

AN ABSTRACT OF THE THESIS OF

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Title: EFFECTS OF GROUP COUNSELING ON SELF CONCEPT AND
ACADEMIC ACHIEVEMENT OF SELECTED HIGH SCHOOL
SOPHOMORE HEALTH CLASSES

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This study was designed to investigate the effects of group counseling on the self concept and academic achievement of high school sophomore health classes. Specific hypotheses to be examined were:

1. The experimental group will evidence more improvement in academic achievement score than will the control group.
2. The experimental group will evidence more improvement in self concept score than will the control group.

A review of the literature in group counseling suggests that it can be a factor in increasing measured self concept and measured academic achievement. Within these two areas, however, there were also negative and inconclusive findings.

The sample consisted of four tenth-grade required health classes at Corvallis High School, Corvallis, Oregon. Fifty one

individuals participated in the experimental group. They were exposed to group counseling for ten weeks. Complete testing data was obtained for 45 experimental subjects. Fifty individuals participated in the control group. They received ten lectures on health during the same time span as the experimental subjects. Complete testing data was obtained for 43 control subjects. Statistical treatment was applied to the data for 88 subjects.

The Tennessee Self Concept Scale and a teacher constructed unit test were administered to subjects prior to the beginning of the research and at the conclusion of the project. Two separate scores on 88 individuals were tabulated. Analysis of variance of experimental variance gain was used comparing experimental and control groups on each instrument. Comparisons between experimental improvement and control improvement scores on the health test did not yield a difference significant at the .05 level. Comparisons on the Tennessee Self Concept scores between experimental and control groups did not yield a difference significant at the .05 level. The effect of group counseling and academic achievement was not determined by this study.

Further analysis of the data was made using the orthogonal single degree of freedom analysis of variance. An F-ratio of 6.56, significant at the .015 level was found on the health test scores favoring experimental females and control males.

Recommendations for further research in group counseling include:

1. Determination of the maximum effective group size.
2. Investigation with subjects at different age levels.
3. Participation based on specific criteria.
4. Utilization of group counseling in a planned, announced, voluntary course curriculum.
5. Investigation of the effect of group counseling on counselor's image.
6. Utilization of co-counselors in larger group settings.
7. Increasing number of sessions.
8. Investigation of sex variable on academic achievement.
9. Investigation of effect of the sex of group leader upon adolescents.
10. Evaluation using long-term follow up tests.
11. Investigation of instruments used in group counseling evaluation.

Effects of Group Counseling on Self Concept and Academic
Achievement of Selected High School
Sophomore Health Classes

by

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EFFECTS OF GROUP COUNSELING ON SELF CONCEPT AND ACADEMIC ACHIEVEMENT OF SELECTED HIGH SCHOOL SOPHOMORE HEALTH CLASSES

CHAPTER I

INTRODUCTION

Man is a social being. Permeating his existence are relationships with groups with which he comes into contact. Schools, in fact, are organized around the concept of group education. Each adolescent reacts to, interacts with and reflects upon the actions of other persons who are members of, or associated with, the group (Glanz, 1962). It might well be argued that the concept we have of ourselves is dependent upon how others perceive us and react to us. One of the basic concerns in modern society is the maintenance of a balance between group conformity and individual autonomy (Combs and Snygg, 1959). "If the major task is learning to adjust to the demands of others, the young person has little opportunity to test his own individuality" (Stewart and Warnath, 1965). An individual easily becomes lost in a typical group situation where the necessity of conforming to the group predominates.

Group counseling seems to be a logical way for school counselors to utilize groups as an aide to the achievement of a realistic self-identity. As Wrenn states, "The counselor must accept responsibility for using wisely what might be called planned group experiences for

the development of improved self-understanding and the facing of psychological realities (Wrenn, 1962). Group counseling holds promise for peer interaction in a natural setting (Calia, 1968).

There are aspects of group counseling which can make it a useful technique for facilitating self-understanding and self-acceptance. For example, it can offer the "quality of relationship," which has been documented as the main ingredient of successful counseling (Carkhuff and Berenson, 1967). For each group member acceptance by the counselor and other group members is a necessary condition for honest communication and self-insight. If members of a group feel relatively secure and friendly, there is much they can learn from each other (Muro, 1968). When a counselee feels accepted by one other significant person, growth is encouraged (Rogers, 1969). Acceptant group members, therefore, can increase the potential for self-understanding (Combs, 1965). When members of the group, including the counselor, give and receive feedback in a supportive atmosphere, the significance of responses, both verbal and non-verbal, can be explored by the group. Group counseling offers a unique situation wherein the counselor can observe interpersonal relationships as they occur between group members. It can also provide for the identification of group members who are in need of individual counseling.

Counseling was formerly conceived of only in terms of a

one-to-one approach. The early appeal of group counseling was its efficiency in utilization of time and effort. However, this has given way to a recognition that group counseling may constitute a preliminary step to individual counseling. There is evidence that the group approach is the best way to develop a one-to-one relationship in counseling (Offer, 1969).

