Competitiveness, Cooperativeness, and Assigning Grades in the High School Classroom

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CLASSROOM.

ANDREWS UNIVERSITY, ED.D., 1978

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COMPETITIVENESS, COOPERATIVENESS, AND ASSIGNING GRADES IN THE HIGH SCHOOL CLASSROOM

A Dissertation
Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Nelson Edward Evans

June 1978
COMPETITIVENESS, COOPERATIVENESS, AND ASSIGNING
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ABSTRACT

COMPETITIVENESS, COOPERATIVENESS, AND ASSIGNING GRADES IN THE HIGH SCHOOL CLASSROOM

by

Nelson Edward Evans

Chairperson: Conrad A. Reichert
ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University
Department of Education

Title: COMPETITIVENESS, COOPERATIVENESS, AND ASSIGNING GRADES IN THE HIGH SCHOOL CLASSROOM

Name of researcher: Nelson Edward Evans
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Date completed: May 1978

Problem

Currently, educators and psychologists have been rejecting the generally favorable position competition has held as a motivator and value within education. This study focused on teacher and student orientations varying as cooperative or competitive and the effect that they can have on student grades. That the interaction among students and teachers varying by orientation may prove counter-productive in the classroom is a crucial concern for both educators and students. It was hypothesized that dissimilarly oriented teachers and students would result in lowered grades.
for students. Independent variables were chosen in accordance with this major hypothesis which was divided into eleven research hypotheses.

Method

Three hundred and sixty students together with twenty of their teachers were included in the study population from among twenty high school mathematics classes equally divided between public and private schools. Each classroom teacher together with his or her students was asked to respond to the test battery containing a standardized achievement test and a cooperative/competitive orientation scale. The test battery consisted of a questionnaire coversheet, the Sawyer Altruism Scale (adapted by the researcher), and the arithmetic subtest from the Wide Range Achievement Test (WRAT). The independent variables were obtained from the questionnaire, the cooperative/competitive orientation from the Sawyer Scale, and the standardized achievement score (covariate) from the WRAT subtest.

The data were collected by the researcher from each classroom as a unit with a guarantee of anonymity given to each participant. Full cooperation was received from all school personnel requested to participate. The primary statistical method employed was the analysis of covariance using the general linear hypothesis model.
Results

The major hypothesis was upheld in one case. There was a significant interaction among student and teacher groups, varying as competitive or cooperative, with respect to the grades assigned after adjusting for achievement test scores ($p < .05$). Within this hypothesis it was determined that cooperatively oriented male teachers account for the greater part of the variance with respect to the grades students received. The highest grades went to female students with a similar orientation while competitively oriented male students received the lowest grades.

Also important was the finding that no significant interactions existed among the remaining hypotheses with respect to the independent variables: students' and teachers' sex, public or private schools, and standardized achievement levels. In and of themselves these independent variables do not appear to account for significant variances among grades given by teachers or received by students.

Conclusions

Cooperative and competitive orientations can be identified among teachers and students in the classroom setting. These cooperative or competitive orientations appear to influence the interpersonal dynamics between the teacher and his students in such a manner as to affect the assigning of grades. Cooperatively and competitively oriented teachers gave higher grades to students of a similar orientation while students with orientations dissimilar
received the lowest grades. This study raises questions about the dynamics or style of teaching that need to be explored systematically.
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PREFACE

For a considerable period of time the researcher has debated the question of the effectiveness of competition to get-the-job-done in education. Only recently has the matter broadened to include the alternative variable of cooperation and subsequently to assume the formality of a doctoral dissertation. The study thus undertook to research the question of cooperativeness, competitiveness, and grading of high school students.

The literature review presented confusing and at times conflicting views on the importance of cooperation/competition in the field of education. Delimiting the scope of the study was not easily accomplished. Should this be another study of motivation? What part of this research should focus on values? Do intrinsic or extrinsic factors enter into consideration? It seemed important to the researcher to observe the attitudes students held about themselves and other persons (students) in the classroom setting with respect to grading. The research design allowed the subjects' responses to be quantified on a point between the purely cooperative or competitive orientations. The questions to be resolved were two-fold: Can cooperative and competitive orientations among students and teachers be identified? And secondly, what effect do these orientations have on the students' achievement as measured by the grades they receive? The findings are
set forth in the following study. It is not presumed that this study answers all questions which may arise with respect to cooperativeness and competitiveness in the classroom, but hopefully it will promote further research of this important dynamic.

This research has helped me understand more clearly the essence of cooperation, working interdependently with others to accomplish a common goal. The most vivid example of interdependency was found among the members of my doctoral program committee. Conrad Reichert, chairman of the committee, has proven a most supportive and competent guide. His many hours of consultation and reading of the manuscript are thoroughly appreciated. He has been my major professor, and I am thankful for the insight of psychology and philosophy gained from the classroom and personal experiences he has shared with me over the past five years. Wilfred Futcher's genius with statistics, clarity of word, and genuine humility provided structure, exactness, and grace for the writer and is hopefully reflected by the written as well. Robert Williams has shared his dynamism, understanding of persons, and piquancy with the researcher. I am most thankful for the experience of working with him as a graduate assistant. Lawrence McNitt has helped increase my understanding of research design, computer technology, and statistical inference. He has been an invaluable resource person.

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God is good and I thank Him for providing the challenge
and the strength to see it through to the end. May this study
provide a challenge and blessing to all who read it. May their
service in education be enriched.
CHAPTER I

INTRODUCTION

Statement of the Problem

Competition is generally accepted as a positive value in American society. It is assumed to provide motivation for both the adult in his vocation and the school-age child in his learning experiences. It is considered to be a necessary "preparation for life." While competition has proved to be an effective incentive as far as mass production is concerned, its value in toto has been questioned by current research in the fields of social psychology and education (Combs, 1973; Bettelheim, 1969; and Wax, 1975).

The nation's economy is expected to flourish under competition. In fact, legislators have passed antitrust laws which ensure competition by protecting commerce from monopolies or, most recently, "fair-traded" goods. The general consensus is that competition will produce a "better mousetrap." Competition has been generally accepted as an inherent drive. So "natural" has this phenomenon of competition become that business persons of the 1960s stared in disbelief as their sons and daughters violently demonstrated their rejection of this competitive style of life. Literature began to flood the bookstores challenging the preeminence of the establishment and its methodology. Popular books a few years ago--The Status Seekers, The Man in the Grey
Flannel Suit, High Brow, Low Brow and Middle Brow, to name a few—all expose social status competition with its subtleties and ambiguities. The accumulation of goods and "cut-throat" manipulations for position, power, and wealth have been graphically portrayed and questioned. In short, the value of competition for social status has been challenged.

Competition is found in industry, athletics, the arts and sciences, and quite unmistakably in adolescent interpersonal relationships. It can also be seen in nearly every aspect of education. Students are rallied by their teachers and peers to "win the PTA pennant for our room," to "grind those bums [the opposing football team] into the turf this season," or to "audition for the school's elite choral group." Are there students who have not inherited or acquired a competitive spirit? Are there students who cannot be "rallied" or "joined-up"? Are there students who have a non-competitive orientation who are adversely motivated or, perhaps, attenuated by the methods of a competitively oriented teacher? These are questions which arise with respect to the place of competition in the classroom and school system.

In a society which requires that all of its children be educated, it is only fair to expect that all children have an equal opportunity to benefit from the total school program. Combs, Avila, and Purkey (1973) wrote,

In our society, competition is almost universally assumed to be an excellent device for motivating persons to extend themselves. . . . When understood in terms of the effects of challenge and threat, competition turns out to be a motivating force of limited value for some and downright destructive for others. (p. 109)
Some social scientists have been introducing the view that cooperation is a more mature value than competition (e.g., Lingren, 1962).

This research attempted to identify the orientation of teachers and students as cooperative- or competitive-types. It studied the relationship between high-school teachers who vary as cooperative- or competitive-types and the achievement of students who had similar or dissimilar orientations.

**Purpose of the Study**

There were four objectives in carrying out the present study: first, to show that teachers could be defined as cooperative- or competitive-types while functioning within the classroom; second, to show that students could be defined as cooperative- or competitive-types while functioning within the classroom; third, to analyze the effect of teachers who vary as cooperative- or competitive-types on the achievement of students who have similar or dissimilar orientation; and fourth, to use the results of this study of cooperative- and competitive-type orientations of teachers and students to suggest directions for further research on the value of both the cooperative and competitive approaches as motivation for learning.

**Definition of Terms**

Certain words used often in this study are to be understood as follows:

**Competition** is the active involvement motivating a person toward achieving a goal (grades) by surpassing the achievement of
others in the same pursuit. It is often equated with an aggressive, self-sufficient personality.

Cooperation is the active involvement of one person with other persons in a give-and-take relationship which is goal directed, i.e., achieving grades. In a learning situation it involves fellow students and a teacher who serves as an expert on learning, a facilitator, a resource person.

Personality Factors are human traits manifested in behaviors which are recognized universally. They are attempts to explain all significant behaviors which are characteristic of man. The factors specific to this study are: cooperativeness and competitiveness.

Limitations of the Study

1. There is no claim that the independent variables selected for this study are the only ones which may affect the assigning of grades to students by teachers. With little doubt there are other factors among personality, teaching styles and course requirements which may affect grading. The variables selected fit into the theory developed from the literature review and personal experience.

2. This study is limited to high school age students in grades nine and ten from public and private schools selected from the four states bordering on Lake Michigan. The number of private schools were limited to those high schools affiliated with the Seventh-day Adventist Church and located within this region. The public schools selected were those in closest geographical proximity to the private schools. The total number of schools selected was limited to twenty.
3. The student's "grade" is defined as the evaluative mark received from his/her mathematics teacher at the end of a major marking period (six or nine week term). It must be pointed out that the grades students received were not necessarily equivalent to the actual learning or education which took place.
CHAPTER II

REVIEW OF THE LITERATURE

Related Research

A multitude of studies, articles and textbooks discussed the question of motivation or achievement motivation, but little material had been written which discussed the problems addressed in this study. The cooperatively or competitively oriented teacher and student were the referents used to review the literature. Empirical studies, numerous journal articles, and literature in general were probed to obtain background and gain perspective for this research.

This chapter will review the literature and research which pertains to the question; present the theories related to the question; and state the hypotheses of the study.

The literature on competition and cooperation falls into two categories; one, a research-oriented approach which treats competition as a motive; and the other, a philosophical approach which views competition as a value.

Research on Competition as a Motive

Among the early studies demonstrating that competition is a motivating factor is Luba's experiment in the 1930s (Pinter, 1961). In this study rivalry produced a 47 percent increase in achievement
of school children and was most effective for those below the lower quartile (71 percent increase as compared to 34 percent increase above the upper quartile). Another early study to ascertain the effects of group rivalry as an incentive was reported by Hurlock (1927). This study shows that arithmetic achievement improved more under competitive than noncompetitive conditions and that the greatest improvement was realized among the youngest children and those of inferior ability. The average score made by the rivalry group exceeded that of the control group. The rivalry group gained 41 percent when compared to the control group. An increase in accuracy of performance came only with the application of the incentive and it was small—the maximum being 8 percent. The members of the rivalry group who were defeated on the first day of the experiment seemed never to be able to overcome this initial defeat.

In a study of college students (Sims, 1928), where the dependent variable was digit substitution and reading, improvement is related to group competition, individual competition, and a control group with no competition. The largest improvement occurred under the individual competitive conditions. It was found that individual-motivation was vastly superior to group-motivation, and group-motivation is only slightly superior to no motivation other than that which comes incidentally in learning.

Time-study research was attempted with college students (Whittemore, 1924) to measure the influence of competition on performance of four "printing" tasks. Students were divided into
competitive and noncompetitive groups and instructed to assemble a paragraph on a rubber stamper and "print" it on a piece of white paper. The competitive participants were instructed to "try to beat your fellowman while remembering that both quality and quantity count in the final scores--compete!" The noncompetitive persons were instructed to "try to get as much done as you can . . . don't attempt to beat your fellow worker!" The result showed that all the subjects turned out more work when competing than when not competing. The average gain was about 26 percent. It was observed that the subjects least capable in speed profit most from competition. Also, all subjects did poorer work when competing than when not competing. Most subjects tended to work faster in groups not present but recognized, than when competing against one another.

In a more recent study a fifth-grade class was divided and arranged so that competition was a factor for one group but not the other, and then the roles were reversed (MacCormack, 1964). The group which had competition as a factor made greater gains. The findings should be viewed as tentative because of the limits of the design (one classroom). Collins (1968), in discussing the role of competition in the classroom, reported that competition, cooperation, and group pressure are all factors in social control. His theory holds that competition provides motivation for adding new knowledge while cooperation allows for the free exchange of that knowledge as information. In Ione, California (Liegerot, 1961), a program of academic games similar to intramural sports was established to promote the acquisition and use of knowledge. Questions were
prepared by members of the faculty and presented to teams of four students. The idea received enthusiastic support from the student body.

Some of the more recent research on competition are directed toward the area of physical education. One researcher (Read, 1968) compared the effects of competitive and noncompetitive programs in physical education on body image and self-concept. He found no difference between the competitive and noncompetitive groups. However, he noted that within the competitive group, the self-concept of the constant winners improved while that of the constant losers lowered. Initially, the positions of the winners/losers were reversed.

Strong (1963) studied the effects of six variations of competitive motivation on a physical fitness test. The results showed that the most effective arrangements were level of aspiration (child sets his own goal after the initial test score is given to him) and team competition. The less effective arrangements were competition with self and competition with estimated class records, someone of near equal ability, or someone of markedly different ability. A control group was given only individual scores with no comment. This study of sixth graders, which continued for a two-year period, showed that the validity of physical fitness tests depends on motivating conditions and that boys' performance improved more than girls' under motivating conditions.
Ogilvie's (1968) study of the personality of high level competitors was born out of a genuine concern for the mental health problems being experienced by some professional athletes. This study compared successful young swimmers with nonathletes on changes in personality characteristics from ages ten to fourteen. The study included both boys and girls. A number of personality assessment inventories were used to evaluate personality changes. The study revealed that those who remained in competition became "more outgoing, warmhearted, more emotionally stable, have increased conscience development and increased tough-mindedness, became more forthright, have increased self-control and moved from high resting tension to low levels of tension."

Heckhauser (1967) makes the point that achievement behavior for its own sake cannot be separated from the social-esteem component. Thus a performer views a task to be completed according to his standard of excellence in the light of how this performance will affect one's relationship with others. In the first three years of life, achievement motivation is primarily sensorimotor. The child is able to experience pleasure and disappointment over his successes and failures. This "function pleasure" plus cognitive development necessary for the child to perceive the self in the environment is necessary before achievement motivation develops. Time perspective is involved since the child must be able to relate past experience to future expectation of success or failure. If success and failure are equiprobable, children of approximately four and one-half years
expect success. This is considered to be a critical age for the child in deciding whether or not to try. Heckhauser states, "a remarkable stability exists from age three into adulthood for individual levels of achievement behavior (especially in the intelligence area) and for the disposition toward competition."

The point is made that risk-taking is not the same as achievement motivation although they are often confused. There is little difference in children under twelve whether risk-taking is on a chance or ability basis.

Exline (1963) reports that among high and low need affiliation groups the amount of mutual interaction (measured by recording the frequency of visual glance) varies with the degree of competition present in the situation. Persons low in need affiliation, especially women, tend to glance at each other more frequently in competitive situations. Those high in need affiliation avoid each other's glances.

Wilkins and Glick (1973), while replicating the Rosenthal and Jacobson (1968) study of the effect teacher expectation has on student achievement, found that there was no significant effect when experimental manipulation of teacher expectations was performed. They found little to support the findings of the Rosenthal study. However, they did not hesitate to state that some effect on students' achievement is attributed to teacher-pupil expectancy-type interaction.

Stallings (1974) in an executive summary of the Stanford Research Institute wrote of her findings regarding the implementation
of the open classroom model as compared to the traditional classroom. It was reported that the great majority of first- to third-grade teachers included in the study was conforming to instructional procedures as specified by the sponsors. Time spent in reading and math activities and a high rate of drill, practice, and praise were shown to contribute to higher reading and math scores. Lower absence rates and higher scores on a nonverbal problem-solving test of reasoning can be attributed in part to more open and flexible instructional approaches. It was concluded that what occurs within a classroom does contribute to achievement in basic skills, good attendance, and desired child behaviors. Further, the seven follow-through models considered in this study are bringing different strengths to their pupils, and each is bringing advantages not usually found in traditional classrooms.

In summary, the research and writings clearly classify competition as a human motivator. It was shown that its effectiveness, however, varied with the tasks undertaken and the personalities of the individuals involved. The research speaks to the question of quantity versus quality. It was noted that when quantity is the primary goal quality will suffer. The effect of competition on a person's self-esteem depends on whether he is a "winner" or a "loser"; constant winners increase in self-esteem while constant losers decrease.

**Competition as a Value**

Mead's *Cooperation and Competition Among Primitive Peoples* (1937) makes an appropriate starting point for reviewing the other
body of literature which treats competition as a value. Mead reports that the three most competitive primitive societies studied contain "a basic recognition of discrepancies in status among individuals" (p. 470). Status is not fixed: that is, an individual may improve or lose status by his own achievements. Achievement is emphasized and so defined that the individual can measure himself against others. Property is an aspect of the ego and sense of security is vested in ego development. Sanctions for social control are the internal fear of loss of position by the society to which one belongs. Supernatural powers are viewed negatively and are not considered trustworthy because they are subject to manipulation. While the primitive type societies varied considerably on the two major factors, there were also common characteristics of the most cooperative societies. In these societies the social hierarchy is more fixed. The individual member has a more ordered view of the universe and man's relationship to the supernatural. Security is more closely tied to the kin group than to individual achievement. The social structure does not depend on initiative and has social sanctions against competitive behavior, assertiveness, and conspicuousness.

