of the course, or	
	b.	Be graded at the end of the course with the possibility of getting a higher or lower mark	.523
77.	a.	Discover a gold mine, or	
	b.	Discover a new medicine	.416
39.	a.	Receive a grade on the basis of how much my teacher thinks I have learned, or	
	b.	Take a course from an instructor who only gives "C"s	.389
33.	a.	Work rapidly just "skimming" along, or	
	b.	Work slowly with great thoroughness	.350

* Labeled unique versus common accomplishment.

Factor I. Five items had the heaviest weighting and met the minimum criterion for interpretation. The underlying theme of the item content is concern with having immediate rewards or waiting for more enduring satisfactions. The factor was labeled long-term versus short-term involvement.

Factor II. Six items exceeded the .35 criterion of factor loading on the second male GSCI factor. The content of the items appears to be a fusion of outer or inner directedness or unique or common accomplishment. The factor was labeled unique versus common accomplishment.

Rotation of Factors with Altered Criterion - Twenty-Two Items:

To yield a more interpretable factorial structure of the academic motivation of parochial school males as reflected by the responses to 22 items of the GSCI, the sum of squares criterion for including a factor for rotation was changed from 1.00 to .50. Six factors were found to meet the criterion and rotated. Four of the factors met the additional criterion of at least three items with factor loadings of .35 to be interpreted. The factors, their item content and their loadings are presented in Tables 5.3, 5.4, 5.5, and 5.6.

Factor I. Six items loaded on the first factor. Four met the minimum criterion of .35. Item 13 was found in Factor I of the first analysis. The content of the items is involved with academic risk-taking. The factor was labeled chance-taking versus no chance-taking.

Factor II. Six items loaded heaviest on the second male GSCI factor with three exceeding the .35 criterion for interpretation. Items 66, 50, and 33 were also found in Factor II in the previous analysis. However, the content of the items found in this factor appears to be the source of control within one's value structure of the individual rather than unique

TABLE 5.3* ITEM LOADINGS FOR THE GSCI MALE RESPONSES - Factor I**

Item Number and Content			Loading
38.	a.	Have everybody in the class get a "C" at the beginning of the course, or	
	b.	Be graded at the end of the course with the possibility of getting a higher or lower mark	.650
13.	a.	Have the teacher give everyone the same grade at the beginning of the term and know I had passed, or	
	b.	Take chances on getting a higher or lower grade at the end of the course	.476
39.	a.	Receive a grade on the basis of how much my teacher thinks I have learned, or	
	b.	Take a course from an instructor who gives only "C"s	.474
18.	a.	Get excellent grades because I have a great deal of ability, or	
	b.	Get average grades because I have average ability	.401

* Tables 5.3, 5.4, 5.5, and 5.6 pertain to the 22 item Factor Analysis, 6 factor rotation, sum of squares in excess of .50.

** Labeled chance-taking versus no chance-taking.

TABLE 5.4 ITEM LOADINGS FOR THE CSCI MALE RESPONSES - Factor II *

Item Number and Content			Loading
66.	a.	Be very happy, or	
	b.	Have lots of money	.605
50.	a.	Do what I think is right, or	
	b.	Do what others think is right	.486
33.	a.	Work rapidly just "skimming" along, or	
	b.	Work slowly with great thoroughness	.445

* Labeled outer versus inner directedness.

TABLE 5.5 ITEM LOADINGS FOR THE CSCI MALE RESPONSES - Factor III *

Item Number and Content			Loading
11.	a.	Be well prepared for a job after graduation from high school, or	
	b.	Be well prepared to continue learning	-.785
59.	a.	Study to go to college, or	
	b.	Study to get out of high school	-.727
55.	a.	Wait until I had finished college and make a better salary, or	
	b.	Get a job right after high school and make a good salary	-.661
9.	a.	Have the best teachers in the state in my school, or	
	b.	Have a large recreation center in my school	-.376

TABLE 5.5 (Continued)

Item Number and Content			Loading
13.	a.	Have the teacher give everyone the same grade at the beginning of the term and know I had passed, or	
	b.	Take chances on getting a higher or lower grade at the end of the course	-.376
36.	a.	Have a great deal of money, or	
	b.	Be an expert in my favorite school subject	-.375

* Labeled long-term versus short-term involvement.