Some authorities in the field of counseling advocate group counseling in the schools. Stefflre (1965) states, "The counselee is able to act out new ways of behaving--to think thoughts he previously rejected." Fulmer and Bernard (1964) are very strong in their support of group counseling. "The importance of group work in counseling cannot be overestimated." Another view, held by Tyler (1969) is that "group counseling seems to be about as effective as individual counseling in producing desirable results." Blocher (1966) speaks for the developmental aspect of group counseling and its positive force in helping to alleviate the dehumanizing aspects of education. He further postulates that principles of group processes may well be among the most significant changes in schools of the future. Zeran (1969) says, "The group approach permits the individual to learn to accept and reflect rather than to deny troubled feelings. He further believes that, "It is conceivable that since the emerging adolescent relates well through group interaction, the main thrust to counseling at this level be group directed." Meeks (1968) writes, "It would seem, then, that

group counseling is one of the best techniques for improving human relations. Group counseling offers a technique for facilitating personal and interpersonal development."

Some research has been done at the high school level using group counseling. Usually this research has been with groups smaller than classroom size and with adolescents whose problems are similar (Glanz, 1962). Rogers, however, along with others, has been advocating what he calls student-centered teaching. "This kind of teaching focuses on similar procedures and relationships involved in group counseling (Rogers, 1969). Aspy found that classrooms where teachers were rated high by the Truax Scales on empathy, congruence and positive regard, scored significantly higher on four of five subtests of the Stanford Achievement Tests than the classrooms where the teachers were rated low on these qualities (Aspy, 1967). In another study Aspy and Hadlock (1967), using the Truax Scales, reported that the students of teachers rated at the highest level gained an average of two and one half academic years in spelling while the students of the lowest rated teachers gained an average of only half an academic year over the same period. Rosenberg (1965) found that the self-image of adolescents correlates significantly and positively with the image important others have of them, particularly teachers and peers. Offer (1969) in his four-year study of model or "normal" students found that students wanted to feel that learning could be enjoyable;

the ideal teacher allowed a student to have his own opinion and to think for himself.

Other research in group counseling has shown similar positive results. The Broedel and Proff (1960) study of underachieving adolescents showed significant growth in achievement and acceptance of self. The Clark and Bobel (1968) study indicated that college students became more like self-actualized people as a result of group counseling. In a study by Elkenberry and Webb (1964) pre-adolescents after exposure to group counseling were found to have a greater congruence between feelings and behavior in identification with parents. Clements' (1966) research indicates that college-bound high school students had less anxiety when exposed to small group counseling. Ofman's (1964) study reported that group counseling improved scholastic performance.

The purpose of this research is to extend the principles of group counseling from small groups to a classroom situation. Authorities differ as to the effects of increases in group size. Ohlsen (1966) states that, as group size increases, there is less member-to-member and more member-to-leader interaction. Corsini (1957) feels that the size of a group and the length of a group session depends upon the setting, the composition of the group, and leader. Warters (1960) reported that the desirable exact size or even range of sizes, has not been established through research. She further states that some

authorities recommend groups larger than twenty as appropriate for group counseling.

Statement of the Problem

The problem is to determine whether individuals at the sophomore level in high school who are exposed to group counseling will show a greater increase in self-concept score and academic achievement than a similar group exposed to the lecture method. The period of time will be the same for both groups.

The dependent variables in this study are self-concept and academic achievement. Extraneous variables such as time and maturation are assumed to exert insignificantly different influences on both experimental and control groups.

Hypotheses

1. The experimental group will evidence more improvement in academic achievement score than will the control group.
2. The experimental group will evidence more improvement in self-concept score than will the control group.

Limitations of the Study

Because this study was conducted with the students from one high school, it is possible that generalizations will not apply to other

schools which may be different in composition of student, faculty or curriculum. The fact that there were only ten counseling sessions over a three-month period may be a limiting factor on the independent variables. Students did not volunteer, and attendance was required; this may have affected results. Placement into the experimental or control group was arbitrarily determined by the researcher. Interruptions such as announcements, messages and early dismissals may have influenced the results. This counselor's ability to facilitate, maintain and perceive vital interpersonal relationships could effect group interaction and have an influence on interpersonal communications.

Implications of the Study

If the original hypotheses are supported, there are implications for changes in the use of the public school counselor's time. Counselors could utilize group counseling techniques on a wider basis. The results of this study could stimulate further research in the public schools in reference to effective group size and evaluation of change in self-concept and academic achievement.

Definition of Terms

For purposes of clarity and consistency the following definitions apply wherever the terms appear.

Group counseling. Group counseling is a process where the focus is primarily upon the members' and group leader's affective perceptions. It is based upon the premise that in order to change or modify behavior, an individual's perceptions of his reality must be changed, and that these perceptual processes can be clarified and helped through group counseling. These processes can be facilitated through the expression of an individual's behavior and his communications with other group members and the leader. The group and the leader can also facilitate an individual's understanding of behavior and the communication of his behavior by questioning and clarifying. Group members can be helped to believe in and trust their own feelings and perceptions in a supportive, understanding atmosphere. This belief and trust can be transferred to situations outside the group counseling setting. Group members are encouraged to state their feelings, and to question and react to the statements of others. There is an emphasis upon listening to the affective meaning of communications. The leader and group members are the "subject matter" of group counseling.