Lauterback (1954), in an examination of the motives which operate in our economic system, proposed that both competition and monopoly represent expression of the more basic motive for self-assertion. Competition is sometimes held to be a socially acceptable expression of aggression.

An article in *The Educational Forum* (1962) presents the agreement that competition is appropriate classroom behavior because
It is necessary preparation for the "real world," the adult world. It is considered important to teach the child how to win or lose without ego involvement so that he may develop healthy responses toward competition. Vincent presents the view that the effect of competition is injurious to the child when "a gain to your ego means a loss to mine" (p. 292).

Hawk (1963) opposed classroom competition on the grounds that it provides reinforcement in only the top contenders and none for the majority, particularly when "marking on the normal curve."

Weinberg (1965) discussed the "price of competition" by citing what he calls "dysfunctional effects": anxiety, withdrawal from learning due to painful fear of failure, loss of joy in learning for its own sake, and the substitution of status gained in competition instead of education as the goal. He wrote,

To date we have not invented an artificial technique with the power of competition to motivate school children to attain goals set for them by the school. Competition is then functional to the accomplishment of some educational goals and is emphasized intensively in every educational setting. (p. 107)

He warned against removing all forms of competition until a viable replacement is devised despite "the price."

Houts and Entwhistle (1968) discovered, while studying the "assumed value of competition" in the society, that it is an opinion held almost exclusively by boys and men. The results of their study showed that competitive attitudes toward boys among girls are related to academic performance with a masculine sex-role orientation, but that there is no relationship between these attitudes and performance among girls with the traditional sex-
role orientation. There was a statistically significant interaction between sex-role orientations and achievement attitudes for obtaining higher grades among girls who see masculine competitive behavior appropriate to the female role. Here it was found that competition as a value provided motivation for those who perceived it to be important.

Rappont and Goldman (1963) refer to the "lonely student," as one who is subjected to the extreme pressures of competitive college admission policies, staying in a given academic program, receiving financial help through competitive scholarships, succumbing to the unethical practice of cheating to survive, and reaping psychosomatic complaints together with other escape-type abnormalities.

Sarason (1960) saw a relationship between Anxiety in School Children and evaluative techniques used by authority persons. To be assessed with the risk of being "devalued" arouses hostility in a child toward authority persons in and out of the school setting. The child's self-concept is primarily tied to body image since he has fewer attributes and roles on which to value himself. He tends to express his hostility in physical ways and likewise expects physical harm as a result of being judged inadequate. Therefore the test situation represents for the child the occasion of judgment which generates varying degrees of fear.

Competition was described by some authors as the antithesis of cooperation and therefore an inferior value. Lindgren (1962) wrote: "Competition is a more primitive and less mature approach
Co human relations than is cooperation" (p. 146). He opposed the promotion of individual competitive striving on the basis that it fosters a strong need to excel at all costs and produces self-centered, overly ambitious children who cannot cooperate. This view is similar to that of Johnson (1970) who saw competition as one context for conflict—the other context being cooperation. He points out the dangers of distortion in perceiving the competition as a rival and the consequences this perception has on effective communication with that "rival." Competition may bring cohesiveness of one group at the expense of a more universal group or other smaller groups. He points out that when conflicts arise in a classroom, the solution will be less than successful if the conflict is defined in a competitive way.

Guilford (1972) studied the relationship between teacher-pupil value disparities and the academic achievement, classroom behavior, and school adjustment of elementary children. He found that values do play a part in the adjustment of a child to school and his achievement. It was concluded that the more a child is like his teacher at the beginning of the school year and continues to become more like her during the school year, the better he will do in school.

LaVoie (1974), making an experimental investigation of the characteristics of children on teacher expectancy, found that children (grades one through six) who are achievement-oriented, accepted, cooperative, dependable, and self-controlled are perceived by teachers to be more academically capable and likely to
achieve greater vocational success. It appears from the study that children with good conduct are the "chosen ones" in the elementary school, regardless of their level of physical attractiveness or sex.

In summary, competition as a value is presented in the literature as varying from cooperation in its effect. The cooperative society provides its membership with a more ordered view of the universe and man's relationship to the supernatural with security tied to the kin group. The societies studied (Mead, 1937) tend to support one value which mutually excludes the other. Competition has been viewed as a socially accepted expression of aggression. The "assumed value" of competition seems to be held almost exclusively by the male population in the United States. Stress on competition to obtain entrance to a college program is shown to have negative physical and mental effects. Again, competition is viewed by some authors as "more primitive and less mature" (Lindgren, 1962). And finally, children who are "achievement-oriented, accepted, cooperative are perceived by teachers as being more academically capable" (LaVoie, 1974).

Rationale Underlying the Present Study

Classrooms in the traditional sense have placed teachers at an unfortunate and unnatural disadvantage with students—unfortunate, in that student achievement is equated with the teacher-directed classroom—unnatural, and that competition provides the motivation necessary to involve all students in a positive and productive educational experience.

The present study lends empirical support to well-known psychological findings. These findings include the following:
personality is multivariate and a complex intrapsychical and interpsychical phenomenon; persons can be described as competitive or cooperative types; traditional teaching methods tend to employ competitive-oriented motivational techniques; and cooperative-oriented teaching techniques are viable teaching alternatives and provide motivation for some students.

Psychologist Sarason (1969) wrote that personality has a wide variability from person to person in response tendencies. Individual differences relating to people's concepts of themselves and others, their goals, and their fears are much less susceptible to simple and unambiguous definition. (p. 1)

Personality assessment is not an easy task, wrote Cronbach and Meehl (1955), because in "referencing internal events (traits, response tendencies, habits) . . . no simple criterion is available" (p. 288). They wrote of identifying constructs relevant to behavior and the complexity of personality, "few specifiable associations with which to pin down the variable exist" (p. 289).

What goes on intrapsychically can only be inferred, not observed directly. The most tangible aspect of personality is behavior. It is possible to explain some behaviors from the standpoint of economic principles, others from geographical settings, and still others from personality factors. Quite possibly, the major determinants of behavior are personality and situational factors. One infers what a person is thinking by what he is observed doing rather than why he does it (DiCaprio, 1974). Murray (1959) has studied human personality and discovered a way of organizing theoretical constructs which aid in identifying, classifying, and
understanding behavior. These constructs are helpful in describing a person's behavior within his environment. Personality to Murray is a dynamic structure composed of needs, abilities, and achievements. Murray (1940) wrote about man as

- a flow of powerful subjective life, conscious and unconscious;
- a whispering gallery in which voices echo from the distant past;
- a gulf stream of fantasies with floating memories of past events, currents of contending complexes, plots and counterplots, hopeful intimations and ideals . . . a personality is a full Congress of orators and pressure-groups. (p. 32)

DiCaprio (1974) wrote that one of the best proofs for the existence of needs is the degree of readiness of the organism to respond to the same stimulus situation at different times. Consider the hunger of man for instance. When one has just eaten, even the most appetizing food may have no appeal. Sometimes, however, a person who has just eaten may still be enticed by a dessert. Most often, although there is no food present, a hungry person begins seeking it. Thus three states exist for understanding need: (1) an inactive phase in which no stimulus will arouse the need, (2) a readiness phase in which only certain stimuli will arouse the need, and (3) an active state in which the need impels the person to seek gratification, even without the pressure of an appropriate stimulus. (p. 200)

It is apparent from Murray's writings that man is viewed as having a multi-faceted personality and that he responds to complex intrapsychic and environmental stimuli. Assuming that Murray's model of personality is correct, it naturally follows that a person's needs can not be classified as static, stereotypical, or completely predictable. In order to determine a person's needs one must know his specific goal-orientation. His concrete, tangible, need-substance must be known and understood. The question of academia is subordinate to need substance and the state of need, inactive, ready, or active. It is not likely that
a person would "select" the variable of achievement alone without
the presence of other factors (money, friends, approval, status)
intricately interwoven.

No matter how they organize their theory, every major
personologist describes personality as multi-faceted and including
interpersonal constructs. Murray (1938) categorizes needs as
viscerogenic, which have to do with the maintenance of life and
little to do with personality unless there is a severe deprivation
or excess; and psychogenic, which are largely responsible for the
structuring of personality. A summary of Murray's psychogenic
needs model provides twenty items (needs) which normally require
attending. Needs specific to this paper would include: the need
to cooperate enjoyably or reciprocate with an allied other; the
need to accomplish something difficult; the need to make an im-
pression; the need to have one's own needs gratified by the sympa-
thetic aid of an allied object; the need to give sympathy and gratify
the needs of a helpless object; the need to separate oneself from
a negatively cathected object; and the need to avoid humiliation.

Freud (1933) conceived of personality as being composed
of warring systems which are constantly in conflict with each other.
The Id represents the psychobiological urges; the Ego is the conscious
agent in the personality; and the Superego is the moral and social
aspect of personality. Freud saw the development of the Superego
as the development of conscience, the cultural prescriptions--the
do's and do not's--of society. The conscience is internalized by
repeated cultural exposure to values, social behavior expectancies,
the work ethic, and the like which are learned by the child in the family and societal environment. The development of personality occurs from the first few weeks after birth through the adolescent age. The healthy personality is one who functions in moderation and compromises, through learning, to accept things as they are. Freud's theory discusses personality as a complex molding which takes place within an individual because of the effect of external events which occur early in a child's life. Normal development of a child is dependent upon being surrounded by well-balanced healthy others in the family and society.

Horney (1937) was among the first psychiatrists to consider cultural factors along with the familial as major determinants of personality. She, like Freud, saw the home environment as significantly important, but also included the child's educational and social experiences. She wrote:

My own belief is that man has the capacity as well as the desire to develop his potentialities and become a decent human being, and that these deteriorate if his relationship to others, and hence to himself, is and continues to be, disturbed. I believe that man can change and go on changing as long as he lives. And this belief has grown with deeper understanding. (1950, p. 22)

Man's hope for reaching his full potential lies within himself if supported by his societal environment. Personality development is seen as being enhanced or impaired by the quality of interpersonal experiences.

Allport (1955) believes that the necessary equipment one must have to be able to cope with life includes mostly time—progressing toward maturity. Since maturity cannot be attained
by a child, it should not be expected during childhood to any marked degree. Maturity involves a moving toward goals which society has adopted. The specific goal is job advancement which will bring most other essentials for personal well-being in its wake. Healthy personalities are not necessarily euphoric and do not search for happiness because joyfulness comes as a byproduct of job advancement. Maturity is self-fulfillment, self-actualizing, with the most complete development demonstrated when given life's circumstances. Each person is seen to have a unique personality and so should be approached as an individual. The criteria of maturity would include seven characteristics (Allport, 1961): (1) self-extension—the active or passive participation of one with society; (2) warm relating of self with others—smooth sociability; (3) emotional security—cooperation with inevitables; (4) realistic perceptions—current knowledge of people and things; (5) skills and assignments; (6) self-objectification; and (7) unifying philosophy of life—guiding goals and values, religious faith, and directedness. Personality is composed of the appropriate balance of these criteria and is accomplished through interpersonal learning experiences.

Rogers (1961) states that every person has powerful constructive forces within his personality that need to be given "space" enough to operate. Man's motivations and tendencies are seen as being essentially good and positive. Negative emotions are not really the core of man's nature for he is really sensitively humane. Parents and significant others are extremely important in the child's life, and what they expect of him and how they structure
his activities have a tremendous influence on his development. The basic problem of the growing individual is to discover and express his real self within the roles which his societal environment imposes on him. The child is usually, and sometimes unfortunately, "fitted" to the culture, and not the culture to him. He is rewarded and punished for his knowledge and successful performance of these roles. Rogers speaks of willingness-to-be-a-process by which he illustrates the flexible, spontaneous, creative, and dynamic life which is always approaching but never arriving. This fully functioning person will be "... fully operating, then he is to be trusted, then his behavior is constructive" (p. 105). Rogers respects the capacity for good of the individual. Every child has a strong need for positive regard, for acceptance, respect, and love; which all presupposes a warm and affectual interpersonal relationship.

Maslow (1970), like Rogers, stresses the value of accepting rather than evaluating others. He insisted that an acceptable attitude toward one's self is the only way a person can develop a healthy and functioning personality. Growth is promoted through using one's powers. A child does not instinctively know what is good or harmful, he must learn. Maslow advocated fulfilling one's own individual personality needs at the expense of his culture. "Being one of the herd is not conducive to self-actualization" (p. 150). Self-actualization implies the full use of talents, capacities, and potential. The traits of a self-actualized person include: (1) efficient perception of reality; (2) acceptance of self, others, and nature; (3) high
individualism; (4) problem centering; (5) self-motivators, viewing free-will as an active process; (6) self-sufficient, independent of environmental conditions; (7) identity with humans in general, affection, understanding, and sympathy given freely; (8) interpersonal relations; (9) democratic character structure, accepting of people; (10) creativity, inventiveness, originality, and spontaneity; and (11) resistance to enculturation.

These references provide sufficient background to conclude that human personality is multivariate in structure and develops through interpersonal experiences. Personality can be considered from many theoretical perspectives, but all of the theorists cited consider individuality and a nonthreatening interpersonal relationship desirable, if not essential, to the formation of the healthy and predicative person.

Persons can interact cooperatively or competitively. Classrooms are quite typically competitively oriented with concentration focused on content learning and information giving. Only recently have the influence of the humanists, perceptionists, and T-groups been expressed in the teaching methods at the elementary and secondary levels. As conceived by Rogers (1964), sensitivity training is designed to assist the participants to "share in the exploration of their interpersonal attitudes and relationships." A high regard for individuality underlies Rogers' philosophy. Most of the theory emphasized by Rogers has been advocated by Bruner (1960, 1966), Combs and Snygg (1959), and Thelen (1960, 1967). Perhaps the greatest difference between
Rogers' approach and the discovery session of Bruner is the focus on personal interaction between teacher and student.

Probably not all students are able to respond equally well to experiential learning. Maslow (1970), Rogers (1961, 1964), and Moustakas (1966) all place emphasis on the desirability of giving students as much free choice as possible. They see the teacher's role as making growth choices attractive and as providing resources of various kinds for the students' uses. The teacher is still an important element in the classroom; he/she will still provide direction and guidance, and some students will need considerably more guidance than others. It should be recalled from the Maslow model, that self-actualization tends to take place only after the lower needs have been satisfied.

Wax (1975) writing in a recent issue of the Kappan, states:

It is difficult to think of a great teacher who advocated competition as a viable motivational tool. Teachers of global impact such as Lao-tse, Socrates, or Christ were advocates of our mission to help others. Psychologists of the rank of Freud, Frankl, and Skinner consistently deplore the effects of competition on emotional and intellectual development. Notable educators such as Froebel, Montessori, and Dewey designed philosophies and curricula that avoided competitive confrontation. (p. 197)

While the cooperative approach to education is not specifically mentioned, there can be little argument that an absence of competition calls for an increase in student and teacher interaction and cooperation.

It is because of the above citations and the questionable effect of competition in the classroom that the present research
was undertaken. Specific to the question are the statements of Combs (1973):

Although it is true that we occasionally compete with others, competition is not the rule of life but the exception. Competition makes the news while cooperation supplies the progress. One needs but to reflect on his own past twenty-four hours to discover how overwhelmingly his behavior has been cooperative and how seldom competitive. (p. 109)

Again Combs (1973) brings focus to the question by itemizing some of the effects of competition:

1. Competition has motivating force only for those persons who believe they have a chance of winning.

2. Persons who are forced to compete and who do not believe they have a chance of success are not motivated by the experience; they are threatened by it.

3. When competition becomes too important, any means become justified to achieve the ends. (p. 110)

Bruno Bettelheim, writing on the "Autonomy and Inner Freedom: Skill of Emotional Management" (1969), states:

My task is to discuss some of the skills which allow the individual to function successfully, and to speculate about the kinds of school experiences which nurture the development of such skills. . . . We can also reduce the problem of coping with human anger by avoiding the situations which arouse it in the first place. The school inadvertently nurtures frustration and anger by its societally inspired perpetuation of the competitive spirit. . . . Competition is extremely destructive where the competitors are poorly matched, and where all too often repeated failure is inevitable for some of the participants. (pp. 79-80)

**Importance of the Study**

Educators at all levels who direct full attention toward effective teaching techniques are often trapped into equating grades with relevant learning, course content/information with socialization, or success in getting the lesson across with grades. It may well
be that the greater emphases of a typical classroom are being un-
intentionally neglected as the emphasis continues to be placed on
content, grades, and a competitive approach to education. Teachers
use competitive techniques to "motivate" their students. While
some competition would seem unavoidable or in some circumstances
desirable, it should be found in the areas where all students
participating have an equal chance to be successful. The pervasive
practice of competition in the school may not be serving the best
interest of all students. While some students, who have known a
high achievement pattern, may survive or even thrive on this
approach to learning, it may not be a successful approach to use
for students who have achievement or interpersonal difficulties.

It is also extremely important to note that children tend
to seek ways to "get into the group," to "receive the group's ap-
proval," and that this grouping tends to increase through the teen
years. Given the opportunity, a child will participate in groups
(pre-gangs, gangs, cliques, peer groups) which naturally provide
needed support for the emerging social being. Children seek ways
to please one another and to cooperate in play and work activities.
This may provide one with an important clue regarding the potential
of group learning activities.

Experimental Hypotheses

The study is based on the following experimental hypo-
theses. The analyses will compare the means of the variables using
the General Linear Model, a trend in analysis of variance (covariance)
technique. Only those first or second order hypotheses which relate specifically to the problem under study are stated. They are:

1. There is a significant difference between the grades given by cooperatively or competitively oriented teachers when adjusted by the achievement scores.