TABLE 5.6 ITEM LOADINGS FOR THE GSCI MALE RESPONSES - Factor IV*

Item Number and Content			Loading
23.	a.	Be allowed to take extra courses before and after school, or	
	b.	Just take courses offered during the school day	.518
46.	a.	Think of an idea that nobody has ever thought of, or	
	b.	Set a world's speed record	.490
77.	a.	Discover a gold mine, or	
	b.	Discover a new medicine	.457
9.	a.	Have the best teachers in the state in my school, or	
	b.	Have a large recreation center in my school	.374
20.	a.	Make quick decisions and sometimes be right and sometimes wrong, or	
	b.	Deliberate over decisions and usually be right	.372

* Labeled unique versus common accomplishment.

or common accomplishment. Therefore, the factor was labeled outer versus inner directedness.

Factor III. Six items exceeded the minimum criterion for interpretation. Items 59, 11, 13, and 9 were also found in Factor I of the first item analysis. The content of the items with the heaviest loadings is concern with having immediate rewards or waiting for more enduring satisfactions. The factor was labeled long-term versus short-term involvement.

Factor IV. Four items loaded highest on the fourth GSCI factor. Item 77 was found in Factor II and item 9 in Factor I of the previous analysis. The content of the items is unique versus common accomplishment and the factor was so labeled.

Factoring of All Forty-Five Valid Items of the GSCI:

To provide a logical comparison with the 22 item factor analysis, each rotated factor of the 45 item analysis had to have the same Eigen value (1.00) and at least three factor loadings of .35 to be considered significant for interpretation. Upon inspection of the eight factors derived, little psychological sense was apparent. Therefore, to arrive at a simpler structure, the criterion for interpretation was changed to permit the factor loadings to drop to .50. The factors, their item content and loading of each item are presented in Tables 5.7 and 5.8. The two identified factors are interpreted and labeled as follows:

TABLE 5.7* ITEM LOADINGS FOR THE GSCI MALE RESPONSES - - Factor I**

Item Number and Content			Loading
9.	a.	Have the best teachers in the state in my school, or	
	b.	Have a large recreation center in my school	.751
32.	a.	Be paid for how well I did a job, or	
	b.	Be paid the same amount no matter how I did the job	.733
33.	a.	Work rapidly just "skimming" along, or	
	b.	Work slowly with great thoroughness	.680
59.	a.	Study to go to college, or	
	b.	Study to get out of high school	.510

* Tables 5.7 and 5.8 pertain to the 45 item Factor Analysis.

** Labeled long-term versus short-term involvement.

TABLE 5.8 ITEM LOADINGS FOR THE GSCI MALE RESPONSES - Factor II*

Item Number and Content			Loading
35.	a.	Have a better job than my father has, or	
	b.	Have a job like my father has	.617
31.	a.	Work at many less important jobs which I know I could finish, or	
	b.	Work at one very important job which may never be entirely finished in my life-time	.599

TABLE 5.8 (Continued)

Item Number and Content			Loading
66.	a.	Be very happy, or	
	b.	Have lots of money	.544
68.	a.	Do something like everyone else, or	
	b.	Do something outstanding	-.532

* Labeled unique versus common accomplishment.

Factor I. On the first factor, four items exceeded the .50 criterion of factor loadings required for interpretation. The theme of the items has undercurrents of concern with time and task involvement. The factor was labeled long-term versus short-term involvement.

Factor II. As with the first factor, four items had factor loadings exceeding .50 on the second factor. The content of the items is doing the unusual. Therefore, the factor was labeled unique versus common accomplishment.

Comparison of Factors:

The primary focal point of the factor analyses was a comparison of the preceding factor analyses with the findings of the Farquhar study. A summary of the labels for the factor analyses, 22 item analyses as well as 45 item analysis, is contained in Table 5.9.