Group counseling is . . . considered to be an experience where the individual in a group has an opportunity to explore his feelings and attitudes. It can be seen from this definition that group counseling is not an instructional, information-giving type of experience. It is, however, a learning experience in that the individual learns about himself, by examining his beliefs, attitudes and emotions. In this experience, the individual is provided the opportunity to compare,

explore and change his self-concept through a loose, personal relationship with other members of a group (Huston, Knighten, 1966).

Group counseling is the establishment of a group of persons for the purposes of individual growth and development in the area of personal and emotional problem solving--normally employed with non-neurotic and non-psychotic persons within a developmental or growth climate (Glanz, 1962).

The core of group counseling is the effort through group interaction to help each individual gain a different perspective on the many experiences he has in coping with a world of change and to find through these new perspectives a personal meaning and a set of values which will guide his decision making and his problem solving outside of the group (Muro and Freeman, 1968).

Group counseling is a dynamic interpersonal process focusing on conscious thought and behavior and involving the therapy functions of permissiveness, orientation to reality, catharsis and mutual trust, caring, understanding, acceptance and support. The therapy functions are created or nurtured in a group through the sharing of personal concerns with one's peers and the counselor. The group counselees may utilize the group interaction to increase understanding and acceptance of values and goals and to learn or unlearn certain attitudes and behaviors (Gazda, Duncan, Meadows, 1967).

Group counseling . . . has as its object the creation of a group situation which provides an opportunity for members to explore their beliefs, attitudes and convictions, provides them with a source of information when needed and assists group members in formulating new meanings of events and discovering the personal meanings of these events in relation to their own beliefs and actions (Combs, 1965).

Counselor. This writer was the counselor in this study. He has had eight years of secondary school counseling experience, more than two years of graduate work in counseling, plus two years of college

work in counselor education, primarily in group processes.

The counselor's function is to facilitate group interaction and effective communication. This is done by seeking from members the meaning of statements by questioning, confronting, supporting, clarifying and by serving as a model for that behavior he hopes to elicit in group members. This is what Rogers (1969) refers to when he speaks of congruency between feelings and communication in the facilitator. The counselor seeks to respond to the personal meaning each member is trying to convey. He attempts to by-pass the factual or descriptive aspects of a group members' comments and to respond instead to the personal meanings these facts have for the individual. The counselor reacts to and with group members as equals, not as peers (Fulmer and Bernard, 1964).

Self-Concept. For this study, self-concept is defined as the "characteristic way an individual feels about himself" as measured by the Tennessee Self-Concept Scale (Fitts, 1965).

Academic Achievement. Academic achievement is defined as those scores obtained on a teacher-constructed unit test on which a split-half reliability will be determined.

Sophomore Health Classes. These classes consist of four required tenth grade health classes at Corvallis High School, Corvallis, Oregon, taught by June McMurdo, Ph. D.

CHAPTER II

REVIEW OF RELATED LITERATURE

Research in group counseling has focused primarily upon individuals with specified problems such as academic under-achievement and behavior deviations. The available studies utilized small groups, usually from five to twelve in size. Studies on group counseling in the schools are included from the junior high, senior high and college level.

Group Counseling

Vriend (1969) conducted a study operating from the theoretical base that the adolescent social system and group counseling could be incorporated into a program for improving the school performance of disadvantaged students. The study was done with a group of selected eleventh grade high school students. Individuals were identified by teacher selection, grade point average and standardized test scores into high- and low-performing categories and divided into control and experimental groups by random selection. It was assumed that those students in the high-performing categories possessed abilities which would enable them to help low-performing students. Four groups of 12 students each, three peer leaders (high-performers) and nine

student participants (low-performers) met each week with the counselor for 40 minutes of group counseling. The focus of groups was on the utilization of peer leaders to help the other members of the group become more achievement-oriented. Each of the four counseling groups was divided into three study groups, each containing one peer leader and three student participants. These groups also met for three 40-minute periods weekly. Guidance activities involving the entire 48 individuals were conducted one day per week. All group sessions lasted for two semesters of 20 weeks each.

The experimental and control groups were given the School and College Ability Test (SCAT), the Sequential Test of Educational Progress (STEP) and a questionnaire based on a study by Sain (1965) of the vocational aspirations of inner city youth before and after treatment. Grade point averages were also computed for both groups before and after treatment.

Analysis of co-variance was used to analyze the data on the SCAT and STEP. On each of the five subscores of the STEP, the experimental group showed significant improvement at the .05 level; the control group did not. The SCAT-Verbal and SCAT-Total scores were statistically significant at the .05 level favoring the experimental group. Post grade point average analysis yielded F values significant at the .001 level of confidence; the experimental group showed a mean gain of .81 while the control showed a decrease of .31. The

questionnaire was examined using a t-test; group mean scores on all five variables were significant at the .05 level favoring the experimental group. Vriend concluded that group counseling and peer leadership models improves scholastic performance, vocational aspirations and group test scores.