2. There is a significant difference between the grades received by cooperatively and competitively oriented students when adjusted by the achievement scores.

3. There is a significant interaction among cooperatively or competitively oriented teachers and cooperatively or competitively oriented students with respect to the grades the students received when adjusted by the achievement scores.

4. There is a significant interaction among cooperatively or competitively oriented teachers and the student's sex as male or female with respect to the grades received when adjusted by the achievement scores.

5. There is a significant interaction among cooperatively or competitively oriented teachers and the students' institution as public or private with respect to the grades received when adjusted by the achievement scores.

6. There is a significant interaction among cooperatively or competitively oriented teachers and the students' measured achievement level (WRAT) with respect to the grades given.

7. There is a significant interaction among cooperatively or competitively oriented students and measured achievement level (WRAT) with respect to the grades received.
8. There is a significant interaction among cooperatively or competitively oriented students and their sex with respect to the grades received when adjusted by the achievement scores.

9. There is a significant interaction among cooperatively or competitively oriented students and their institutions as public or private with respect to the grades received when adjusted by the achievement scores.

10. There is a significant interaction among cooperatively or competitively oriented teachers and their sex with respect to the grades given when adjusted by the achievement scores.

11. There is a significant interaction among cooperatively or competitively oriented students and the teachers' sex with respect to the grades received when adjusted by the achievement scores.

**Summary of the Literature**

Many sources concerning cooperation and competition as motivators and values have been reviewed. It was observed that all studies were not in agreement. In fact, there were many divergent findings some of which appeared to support opposing viewpoints. The major themes which the cited literature reviewed have been integrated into the following summary.

Competition was clearly shown to have a significant influence in "urging" humans toward a multiplicity of goals. It was shown to effectively increase quantity of production, however, at some expense to the overall quality of the product. It seemed to be most positively influential on the self-esteem of "winners" and appeared somewhat destructive to the self-esteem of "losers." The efficiency/
effectiveness of competition over cooperation varied with the tasks presented and the personality of a given individual.

Competition and cooperation appear in varying degrees in the many societies throughout the world. In some societies it appears that the presence of one value tends to exclude the presence of the other value. In a cooperative-type society it has been observed that the members have a more ordered view of the universe and their relationship to the supernatural is more significantly positive. Their security is more closely tied to kin groups. The competitive-oriented society tends to find security in ego development. Sanctions for social control are the internal fear of loss of position within that society. Supernatural powers are considered untrustworthy.

The value of competition is regarded as being more significant for goal attainment among males than females.

Competition has been viewed by some writers as more primitive and less mature than cooperation. It has been demonstrated that children who are achievement oriented, accepted, and cooperative are perceived by teachers as being more academically capable.
CHAPTER III

METHODOLOGY

The Variables

Previous studies have introduced one or more of the variables being studied at this time but none has undertaken to dichotomize the subjects as being cooperative or competitive. It is not yet known what effect cooperative or competitive teacher/student orientations may have on student achievement.

Independent variables

In the present study, six independent variables were introduced in an attempt to focus on the causes for differences in student grades if such differences appeared. These independent variables were used to categorize students and their teachers with respect to the eleven questions raised by the study and stated in the hypotheses. These variables describe specific characteristics of the population studied. They are listed as follows:

1. Teachers' orientation had two levels—cooperative and competitive. These were the two primary variables in the study, and their purpose was to determine what effect teachers' orientations might have on the grades students receive.

2. Students' orientation had two levels—cooperative and competitive. These were the second set of variables in the
study, and their purpose was to determine what effect students' orientations might have on the grades received.

3. **Teachers' sex** had two levels—male and female. The purpose of using these variables was to see if sex differences among teachers is a significant factor in the grades students receive.

4. **Students' sex** had two levels—male and female. The purpose of using these variables was to see if the sex differences of students is a significant factor in the grades they receive.

5. **Teachers'/students' institution** had two levels—public and private. The purpose of using these variables was to see if institutional differences are a significant factor in determining the grades a teacher gives a student.

6. **Mathematics achievement** had two levels (as measured by the WRAT)—low average, standard scores 1-99; and high average, standard scores 100 and above. The purpose of using these variables was to see if a standardized mathematics achievement test score is a significant factor with respect to the grade a student received in his mathematics class. In addition to using these variables to classify students relative to achievement, the standard score (grade equivalents were also calculated but used for demographics) was the covariate used to adjust the dependent variable. Since randomness was not possible with the collection or statistical manipulation of the data, it was important to use the covariate. The covariate provided external criteria to adjust the dependent variable for the effect(s) of ability, age, and educational experience(s). The achievement level variable (WRAT) was not used as a covariate with hypotheses 6 and 7.
Dependent variable

The following dependent variable was used as the criterion of achievement.

Grade awarded the student. This grade was received by the student from his teacher for class work completed during the preceding marking period (2-6 weeks earlier). Grades were assigned values ranging from one to fifteen. A value of one corresponded with the lowest grade (E or F) while a value of fifteen corresponded with the highest possible grade (A+).

Statement of the Null Hypotheses

The underlying hypothesis for this study was that cooperatively or competitively oriented students would receive higher grades from teachers with similar orientations and lower grades from teachers who were dissimilarly oriented. This broad general hypothesis was divided into the following hypotheses, which are stated in the null form. Because of the nature of the study a probability level of .10 was used to determine the significance of the F-test. Since this research covers a rather new area of study, it was the researcher's purpose to observe trends presented by the analyses of data. The sample size was somewhat smaller than that usually analyzed by the conventional alpha levels thus \( p = .10 \) level of significance was adopted. It was considered more important to avoid missing an inference presented by the statistical manipulation of the data than to use the conventional alpha levels (.01, .05). To avoid concluding falsely that a difference does not exist an \( N = 65 \) would be necessary for each cell (\( p = .05 \), power = .90). A cell size of \( N = 30 \) (\( p = .05 \)) yielded power = .76 (Beta = .24).
The dependent and independent variables for both students and teachers are stated in the following eleven null hypotheses:

1. There is no significant difference between the grades given by cooperatively or competitively oriented teachers when adjusted by the achievement scores.

2. There is no significant difference between the grades received by cooperatively or competitively oriented students when adjusted by the achievement scores.

3. There is no significant interaction among cooperatively or competitively oriented teachers and cooperatively or competitively oriented students with respect to the grades the students received when adjusted by the achievement scores.

4. There is no significant interaction among cooperatively or competitively oriented teachers and the students' sex as male or female with respect to the grades they received when adjusted by the achievement scores.

5. There is no significant interaction among cooperatively or competitively oriented teachers and the students' institution as public or private with respect to the grades received when adjusted by the achievement scores.

6. There is no significant interaction among cooperatively or competitively oriented teachers and the students' measured achievement level (WRAT) with respect to the grades received.

7. There is no significant interaction among cooperatively or competitively oriented students and measured achievement level (WRAT) with respect to the grades received.
8. There is no significant interaction among cooperatively or competitively oriented students and their sex with respect to the grades received when adjusted by the achievement scores.

9. There is no significant interaction among cooperatively or competitively oriented students and their institution as public or private with respect to the grades received when adjusted by the achievement scores.

10. There is no significant interaction among cooperatively or competitively oriented teachers and their sex with respect to the grades given to students when adjusted by the achievement scores.

11. There is no significant interaction among cooperatively or competitively oriented students and the teachers' sex with respect to the grades received when adjusted by the achievement scores.

The Statistical Design

The General Linear Hypothesis Model (W. J. Dixon, 1973; and Maurice M. Tatsuoka, 1975) is a factorial design as depicted in figure 1.

Orientation Variables

<table>
<thead>
<tr>
<th>Group I = A₁</th>
<th>X₁</th>
<th>X₂</th>
<th>· · ·</th>
<th>Xₙ</th>
<th>Y₁</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A₁X₁</td>
<td>A₁X₂</td>
<td>· · ·</td>
<td>A₁Xₙ</td>
<td>A₁Y₁</td>
</tr>
</tbody>
</table>

| Group II = A₂ | A₂X₁ | A₂X₂ | · · · | A₂Xₙ | A₂Y₂ |

Fig. 1. The experimental design of the study.

This study followed the model set forth as Ex Post Facto Research. Direct control of the independent variables was not possible.
in this study because they were not manipulable. The classroom was used instant and through statistical analyses the variables were studied relative to student grades received after adjusting them by the achievement test (WRAT) scores. Because of their nature, hypotheses 6 and 7 were analyzed using the unadjusted student grade means. This study presented alternative independent variables in an attempt to explain what was happening to the dependent variable, student grades.

The major statistical procedure used was analysis of co-variance (or analysis of variance) using the general linear hypothesis model. This technique determined the degree of relationship between the dependent variables between/among the groups tested after they were adjusted by the achievement test scores. This procedure of analysis was chosen for its efficiency in testing the separate and combined effects of the variables.

The Xerox Sigma VI Computer at Andrews University was used in carrying out the statistical computations. The general linear hypothesis model of the Biomedical Computer Programs (Dixon, 1974) was used.

Population and Sample

Population

The subjects were chosen from grades 9, 10, and 11 in twenty public and private schools within a 250 mile radius of Berrien Springs, Michigan. A large cross-population sample was used in an attempt to reduce the effect of socio-economic, rural-urban, and individual personality factors. The school districts were located in a four-state...
area bordering on Lake Michigan and included Indiana, Illinois, Michigan, and Wisconsin.

The subjects were taken from freshman or sophomore level mathematics classes. Ten of the schools were private denominational type schools operated by state conferences within the Lake Union Conference of Seventh-day Adventists. The remaining subjects were students from public schools located within ten miles of each denominational school mentioned earlier. The public schools were selected for their proximity to the denominational schools. The names of the schools are being withheld at the request of the school administrators and their governing boards.

Sample

One entire classroom of students from each of twenty schools was selected for the study. These classrooms were selected from among those being offered as mathematics options for freshman- or sophomore-level students but nearly always contained a small number of junior or senior students. There was no attempt made to control the size or student composition of the classroom selected. The researcher made an attempt to vary the hour at which the sample class was selected but often had to select a class from a small number of alternative classes or from among no alternatives at all. The classes selected included algebra 1, geometry, and general mathematics. These classrooms contained students of all ability and achievement levels, including both remedial and honor levels.

A total of 170 students came from the private denominational high schools. Of this total, eight respondents were deleted due to
inappropriate or incomplete responses. This left a total of 162 private school students who were included in the sample.

A total of 199 students came from the public high schools. Of this total, one respondent was deleted due to inappropriate response to the questions. This left a total of 198 public school students who were included in the sample.

A total of 360 student subjects were thus involved in the sample. This figure does not include the number of subjects involved in the pilot study, which is discussed later in this chapter.

Table 1 shows the number of participating student subjects who possessed the specific characteristics described in this study. This table describes the composition of the student sample used. The low-average and high-average mathematics achievement grade equivalents ranged from 3.4 to 8.9, and 9.0 to 13.3, respectively. The cooperatively oriented group scores for students ranged from 101 to 200; the competitively oriented group ranged from 1 to 99. The cooperatively oriented group scores for teachers ranged from 101 to 167; the competitively oriented group ranged from 24 to 99.

Table 2 shows the characteristics of teacher subjects included in this study. This table summarizes the composition of the teacher sample.

The following sections of this chapter will present the instruments used and the results of the pilot study.
TABLE 1

STUDENT SUBJECTS SHOWING CHARACTERISTICS SPECIFIC TO THEIR ORIENTATION
WITH THE PERCENTAGES GIVEN IN PARENTHESES

<table>
<thead>
<tr>
<th>Student Orientation</th>
<th>Grades Received</th>
<th>Achievement (Grade Equiv.)</th>
<th>Institution</th>
<th>Sex</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Cooperative</td>
<td>13</td>
<td>30</td>
<td>70</td>
<td>61</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>(8)</td>
<td>(19)</td>
<td>(17)</td>
<td>(15)</td>
</tr>
<tr>
<td>Competitive</td>
<td>5</td>
<td>21</td>
<td>46</td>
<td>41</td>
<td>18</td>
</tr>
<tr>
<td>Totals</td>
<td>18</td>
<td>51</td>
<td>116</td>
<td>102</td>
<td>73</td>
</tr>
</tbody>
</table>

*Five students whose scores fell at the mean (100) are not included for they do not show either a cooperative or competitive trend.*
TABLE 2

TEACHER SUBJECTS SHOWING CHARACTERISTICS SPECIFIC TO THEIR ORIENTATION WITH PERCENTAGES GIVEN IN PARENTHESES

<table>
<thead>
<tr>
<th>Teachers' Grades Given to Students</th>
<th>Total Students</th>
<th>Institution</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>F D C B A</td>
<td></td>
<td>Public</td>
<td>Private</td>
</tr>
<tr>
<td>Cooperative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 (5)</td>
<td>281 (78)</td>
<td>8 (40)</td>
<td>8 (40)</td>
</tr>
<tr>
<td>(12) (25)</td>
<td>(20) (16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (.3)</td>
<td>79 (22)</td>
<td>2 (10)</td>
<td>2 (10)</td>
</tr>
<tr>
<td>(8) (8)</td>
<td>(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>18 (5)</td>
<td>10 (50)</td>
<td>10 (50)</td>
</tr>
<tr>
<td></td>
<td>51 (14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>116 (33)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>102 (28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>73 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>360 (100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(28)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(100)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Instrumentation

Instrumentation for the study included the Altruism Scale developed by Sawyer (1966) and the arithmetic subtest (level 2) of the Wide Range Achievement Test (WRAT) (Jastak, and Jastak, 1965).

The Altruism Scale

The Altruism Scale was designed to provide a measurement of the value one places upon the welfare of another in relation to his own. The instrument is intended to correspond in principal to the concepts of altruism found both in psychology ("affection and concern for others," English, and English, 1958, p. 24) and in sociology ("where the goal of conduct [of the ego] is exterior to itself," Durkheim, 1951). The Scale is composed of two measures—one a ranking of outcomes for self and other, the other a direct estimation of altruism on a scale from 1.0 to -1.0.

The administration of the Altruism Scale was accomplished by having the students and teachers read the following instructions silently as the researcher read them aloud.

Think of yourself in the following situation:

It is the beginning of a new school year and you are taking a class you like very much. There are only two students in the class: you and one other student. You will both receive a grade at the end of the class. The grades will be one of the following: A, B, or C. Since each one of you could receive any one of the three grades, it is possible to have a combination of nine grades, ranging from both of you receiving A's to both of you receiving C's. You are to number the way you would like these combinations to come out. Place the numbers 1 through 9 in the boxes showing how you would like the grades to come out for you and the other student. If it does not matter at all to you which grade you and the other student receive, you can put the same number in the boxes. (Sawyer, 1966, p. 410; adapted for use with high school students by the researcher.)
In figure 2, the response matrix is filled in as it would be completed by a "purely" cooperative respondent, one who cares exactly as much about the other's grade as about his own. Two A's are best and two C's worst (one for "self" and one for "other").

The second orientation is seen illustrated by figure 3 as "purely" competitive. Most preferred is an A for oneself and a C for the other; least preferred is a C for oneself and an A for the other. The truly competitive person is most concerned with his relative advantage over the other person.

To produce the measure of relative altruism, the discrimination between C's and A's for the other person is divided by the discrimination between C's and A's for self. Thus one has the following formula:

\[
\text{Altruism} = \frac{(\text{summed ranks for C to other}) - (\text{summed ranks for A to other})}{(\text{summed ranks for C to self}) - (\text{summed ranks for A to self})}
\]

Division by a measure indexing strength of preference for one's own grades creates the desired relative orientation. The several choices a person makes among the alternatives that are better or worse for him or the other infer the orientation of the person's behavior.

The Direct Scale Estimation

On this measure a person can estimate his orientation toward cooperation or competition directly. The scale ranges from -1.0 to 1.0 by tenths, and a person checks one of the resulting twenty-one alternatives. The scale was anchored by the following descriptions which represented the alternatives (see appendix A):
### Fig. 2. Preference rankings of a strictly cooperative person. (Numbers in the corner of each cell illustrates adjustment for tied ranks.)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>2.5</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>2.5</td>
<td>5</td>
<td>7.5</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>7.5</td>
<td>9</td>
</tr>
</tbody>
</table>

### Fig. 3. Preference rankings of a strictly competitive person.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
1.0 I am equally interested in how good his grade is and in how good my grade is.
.5 I am half as interested in how good his grade is as I am in how good my grade is.
.0 I am only interested in how good my grade is; how good or poor his grade is makes no difference to me.
-.5 I am equally interested in how much better my grade is than his and in how good my grade is per se.
-1.0 I am only interested in how much better my grade is than his; I do not care how good my grade is per se (Sawyer, 1966, p. 412).

Using the same rationale underlying the previously described measurement through rankings; direct estimation assumes that one can make a reasonable decision about his own and another's preference.

The study uses these two measures, ranking the outcomes for "self" and the "other" (the matrices) together with the direct scale estimation to arrive at a single score. These scores are ranked to determine which subjects show the extreme positions. The extreme at the highest end of the scale constitutes the cooperatively oriented subjects while the lowest extreme constitute the competitively oriented subjects (Sawyer, 1966).

An adequate review of Sawyer's Altruism Scale can be found in Measuring Human Behavior, by Lake, Miles, and Earle, Jr. (1973), who give the following summary, "... the test does appear to be a moderately good indicator of a cooperative [and a competitive] orientation. It is easy to administer and score, and does differentiate between groups" (pp. 12-13).