Comparison of Factors Derived By Similar Procedures - Twenty-Two Items

Three factors were derived by the Farquhar study by quartimax rotation of responses: (1) unique versus common accomplishment, (2) immediate

TABLE 5.9 SUMMARY OF LABELS FOR THE FACTOR ANALYSES OF THE MALE RESPONSES TO THE GSCI FROM THE FARQUHAR AND THE PAROCHIAL SCHOOL STUDY

Investigation:	Farquhar Sample (22 Items)	Parochial School Sample (22 Items		(45 Items)
Criterion for Rotation and Interpretation	Unrotated Factors with Eigen Values in excess of 1.00; quartimax method; at least three items with .35 loading	Unrotated Factors with Eigen Values in excess of 1.00; normal varimax method; at least three items with .35 loading	Unrotated Factors with Eigen Values in excess of .50; normal varimax method; at least three items with .35 loading	Unrotated Factors with Eigen values in excess of 1.00; normal varimax method; at least three items with .50 loading
Labels	I. Unique versus common accomplishment	I. Long-term versus short-term involvement	I. Chance-taking versus no chance-taking	I. Long-term versus short-term involvement
	II. Immediate versus long-term gratification	II. Unique versus common accomplishment	II. Outer versus inner directedness	II. Unique versus common accomplishment
	III. Competition with versus ease of meeting a standard		III. Long-term versus short-term involvement	
			IV. Unique versus common accomplishment	

versus long-term gratification, and (3) competition with versus ease of meeting a standard. When a similar criterion was used for factor rotation (Eigen value 1.00) and at least three with loadings of .35 for interpretation, two factors were derived from this study: (1) long-term versus short-term involvement, and (2) unique versus common accomplishment.

Parochial School Factor I: Long-term versus short-term involvement. Four of the five items found in Parochial School Factor I were also found in Farquhar's Factor I, unique versus common accomplishment. Although there is much overlap of items, the order varies. The overall theme of the items of Parochial School Factor I gives the impression of a time dimension rather than unique or common accomplishment.

Parochial School Factor II: Unique versus common accomplishment. The same three items found in Parochial School Factor II were also found in Farquhar's Factor I, unique versus common accomplishment. Items 66 and 77 were also found in Farquhar's Factor II, immediate versus long-term gratification. Item 50 was found in Farquhar's Factor III, competition with versus ease of meeting with a standard. However, the content of Parochial School Factor II appears to be mostly concerned with either doing or not doing an unusual task.

Although similar procedures were used in the analysis compared above, the factor rotation methods were different. The overlap of items is obvious even though factor loadings and order of heaviest items were somewhat different.

Comparisons of Factors Rotated with Eigen Values of 1.00 and .50 - 22 Items

Four factors were derived when the sum of squares was changed from 1.00 to .50 to permit factor rotation until at least three items loaded in excess of .35. The factors were: (1) chance-taking versus no chance-taking, (2) outer versus inner directedness, (3) long-term versus short-term involvement, and (4) unique versus common accomplishment.

Parochial School Factor I (Eigen value .50): Chance-taking versus no chance-taking. Item 13 was also found in Parochial School Factor I (Eigen value 1.00), long-term versus short-term involvement. Items 38 and 39 were found in Parochial School Factor II (Eigen value 1.00), unique versus common accomplishment. However, the theme of the items of Parochial School Factor I (Eigen value .50) appears to be chance-taking or no chance-taking.

Parochial School Factor II (Eigen value .50): Outer versus inner directedness. The same three items, 66, 77, and 33, found in the factor, were also found in Parochial School Factor II (Eigen value 1.00), unique versus common accomplishment. The content of the items found in Parochial School Factor II (Eigen value .50) appears to reflect an outer or inner directedness rather than unique or common accomplishment.

Parochial School Factor III (Eigen value .50): Long-term versus short-term involvement. Four of the six items found in Parochial School Factor III (Eigen value .50) were also found in Parochial School Factor I

(Eigen value 1.00). Both factors were labeled long-term versus short-term involvement.

Parochial School Factor IV (Eigen value .50): Unique versus common accomplishment. Item 9 was also found in Parochial School Factor I (Eigen value 1.00), long-term versus short-term involvement, and item 77 in Parochial School Factor II (Eigen value 1.00), unique versus common accomplishment. The overall theme of the item content appears to be unique or common accomplishment.

When factor rotation was done by varimax method, but the Eigen values changed from 1.00 to .50, four factors were derived that met the criterion of .35 loading for interpretation instead of two factors derived in the previous study. Again, the items overlap frequently with somewhat different factor loadings and order.