Dickinson and Truax (1966) studied college underachievers using group counseling procedures. The study was aimed at evaluating the effects of time-limited group counseling upon the college under-achiever contrasted with a similar group that was receiving no counseling. Academic performance was used as the criterion for evaluating the outcome. Underachieving college freshman were defined as those who were placed on academic probation at the end of their first college semester despite having scores on the American College Test (ACT) indicating academic aptitude sufficient to have maintained a "C" average. A population of 109 students was obtained, and from this population 48 responded to a letter. These 48 individuals were randomly divided into experimental and control groups. Groups were matched as to age, grade point average and semester hours carried. Three experimental groups of eight individuals each, met twice a week for group counseling over a period of 12 weeks. Post-treatment application of the t-test to grade point average indicated that the experimental group improved over the control group at the .01 level. The researchers state that

group counseling is effective in the treatment of underachieving college students.

Caplan (1957) worked with teacher-referred junior high school boys who were identified as deviant in behavior. He divided 17 boys into three groups for one academic semester of weekly group counseling sessions. An equal number of referrals served as a control. Groups were matched in age, measured intelligence, family economic level and school record. Experimental groups met for 50-minute sessions in a "permissive" atmosphere. A counseling Q sort was given to both groups before and after treatment. The Q sort was composed of 50 self descriptive statements taken from student autobiographies. These 25 statements were divided into 25 positive and 25 negative statements. Participants were told to arrange the statements into a forced normal distribution ranging from "least like me" to "most like me." A Fisher's Z comparison was used to analyze the data from experimental and control groups. Caplan found an increase in the mean self-concept scores of the experimental group significant at the .01 level. The control group showed an increase in mean scores, but it did not approach significance. He states, therefore, that group counseling can assist in increasing the measured self-concept of junior high school boys.

In another study using junior high school students, Broedel, Ohlsen, Proff and Southard (1960) focused on underachieving ninth

grade students. These students were identified by selecting 29 students who ranked in the top ten percent of their class on the California Test of Mental Maturity (CTMM) and the ninth decile or below in terms of their grade point average. The 29 students were divided in four groups, two experimental and two control. While the experimental groups received "unstructured" group counseling twice a week for eight weeks, the control groups received no special treatment. Following post-testing the control group received group counseling and were used as their own control. An effort was made to control the educational and guidance experiences during the experimental period.

The growth of students was evaluated by (a) academic performance as measured by the California Achievement Test Battery (CATB) and grade point average, (b) acceptance of self and others as revealed in responses to the Picture Story Test (PST), and (c) behavior in interpersonal relationships reported on a Behavior Inventory by pupils themselves, parents and the counselor. Using a t-test, the following results were obtained. The mean gain in acceptance of self and others was significantly greater for the experimental groups. Experimental subjects' grade point averages dropped significantly at the .05 level, but control change was not significant. Differences in improvement of scores on the CATB were significant, favoring the experimental group at the .01 level. Using a t-test for

correlated means, a significant difference at the .05 level favored the experimental group using scores from the Behavior Inventory. The researchers concluded that group counseling aided in two of the three variables tested.

Clements (1966) reported a study using 180 college-bound high school seniors. He attempted to determine whether group counseling would affect their anxiety level. The 180 individuals were randomly selected from a population of 225 college-bound seniors. Sixty students formed the experimental group and were randomly assigned to six sub-groups of ten each. The remaining 120 comprised two control groups. Six weekly 50-minute sessions were scheduled in the spring, prior to graduation, and six more in the fall, following college enrollment. The group counseling sessions were of an accepting, permissive nature. Following the final session in the spring the Bills Index of Adjustment and Values (IAV) and an unpublished Self Concept Inventory (SCI) (Faust and Doane, 1964) were administered to both experimental and control groups. These instruments were used to measure anxiety concerning self. Following the sixth session in the fall, the same instruments were administered to the experimental students and to those of the second control group who had enrolled at Arizona State University.

Analysis of variance with means adjusted for disproportionality indicated that F values reached the .05 level favoring experimental

over control groups and fall over spring groups. Clements states that group counseling with high school seniors resulted in a significant decrease in their anxiety level.

Sixty-nine academically gifted, but underachieving, sophomore high school students were given four semesters of weekly group counseling sessions in a study done by Finny and VanDolsen (1969). Students whose grade point average for the freshman year were below the mean for all students at their combined verbal-numerical Differential Aptitude Test (DAT) scores were classified as under-achievers. These underachieving students were divided according to sex, and then randomly assigned to control or experimental groups to constitute paired, same-sexed groups of similar size. Groups ranged in size from 5-15 with an average size of 12. The authors hypothesized that group counseling would result in higher grade point averages, and that there would be a positive change in attitudes and behaviors towards school. The second hypothesis was tested using (a) the California Study Methods Survey (CSMS) (b) absences and deportment referrals obtained from school records (c) the Study Behavior Questionnaire (SBQ) and (d) the California Psychological Inventory (CPI).