The validity and reliability were analyzed both by ranking outcomes and by direct scale estimation for three groups of subjects, each toward three different alters and two situations (Sawyer, 1966, p. 413). The alters consisted of ranking oneself with another:
friend, stranger, or antagonist. The situations varied from a classroom setting of awarding grades to assigning salaries. The groups were composed of college students majoring in social science, business, and trainees for directorships of social service-type positions (YMCA, etc.).

Sawyer (1966) states that the "over-all altruism, across the various alters, measures, and situations, is simply the sum of the twelve separate scores a subject receives; considered as a twelve-item scale, this measure of altruism has an internal-consistency reliability of .79" (p. 416). Other consistencies appear between the subsets of scores: a composite score for four scales involving stranger correlates .63 with a composite for friends and .57 with one for antagonists. The situations involving salary show a correlation between the two six-item composites to be .75.

The Scale was able to differentiate between the groups by showing YMCA college students to be more altruistic (cooperative), helping others. The business students showed more concern with maximizing their own welfare and less concern for the welfare of others. The social science student group gave more credence to the principles of reciprocity or responding in kind to those who had been helpful to them.

All things considered the Altruism Scale appeared to have the ability to evaluate, with a moderate degree of reliability and validity, the range from cooperative to competitive needed for this study. The Scale was adopted because of its ability to quantify an individual's orientation toward the rewards he and another
experience in cooperative or competitive interaction. A copy of the instrument used in this study appears in appendix A.

The Wide Range Achievement Test

Since this instrument was designed as an "adjunct to tests of intelligence and behavior adjustment . . . its use became widespread both here (U.S.) and abroad in a relatively short time" (Jastak, et al., 1965, p. 12). The two levels in the 1965 edition are designed for use with children between ages 5 years 0 months (Level I) and 12 years 0 months to adulthood (Level II). There are three subtests in each level but for this study only the arithmetic subtest from Level II was used.

The arithmetic subtest consists of skills involving counting, reading number symbols, solving oral problems, and performing written computations. The last skill area, solving written computations, was adopted for this study. It contains problems of addition, subtraction, multiplication, and division which become progressively more difficult as the student continues. This portion of the subtest has a ten-minute time limit. The standard score corresponding to the total raw score was used to determine whether the subject would be classified as low or high achieving. Thus, this variable consisted of two levels: Low, and High achieving student groups. Standard scores were derived from the raw scores using the author's criteria (Jastak, et al., 1965).

The authors report that "the WRAT satisfies the statistical conditions of reliability most adequately. Numerous population groups of different degrees of homogeneity have been studied by the authors
during the past twenty years. The correlation coefficients ranged from . . . .85 to .92 for the arithmetic test" (Jastak, et al., 1965, p. 13).

The split-half reliability coefficients for the age groups under study together with the standard errors of measurement (SEM) are listed in table 3. The split-half measures used were odd-even scores after the test items of each subject had been arranged in their exact order of difficulty.

The authors report (Jastak, et al, 1965) that several methods of estimating validity of the test have been used; i.e., correlation of test results with outside criteria such as teachers' ratings, correlation of the test scores with another achievement test, and the correlation of the achievement test scores with mental ability or intelligence ratings. The results of the reading subtest, using the 1946 edition, were checked against an external criterion in a validity study performed by Wagner (1962). The correlations between the reading grades and the teacher's ratings in grade levels was +.78. The WRAT levels and midterm grades correlated at +.88, which was significant at the .01 level.

Wagner and McCloy (1962) have compared the WRAT arithmetic subtest of the 1946 edition with the New Stanford Arithmetic Test using 140 students. The WRAT arithmetic subtest and the New Stanford Arithmetic Test correlated at +.91. This correlation coefficient is significant (p < .01).

The WRAT correlation with the Wechsler Adult Intelligence Scale (Jastak, 1965) using 500 subjects ages 16 to 60 showed the
arithmetic (Level II) subtest to correlate at +.77. When correlations between the WRAT standard scores and the Wechsler Intelligence Scale for Children (WISC) scaled scores were performed using 244 girls, intercorrelation between arithmetic (WRAT) and arithmetic (WISC) were at +.668; when using 300 boys in the same study the intercorrelation was +.722.

TABLE 3

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>N</th>
<th>r</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>200</td>
<td>.940</td>
<td>1.33</td>
</tr>
<tr>
<td>13</td>
<td>200</td>
<td>.957</td>
<td>1.27</td>
</tr>
<tr>
<td>14</td>
<td>200</td>
<td>.956</td>
<td>1.37</td>
</tr>
<tr>
<td>15</td>
<td>200</td>
<td>.966</td>
<td>1.31</td>
</tr>
<tr>
<td>16-17</td>
<td>200</td>
<td>.955</td>
<td>1.38</td>
</tr>
<tr>
<td>18-19</td>
<td>200</td>
<td>.969</td>
<td>1.34</td>
</tr>
</tbody>
</table>

While conflicting statements regarding the reliability and validity of the WRAT can be found in reviews written in Buros, Mental Measurements Yearbook (MMY), seventh edition (1972), it was decided to use the test on the strength of the author's reports and that of the following reviews. Merwin (MMY, 1972), wrote, "in summary, this 'achievement' test is a unique, individually administered test. While possibly a potentially useful clinical tool for
the psychologist working with specialized cases, for general school
use it is impractical" (p. 67).

Thorndike (1972), writing also as a reviewer for the Mental
Measurements Yearbook, comments:

This test may have some value in a clinical or research setting
in which one is testing individually persons of such diverse
ability or background that one cannot tell in advance what
level of test would be appropriate, and needs to get a quick
estimate of each person's general level of ability. (p. 68)

All things considered the Wide Range Achievement Test
(Jastak, 1965) seems to possess the ability to assess, with a
moderate degree of reliability and validity, the achievement level
of students at the high-school level. The test was adopted for
this study because of its ability to identify a student who is
working at or below his grade level (algebra, general math at 9th
grade level; geometry at 10th grade level, approximately). The
arithmetic subtest was a pencil and paper computational test with a
ten minute time limit. This subtest is appropriately used with
groups as with individual administrations. A copy of the arithmetic
subtest used in this study appears in appendix A.

Procedures

The procedures followed in carrying out the study included:

1. Researching and critiquing the previous studies using
   cooperative or competitive variables relative to student achieve-
   ment in a classroom setting.

2. Designing research appropriate for the present study.

3. Selecting instruments appropriate for the present
   study.
4. Constructing (assembling) instruments into a comprehensive test battery for administration to the subjects.

5. Selecting the pilot subjects and the experimental subjects.

6. Obtaining permission from the respective school administrators to conduct the research.

7. Refining the test battery for general administration to the experimental subjects following the pilot study.

8. Administering the test battery to the experimental subjects.

The following discussion will present the procedures used and the test battery developed for the pilot study and the administration of the test battery to the experimental subjects.

**Pilot Study**

The pilot study was used to ascertain the factors relative to test battery administration, including: the length of time necessary to administer the battery; the clarity of the printed and orally delivered instructions; the face-validity of the best battery; and the familiarity needed by the researcher to administer the test in an actual classroom setting. Before the test battery was used in the pilot study it was read and critiqued by several adult and high-school-age persons. Suggestions were made which permitted the test battery to be refined in language quality and clarity. During the pilot testing the researcher directed the Ss to read the introductory statements in the test booklet themselves. If they did not understand what was required, they were to ask questions of the
researcher. This approach was difficult for administering to students of varying levels of ability and skills. The approach was modified by reading the complete booklet to the Ss and explaining the requirements. The test booklet was completed sequentially with Ss progressing from page-to-page simultaneously. Nearly all revisions were editorial in nature. These refinements were incorporated in the final test battery administered to the experimental subjects. A copy of the revised test battery is in appendix A.

The pilot study was carried out on subjects in a grade 9, general mathematics class conducted in a private denominationally affiliated high school located in Michigan. The class contained three female and five male student subjects with a male teacher.

Administration of the Test Battery

The test battery (appendix A) was composed of a covering information sheet used to obtain demographic information included as independent variables in the study; the adapted Altruism Scale, (pp. 1-10); and the arithmetic subtest from the Wide Range Achievement Test, (p. 11). The total time required for administering the battery was thirty-seven minutes. The test was photo-copied using the Xerox process on standard weight white paper. The test battery was assembled to form an eleven-page booklet plus a covering sheet.

The criterion score (grade for the course earned at the last marking period) was obtained from the teacher. The Altruism Scale was scored using Sawyer's (1966) criteria and then converted
to whole numbers as explained earlier in this chapter. The arithmetic subtest from the Wide Range Achievement Test was scored using Jastak's (1965) criteria, and the raw scores were then converted to standard scores. Although the grade equivalents for the WRAT were computed, they were reported as demographic information only and did not enter into the analysis of covariance tests.

The entire test battery booklet was administered during the one classroom visit and required approximately thirty-five minutes to complete. The test booklet contains all of the directions used to administer the test. A sample copy of this test booklet is found in appendix A.

The experimenter was present at all administrations of the test together with the classroom teacher who was asked to complete the Sawyer Scale. No other adult persons were present. The examiner first met with the building administrator (usually the principal) and obtained permission to conduct the research. A classroom was then selected which met with the research criteria. The procedure for completing the test was explained to the teacher by the researcher and then to the students. In most cases there was only one class in session at the times available to the researcher. It was not possible to apply randomness in the classroom selection as proposed.

The same administrative procedure was used with all classrooms: the teacher introduced the researcher, who gave a brief explanation of the purpose for requesting them to participate in the research. It was apparent to the researcher that the subjects participated willingly and demonstrated a high level of involvement.
(motivation). No subject requested to be excused from the experiment and only one student failed to write responses for the test items. The booklet was completed starting with the cover sheet. The concepts involved in completing the Altruism Scale were presented by the experimenter who consistently used the same instructions and chalkboard illustrations. The arithmetic subtest was strictly timed (ten minutes) and papers were collected immediately following the conclusion of this test. Subjects were not permitted to return to earlier administered portions of the test booklet.

There were a large number of questions raised by the subjects and time was used following the test to discuss their queries. The major focus of the subjects' comments revealed both interest and support for this "grass-roots" research. A strong desire was expressed by the students and school personnel involved to receive a follow-up copy of the conclusions of the study after the research is completed.

**Summary**

Chapter 3 has presented the methodology and research design of this study. The data are set forth as six independent variables, one of which was used as a covariate (WRAT score), and one criterion variable, student grades. The method of testing nine hypotheses was analysis of covariance using the general linear hypothesis model. Two hypotheses (6 and 7) were tested by analysis of variance using the general linear hypothesis model. The major instruments for gathering data were the Sawyer Altruism Scale and the Wide Range
Achievement Test (WRAT). The construction and reliability of the instruments has been discussed. Procedures for selecting the sample, obtaining the data, and the statistical analyses have been presented.
CHAPTER IV

FINDINGS

The preceding chapters have discussed the theoretical aspects of the cooperative and competitive orientations of students and teachers. The major questions posed were: If these orientations exist, can they be defined in the classroom setting? What effect will the presence of these orientations have on the assigning of grades to students at the high school level? What are the conclusions to be drawn from the analyses of the data? This chapter presents the findings of the study.

The population for this study consisted of all students and teachers in ninth or tenth grade mathematics classes selected from within the public or private high schools meeting the criteria: ten senior academies within the Lake Union Conference of Seventh-day Adventists and one public senior high school located within the geographical area of each academy. From these schools a total of 369 students and twenty mathematics teachers were used to complete the sample. One hundred ninety-eight student subjects came from the public schools and one hundred and seventy-one from the private schools. The twenty teacher subjects were equally divided between public and private schools. The mathematics classes chosen were from among the class periods available to the researcher during the time of the visit. Due to the limited number of

55
mathematics classes offered to freshmen and sophomores in the smaller schools, it was not possible to use a randomized design. Data were collected from each of these 369 student and twenty teacher subjects and were analyzed to determine the findings in this chapter. Of these 369 student subjects nine were eliminated for inaccurately completing either the questionnaire or one of the scales.

A further reduction in the sample size was made in an attempt to select students clearly varying as competitively or cooperatively oriented (table 4). The eligible student subjects were ranked using the orientation score as the criterion with 27 percent from either extreme used to test the hypotheses. There were ninety-eight students in each group of both cooperative and competitive orientation. The orientation scores for the teachers were ranked to show their trend toward an orientation. The grade means given to the student sample is shown on table 5. It was divided to show the relationship between the independent variables with respect to the grade teachers gave.

The major hypothesis was that cooperatively and competitively oriented students may vary with respect to the grades they receive from similarly or dissimilarly oriented mathematics teachers. From this general hypothesis eleven research hypotheses were developed and stated in the null form. These hypotheses tested the relationship between cooperatively and competitively oriented student and teacher subjects and selected classifying variables: students' and teachers' institution (public, private); students' and teachers' sex; and students' achievement level in mathematics as measured by a standardized test (WRAT).
<table>
<thead>
<tr>
<th>Student Orientation</th>
<th>Teacher's Sex</th>
<th>Institution</th>
<th>Student's Sex</th>
<th>Student's Achievement</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Private Public</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Competitive</td>
<td>71</td>
<td>27</td>
<td>44</td>
<td>56</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>9.25</td>
<td>8.22</td>
<td>8.50</td>
<td>9.35</td>
<td>8.98</td>
</tr>
<tr>
<td></td>
<td>(9.04)</td>
<td>(8.59)</td>
<td>(8.94)</td>
<td>(8.91)</td>
<td>(8.93)</td>
</tr>
<tr>
<td>Cooperative</td>
<td>77</td>
<td>21</td>
<td>55</td>
<td>42</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>9.26</td>
<td>8.05</td>
<td>9.04</td>
<td>8.95</td>
<td>8.52</td>
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<td></td>
<td>(9.20)</td>
<td>(8.50)</td>
<td>(9.34)</td>
<td>(8.68)</td>
<td>(9.33)</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>48</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
</tbody>
</table>

*a Students' achievement scores were not adjusted therefore they were not included.
<table>
<thead>
<tr>
<th>Teacher Orientation</th>
<th>Teacher's Sex</th>
<th>Institution</th>
<th>Student's Sex</th>
<th>Student's Achievement</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Private</td>
<td>Public</td>
<td>Male</td>
</tr>
<tr>
<td>Competitive</td>
<td>73</td>
<td>25</td>
<td>42</td>
<td>56</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>8.85</td>
<td>8.44</td>
<td>8.60</td>
<td>8.80</td>
<td>8.65</td>
</tr>
<tr>
<td></td>
<td>(9.15)</td>
<td>(8.25)</td>
<td>(9.39)</td>
<td>(8.55)</td>
<td>(8.72)</td>
</tr>
<tr>
<td>Cooperative</td>
<td>75</td>
<td>23</td>
<td>55</td>
<td>43</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>9.65</td>
<td>7.83</td>
<td>8.98</td>
<td>9.60</td>
<td>8.98</td>
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<tr>
<td></td>
<td>(9.10)</td>
<td>(8.90)</td>
<td>(9.07)</td>
<td>(9.05)</td>
<td>(8.94)</td>
</tr>
<tr>
<td>Total Both Groups</td>
<td>148</td>
<td>48</td>
<td>97</td>
<td>99</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>(9.12)</td>
<td>(8.56)</td>
<td>(9.21)</td>
<td>(8.77)</td>
<td>(8.81)</td>
</tr>
</tbody>
</table>

*Means for the grades are shown as unadjusted (adjusted) except for the students' achievement scores which were not adjusted.*
The instrument used to classify students and teachers as either cooperative or competitive was the Sawyer Altruism Scale. This instrument consisted of twelve items which yielded a composite score. If the score was positive, it showed a trend toward cooperativeness. If it was negative, it showed a trend toward competitiveness. The range of scores possible on the subitems was -1 to +1, with zero yielding a "balance" between cooperative and competitive orientations. The subtest scores were transformed to an integral scale which ranged from one to seven for students and teachers. The Sawyer Scale facilitated the transformation because the direct response questions afforded the respondent twenty-one choice alternatives. Thus the lowest three responses -1.0, -.9, -.8, were transformed to 1 on the integral scale while .8, .9, and 1.0, became 7. The integral scale from 1 to 7 transformed the intervals of the Sawyer Scale as follows: 1, -1.0 to -.80; 2, -.799 to -.500; 3, -.499 to -.200; 4, -.199 to .199; 5, .200 to .499; 6, .500 to .799; and 7, .800 to 1.00. This transformation of scores was completed to enable the researcher to perform an item-analysis on the Ss' responses. Thus, a total score was obtained for each subject as well as information about the reliability of the scale itself.

Information About the Scales

The item analysis program (Andrews University Computer Center) was used to determine the reliability of the pattern of response for the 360 students and 20 teachers. It yielded information about the twelve items of the Sawyer Altruism Scale. These findings are shown
in tables 6 and 7. The item analysis program (Item) performs an item analysis on a test consisting of multiple-type responses by weighting them. The output from the program includes:

1. Student ID, score, and rank for each individual.
2. Frequency distribution of the scores.
3. Mean score, standard deviation, and reliability coefficient Alpha (KR-20 for binary scores).
4. Analysis of each item, including proportion score per individual and point multiserial R for weighted response tests.
5. For each item, proportion of high, mid and low scoring students on total test who respond in each category.

The item analysis performed on the 360 student subjects (table 6) shows a range of scores from 21 to 84, with a reliability coefficient of .752 that is 75 percent of the variance on this set of scores was real variance. For the individual student the probability is .95 that his true score is within 9.3 points above or below his observed score. The finding of the item analysis test supports the Sawyer Scale's published statement of instrument reliability.