Comparison of Farquhar's Factors and Parochial School Factors (Eigen Value .50)

Parochial School Factor I: Chance-taking versus no chance-taking. Although the same items in Factor I were found in Farquhar's Factor I, unique versus common accomplishment, the order of the items and the factor loadings are different. Elements of chance-taking submerged in Farquhar's Factor I appear to be the theme of Parochial School Factor I.

Parochial School Factor II: Outer versus inner directedness. Item 33 was found in Factor I of the Farquhar study, unique versus common accomplishment, item 66 in Farquhar's Factor II, immediate versus

long-term gratification, and item 50 in Factor III of the Farquhar study, competition with versus ease of meeting a standard. The overall theme of item content for Parochial School Factor II seems to be outer or inner directedness.

Parochial School Factor III: Long-term versus short-term involvement. Four of the five items found in Parochial School Factor III were found by Farquhar in Factor I, unique versus common accomplishment. Item 36 was also found in Farquhar's Factor II, immediate versus long-term gratification. However, the content of the items with the heaviest loadings for Parochial School Factor III appears to be long-term or short-term involvement rather than unique or common accomplishment.

Parochial School Factor IV: Unique versus common accomplishment. Items 23 and 20 were also found in Farquhar's Factor III, competition with versus ease of meeting a standard. Items 46 and 77 were found in Farquhar's Factor II, immediate versus long-term gratification. Item 9 was also found in Farquhar's Factor I, unique versus common accomplishment. The underlying theme of the item content for Parochial School Factor IV appears to be unique versus common accomplishment.

When the methods of rotation and Eigen values for rotation were changed, similarity of factor content is still apparent, even though loadings and order of items differ.

One factor, Parochial School Factor II (Eigen value .50), outer versus inner directedness, appears unique to the motivational structure

of the parochial school male. Parochial School Factor I (Eigen value 1.00), chance-taking versus no chance-taking, seems submerged in Factor I of the Farquhar study, unique versus common accomplishment.

The hypothesis for the 22 variable factor analysis for the parochial school male was:

Ho_5 The factor analysis of the male parochial school students' responses to the GSCI will yield an interpretable structure not different than that found for the public school male.

On the basis on the preceding analysis, two interpretations are apparently warranted. The factorial structure of the parochial school male responses to the GSCI is, for the most part, similar to that found for public school students. However, certain elements, such as outer or inner directedness, emerged which presents the possibility of some unique characteristic of the parochial school student. The results may be due to the prevailing attitudes developed in the parochial school setting or they may be an artifact of the rotational procedures. That is, varimax rotation may have brought the factor to a new simpler structure which might have also been found in the Farquhar analysis had he also used this tool rather than quartimax.

Inasmuch as it is possible to accept or reject a hypothesis which is not tested against an exact probability model, the factor hypothesis appears to have been, for the most part, accepted. However, this statement can only be made with reservation because the factors from the parochial students' responses also exhibited some unique characteristics which need further exploration.

Comparison of Factors of the Forty-Five and Twenty-Two Item Analysis

Items 9 and 59 of Factor I of the 45 item analysis, long-term versus short-term involvement, were also found in Parochial School Factor I (Eigen value 1.00) of the 22 item analysis. Item 33 of Factor I of the 45 item analysis was also found in Parochial School Factor II (Eigen value 1.00) of the 22 item analysis, unique versus common accomplishment.

When the 45 item analysis was compared to the 22 item analysis (Eigen value .50), items 9 and 59 are found in Factor I of the 45 item analysis, and in Parochial School Factor III (Eigen value .50). Both factors were labeled long-term versus short-term involvement. Item 33 was found in Factor I of the 45 item analysis, long-term versus short-term involvement, and in Factor II (Eigen value .50), outer versus inner directedness.

Items 9, 33, and 59 of Factor I of the 45 item analysis, long-term versus short-term involvement, were also found in Factor I of the Farquhar study, unique versus common accomplishment. The factor loadings and order of items of Factor I of the 45 item analysis are different from Factor I of the Farquhar study.