Post treatment statistical analysis showed no significant differences between the two groups in grade point averages, CSMS, and absence and deportment referrals. Chi square analysis indicated

the experimental group was significantly favored by teachers on 11 of 33 items of the SBQ; the other 22 items showed no difference. Using a t-test for correlated means, there was a significant difference for the experimental group on the CPI. The authors conclude that results from the study indicate group counseling does not affect grade point averages of underachieving in high school students but can have a positive effect upon attitudes and behavior towards school.

A similar study was done by Laxer (1967) to determine if group counseling would reduce the number of after-school detentions. Twenty students were selected from ninth grade males in each of three schools. Those 20 having the greatest numbers of detentions for violating school regulations were considered behavioral problem students. Individuals were matched in terms of recorded detentions, I. Q., average school grades and age. Of each pair one was randomly assigned to be counseled and the other was assigned to an uncounseled control group. Tape recorded counseling sessions, 40 minutes in length, were held twice a week for a minimum of 600 minutes of counseling. Each group was pre- and post-tested using (a) the Alpert Haber Anxiety Scales (b) a scale constructed to measure attitudes towards counseling (c) the Taylor Manifest Anxiety Scale and (d) a 50-item Q sort using real and ideal self. Statistical analysis revealed no significant differences in any of the compared variables.

Using counselors in training at an N. D. E. A. Guidance and

Counseling Institute, Catron (1966) studied the effects of educational-vocational group counseling with "normal" high school students. From a group of 110 students who had indicated an interest in joining a college and career planning group, 54 completed the experimental period with sufficient data to be considered experimental subjects. The control group was composed of 66 non-remedial summer school students who were paid 50 cents per hour to complete three and one-half hours of testing. The matching procedure required that subjects be of the same sex and grade, within six months of each other in age and within ± 1 SD on the School and College Ability Test (SCAT) total score. Sufficient data was available to match 46 pairs. Both experimental and control groups were given a modification of the Butler-Haigh (1954) S-I-O (Self, Ideal Person, Ordinary Person) Q sort during the second week and at the conclusion of the experiment. The experimental subjects were divided in 13 counseling groups ranging in size from 5 to 12. These groups met for 14 sessions over a five week period. Each session lasted one and one-half hours. The first four groups were structured with the remaining sessions unstructured and group determined.

Analysis of variance revealed that perceptions of self changed significantly at the .01 level for the experimental group in the direction of "good" adjustment. The control group's change did not approach significance. Differences in perceptions of Ideal Person

and Ordinary Persons were not significant for either group.

The effects of two different methods of group counseling on those personality characteristics that typify the male, college, academic underachiever and upon grade point average is reported by Gilbreath (1967). Eight groups (N=81) of male underachievers who volunteered for counseling were divided between two counselors who each led two groups in the Leader Structured (LS) directive method and two in the Group Structured (GS) non-directive method. A like group served as a control. Eight sessions of one-half hour in length were conducted for each experimental group during the academic term.

A questionnaire was given prior to the last session which indicated at the .01 level of significance that counselors were consistent in maintaining the difference between GS and LS. At the conclusion of the experimental period all subjects were given the Stern Activities Index (SAI) and the Minnesota Multiphasic Inventory (MMPI). Selected scales within these two tests were used to measure the degree of change. Men in the LS group increased significantly in ego strength when compared with individuals in the control group. LS groups had a significantly greater rate of positive change in grade point average than either GS or control groups. The GS groups' rate of positive change in grade point average was significant at the .05 level over the control group. Three months after counseling, both

GS and LS groups rates of positive change in grade point average were significantly greater than those of the control groups. Gilbreath concludes that the LS method of group counseling specifically focused on personality patterns of underachievers related to scholastic difficulties produced greater change in ego strength, when compared with other groups. He further states that either method of group counseling results in significantly higher grade point averages when compared to control groups.

Speilberger, Weitz and Denny (1962) devised a study to determine the effects of group counseling on academic performance of anxious college freshmen using the Taylor Manifest Anxiety Scale (MAS) and the Wesh Factor Scale A-Scale (A-Scale). One hundred and twelve male freshmen liberal arts students met the criteria established for "anxiety." Of the 112, 56 volunteered for the study and were assigned to experimental and control groups. The groups were matched as to academic performance. Experimental groups met weekly during the first semester. Groups were permissive and relatively unstructured.

Grade point averages were compared using analysis of variance and showed a significance at the .05 level for the counseled group. The authors conclude that this study indicates that anxious college freshmen who volunteer for group counseling showed significantly more improvement in academic performance than anxious freshmen

who were not offered this opportunity.

In evaluating the effectiveness of a group counseling procedure, Ofman (1964) studied five groups of 60 students. These groups consisted of a baseline group of randomly chosen college students, an experimental group of volunteers who participated in group counseling for eight semesters, a control group of volunteers who were refused admission to group counseling, a dropout group who participated in counseling for less than three sessions, and a wait group of volunteers who were refused admission but who became participants two semesters later. The grade point averages for each of these groups was computed for each of the eight semesters. Scholastic aptitude was similar for all groups as measured by the American Council on Education (ACE) examination.