The item analysis performed on the twenty teacher subjects (table 7) shows a range of scores between 47-73, with a reliability coefficient of .620 that is 62 percent of the variance on this set of scores was real variance. The probability is .95 that the teacher's individual true score is within 7.96 points above or below his observed score. The mean (54.35) and range of scores (47-73) indicate a predominantly cooperative orientation for the teachers. The finding of the item analysis test lends support to the Sawyer Scale's ability to define a teacher as being either cooperatively or competitively oriented.
### TABLE 6
SUMMARY OF THE SAWYER ALTRUISM SCALE ADMINISTERED TO THE 360-STUDENT SAMPLE

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of Items</th>
<th>Subtest Score Range</th>
<th>Total Score Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawyer Altruism Scale</td>
<td>12</td>
<td>1-7</td>
<td>21-84</td>
<td>51.79</td>
<td>9.52</td>
<td>.752</td>
</tr>
</tbody>
</table>

### TABLE 7
SUMMARY OF THE SAWYER ALTRUISM SCALE AS ADMINISTERED TO THE TWENTY MATHEMATICS TEACHERS

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of Items</th>
<th>Subtest Score Range</th>
<th>Total Score Range</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawyer Altruism Scale</td>
<td>12</td>
<td>1-7</td>
<td>47-73</td>
<td>54.35</td>
<td>6.59</td>
<td>.620</td>
</tr>
</tbody>
</table>
In summary, the findings of the item analysis test for both the student and teacher subjects lends support to the Sawyer Altruism Scale's published statements of instrument reliability. A reliability coefficient of .752 for student and .620 for teacher subject response lends statistical support to the use of this Scale in the present study.

The Wide Range Achievement Test (WRAT) was not analyzed for internal consistency due to the published information available and previously cited (p. 46). The population obtained the following results on the WRAT (grade equivalents and standard scores were calculated): a mean grade equivalent of 8.38 with a standard deviation of 2.51. Of special interest is the grade equivalent mean (8.38) which falls below the lowest grade placement used in the study. More than one-half of the Ss from the twenty schools achieved below their expected level on the WRAT. The range of grade equivalents was 3.4 to 16.5, which showed a difference of 13.1 grades. There were 131 students who obtained the 9.0 grade level or above which amounts to 36 percent of the total sample (360).

The correlation (table 8) used the WRAT standard scores and the teachers' grades which yielded .44 for the statistical sample (N=196). This accounts for 19 percent of the total score variance. The correlation was significant at p ≤ .01 and supports the decision to use the WRAT standard score as a covariate with the grade students received (dependent variable). This decision should strengthen the research design by adjusting for initial differences between groups.
TABLE 8
INTERCORRELATION MATRIX FOR SEVEN VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Student Orientation</td>
<td>1.000</td>
<td>0.027</td>
<td>-0.134&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.130&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.127&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.018</td>
<td>0.067</td>
</tr>
<tr>
<td>2. Teacher Orientation</td>
<td>0.027</td>
<td>1.000</td>
<td>-0.087</td>
<td>-0.156&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.069</td>
<td>0.086</td>
<td>-0.030</td>
</tr>
<tr>
<td>3. Institution (Public-Private)</td>
<td>-0.134&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.087</td>
<td>1.000</td>
<td>0.338&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-0.112&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.262&lt;sup&gt;e&lt;/sup&gt;</td>
<td>0.060</td>
</tr>
<tr>
<td>4. Teachers' Sex</td>
<td>-0.130&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.156&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.338&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.000</td>
<td>-0.142&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-0.171&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-0.151&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>5. Students' Sex</td>
<td>0.127&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.069</td>
<td>-0.112&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-0.142&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.000</td>
<td>0.018</td>
<td>0.063</td>
</tr>
<tr>
<td>6. WRAT Score</td>
<td>-0.018</td>
<td>0.086&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.262&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-0.171&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.018</td>
<td>1.000</td>
<td>0.438&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td>7. Grade Received</td>
<td>0.067</td>
<td>-0.030</td>
<td>0.060</td>
<td>-0.151&lt;sup&gt;c&lt;/sup&gt;</td>
<td>0.063</td>
<td>0.438&lt;sup&gt;e&lt;/sup&gt;</td>
<td>1.000</td>
</tr>
</tbody>
</table>

<sup>a</sup>N = 196

<sup>b</sup>p < .10 level of significance

<sup>c</sup>p < .05 level of significance

<sup>d</sup>p < .01 level of significance

<sup>e</sup>p < .001 level of significance
The data were analyzed using principal components followed by varimax rotations of three factors. The WRAT standard score (table 9) with loadings of .858 and the students' grades with loadings of .783 on Factor II would seem to indicate some commonality between these two variables for the statistical sample (N=195). Additional research is suggested by the factor analyses but the hypotheses of this study do not require it.

**TABLE 9**

FACTOR ANALYSIS OF DATA OBTAINED FROM THE 196-STUDENT SAMPLE

| Variable                        | Rotated Factors | Matrix Factor | I     | II    | III
|---------------------------------|-----------------|---------------|-------|-------|------
| 1. Student Orientation         |                 |               | .684<sup>b</sup> | .031  | .180 |
| 2. Teacher Orientation         |                 |               | -.137 | .013  | -.826|
| 3. Institution (Public-Private)|                 |               | -.566 | .402  | .384 |
| 4. Teacher--Sex                |                 |               | -.500 | -.192 | .564 |
| 5. Student--Sex                |                 |               | .531  | .073  | -.053|
| 6. WRAT Score                  |                 |               | -.092 | .858  | -.145|
| 7. Grade of Student            |                 |               | .214  | .783  | .041 |

<sup>a</sup>Three factors account for .593 of the cumulative proportion of total variance (Factor I = .231).

<sup>b</sup>Loadings have been rounded to three decimal places.
In summary, the scores obtained on the WRAT as grade equivalents were generally lower than the grade levels sampled. The information resulting from the intercorrelation matrix (table 8) shows a correlation (.438) between WRAT standard scores (p < .001) and the students' grade received from his teacher.

The Two Student Groups: Cooperative and Competitive

As noted earlier the Altruism Scale was interpreted to place high scoring students in the cooperatively oriented group and the low scoring student in the competitively oriented group.

To maximize the group distinctiveness the upper and lower 27 percent of scores based on the cumulative scoring technique of the Item analysis program were analyzed. The upper 27 percent (positive extreme) became the cooperative student sample while the lower 27 percent (negative extreme) became the competitive student sample. There were ninety-eight student subjects in each group giving a total of 196 student subjects. The scores of the cooperative group ranged from 57 to 84. The scores of the competitive group ranged from 21 to 46. The mean score for the cooperative group was 63.46 with a standard deviation of 5.68, while the mean score for the competitive group was 40.51 with a standard deviation of 4.38. The characteristics of the cooperative and competitive student groups are shown in table 10.

While no attempt was made to group the students on other variables than that of student orientation (upper and lower 27 percent), it can readily be observed that near equivalent groups have
### TABLE 10

**CHARACTERISTICS OF THE COOPERATIVE AND COMPETITIVE STUDENT GROUPS CONTAINING 196 SUBJECTS**

<table>
<thead>
<tr>
<th>Student Groups</th>
<th>N</th>
<th>Institutions</th>
<th>Student Sex</th>
<th>Teacher Sex</th>
<th>WRAT Achievement Levels</th>
<th>Mean Standard Score</th>
<th>Grade of Student</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Priv. Public</td>
<td>M  F</td>
<td>M  F</td>
<td>Low  High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative</td>
<td>98</td>
<td>55 43</td>
<td>42 56</td>
<td>15 5</td>
<td>63 35</td>
<td>94.78</td>
<td>9.00 (C+)</td>
</tr>
<tr>
<td>Competitive</td>
<td>98</td>
<td>44 54</td>
<td>56 42</td>
<td>14 5</td>
<td>60 38</td>
<td>95.73</td>
<td>8.97 (C+)</td>
</tr>
<tr>
<td>Total</td>
<td>196</td>
<td>99 97</td>
<td>98 98</td>
<td>15 5</td>
<td>131 65</td>
<td>95.26</td>
<td>8.99 (C+) (avg.)</td>
</tr>
</tbody>
</table>

\(^a\)One private institution was omitted from the competitive sample because the students' scores were not within the group's range.
resulted. The major differences are with the institution and the student sex variables. One private institution was omitted because the scores did not fall within the range tested. The student sex variable shows 33 percent more males than females in the cooperative group and 33 percent more females than males in the competitive group.

Of major concern is the grade equivalency shown by the number of students achieving in the high and low ranges of the WRAT test. There is only a 0.12 difference between grade equivalents for the two groups. The student grades were observed to be essentially equal for the two groups; each receiving an average grade of 9.0, or C+.

In summary, the cooperative and competitive student groups were selected as the upper and lower 27 percent of the 360 Ss when ranked on the Sawyer Altruism score variable. The groups were nearly equivalent on the variables to be studied except for the student-sex and institution variables. The WRAT achievement test scores showed a mean grade equivalent difference of only 0.12 between the two groups with the average for student grades being essentially equal at 9.0, or C+. These two student groups totaling 196 subjects (tables 4 and 10) provided the data used for purposes of testing the hypotheses presented in this study. The Sawyer Altruism Scale scores for teachers were ranked to ascertain the trend with respect to teacher's orientation. The teacher orientation groups consisted of the upper 50 percent as showing direction toward a cooperative orientation and the lower 50 percent as showing direction toward a competitive orientation.
Testing the Hypotheses

The hypotheses as set forth in this study will now be examined. They are stated as null hypotheses and were tested at an alpha level of .10.

The analysis of the data used a one-way analysis of covariance package employing the general linear hypothesis model (BMD04V) for hypotheses one and two. Hypotheses three through five and eight through eleven were analyzed using the analysis of covariance package employing the general linear hypothesis model (BMD10V). Hypotheses six and seven were analyzed using the analysis of variance computer package (BMD10V) employing the general linear hypothesis model. These computer packages were available through the Andrews University Computer Center and employed the Xerox Sigma VI computer.

When an interaction effect proved significant, a series of one-way analysis of covariance tests were performed together with a test of homogeneity of variance. Only hypothesis 3 showed a significant interaction among groups.

Hypothesis 1

THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN THE GRADES GIVEN BY COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

The means for the teacher orientations are shown in table 11. When adjusting the competitive teachers' grade means by the covariate (WRAT) the means were raised (.171) from 8.745 to 8.916. The cooperative teachers' grades were reduced (-.171) from a mean of 9.225 to 9.054 when adjusting the grades by the covariate.
Cooperatively oriented teachers gave higher grades than competitively oriented teachers. Adjusting the grade means by the students' achievement scores appeared to reduce the likelihood of differences between the grades given by competitively and cooperatively oriented teachers.

**TABLE 11**

**THE VARIABLE MEANS FOR COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS**

<table>
<thead>
<tr>
<th>Teacher Orientation</th>
<th>N</th>
<th>Unadjusted Grade Means</th>
<th>Adjusted Grade Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitive</td>
<td>98</td>
<td>8.745</td>
<td>8.916</td>
</tr>
<tr>
<td>Cooperative</td>
<td>98</td>
<td>9.225</td>
<td>9.054</td>
</tr>
<tr>
<td>Difference between the means</td>
<td></td>
<td>0.480</td>
<td>0.138</td>
</tr>
</tbody>
</table>

In a one-way analysis of covariance test (table 12), the between groups variance yielded $F = 1.127$. There was no significant difference ($p > .10$) between the grades given by cooperatively or competitively oriented teachers after adjusting by the WRAT score (covariate). Therefore, the null hypothesis was upheld. Since there was no significant difference between the grades given by competitive or cooperative teachers, no further testing was performed.

**Hypothesis 2**

**THERE IS NO SIGNIFICANT DIFFERENCE BETWEEN THE GRADES RECEIVED BY COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.**
TABLE 12

ONE-WAY ANALYSIS OF COVARIANCE FOR GRADES GIVEN BY
COMPETITIVELY OR COOPERATIVELY ORIENTED TEACHERS

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (Between)</td>
<td>1</td>
<td>11.270</td>
<td>1.127</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error (Within)</td>
<td>193</td>
<td>9.998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>10.005</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The means for the student orientations are shown in table 13. Competitively and cooperatively oriented students received approximately the same grades as shown by their unadjusted means. Adjusting the means by the achievement scores lowered the grade mean (-.053) for competitively oriented students and raised the grade mean (.053) for cooperatively oriented students. Adjusting the grade means by the students' achievement scores appeared to increase only slightly the likelihood that cooperatively oriented students would be assigned higher grades than competitively oriented students.

In a one-way analysis of covariance test (table 14) the between groups variance yielded $F = 0.110$. There was no significant difference ($p > .10$) between the grades received by cooperatively or competitively oriented students when adjusted by the achievement score. Therefore, the null hypothesis was upheld. Since, there was no significant difference between the grades received as tested, no further testing was performed.
## TABLE 13
THE MEANS FOR STUDENT GROUPS VARYING BY ORIENTATION

<table>
<thead>
<tr>
<th>Student Group</th>
<th>N</th>
<th>Unadjusted Grade Means</th>
<th>Adjusted Grade Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competitively oriented</td>
<td>98</td>
<td>8.969</td>
<td>8.916</td>
</tr>
<tr>
<td>Cooperatively oriented</td>
<td>98</td>
<td>9.000</td>
<td>9.053</td>
</tr>
<tr>
<td>Difference between the means</td>
<td></td>
<td>0.031</td>
<td>0.137</td>
</tr>
</tbody>
</table>

## TABLE 14
ONE-WAY ANALYSIS OF COVARIANCE FOR COMPETITIVELY OR COOPERATIVELY ORIENTED STUDENTS

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment (Between)</td>
<td>1</td>
<td>0.898</td>
<td>0.110</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error (Within)</td>
<td>193</td>
<td>8.167</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>194</td>
<td>8.130</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hypothesis 3

THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS AND COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS WITH RESPECT TO THE GRADES THE STUDENTS RECEIVED WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

The means for the interaction effects of hypothesis 3 are shown in figure 4 where they have been plotted before and after adjustment by the achievement scores. Students with a similar orientation to that of their teacher's orientation received the highest grades while those with a dissimilar orientation received the lowest grades. Cooperatively oriented students with teachers of a similar orientation received the highest grades overall while cooperatively oriented students having teachers of a competitive orientation received the lowest grades overall. Adjusting the grade means by the students' achievement scores appeared to increase only slightly the likelihood that competitively oriented students would receive higher grades from competitively oriented teachers than from cooperatively oriented teachers; and reduced the likelihood that cooperatively oriented students were being graded lower by competitively oriented teachers than by cooperatively oriented teachers who graded only slightly higher.

The two-way analysis of covariance test was performed which yielded F = 5.712, significant at p < .05. There was a significant interaction between cooperatively or competitively oriented students and teachers with respect to the grades students received when adjusted by the achievement scores (table 15). The null hypothesis was rejected.
Fig. 4. The interaction means plotted to show the relationship among competitive or cooperative teacher and student groups.
### TABLE 15
THE ANALYSIS OF COVARIANCE TESTS FOR THE INTERACTION EFFECTS OF SIMILARLY AND DISSIMILARLY ORIENTED COOPERATIVE OR COMPETITIVE STUDENTS AND THEIR TEACHERS

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Student Groups (rows)</td>
<td>1</td>
<td>0.872</td>
<td>0.109</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between Teacher Groups (columns)</td>
<td>1</td>
<td>3.095</td>
<td>0.387</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Interaction Among Student and Teacher Groups</td>
<td>1</td>
<td>45.686</td>
<td>5.712&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; .05</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td>7.998</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Significant

A series of one-way analysis of covariance tests were made because of the significant interaction between teacher and student orientations. The tests analyzed the differences for each row and each column of the data table. A summary of the analysis of covariance tests is shown in table 16. The critical F-ratio of 2.77 ($p = .10$) was exceeded by cooperatively oriented students varying by teacher orientation and the cooperatively oriented teacher group varying by student orientation. There was a significant difference ($F = 3.71$, $p < .10$) between the grades of cooperatively oriented students from teachers varying as cooperatively or competitively oriented. There was a significant difference ($F = 3.93$, $p < .10$) between the grades given by cooperatively oriented teachers to students varying as cooperatively or competitively oriented.
TABLE 16
FOUR ONE-WAY ANALYSIS OF COVARIANCE TESTS FOR HYPOTHESIS 3: TESTING DIFFERENCES FOR EACH ROW AND EACH COLUMN OF THE DATA TABLE

<table>
<thead>
<tr>
<th>Group</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students competitive with teachers varying as competitive or cooperative</td>
<td>(1,95)</td>
<td>10.064</td>
<td>1.286</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Students cooperative with teachers varying as competitive or cooperative</td>
<td>(1,95)</td>
<td>30.188</td>
<td>3.713*</td>
<td>&lt; .10</td>
</tr>
<tr>
<td>Teachers competitive with students varying as competitive or cooperative</td>
<td>(1,95)</td>
<td>18.636</td>
<td>2.221</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Teachers cooperative with students varying as competitive or cooperative</td>
<td>(1,95)</td>
<td>29.610</td>
<td>3.926*</td>
<td>&lt; .10</td>
</tr>
</tbody>
</table>

*Significant

Subsequent tests of homogeneity of variance showed that both the cooperatively oriented teacher and student groups upheld the assumption of homogeneity of variance. The teacher group yielded F = 1.06, p = .83, while the student group yielded F = 1.03, p = .92.

Separate analyses were performed on male students, female students, male teachers, and female teachers. The male and female student analysis of covariance tests were not significant F = 2.43 (df = 1,93) and F = 2.05 (df = 1,93), respectively (F = 2.77; p = .10). The female teacher group yielded an F = 0.56 (df = 1,43).
which was not significant at $p = .10$. However, the male teachers interacting with the students yielded $F = 4.88$ ($df = 1,143$) which was significant, $p < .05$. There was a significant interaction between cooperative or competitive male teachers and students varying by orientation (Table 17). Some of the significant interaction among student and teacher groups varying by orientation was explained by the teacher sex variable (male teachers).