Item 66, a choice of being happy or having lots of money, is found in all of the factor analyses. The item is loaded heaviest for all three of the 22 item analyses, and has the third heaviest loading in the 45 item analysis. Item 66 appears in Parochial School Factor II (Eigen value 1.00)

of the 22 item analysis and is labeled unique versus common accomplishment; in Parochial School Factor II (Eigen value .50) of the 22 item analyses labeled outer versus inner directedness; in Factor II of the Farquhar study labeled immediate versus long-term gratification. Factor II of the 45 item analysis was labeled unique versus common accomplishment.

When the factors of the 45 item analysis are compared with the 22 item analysis, some using the same criterion, some a different criterion, the similarity of items, factor loadings, and order of items is apparent. However, the factors are not interpreted by the nuances of a single item, but by the global aspects of the content. Thus, much room is left for error in interpretation - a risk all factor analysis runs when an attempt is made to label the end product.

Summary:

The principal axis solution was used for the unrotated factors on the responses of male parochial students to the 22 item GSCI. In an attempt to obtain a simpler factorial structure for interpretation, the normal varimax method of rotation was used rather than the quartimax method used by Farquhar. For the first analysis of the 22 items of the GSCI, each factor had to have an Eigen value of 1.00 to be rotated, and each rotated factor had to have at least three items with a minimum loading of .35 to be interpreted. Two factors were found.

To yield a more interpretable factorial structure for the 22 item analysis, the Eigen value was changed from 1.00 to .50. Six factors met the

criterion and were rotated using varimax. Four of the factors met the additional criterion of at least three items with factor loadings of .35.

The factors derived in the 22 item analyses of the GSCI were then compared with each other and with the factors derived by the Farquhar study.

To provide a logical comparison with the 22 item analysis, each rotated factor of the 45 item analysis of the GSCI had to have the same Eigen value (1.00) and at least three items with loadings of .35. When eight fairly uninterpretable factors were derived, more psychological sense was apparent when the criterion for interpretation was changed to permit interpretation of factors with loadings of .50. Two factors were identified and compared with all three previous analysis of 22 items of the GSCI.

Although items loaded differently and the order of the heaviest items varied from analysis to analysis, item patterns, overlapping of items in different factors, and factors derived gave a picture of similarity in structure. One factor, outer versus inner directedness, appears unique to the academic motivational structure of the parochial school male. The conceptual framework undergirding Farquahr's male GSCI Factor III, competition with versus ease of meeting a standard, did not appear as an identifiable structure for the parochial school students of this study. However, neither the unique nor the exclusion finding was given much weight because they most likely were traceable to the differences in rotational procedures.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The study represents another attempt to examine the theory underlying an objective measure of academic motivation - the Michigan M-Scales.

Summary:

The study was both predictive and descriptive in nature. It was predictive in that it estimated grade point averages and descriptive in that an attempt was made to determine the structure of responses through factor analysis.

Purpose of the Study

The purpose of the study was (1) to measure the predictive efficiency of the M-Scales when applied to a parochial school sample, and (2) to study the underlying academic motivational structure by use of factor analysis.

Design of the Study

A parochial school sample was drawn from the eleventh grade of two Michigan Class B parochial high schools. Correlational analysis was used to study the predictive efficiency of the M-Scales while the factored dimensions of the M-Scales were studied through factor analysis.

The results of the factor analysis were compared with the results obtained by Farquhar[1] in a study based on eleventh grade public school students.

Results of Tests of Mean Differences

Scores of the four sub-tests and total M-Scales, the aptitude test (DAT-VR), and the grade point average were obtained for each of the 100 parochial school eleventh grade boys and 100 girls randomly selected in two parochial high schools. From this data mean scores were compared with the mean scores of a public school sample studied previously by Farquhar.

Significant differences were found in GPA, and DAT-VR mean scores in favor of the parochial school males and females. Significant differences were also obtained favoring the parochial school male in the PJCS, the WRL, and total M-Scales. The difference in mean scores of the HTI were significant in favor of the public school male student, while no significant difference was found for the GSCI. For the female sample, the parochial school students exceeded the public school students in mean differences on responses to the WRL. No significant mean differences were found on scores of the GSCI, the PJCS, the HTI, and total M-Scales for females.

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[1] Farquahr, William W., "A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students," Research Project No. 846, supported by the U. S. Office of Education in cooperation with Michigan State University, Final Report, 1963.