Using analysis of variance the following results were obtained. Those students who volunteered for group counseling, while comparable to the baseline group in scholastic aptitude had significantly lower first semester grades. As a function of group counseling the experimental group improved its grades significantly to a level comparable to that of the baseline group and significantly above that of control and dropout groups. The wait group remained static during the wait period, but after subsequent group counseling improved its grade point average to a level comparable to the experimental or baseline group's grade point averages. Grade point averages did not improve for

control and dropout groups. It was concluded that group counseling over a long period of time was effective in improving scholastic performance.

Summary

A review of the literature in group counseling suggests that group counseling can help to bring about an increase in (a) measured self concept, (b) measured self acceptance and self perception, (c) measured vocational aspirations, (d) measured positive attitude and behavior towards school and (e) a measured decrease in anxiety. Such a review also suggests that group counseling can be a factor in increasing academic achievement when measured by standardized test scores or grade point averages.

Within these areas, however, there were negative and inconclusive findings. There appears to be a need for more carefully controlled research to evaluate group counseling techniques, procedures and effects.

CHAPTER III

METHODS AND PROCEDURES

Sample

The sample consisted of four tenth grade required health classes at Corvallis High School, Corvallis, Oregon. These four classes were selected from a larger population of eleven required health classes. At the request of the school administration the first four classes taught by June McMurdo, Ph. D. were used in this project. These were school periods one, two, three and six. The sample classes contained members of both sexes, approximately equally distributed. They were not scheduled by academic ability, and numbered about 25 individuals in each class. The sample classes were similar then as to sex, age, academic ability and size.

Design

The design of the research included the assignment to control and experimental groups after pre-testing. Means for the Tennessee Self Concept Scale and the teacher constructed unit health test were computed. The two classes with the lowest mean scores on each test were matched and then randomly assigned to control and experimental groups by tossing a coin. The same procedure was used with the

two classes having the highest mean scores.

Procedure

Before the pre-testing a letter was sent home with each student explaining the project to parents (Appendix I). The letter included a general explanation and instructions for changing the classes if the parents did not want their children participating. One set of parents objected to the project and their child was transferred to another class. Seven parents reacted by letter and telephone for further information. All of these parents gave their consent for participation in the project.

The entire sample was given the pre-test of Tennessee Self Concept Scale and a teacher-constructed health test. Each test took approximately 40 minutes to administer. Of the 101 students enrolled in the four health classes, seven, because of prolonged absences, did not complete the pre-testing and were not included in the statistical analysis. Two of these students were in the control group and five more were in the experimental group. The subjects were asked to designate identification by birthdate, sex and school health period number. No classes contained individuals with the same sex and birthday.

School periods one and three, totaling 51 students (including the two not pre-tested) were designated as experimental groups while 50

individuals (including the five not pre-tested) in periods two and six were designated as control groups. A brief presentation was given to each group explaining the procedure of the project.

The control group received ten 40-minute lectures by this researcher on areas of health not covered by the teacher during the time span of the project. Although the project was originally designed for ten consecutive weeks, a snowstorm and an assembly forced an extension to a twelve week period. An effort was made not to cover material in the lectures which were included in the health test (Appendix II). The first three lectures were on first aid. The next three were on medical "quackery." The final four lectures consisted of areas in general psychology. None of these were areas included in the health test. Attendance was taken with an average absence of 2.4 per period. No consistent absence pattern was noted.

The experimental groups received ten 40-minute group counseling sessions by this researcher. Group members were encouraged to state feelings, question and react to statements of others. There was an emphasis upon listening to the affective meaning of communication. The leader and group members were the "subject matter" of the experimental groups. These ten sessions coincided with the time period of the control group and were conducted on the same day. The chairs were arranged in a circle as contrasted with the traditional rows of the control in order to facilitate communication.

Attendance was kept by the use of name cards with an average absence of 2.3 per period. No consistent individual absence pattern was noted.

After the treatment both experimental and control groups were post-tested with the Tennessee Self Concept Scale and the teacher-constructed unit test. Two students in the control group had transferred to other health classes during the project. Four individuals in the experimental group were absent for a seven-day period and did not complete the post-testing. Pre and post-testing was completed for 45 individuals in the experimental group and 43 individuals in the control group.

Measuring Instruments

Tennessee Self Concept Scale

The Tennessee (Department of Mental Health) Self Concept Scale was published in 1965 and consists of one hundred self-descriptive statements which the subject uses to describe himself. (Fitts, 1965). The test is self-administering, can be used with either individuals or groups, and is usable with subjects twelve years old or older. There are two forms for scoring; the counseling form was used for this study.

The total P score indicates the overall level of self esteem and

is the score used in data treatment procedures. A high score indicates that a person tends to like himself, feels he is of value and worth and has confidence in himself. Low P scores indicate that an individual may be anxious and see himself as undesirable, depressed and unhappy. It may also indicate that the individual has little confidence in himself (Fitts, 1965).