**Table 17**

The analysis of covariance test for interaction effects of similarly and dissimilarly oriented cooperative or competitive students and their male teachers

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Student Groups (rows)</td>
<td>1</td>
<td>0.866</td>
<td>0.095</td>
<td>$&lt; .10$</td>
</tr>
<tr>
<td>Between Teacher Groups (columns)</td>
<td>1</td>
<td>0.499</td>
<td>0.055</td>
<td>$&lt; .10$</td>
</tr>
<tr>
<td>Interaction Among Student and Teacher Groups</td>
<td>1</td>
<td>44.436</td>
<td>4.876$^a$</td>
<td>$&lt; .05$</td>
</tr>
<tr>
<td>Error</td>
<td>143</td>
<td>264.944</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$Significant

The interaction among means between students receiving grades from male teachers and varying by orientation is shown in figure 5. The unadjusted means show that cooperatively oriented male teachers gave the highest grades overall to cooperatively oriented students. The lowest grades overall were given by competitively oriented male teachers to cooperatively oriented
Fig. 5. The interaction means plotted to show the relationship among male teachers and students grouped by orientation.
students. Adjusting the grade means by the students' achievement scores resulted in increasing somewhat the likelihood that competitively oriented students would receive higher grades from competitively oriented male teachers than from cooperatively oriented male teachers; while the adjusted scores decreased somewhat the likelihood that cooperatively oriented students would receive lower grades from competitively oriented male teachers than from cooperatively oriented male teachers. Adjusting the means by the covariate influenced only slightly the grades given among the groups tested but possibly more severely affected the dissimilarly oriented groups.

A series of one-way analysis of covariance tests were performed because of the significant interaction among groups of students and male teachers varying by orientation (table 18). These tests analyzed the difference for each row and each column of the data table for male teachers. The critical F-ratio of 2.78 ($\alpha = .10$, df = 1,72) was exceeded by cooperatively oriented teachers varying by student orientation only. There was significant difference between the grades given by cooperatively oriented male teachers to students varying by orientation ($F = 3.29$, $p < .10$).

The tests of homogeneity of variance yielded $F = 1.149$, with $p = .67$ (df = 1,73) for the cooperatively oriented male teachers interacting with students varying by orientation. The assumption of homogeneity of variance was upheld for testing between the means of grades given by cooperatively oriented male teachers to students varying by orientation. It was shown that cooperatively oriented male teachers gave the highest grades overall to students with a similar orientation.
TABLE 18
FOUR ONE-WAY ANALYSIS OF COVARIANCE TESTS FOR
MALE TEACHERS AND STUDENTS VARYING BY
ORIENTATION: TESTING DIFFERENCES FOR
EACH ROW AND EACH COLUMN OF THE
DATA TABLE

<table>
<thead>
<tr>
<th>Group a</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students competitive with teachers varying as competitive or cooperative</td>
<td>(1,68)</td>
<td>20.681</td>
<td>2.332</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Students cooperative with teachers varying as competitive or cooperative</td>
<td>(1,74)</td>
<td>12.878</td>
<td>1.368</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Teachers competitive with students varying as competitive or cooperative</td>
<td>(1,70)</td>
<td>18.130</td>
<td>1.977</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Teachers cooperative with students varying as competitive or cooperative</td>
<td>(1,72)</td>
<td>29.708</td>
<td>3.286b</td>
<td>&lt;.10</td>
</tr>
</tbody>
</table>

a Only grades given by MALE teachers are included in this summary (N = 148).

b Significant

One further question with respect to the student sex variable needed testing. Was there significant interaction among the student groups varying by sex as well as orientation? Additional analysis of covariance tests were performed and are summarized in tables 19 and 20. While stronger support was found among the interaction effects of male students and male teachers varying by
TABLE 19
THE ANALYSIS OF COVARIANCE TEST FOR THE INTERACTION EFFECTS AMONG MALE TEACHERS VARYING BY ORIENTATION AND FEMALE STUDENTS VARYING BY ORIENTATION

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Student Groups (rows)</td>
<td>1</td>
<td>0.988</td>
<td>0.113</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between Teacher Groups (columns)</td>
<td>1</td>
<td>1.150</td>
<td>0.132</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Interaction Among Student and Teacher Groups</td>
<td>1</td>
<td>17.437</td>
<td>1.994</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>75</td>
<td>8.744</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Male teachers and female students only.

TABLE 20
THE ANALYSIS OF COVARIANCE TEST FOR THE INTERACTION EFFECTS AMONG MALE TEACHERS VARYING BY ORIENTATION AND MALE STUDENTS VARYING BY ORIENTATION

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Student Groups (rows)</td>
<td>1</td>
<td>0.091</td>
<td>0.009</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between Teacher Groups (columns)</td>
<td>1</td>
<td>0.308</td>
<td>0.030</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Interaction Among Student and Teacher Groups</td>
<td>1</td>
<td>27.540</td>
<td>2.726</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>63</td>
<td>10.103</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Male teachers and male students only.
orientation, it was not significant (p = .10; df = 1,63). A comparison of the means of grades received by students varying by sex and orientation, and male teachers varying by orientation is shown in table 21.

The means of grades given by male teachers varying by orientation (table 21) show some interesting trends. Similarly oriented male teachers gave their students the highest grades while dissimilarly oriented male teachers gave their students the lowest grades. The highest grades after adjusting for the covariate (WRAT scores) went to female students with orientations similar to that of their teachers. The lowest grades overall after adjusting by the covariate went to male students with orientations dissimilar to that of their teachers. The lowest grades overall before adjusting by the covariate went to the cooperatively oriented male students (7.89) from male teachers with a competitive orientation. While sex of the subjects was not a factor with respect to the grades received by competitively oriented students, it appeared to be a factor with the cooperatively oriented students.

Cooperatively oriented females received higher grades from male teachers than did any other student group. The teacher orientation was also a factor. An analysis of the data showed that the highest grades overall (10.63) were received by cooperatively oriented female students from cooperatively oriented male teachers. The lowest grades overall (8.15) after adjusting for the covariate were received by competitively oriented male students from cooperatively oriented male teachers. Thus, it would appear that the sex variable tends to combine with the orientation variables in affecting grades.
TABLE 21
THE GRADE MEANS GIVEN BY MALE TEACHERS VARYING BY ORIENTATION TO STUDENTS VARYING BY SEX AND ORIENTATION

<table>
<thead>
<tr>
<th>Student Groups</th>
<th>Male Teachers</th>
<th>Total</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Competitive</td>
<td>N</td>
<td>Cooperative</td>
<td>N</td>
</tr>
<tr>
<td>Competitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>21</td>
<td>9.48</td>
<td>13</td>
<td>8.92</td>
<td>34</td>
</tr>
<tr>
<td>Females</td>
<td>14</td>
<td>9.50</td>
<td>23</td>
<td>9.09</td>
<td>37</td>
</tr>
<tr>
<td>Cooperative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>19</td>
<td>7.89</td>
<td>15</td>
<td>9.60</td>
<td>34</td>
</tr>
<tr>
<td>Females</td>
<td>19</td>
<td>8.63</td>
<td>24</td>
<td>10.63^c</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperative</td>
<td>38</td>
<td>8.26</td>
<td>39</td>
<td>10.23</td>
<td>77</td>
</tr>
<tr>
<td>Both Groups</td>
<td>73</td>
<td>8.85</td>
<td>75</td>
<td>9.65</td>
<td>148</td>
</tr>
</tbody>
</table>

^a Means adjusted by WRAT score.

^b Lowest grade mean.

^c Highest grade mean.
No further tests were performed on these data. A rejection of the null hypothesis could best be explained by the varying effect of cooperatively oriented male teachers on students varying as competitive or cooperative with respect to the grades received when adjusted by the achievement scores.

Hypothesis 4

THERE IS NO SIGNIFICANT INTERACTION BETWEEN COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS AND THE STUDENTS' SEX AS MALE OR FEMALE WITH RESPECT TO THE GRADES THEY RECEIVED WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

A comparison of the means showed (fig. 6) that female students generally received higher grades than male students. Adjusting the grade means by the students' achievement scores appeared to make little difference in the grades male students received. It increases slightly the likelihood that female students would receive higher grades from competitively oriented teachers; but decreased slightly the likelihood that they would receive as high grades from cooperatively oriented teachers.

In a two-way analysis of covariance test using the general linear hypothesis model, the interaction among the groups (rows and columns) yielded $F = 0.063$, with $p > .10$ (table 22). The critical $F$-ratio ($F = 2.73$) was not attained for $p = .10$. The null hypothesis was upheld. There is no significant interaction among cooperatively or competitively oriented teacher and students varying by sex with respect to the grades they received when adjusted by the achievement scores. No further tests were performed.
Fig. 6. The interaction means plotted to show the relationship among competitively or cooperatively oriented teachers and students varying by sex.
### TABLE 22

ANALYSIS OF COVARIANCE SUMMARY FOR COMPETITIVELY OR COOPERATIVELY ORIENTED TEACHER GROUPS AND STUDENTS VARYING BY SEX

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between teacher groups (rows)</td>
<td>1</td>
<td>0.647</td>
<td>0.079</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between students by sex (columns)</td>
<td>1</td>
<td>5.178</td>
<td>0.630</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Interaction among groups (rows x columns)</td>
<td>1</td>
<td>0.514</td>
<td>0.063</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td>8.220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 5**

**There is no significant interaction among cooperatively or competitively oriented teachers and the students' institution as public or private with respect to the grades received when adjusted by the achievement scores.**

The means for student grades have been plotted showing the interaction among teacher groups varying by orientation and institutions varying as public or private (fig. 7). The unadjusted grade means showed that the highest grades overall were assigned by cooperatively oriented public school teachers while the lowest grades overall were assigned by competitively oriented teachers in private schools. Adjusting the grade means by the students' achievement scores increased the likelihood that competitively oriented teachers...
Fig. 7. The interaction means plotted to show the relationship among teachers varying by orientation and students from private or public schools.
assigned lower grades to students in private schools than to public school students; and reduced the likelihood that cooperatively oriented teachers assigned higher grades to students in public schools. Among the adjusted grades, the highest grades overall when achievement scores were held constant were assigned by competitively oriented teachers in private schools while the lowest grades overall were assigned by competitively oriented teachers in public schools. Adjusting the grade means affected quite substantially the grades assigned by teachers varying by orientation in the public and private schools.

In a two-way analysis of covariance test using the general linear hypothesis model the interaction (rows and columns) yielded $F = 0.983$, which does not attain the $p = .10$ level of significance ($F = 2.73$). Therefore, the null hypothesis was upheld. There is no significant difference between the grades given by cooperatively or competitively oriented teachers to students in public or private schools. Information regarding the results of the analysis of variance tests is shown in table 23.

There was no significant interaction among the row or column groups tested. No further tests were performed as the null hypothesis was upheld.

**Hypothesis 6**

**THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS AND THE STUDENTS' MEASURED ACHIEVEMENT LEVEL (WRAT) WITH RESPECT TO THE GRADES RECEIVED.**
TABLE 23
SUMMARY OF ANALYSIS OF COVARIANCE TEST FOR TEACHERS VARYING AS COOPERATIVELY OR COMPETITIVELY ORIENTED AND STUDENTS FROM PUBLIC OR PRIVATE SCHOOLS

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between teacher groups (rows)</td>
<td>1</td>
<td>0.385</td>
<td>0.047</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between public and private school students (columns)</td>
<td>1</td>
<td>8.155</td>
<td>0.998</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Interaction between teacher and student groups (rows x columns)</td>
<td>1</td>
<td>8.028</td>
<td>0.983</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td>8.167</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The means for the groups were plotted which showed a substantial difference between low and high achieving students as measured by their grades without respect to the teachers' orientation (fig. 8). The cooperatively oriented teachers gave a much broader range of grades than the competitively oriented teachers. The highest grades were given by cooperatively oriented teachers to students in the high achievement group. The lowest grades were given by competitively oriented teachers to the low achievement students.

In a two-way analysis of variance test using the general linear hypothesis model the interaction (rows and columns) among groups yielded $F = 1.239$, which did not exceed the critical F-ratio.
Fig. 8. The interaction means plotted to show the relationship among teachers varying by orientation and students' achievement level.
Therefore, the null hypothesis was upheld, there is no significant interaction among cooperatively or competitively oriented teachers and the students' achievement level with respect to the grades given. Summary of the analysis of variance test is shown in table 24. Since the hypothesis was upheld no further testing was performed.

**TABLE 24**

**ANALYSIS OF VARIANCE TEST FOR THE INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS AND STUDENTS' MEASURED ACHIEVEMENT LEVELS**

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated R-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between teacher groups (rows)</td>
<td>1</td>
<td>14.682</td>
<td>1.723</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Between low and high achievers (columns)</td>
<td>1</td>
<td>280.217</td>
<td>32.877&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Interaction among teacher and student groups (rows x columns)</td>
<td>1</td>
<td>10.564</td>
<td>1.239</td>
<td>&gt; .10</td>
</tr>
<tr>
<td>Error</td>
<td>192</td>
<td>8.523</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Significant

**Hypothesis 7**

THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS AND MEASURED ACHIEVEMENT LEVEL (WRAT) WITH RESPECT TO THE GRADES RECEIVED.

The grades means for the groups were plotted (fig. 9) which showed a substantially higher set of grades for the high
Fig. 9. The interaction means plotted to show the relationship among student groups varying by orientation and achievement level.
achieving student group than for the low achieving student group. However, it is interesting to note the broader range of grades received by cooperatively oriented students than for competitively oriented students. The highest grades overall were received by students in the high achievement group and had a cooperative orientation. The lowest grades were also obtained by cooperatively oriented students but showed achievement in the low level group.

In a two-way analysis of variance test using the general linear hypothesis model the interaction (rows and columns) among groups yielded $F = 0.436$, which did not exceed the critical $F$-ratio (2.73). Therefore the null hypothesis was upheld. There is no significant interaction among the student groups with respect to the grades they received. The analysis of variance test was summarized in table 25. Since the hypothesis was upheld no further testing was performed.

**Hypothesis 8**

THERE IS NO SIGNIFICANT INTERACTION BETWEEN COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS AND THEIR SEX WITH RESPECT TO THE GRADES RECEIVED WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

The means were plotted (fig. 10) which showed that very little difference exists between the grades received by male or female competitively oriented students. Cooperatively oriented students varied considerably between the grades given with females receiving much higher grades (average C+) than males (average C). Adjusting the grade means by the students' achievement scores appeared to increase only slightly the likelihood that competitively oriented
Table 25: Analysis of Variance Test for the Interaction Among Cooperatively or Competitively Oriented Students Varying by Achievement Levels

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between student orientations (rows)</td>
<td>1</td>
<td>2.357</td>
<td>0.270</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Between student achievement levels (columns)</td>
<td>1</td>
<td>328.657</td>
<td>37.697(^a)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Interaction among student groups (rows x columns)</td>
<td>1</td>
<td>3.797</td>
<td>0.436</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Error</td>
<td>192</td>
<td>8.718</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Significant

Male students received higher grades than as female students; and reduced only slightly the likelihood that cooperatively oriented male students received lower grades than did female students. Adjusting the grade means appeared to only modestly affect the grades assigned with respect to the sex of the student.

In a two-way analysis of covariance test using the general linear hypothesis model the interaction (rows and columns) among groups yielded \(F = 0.887\), which was not significant at the \(p = .10\) level \((F = 2.73)\). Therefore, the null hypothesis was upheld: there is no significant interaction among student orientations as competitive or cooperative and the sex of the student with respect to the grade received. A summary of the analysis of covariance tests is shown in table 26. It was observed that none...
Fig. 10. The interaction means plotted to show the relationship among students grouped by orientation and sex.
of the tests resulted in significant findings. Therefore, no further tests were performed on these data.

**TABLE 26**

**THE ANALYSIS OF COVARIANCE TEST FOR INTERACTION AMONG GROUPS OF STUDENTS VARYING BY ORIENTATIONS AND SEX**

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between student orientations (rows)</td>
<td>1</td>
<td>0.368</td>
<td>0.045</td>
<td>~.10</td>
</tr>
<tr>
<td>Between students sex (columns)</td>
<td>1</td>
<td>5.424</td>
<td>0.662</td>
<td>~.10</td>
</tr>
<tr>
<td>Interaction among student groups (rows x columns)</td>
<td>1</td>
<td>4.938</td>
<td>0.602</td>
<td>~.10</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td>8.199</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 9**

THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS AND THEIR INSTITUTION AS PUBLIC OR PRIVATE WITH RESPECT TO THE GRADES RECEIVED WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

The grade means were plotted to show the relationship of the groups being tested (fig. 11). Very little difference was shown between the groups of cooperatively oriented students from public or private schools. There was a substantial difference between the grade means of competitively oriented students with public school students receiving higher grades than private school students. Adjusting the grade means by the students'
Fig. 11. The interaction means plotted to show the relationship among student groups varying by orientation and institution.
achievement scores appeared to reduce to zero the likelihood that competitively oriented students received higher grades as students in public schools than students in private schools; and suggests the likelihood that cooperatively oriented students received lower grades as students in public schools than students in private schools. When the achievement levels were held constant the highest grades overall were assigned to cooperatively oriented students from private schools while the lowest grades overall were assigned to cooperatively oriented students in public schools.