Correlational Analysis

Significant correlations from zero with the GPA and DAT-VR were found in the GSCI, the WRL, the PJCS, and the total M-Scales for the parochial school males. For the female sample, the GSCI, the WRL, the HTI, and total M-Scales correleated significantly from zero with GPA and DAT-VR. The sub-test inter-correlations for males ranged from .19 to .64; for females, from .33 to .76. The total M-Scales correlation with GPA was .45 for males and .48 for females. The DAT-VR correlated with GPA at the .66 level for males and .65 level for females.

Results of the Regression Analysis

When the GSCI, the WRL, and the total M-Scales were added to the DAT-VR for the prediction of academic achievement as measured by grade point average, significant F's were found at the .01 level for males. For the females, significance was found at the .01 level when the WRL, the HTI, and total M-Scales were added to the DAT-VR; at the .05 level when the GSCI was added.

Multiple Correlation

A significant increase in the multiple over the zero order correlation of about the same magnitude was found for the male and female sample except for the WRL and HTI for females. For these latter two scales, the multiple correlation exceeded that found in the other scales of the M-Scales.

Factor Analysis Results

The academic motivational structure revealed by factor analysis of the parochial school male responses to 22 selected items of the GSCI, 45 valid items of the GSCI appeared similar to the public school motivational complex with much overlapping of items and similar patterns of responses. One factor, outer versus inner directedness, appeared unique to the motivational structure of the parochial school male. Farquhar's Factor III, competition with versus ease of meeting a standard, did not appear as a motivational factor for the parochial school students. However, neither of these findings was given much weight because of differences in rotational procedures.

Conclusions:

1. The grade point average of the parochial school male and female eleventh grade students was significantly higher than that of the public school sample.
2. The significant difference in academic ability as measured by the DAT-VR indicates that the parochial school male and female sample had higher aptitude scores than the public school student.
3. Each of the sub-tests of the M-Scales and the total M-Scales correlated significantly with grade point average except for the PJCS for both male and female and the HTI for the male sample. As anticipated from previous

research comparing intellectual with non-intellectual predictors, the DAT-VR for both males and females correlated higher with GPA (.66 for males, .65 for females) than any of the sub- or total M-Scales. The inter-correlations of the sub- M-Scales indicates overlap of measurement.

4. The regression analysis revealed that when added to the DAT-VR, the M-Scales, with the exception of the PJCS for both male and female, and the HTI for the male sample, did increase the precision of prediction of grade point average.

5. The factor analysis indicated that factors pertaining to achievement motivation were similar for both public and parochial school samples. However, there were differences in factorial structure. Factors unique to the parochial school sample and public school sample were derived when different factor rotational methods were used.

6. The M-Scales did predict achievement and subsequently helped to explain the motivational complex regarding parochial high school students, at least as far as can be generalized from the sample employed in the study.

Discussion

Many studies comparing parochial and public school students have found that scholastic aptitude measures tend to favor the parochial school student, while achievement measures favor the public school student.

Denny's[2] study revealed a picture of equal achievement between parochial and public school students in a public school setting. When the parochial school sample used in this study was compared with the public school sample used by Farquhar, the parochial school students scored higher both on the aptitude measure as well as on the achievement criterion. This finding may be traceable to the sample selection. Farquhar chose his sample from nine schools in eight Michigan cities in which the heterogeneity in social class composition was obvious. The parochial school sample was drawn from two parochial high schools in two cities from what appears to be primarily homogeneous middle class. The findings of this study pointedly underscore the necessity of delineating sample characteristics. Any discussion of the achievement of parochial schools should carefully consider the socio-economic, cultural, ethnic, and religious parameters of the parochial and contrast group.

The academic motivational structure revealed by factor analysis of selected items of the Generalized Situational Choice Inventory of the M-Scales is a picture of similarity rather than differences in the motivational complex of parochial and public school students. Attitudes of students

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[2] Denny, Terry, "Achievements of Catholic Students in Public High Schools - II," The Catholic Educational Review, LX, October, 1962, pp. 442-469.

toward school may differ from one school to another, but essentially the students appear more alike than different. This appears to be a reasonable finding because, for all practical purposes, the objectives of parochial and public secondary education are the same except for the role of religious education.