The scale was originally normed using 626 subjects from geographical locations throughout the United States. The norming group ranged in age from 12 to 68. It included an approximately equal representation of men and women, all socio-economic classes, and all educational levels from sixth grade through Ph.D. (Fitts, 1965).

Data collected by Sunby, Hall and Gividen (as cited by Fitts, 1965) show group means and variances comparable to those for the norming group.

Selected statistics show a reliability coefficient of .92 over a two week test-retest period with 60 college students. Correlation with related parts of the Minnesota Multiphasic Personality Inventory and the Edwards Personal Preference Scale show small, but positive correlations (Fitts, 1965).

Teacher-Constructed Unit Test

The teacher-constructed unit test was a 60-item multiple choice examination. The test covered areas of health in (1) communicable

diseases (2) congenital diseases (3) bodily disease defenses (4) immunization (5) disease detection and identification and (6) disease prevention. A split-half coefficient of correlation with an N of 100 showed an r of .90 (Appendix III) as computed by this writer. Sophomore health students from McMinnville High School, McMinnville, Oregon were used as a sample for the computation of the split-half correlation.

CHAPTER IV

RESULTS

This study was designed to investigate whether or not individuals at the sophomore level in high school who were exposed to group counseling would show a greater increase in self-concept and academic achievement than a similar group exposed to a lecture method of instruction in the academic area of health.

From the original sample of 101 students, 49 males and 52 females, complete results were obtained from 88 subjects, 41 males and 47 females. The control group was composed of 21 males and 22 females. The experimental group consisted of 20 females and 25 males. Only those subjects who completed all the designated testing for both the health test and the Tennessee Self Concept Scale were included in the data treatment. Specific hypothesis tested were:

1. The experimental group will evidence more improvement in academic achievement score than will the control group.
2. The experimental group will evidence more improvement in self-concept score than will the control group.

The statistical treatment used was analysis of variance of difference scores, which is defined as post-test score minus pre-test score.

An analysis of the difference in score gain between experimental

and control groups was made for the health test, in order to test hypothesis number one (Appendix III).

Analysis of Variance Comparison

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Control	306.96	1	306.96	1.47
Experimental	377.00	1	377.00	

The control gain in scores when compared with the experimental gain in scores yielded in F-ratio of 1.47, not significant at the .05 level. The first hypothesis was not supported. Subjects exposed to group counseling did not show significant superiority in academic achievement score gain as measured by the health test.

An analysis of the difference in score gain between experimental and control groups was made for the Tennessee Self Concept Scale scores to test the second hypothesis (Appendix III).

Analysis of Variance Comparison

	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Control	165.99	1	165.99	.17
Experimental	355.00	1	355.00	

This comparison of score gain yielded an F-ratio of .17, not significant at the .05 level. The second hypothesis was not supported. Subjects exposed to group counseling did not show a significant superiority in self-concept score gain.

Additional comparisons were made with the data using analysis of variance with the orthogonal single degree of freedom. Comparisons

are orthogonal when they are independent of each other and when the sum of the paired weights is zero (Winer, 1962) (Appendix III).

Two orthogonal comparisons were computed analyzing the gain in health test scores. A comparison between male and female averaged over experimental and control, yielded an F-ratio of .09, not significant at the .05 level. A second orthogonal comparison was made between experimental and control males and experimental and control females. This second comparison yielded an F-ratio of 6.56 significant at the .015 level favoring control males and experimental females. This second comparison indicates that sophomore males gain significantly in academic achievement when exposed to a lecture method while sophomore females gained significantly in academic achievement when exposed to group counseling.

Two orthogonal comparisons were made to analyze the gain in self-concept scores (Appendix III). A comparison between male and female averaged over experimental and control, yielded an F-ratio of .70, not significant at the .05 level. A second orthogonal comparison was made between experimental and control males and experimental and control females. This second comparison yielded an F-ratio of .38, not significant at the .05 level.

CHAPTER V

SUMMARY AND DISCUSSION

This research was undertaken to investigate the effect of group counseling on self-concept and academic achievement of selected high school sophomore health classes. Specific hypotheses examined were:

1. The experimental group will evidence more improvement in academic achievement score than will the control group.
2. The experimental group will evidence more improvement in self-concept score than will the control group.

The sample consisted of four tenth-grade required health classes, numbering 101 students, at Corvallis High School, Corvallis, Oregon. Fifty-one individuals participated in the experimental group. They were exposed to group counseling for ten weeks. Complete testing data was obtained for 45 experimental subjects. Fifty individuals participated in the control group. They received ten lectures on areas of health. Complete testing data was obtained for 43 control subjects. Statistical treatment was applied to the data for 88 subjects.

The Tennessee Self Concept Scale and a teacher-constructed health test were administered to subjects prior to the beginning of the research and at the conclusion of the project. Two separate scores on 88 individuals for each measuring instrument were tabulated. Analysis of variance of experiment gain (post score-pre score) was

used comparing experimental and control groups on each instrument.