In a two-way analysis of covariance test using the linear hypothesis model, the interaction among groups (rows and columns) yielded \( F = 0.542 \), which was not significant at the \( p = .10 \) level (\( F = 2.73 \)). Therefore, the null hypothesis was upheld: there is no significant interaction among students varying by orientations and institutions (public or private) with respect to the grades they receive when adjusted by the achievement scores. A summary of the analysis of covariance tests is shown in table 27.

Since there was no significant interaction among the students groups by orientation and institution no further tests were performed.

Hypothesis 10

THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED TEACHERS AND THEIR SEX WITH RESPECT TO THE GRADES GIVEN TO STUDENTS WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.

The results of plotting the means is shown in figure 12. Generally, male teachers gave higher grades than female teachers.
Cooperatively oriented teachers gave a broader distribution of grades (more grades at the extremes) than competitively oriented teachers whose grade means varied only moderately. Adjusting the grade means by the students' achievement scores appeared to increase somewhat the likelihood that competitively oriented teachers would give higher grades as males than females; and decreased the likelihood that cooperatively oriented teachers would give higher grades as males than females. The highest adjusted grades were assigned by both cooperatively and competitively oriented male teachers while the lowest adjusted grades overall were assigned by competitively oriented female teachers. Adjusting the student grade means narrowed the differences between the grades given by cooperatively oriented teachers but increased the differences between the grades given by competitively oriented teachers.
Fig. 12. The interaction means plotted to show the relationship among teachers varying by sex and orientation.
In a two-way analysis of covariance test using the general linear hypothesis model, the interaction among groups (rows and columns) yielded $F = 0.479$, which was not significant at the $p = .10$ level ($F = 2.73$). Therefore, the null hypothesis was upheld. There was no significant interaction among teacher groups varying by orientation or their sex with respect to the grades they gave to students when adjusted by the achievement scores. Information regarding the analysis of covariance tests is summarized on table 28. Since there was no significant interaction among groups additional tests were not performed.

**TABLE 28**

THE SUMMARY ANALYSIS OF COVARIANCE TEST FOR INTERACTION AMONG TEACHER GROUPS VARYING BY THEIR ORIENTATION AND SEX

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated $F$-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between teachers' orientations (rows)</td>
<td>1</td>
<td>3.292</td>
<td>0.403</td>
<td>$&gt;.10$</td>
</tr>
<tr>
<td>Between teachers' sex (columns)</td>
<td>1</td>
<td>10.538</td>
<td>1.290</td>
<td>$&gt;.10$</td>
</tr>
<tr>
<td>Interaction among groups</td>
<td>1</td>
<td>3.912</td>
<td>0.479</td>
<td>$&gt;.10$</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td>8.171</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 11**

**THERE IS NO SIGNIFICANT INTERACTION AMONG COOPERATIVELY OR COMPETITIVELY ORIENTED STUDENTS AND THE TEACHERS' SEX WITH RESPECT TO THE GRADES RECEIVED WHEN ADJUSTED BY THE ACHIEVEMENT SCORES.**
The means have been plotted in fig. 13. The grade means for female teachers irrespective to orientation are an average of 1.22 points below that given by male teachers. This is approximately the difference between a C and a C-. Adjusting the grade means by the students' achievement scores appeared to decrease somewhat the likelihood that competitively oriented students would receive higher grades from male teachers than from female teachers; and only slightly decreased the likelihood that cooperatively oriented students would receive higher grades from male teachers while receiving substantially lower grades from female teachers. The lowest grades after adjustment were assigned to cooperatively oriented students by female teachers while the highest grades after adjustment were assigned to cooperatively oriented students by male teachers.

In a two-way analysis of covariance test using the general linear hypothesis model the differences in group interaction (rows and columns) yielded $F = 0.066$, which was not significant at the $p = .10$ level ($F = 2.73$). Therefore, the null hypothesis was upheld: there is no significant difference between student orientations with respect to the grades received from teachers varying by sex when adjusted by the achievement scores. Information regarding the results of the analysis of variance tests is found in table 29. No additional tests were performed since the hypothesis was upheld.

Summary

Chapter IV has presented the findings of a study on student and teacher orientations; i.e., competitive and cooperative, and
Fig. 13. The interaction means plotted to show the relationship among student groups varying by orientation and teacher groups varying by sex.
selected independent variables. The significant differences between and among groups have been noted. It has been observed that cooperative and competitive orientations for teacher and student groups can be identified and that a significant interaction (p < .05) results in rejecting the major hypothesis (hypothesis 3). There was a significant interaction among teacher and student orientation groups which showed that students with orientations similar to that of their teachers received higher grades than those who were dissimilarly oriented.

**TABLE 29**

THE ANALYSIS OF COVARIANCE TEST FOR THE INTERACTION AMONG TEACHER GROUPS VARYING BY SEX AND STUDENT GROUPS VARYING BY ORIENTATION

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Mean Square</th>
<th>Calculated F-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between student orientations (rows)</td>
<td>1</td>
<td>0.043</td>
<td>0.005</td>
<td>&gt;.10</td>
</tr>
<tr>
<td>Between teachers' sex (columns)</td>
<td>1</td>
<td>11.723</td>
<td>1.431</td>
<td>&lt;.10</td>
</tr>
<tr>
<td>Among teacher and student groups (rows x columns)</td>
<td>1</td>
<td>0.544</td>
<td>0.066</td>
<td>&lt;.10</td>
</tr>
<tr>
<td>Error</td>
<td>191</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Problem

This study has focused on teacher and student orientations varying as cooperative or competitive and the effect that they can have on a student's achievement as measured by his earned grade. That the interaction among students and teachers varying by orientation may prove counter-productive in the classroom is a crucial concern for both educators and students.

The research sought to identify the cooperative and competitive orientations in both teachers and students. Further, it was designed to test the results of varying orientations upon the grade received by the student. The grade was adjusted by the WRAT standard score (covariate) before testing the respective hypotheses. Five classification variables were selected as representing characteristics peculiar to the teacher and student sample. Two of these dealt with the cooperatively or competitively oriented teachers and students. Two were concerned with teachers and students varying by sex. The final one examined the difference between the private schools operated by Seventh-day Adventists and public schools.

The literature views the variables of cooperation and competition as motivators and/or values. Not all studies agreed
on the value or motivating effect of these variables. Competition was regarded as being more significant for goal attainment than cooperation, at least in the United States. Some writers concluded, however, that competition is a more primitive and less mature value or less effective motivator than cooperation. This was very apparent when "ends" as well as "means-to-ends" were considered. So it was that this study grew out of the researcher's curiosity about the need for cooperation and/or competition in the classroom.

Summary of the Methodology

The population of this study was 360 students and 20 mathematics teachers within the geographical boundaries of the Lake Union Conference of Seventh-day Adventists. The twenty-school sample was selected by using a ninth- or tenth-grade mathematics class from all ten Adventist-operated senior high schools together with the public high school in closest proximity to it. The mathematics class was selected from among those available to the researcher at the time of his visit. The statistical sample consisted of the upper and lower 27 percent of the groups ranked by the score they received on the Sawyer Altruism Scale. The selected groups tended to manifest primarily a cooperative or competitive orientation. These 196 students constituted the student sample. The twenty teachers were reduced to nineteen when the 27 percent sample was drawn from the student population. These nineteen teachers constituted the teacher sample.
The data were collected using existing scales, the Sawyer Altruism Scale (adapted), the Wide Range Achievement Test (Mathematics subtest), and a cover sheet questionnaire designed by the researcher. This test battery consisted of eleven pages and required approximately thirty minutes to administer. Responses were made in the test battery booklet.

The major scale selected was the Sawyer Altruism Scale. This scale was designed to measure an individual's level of altruism which was perceived by its author as varying between two extremes, cooperative and competitive orientations. The secondary scale was the Wide Range Achievement test (level 2) which was designed to assess a student's achievement level in mathematics. This scale reports the scores as grade equivalents and standard scores. The standard scores were used as the covariate to test the research hypotheses. The battery also includes six demographic items, three of which were used to test hypotheses.

The data were collected over a period of two months in the spring of 1976. The acting administrator at each school served as a liaison person to give approval for conducting the study, assist with the mathematics class selection, and introduce the researcher to the teacher. Complete anonymity was assured to participating school personnel and students.

The collected data were stored on tape and have been processed and analyzed at the Andrews University Computing Center. The statistical tests were made using the General Linear Hypothesis
Model application for analysis of covariance. Tests of teacher and student orientation groups varying as competitive or cooperative have been analyzed using five classification variables.

**Summary of the Findings**

The major focus of the research was to identify the cooperative or competitive orientation in teachers and students, and to analyze the effect of the varying orientations on student achievement. The Sawyer Altruism Scale was used to identify the orientations while the student's earned grade adjusted by the WRAT score was used as the criterion variable.

The Sawyer Scale was evaluated with a statistical procedure for item analysis which yielded a reliability coefficient of .75 for the student group (N=360) and .62 for the teachers (N=20). This means that 75 percent (or 62 percent) of the variance of the test scores was real variance. The moderately high level of reliability lends credibility to the use of the Sawyer Scale to identify cooperative and competitive orientations.

Using the achievement test score (WRAT) as a covariate with the student's earned grade (dependent variable) yielded a .44 correlation between the two variables (p < .001). This finding strengthened the research design because it adjusted for initial differences with respect to students' achievement levels (ability).

The interaction between cooperative or competitive teacher and student groups resulted in rejecting hypothesis 3. There was a significant interaction among the groups with
The F-ratio = 5.71, and p < .05. The highest grades went to students who had orientations similar to their teachers. The lowest grades were received by students with orientations dissimilar to their teachers. The highest grade overall was obtained by cooperatively oriented students from cooperatively oriented teachers. The lowest grade overall was obtained by cooperatively oriented students from competitively oriented teachers.

Further analyses of hypothesis 3 revealed that the cooperative variable for both teachers and students resulted in statistically significant differences (p < .10). The cooperatively oriented teachers gave higher grades to students with a similar orientation and lower grades to students with a dissimilar orientation than would occur by chance alone (F=3.93, p < .10). The mean grade average for the cooperatively oriented student group was 9.66 (C+) while the competitively oriented student group received a mean grade average of 8.56 (C).

Analysis of the differences between the teacher groups varying by orientation and students with a cooperative orientation yielded a significant F-ratio (F=3.71, p < .10). Cooperatively oriented students received the highest grades from teachers of a similar orientation and the lowest grades from teachers with a dissimilar orientation.

Although not statistically significant, a comparison of adjusted means for the other groups tested provides some interesting information. Cooperatively oriented teachers on the whole gave higher grades (9.05) than competitively oriented teachers (8.75).
Cooperatively and competitively oriented students varied little with respect to their overall grade average, 9.05 and 8.92, respectively. Adjusting the students' grades by the WRAT scores changed them very little (less than 0.1). It is important to note that no statistically significant difference existed between the grades given by teachers varying by orientation. Further, there was no statistically significant difference between the grades received by students varying as competitive or cooperative.

Female students generally received higher grades than males, while male teachers generally gave higher grades than female teachers. While there was no significant finding with respect to unadjusted or adjusted grades received by students varying by sex, adjusting the grade means appeared to indicate that the highest grade overall was assigned to female students by male teachers similarly oriented.

It appears that the teachers in private schools are more generous with the assigning of grades than public school teachers. Adjusting for the covariate increased the likelihood that students in private schools were graded higher than those in public schools. This finding was observed in the adjusted grades given by competitively oriented teachers in private schools but not in public schools. The cooperatively oriented teachers appeared to grade similarly without respect to the institution. The cooperatively oriented student in the private school was more likely to receive the higher grade while the student in public school received the lower. The institution did not seem to be a factor with the grades assigned to competitively oriented students.
Students who achieved higher than average scores (standard scores) on the WRAT and were classified as high achievers also generally obtained higher than average grades from their teachers. However, this was much more pronounced among students varying as cooperatively oriented. Students classified as low achievers generally received lower grades from their teachers. There was no significant interaction among the groups, however, with respect to the grades the students received or the teachers gave.

Conclusions

The following conclusions have resulted from an examination of the findings.

1. The interpersonal dynamics between students and teachers referred to as competitive or cooperative orientations were identified and measured in the typical high school classroom.

2. Interpersonal dynamics favored similar teacher and student orientations, either as competitive or cooperative, but generated adverse effects between dissimilar orientations as measured by the grades students received. Cooperatively oriented students received the highest grades from cooperatively oriented teachers, while conversely, competitively oriented students in the same classroom received lower grades. A similar pattern of grading was experienced by students varying by orientation with a competitively oriented teacher.

3. Interpersonal dynamics in a classroom have a positive or negative effect on what a student learns as measured by the
grade received and appear to be more important than the variables: institution, sex, or achievement level.

4. Competitively and cooperatively oriented teachers appear to grade somewhat differently. The competitive teacher tended to grade more conservatively (average C to C+), with scores clustered rather closely to the mean (standard deviation, 3.0); while the cooperatively oriented teacher graded more liberally (C+ to B-) with a broader distribution of grades about the mean (standard deviation, 3.31).

5. Competitively and cooperatively oriented students in general received equal grades. The grades of the competitive students had a tendency to cluster about the mean (standard deviation, 2.95), while cooperatively oriented students' grades were more broadly distributed (standard deviation, 3.37).

6. When students were grouped by their orientation and then regrouped by the teachers' orientation very little grade adjustment by the covariate occurred. The students' achievement level in the group sampled held similar grade means with the orientation groups. Could it be that in many cases students are placed with teachers (or teachers "select" students) who complement their orientation or complete their personality need(s). This is an area where more research is required.

7. Male teachers with a cooperative orientation show the greatest variability with respect to the grades they gave students varying by orientation. Cooperatively oriented students obtained the highest grades while competitively oriented students received
the lowest. Although not shown at a statistically significant level, female students received the highest grades overall from cooperatively oriented male teachers. The lowest grades overall went to cooperatively oriented male students in the classroom of competitively oriented male teachers.

8. Competitively oriented teachers in private schools gave higher grades than public school teachers; while cooperatively oriented teachers assigned nearly equal grades to private and public school students. Cooperatively oriented students are more likely to receive higher grades in private than in public schools; but nearly equal grades are given to competitive private and public school students.

9. Female teachers irrespective of a student's orientation graded students lower than male teachers. This would seem to imply a bias on the part of the teacher, the student, and perhaps the school administration's philosophy.

Specific Recommendations for Educators

The above conclusions have made it possible to formulate a number of recommendations for educators in general and especially for those teaching at the secondary level.

1. Interpersonal dynamics are present in the classroom and may bias a teacher's evaluation of a student's degree of participation, understanding of the subject material, or competency level. It is important for teachers to be objective about interpersonal factors. Teachers would seem to be in a position to benefit from understanding the personality factors among their students, the function of group dynamics, psychological factors for
the respective age/sex group, and age-appropriate communication skills. School administrators may assist teachers by providing in-service education to meet these teacher needs.

2. Educators should avoid the contaminating influence of bias upon evaluation technique(s). Attention should be given in teacher education programs to formal and informal assessment techniques which are appropriate for evaluating the competency level, avoiding the biases inherent in interpersonal dynamics, and objectively measuring student performance appropriate to the learning. Teachers should demonstrate mastery of evaluation techniques appropriate to the learning situation and present rationale for its use. Specific competency requirements should be obtained in tests and measurements techniques for teachers as a requirement for licensure or certification.

3. Guidance counseling personnel should attempt to place students in classes with teachers who complement the students' personality needs as well as meet their academic requirements. In many high schools counselors are already doing this.

4. Competency-based teaching and evaluation would seem appropriate with skill related subjects. This methodology permits individualized instruction, flexibility in planning for both the teacher and student, and the likelihood of increased objectivity.

5. External standardized instruments appropriate to the evaluation required (desired) which are not subject to the source of unreliability may prove to be a helpful "check" for the teacher to employ periodically.
6. There appears to be some justification for grouping students by their competency levels. It would be conceivable to group students on the basis of competency (proficiency levels), proven performance, and motivational (perhaps personality) factors. It is quite possible that students would benefit by regrouping themselves in smaller numbers within a classroom. There is evidence that smaller groups are more productive than larger ones and the size of the group plus the dynamics factors may prove catalytic to learning. The teacher's role would be that of facilitator as well as instructor. Learning would be structured as a problem-solving experience employing both inductive and deductive approaches.

7. Teachers should be aware of stereotypes with respect to sex roles. If a teacher is in doubt with respect to a student's potential, whether male or female, standardized testing may prove helpful. Female students appear to have as much potential for success in mathematics, for example, as males.

8. Similar problems relative to interpersonal dynamics, teaching methodology, and evaluation techniques seem to be occurring on both private and public school campuses. Perhaps there are understandings that one group could share with the other (private schools tend to have more cooperatively oriented teachers, for example). Joint inservice programs or conventions may be productive for each. This might provide needed funding for programs/workshops otherwise unobtainable.

9. While teachers should be accountable for teaching and evaluating students within the parameters of the course objectives,
they should evaluate their success by both locally- and nationally-established objectives. They should be ready to revise and update course objectives whenever the academic and personal needs of their students are not being realized. When standardized information reveals that objectives are not being fulfilled, the professional teacher will re-examine the objectives, methodology, and his own personal dynamics together with those of his students, and seek revision.

10. Grading should be in terms of completed objectives (competencies). While personality factors interact to create a more-or-less favorable learning climate, the teacher must evaluate students on the basis of objectives/competencies obtained. No one group of students should be shown an advantage over other students for previous performance, factors of genetics, or stereotypical reasons.

11. Public and private school personnel should be informed that biases with respect to the competitively oriented (assertive, perhaps aggressive) student may be effecting the grade he receives. Public school teachers appear to "reward" students manifesting this behavior while private school teachers, at least those affiliated with the Seventh-day Adventist denomination, may have a tendency to "penalize" this type of student. There is some evidence from adjusting grade means that students in private schools tended to receive higher grades while public school students received grades lower than their WRAT scores would seem to indicate. Awareness of the potential for bias would seem to promote more objectivity.
in student evaluation and more openness toward alternative classroom methods and techniques.