Recommendations:

1. Replication of the study on another sample of parochial school students to determine whether or not the same academic and motivational differences prevail.
2. A factor analysis of all sub-tests of the M-Scales, male and female, to gain knowledge of the entire test as it relates to the academic motivation of the parochial school student.
3. Replication of the study using depth interviews to increase the understanding of responses of over- and under-achievers in relation to the theory underlying the M-Scales, particularly for a group easily definable as a separate educational unit such as the parochial school students.

ROUNDED INTER-CORRELATION MATRIX FOR TWENTY-TWO SIGNIFICANT ITEMS OF THE GSCI FOR PAROCHIAL SCHOOL MALES

Item No.	1	2	3	4	5	6	7	8	9	10	11
1.	----										
2.	189	----									
3.	137	308	----								
4.	126	125	380	----							
5.	030	051	316	206	----						
6.	043	-031	-106	-096	055	----					
7.	234	127	205	069	095	079	----				
8.	206	077	027	-013	-091	-075	-121	----			
9.	226	266	177	226	090	039	040	200	----		
10.	077	077	101	067	-091	082	208	053	200	----	
11.	-072	105	-073	038	-093	-099	-059	135	-029	056	----
12.	015	197	276	215	050	059	-067	169	075	-020	074
13.	231	159	339	489	102	-064	234	206	152	206	115
14.	139	035	110	342	155	-060	114	005	-022	118	139
15.	011	147	141	110	120	082	017	087	115	025	-074
16.	133	149	251	090	119	-118	050	-071	073	142	191
17.	114	206	179	091	018	089	112	161	286	027	-095
18.	009	097	-033	-009	024	-052	007	036	004	166	200
19.	263	285	624	364	117	050	285	007	198	091	-003
20.	126	348	568	255	152	037	237	067	171	147	038
21.	175	129	145	278	-014	-068	-014	185	099	185	263
22.	053	223	086	159	-090	-130	-108	171	319	035	140

Item No.	12	13	14	15	16	17	18	19	20	21	22
12.	----										
13.	037	----									
14.	009	294	----								
15.	060	144	-104	----							
16.	178	141	085	-035	----						
17.	076	328	048	154	176	----					
18.	-057	215	236	-110	146	202	----				
19.	181	339	072	175	063	190	005	----			
20.	215	126	-042	110	210	148	-009	577	----		
21.	130	361	270	-034	269	218	477	127	191	----	
22.	150	184	055	047	038	207	210	142	159	301	----

(Decimals are omitted; values are positive unless otherwise indicated.)

SIX UNROTATED FACTORS FOR TWENTY-TWO ITEMS OF THE GSCI

Item	No.	Factors 1	2	3	4	5	6	Communality *
1.	(6)	33	00	00	28	07	07	25
2.	(9)	45	-05	-27	-01	-09	02	39
3.	(11)	70	-38	09	-22	01	13	72
4.	(13)	55	00	29	-06	40	-10	54
5.	(14)	21	-19	23	-06	09	32	23
6.	(16)	-04	-13	-02	19	-10	05	03
7.	(18)	27	-18	24	25	-31	-05	27
8.	(20)	19	20	-27	07	11	-03	14
9.	(23)	38	00	-31	26	14	03	33
10.	(27)	23	12	04	14	-22	-09	15
11.	(33)	11	34	-03	-26	-07	-15	19
12.	(36)	28	-06	-19	-26	15	04	24
13.	(38)	60	23	25	25	16	-04	57
14.	(39)	26	28	41	-00	06	-00	31
15.	(41)	17	-17	-11	13	14	07	08
16.	(44)	32	15	-02	-20	-16	23	27
17.	(46)	38	11	-20	29	-00	27	36
18.	(50)	21	54	06	-02	-25	12	43
19.	(55)	68	-37	03	01	-08	-23	70
20.	(59)	61	-33	-15	-22	-25	-08	64
21.	(66)	47	54	01	-12	-08	-00	53
22.	(77)	33	28	-34	-03	16	-11	34
Sum of Squares		3.52	1.56	.94	.76	.66	.42[2]	

[1] Values are positive unless otherwise indicated; decimals are omitted in body of table.

[2] Due to parameter this factor, sum of squares, was included even though it fell short of criterion.

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