12. Female teachers appear to grade students lower than male teachers without respect to the students' orientation. Female teachers should know that this appears to be a sex difference peculiar to them. The ramifications of this phenomenon are varied and subtle (e.g., may be personality factor of female mathematics teachers). What effect it may have on students varying by sex or by the other variables of this study are not known. Again, the need for knowing how to apply testing and measurement techniques is before us. The question of objectivity again becomes a reality. The need for staffing and inservice training which cross sex lines are highlighted. The need to further research this question is evident.

**Recommendations for Further Research**

This study has raised several questions which additional research should pursue. These suggested areas for further study would include:

1. The research sample was students in the ninth and tenth grades. It would be important to replicate this study with students above and below these early high school years. Further research might consider some of the following questions: When do students acquire their orientation? Is there a time in the early lifespan when this orientation trend is a relatively "fixed" phenomenon among developing children (adults)? What other personality factors are correlated with the respective orientations? How flexible or tolerant are persons of varying orientations? Is one
orientation more clearly a motivating agent than the other? What influence does one's values have on the type of orientation developed? The Sawyer Scale would need some revision to accommodate younger children but would be appropriate in its present form to use with older groups.

2. Experimental research should be designed to further define and study the effect on achievement of the cooperative and competitive orientations. The study should employ typical classroom settings as opposed to simulated (laboratory) or clinical-type settings, and require rigorous management of the variables and conditions either by direct control or through randomization. What effect will experimental manipulation have on student achievement?

3. It would seem important to determine which aspects of a family, school, or community are best served by one orientation as opposed to the other. Which one serves better to accomplish short-term goals? Or long-term goals? Can persons learn to accommodate more than one orientation?

4. Part of the teachers' score variance (19 percent) was attributed to the standardized test score. What other factors are there in addition which account for the balance of the variance (81 percent)? Personality factors? Motivational? Research should continue to identify other factors which effect a student's learning as measured by the grades he receives.

This study is just a beginning; there should be many more. An interdisciplinary approach to this thesis should prove fruitful.
Some additional knowledge has accrued through this research on the identification of motivational factors (and/or values) in the classroom which influence the student/teacher interaction and in turn affect student grades. Much more research is needed to further define and describe this phenomenon. The questions raised are crucial ones and demand the professional educators' full attention.

Summary

Chapter V has summarized the presentation of the problem, the methodology, and the findings of a study directed toward defining student and teacher interpersonal factors (cooperative or competitive orientations) and their effect on student achievement as measured by the grades they receive. Conclusions have been formulated from a careful study of the findings. Recommendations are presented for continuing research and to assist educators toward a better understanding of some interpersonal dynamics which may realistically effect the grades students receive from their teachers.
TEACHER - STUDENT RESPONSE FORM

NAME ________________________________

MALE ___ FEMALE ___

AGE _____ BIRTHDATE: MONTH _____ DAY _____ YEAR _____

GRADE IN SCHOOL _____

WHAT WAS THE GRADE YOU RECEIVED IN THIS CLASS AT THE END OF THE LAST MARKING PERIOD? _____.
IN THE CLASSROOM

THINK OF YOURSELF IN THE FOLLOWING SITUATION:

IT IS THE BEGINNING OF A NEW SCHOOL YEAR AND YOU ARE TAKING A CLASS YOU LIKE VERY MUCH. THERE ARE ONLY TWO STUDENTS IN THE CLASS: YOU AND ONE OTHER STUDENT. YOU WILL BOTH RECEIVE A GRADE AT THE END OF THE CLASS. THE GRADES WILL BE ONE OF THE FOLLOWING: A, B, OR C. SINCE EACH ONE OF YOU COULD RECEIVE ANY ONE OF THE THREE GRADES, IT IS POSSIBLE TO HAVE A COMBINATION OF NINE GRADES. THESE GRADES COULD RANGE FROM BOTH OF YOU RECEIVING A's TO BOTH OF YOU RECEIVING C's. YOU ARE TO NUMBER THE BOXES IN THE FOLLOWING GRID THE WAY YOU WOULD LIKE THESE COMBINATIONS TO COME OUT. PLACE THE NUMBERS 1 THROUGH 9 IN THE BOXES TO SHOW HOW YOU WOULD LIKE THE GRADES TO COME OUT FOR BOTH YOU AND THE OTHER STUDENT. IF IT DOES NOT MATTER AT ALL TO YOU WHICH GRADE YOU AND THE OTHER STUDENT RECEIVE, YOU CAN PUT THE SAME NUMBER IN BOTH OF THE BOXES. YOU WILL FOLLOW THIS SAME REASONING FOR THE NEXT THREE GRIDS: GRID #1, ONE OF YOUR BEST FRIENDS; GRID #2, A STUDENT NOT KNOWN BY YOU; GRID #3, A STUDENT WHOM YOU DISLIKE BEING AROUND.

GRID #1

\[
\begin{array}{ccc}
A & B & C \\
A & & \\
B & & \\
C & & \\
\end{array}
\]

The other person is one of your best friends. You have been together in several classes and have enjoyed working with him on several projects.
The other person is a stranger to you. He is new at school and is not known by you. You have heard nothing in particular about this person from any source.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td><strong>YOU GET</strong></td>
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The other person has often given you a hard-time in class. In several other classes he has frequently made harsh attacks upon your ideas. The attacks have been very direct and personal and as a result you dislike being around this person.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YOU GET</strong></td>
<td></td>
<td></td>
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</tbody>
</table>
IN THE CLASSROOM (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW YOU FEEL ABOUT THE GRADES YOU AND THE OTHER PERSON RECEIVE. THE OTHER PERSON IS ONE OF YOUR BEST FRIENDS.

____ I AM INTERESTED IN HOW GOOD HIS GRADE IS AND IN HOW GOOD MY GRADE IS.

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____ I AM SOMewhat LESS INTERESTED IN HOW GOOD HIS GRADE IS.

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____ I AM ONLY INTERESTED IN HOW GOOD MY GRADE IS; HOW GOOD OR POOR HIS GRADE IS MAKES NO DIFFERENCE TO ME.

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____ I AM SOMewhat MORE INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS AND IN HOW GOOD MY GRADE IS MAINLY.

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____ I AM ONLY INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS; I DO NOT REALLY CARE HOW GOOD MY GRADE IS AS LONG AS IT IS BETTER THAN HIS.
IN THE CLASSROOM (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW YOU FEEL ABOUT THE GRADES YOU AND THE OTHER PERSON RECEIVE. THE OTHER PERSON IS A STRANGER TO YOU.

I AM INTERESTED IN HOW GOOD HIS GRADE IS AND IN HOW GOOD MY GRADE IS.

I AM SOMEWHAT LESS INTERESTED IN HOW GOOD HIS GRADE IS.

I AM ONLY INTERESTED IN HOW GOOD MY GRADE IS; HOW GOOD OR POOR HIS GRADE IS MAKES NO DIFFERENCE TO ME.

I AM SOMEWHAT MORE INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS AND IN HOW GOOD MY GRADE IS MAINLY.

I AM ONLY INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS; I DO NOT REALLY CARE HOW GOOD MY GRADE IS AS LONG AS IT IS BETTER THAN HIS.
IN THE CLASSROOM (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW YOU FEEL ABOUT THE GRADES YOU AND THE OTHER PERSON RECEIVE. THE OTHER PERSON IS ONE WITH WHOM YOU WOULD RATHER NOT ASSOCIATE (DISLIKE).

I AM INTERESTED IN HOW GOOD HIS GRADE IS AND IN HOW GOOD
____ MY GRADE IS.

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____ I AM SOMewhat LESS INTERESTED IN HOW GOOD HIS GRADE IS.

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____ I AM ONLY INTERESTED IN HOW GOOD MY GRADE IS; HOW GOOD OR POOR HIS GRADE IS MAKES NO DIFFERENCE TO ME.

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____ I AM SOMewhat MORE INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS AND IN HOW GOOD MY GRADE IS MAINLY.

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____ I AM ONLY INTERESTED IN HOW MUCH BETTER MY GRADE IS THAN HIS; I DO NOT REALLY CARE HOW GOOD MY GRADE IS AS LONG AS IT IS BETTER THAN HIS.

STOP
THINK OF YOURSELF IN THE FOLLOWING SITUATION:

YOU AND ANOTHER PERSON HAVE JUST COMPLETED YOUR LAST CLASS OF
THE SCHOOL YEAR AND HAVE ACCEPTED SUMMER JOBS WHICH REQUIRE THE SAME
AMOUNT OF SKILL. EACH OF YOU IS TO BE PAID EITHER $1000., $1300.,
OR $1600., FOR YOUR SUMMER WORK, AND OTHER THINGS BEING EQUAL, EACH
OF YOU WOULD PREFER A LARGER TO A SMALLER SALARY. YOU ARE TO NUMBER
THE BOXES IN THE FOLLOWING GRIDS IN THE WAY YOU WOULD LIKE THESE
COMBINATIONS TO COME OUT FOR YOU AND THE OTHER PERSON. IF IT DOES
NOT MATTER AT ALL TO YOU WHICH SALARY YOU AND THE OTHER PERSON RECEIVE,
YOU CAN PUT THE SAME NUMBER IN BOTH OF THE BOXES. YOU WILL FOLLOW THE
SAME REASONING FOR THE NEXT THREE GRIDS: GRID #1, ONE OF YOUR BEST
FRIENDS; GRID #2, A PERSON NOT KNOWN TO YOU; GRID #3, A STUDENT WHOM
YOU DISLIKE BEING AROUND.

GRID #1

OTHER GETS

$1000. $1300. $1600.

YOU GET

$1000. $1300. $1600.

The other person is one of your best friends. You have been together in
several classes and you enjoy being together.
You get

The other person is a stranger to you. He has only recently come to your school. You have heard nothing in particular about this person from any source.

The other person has often given you a hard-time in class. He has frequently made harsh attacks upon your ideas. The attacks have been very direct and personal and as a result you dislike being around this person.
A SUMMER JOB (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW YOU FEEL ABOUT THE SALARY YOU AND THE OTHER PERSON RECEIVE. THE OTHER PERSON IS ONE OF YOUR BEST FRIENDS.

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I AM INTERESTED IN HOW HIGH HIS SALARY IS AND IN HOW HIGH MY SALARY IS.

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I AM SOMEWHAT LESS INTERESTED IN HOW HIGH HIS SALARY IS.

---

I AM ONLY INTERESTED IN HOW HIGH MY SALARY IS; HOW HIGH OR LOW HIS SALARY IS MAKES NO DIFFERENCE TO ME.

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I AM SOMEWHAT MORE INTERESTED IN HOW MUCH HIGHER MY SALARY IS THAN HIS AND IN HOW HIGH MY SALARY IS MAINLY.

---

I AM ONLY INTERESTED IN HOW MUCH HIGHER MY SALARY IS THAN HIS; I DO NOT REALLY CARE HOW HIGH MY SALARY IS AS LONG AS IT IS HIGHER THAN HIS.
A SUMMER JOB (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW YOU FEEL ABOUT THE SALARY YOU AND THE OTHER PERSON RECEIVE. THE OTHER PERSON IS A STRANGER TO YOU.

I AM INTERESTED IN HOW HIGH HIS SALARY IS AND IN HOW HIGH MY SALARY IS.

I AM SOMewhat LESS INTERESTED IN HOW HIGH HIS SALARY IS.

I AM ONLY INTERESTED IN HOW HIGH MY SALARY IS; HOW HIGH OR LOW HIS SALARY IS MAKES NO DIFFERENCE TO ME.

I AM SOMEWHAT MORE INTERESTED IN HOW MUCH HIGHER MY SALARY IS THAN HIS AND IN HOW HIGH MY SALARY IS MAINLY.

I AM ONLY INTERESTED IN HOW MUCH HIGHER MY SALARY IS THAN HIS; I DO NOT REALLY CARE HOW HIGH MY SALARY IS AS LONG AS IT IS HIGHER THAN HIS.
A SUMMER JOB (CONTINUED): PUT AN X ON THE LINE WHICH BEST TELLS HOW
YOU FEEL ABOUT THE SALARY YOU AND THE OTHER PERSON RECEIVE. THE OTHER
PERSON IS SOMEONE YOU DISLIKE BEING AROUND.

I AM INTERESTED IN HOW HIGH HIS SALARY IS AND IN HOW HIGH
___ MY SALARY IS.

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___ I AM SOMEWHAT LESS INTERESTED IN HOW HIGH HIS SALARY IS.

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___ I AM ONLY INTERESTED IN HOW HIGH MY SALARY IS; HOW HIGH OR
LOW HIS SALARY IS MAKES NO DIFFERENCE TO ME.

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___ I AM SOMEWHAT MORE INTERESTED IN HOW MUCH HIGHER MY SALARY IS
THAN HIS AND IN HOW HIGH MY SALARY IS MAINLY.

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___ I AM ONLY INTERESTED IN HOW MUCH HIGHER MY SALARY IS THAN HIS;
I DO NOT REALLY CARE HOW HIGH MY SALARY IS AS LONG AS IT IS
HIGHER THAN HIS.

STOP
\[ \begin{align*}
43 &+ 6 = 49 \\
94 &+ 6 = 100 \\
8.4.95 &\times 3 = 25.445 \\
726 &- 349 = 377 \\
\frac{1}{2} \text{ of } 30 &+ 1381 = 1411
\end{align*} \]

\[ \begin{align*}
9 \div 4527 & \quad \text{Add:} \\
1 \frac{1}{2} \text{ ft.} & = \_\_\_ \text{ in.} \\
6 \frac{1}{2} & \times 47 \quad \text{Write as percent:} \\
1 \frac{1}{2} & = \_\_\_ \\
2 - \_\_\_ = \frac{1}{2} \\
4 \frac{1}{2} & = \_\_\_\%
\end{align*} \]

\[ \begin{align*}
\text{Subtract:} & \quad \text{Multiply:} \quad 6.2 \ 3 \\
10 \frac{1}{2} & \quad 12.7 \\
7 \frac{3}{8} & \quad 34, 16, 45, 39, 27 \\
\text{Ans.} & \quad \frac{52}{5} \% = \_\_\_.
\end{align*} \]

\[ \begin{align*}
\text{Add:} & \quad M + 2 = 5 \\
5 \text{ ft. 7 in.} & \quad M = \_\_\_ \\
8 \text{ ft. 11 in.} & \quad 6 \times 3 \frac{7}{8} = \_\_\_ \\
2x = 3 & \quad \frac{15\% \text{ of } 175 = \_\_\_ \text{ of } 30\% = \_\_\_} \\
x = \_\_\_ & \quad \text{The complement of an angle}
\end{align*} \]

\[ \begin{align*}
4^3 & = \_\_\_ \\
\text{If } a = 7, b = 3, \quad \frac{1}{4} \% \text{ of } 60 = \_\_\_ \\
\text{Solve:} & \quad 7 - (6 + 8) = \_\_\_. \\
\text{Add:} & \quad -x - y = 23 \\
0.25 + 1 \frac{1}{2} & = \_\_\_. \\
e^3 + 3b & = \_\_\_. \\
66 \text{ sq. ft.} & = \_\_\_. \text{ sq. yd.}
\end{align*} \]

\[ \begin{align*}
\text{Factor:} & \quad \frac{r^2 - 5r - 6}{r + 1} \\
3p - q & = 10 \\
\text{Change to familiar numerals:} \quad \text{M D C X C l} = \_\_\_ \\
2p - q & = 7 \\
3 \text{ of } 100 & = \_\_\_. \\
\text{Find interest on } \$1,200 & \quad \text{at } \frac{1}{2}\% \text{ for 70 days.} \\
\text{At } 65\% & \quad \text{Ans.} \\
\text{At } 65\% & \quad \text{Ans.} \\
\text{Ans.} & \quad \text{Ans.} \\
\text{Ans.} & \quad \text{Ans.} \\
\text{Ans.} & \quad \text{Ans.} \\
\text{Find square root:} & \quad \sqrt{67081} \\
\log_{10} (\frac{1}{50}) & \quad \log_{10} 5 \sqrt{5} \\
\text{Reduce:} & \quad \frac{k^2 + k}{k^2} \frac{3k - 3}{k^2 - 1} \\
2x^2 - 36x & = 162 \\
\text{Find root:} & \quad x = \frac{\_\_\_}{\_\_\_}
\end{align*} \]

**Percentiles and Standard Scores corresponding to grade ratings and age may be found in the Manual.**

**Arithmetic—Level 11—Grade Norms.**

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<thead>
<tr>
<th>Score Grade</th>
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**THANK YOU.**
BIBLIOGRAPHY

Books


Articles


**Unpublished Materials**


VITA

Name: Nelson Edward Evans

Date of birth: September 29, 1936

Place of birth: Cortland, New York

Secondary education: Union Springs Academy, 1953-1955

Collegiate institutions attended: Dates: Degree:

Atlantic Union College 1955-1957; 1958-1961 B.A.

State University of New York at Oswego 1970-1972

Andrews University 1973-1974 M.A.


Major: Educational psychology and counseling

Cognate: Measurement

Positions held:

Elementary and junior high principal and teacher—New York 1961-1967


Principal—Union Springs Academy, New York 1970-1973

Senior high teacher (part-time), Michigan 1973-1974

Research assistant—Hewitt Research Center, Michigan 1974

Graduate assistant—Andrews University 1975-1976

Part-time instructor—Andrews University 1977

School psychologist—Berrien County Intermediate School District, Michigan since 1976