Analysis of variance comparisons between experimental and control group scores on the health test did not yield a difference significant at the .05 level. Analysis of variance comparisons on the Tennessee Self Concept Scores between the experimental and control groups did not yield a difference significant at the .05 level. The effect of group counseling on self concept and academic achievement was not determined by this study.

Further analysis of the data was made using the orthogonal single degree of freedom analysis of variance for the health test and the self concept scale. These comparisons were (1) male control-female control (2) male experimental-female experimental (3) male control-male experimental (4) female control-female experimental. An F-ratio of 6.56 significant at the .015 level was found between the male control-male experimental scores on the health test, favoring the control males. An F-ratio of 6.56, significant at the .015 level, was found between the female control-female experimental health test scores comparisons favoring the experimental females. No other comparisons approached significance at the .05 level.

While this research did not support the original hypothesis of the effect of group counseling on academic achievement and self-concept, this researcher has some observations of a subjective nature which seem relevant to this study. Students in the experimental

group made statements indicating a desire to continue with group counseling for a longer period of time. The control group made no such request. Group counseling appeared to facilitate members' ability to communicate more easily about feelings, group interactions, and present perceptions. Initial communications within the group counseling situation were of a general, cognitive nature and changed to more personal, affective interchanges at the conclusion of the study.

Discussion and Recommendations for Further Research

The maximum effective size for group counseling needs to be determined. More research needs to be done with groups of classroom size. A limitation of this study may be that the sample classes in health were required and not of a voluntary or elective nature. Another area in need of further investigation is the effect of group counseling on subjects at different age levels, ranging from elementary school to the college level.

More significant results may be obtained if participation in group counseling is voluntary or based upon specific criteria such as academic standing, interest or teacher referral. Several critical, verbal statements were made by the experimental subjects about the required nature of the project. One possibility would be research with a course in which group counseling is an announced, planned

part of the course content. If the counseling department were an integral part of such a program, there would seem to be many implications for the use of counselor time. More study needs to be done to determine whether such a program could change the present, often negative, image of counselors held by both teachers and students. Statements by members of the experimental group indicated a basic distrust of counselors in general or saw the counselor as a schedule changer, a disciplinarian, and one who works exclusively with "problem" students. This image must be changed, and effective group counseling is one possible means of bringing about that change.

Because there are more interactions as group size increases, the use of co-counselors in larger group settings needs to be investigated. This researcher found it difficult at times to be aware of the many interactions which took place. An additional counselor could alleviate this difficulty. Another possibility would be to include the teacher as a part of such a project. This could conceivably aid in better mutual understanding between students and teachers.

The likelihood of measurable change as a result of group counseling might increase if the number of sessions were increased over the ten sessions held during this study. Members of the experimental group voiced a desire to continue the experiment and to meet more often than once a week.

Because the results reached significance regarding the

experimental females and control males, there would seem to be a need for further research investigating the sex variable as to how it affects academic achievement. There is also a need for further study of the effect of group counseling on female academic achievement and the lecture method on male academic achievement. The sex of the group leader may have a differential effect upon male and female adolescents; this also could be further examined.

Because of the transitory, changeable aspects of the self-concept, there is a possibility that several long-term follow-up tests would give a more accurate evaluation of group counseling research. In addition, further investigation is needed into the kinds of instruments used for the evaluation of group counseling effectiveness. These could include such devices as open-ended self-report instruments, video and audio tape analysis, or expert ratings on specific observable behaviors during the counseling sessions.

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APPENDICES

APPENDIX I

CORRESPONDENCE

CORVALLIS HIGH SCHOOL
Corvallis, Oregon

HEALTH DEPARTMENT

Dear Parents:

Each semester I attempt to incorporate into the Health Education program many different approaches in an attempt to make the material meaningful and interesting.

This term several health classes will spend Fridays with Mr. Ted Taylor, an experienced teacher and discussion leader. Friday's discussions will be devoted to activities that emphasize techniques designed to increase motivation. The whole class will be involved in discussions with no individual approach.

I am looking forward to working with Mr. Taylor and anticipate this will be a rewarding learning experience for the students. However, since this is a unique approach in this program, I want you to be informed. If you have any questions please call me. Since we have two sections of health education each period it is possible for any student to be placed in a section using a different approach.

Sincerely,

June McMurdo
(Mrs. Scott McMurdo)

APPENDIX II
HEALTH TEST

NAME _____

PERIOD _____

CHOOSE THE BEST ANSWER AND PLACE THE LETTER OF THAT ANSWER ON THE LINE.

1. The most inclusive definition of health would be:
 - a. Free from physical disease.
 - b. Physical fitness and high efficiency.
 - c. A state of physical, mental and social well-being.
 - d. Freedom from illness and physical deformity.
2. Improved health for the majority of people in the U. S. could be most readily achieved through:
 - a. New medical discoveries.
 - b. Increase in medical services.
 - c. Better public health clinics.
 - d. Individuals becoming more aware of current knowledge and utilizing information to formulate better health practices.
3. The capacity of the body to resist infection is: a. immunity
b. susceptibility c. habituation d. incubation
4. Diseases transmitted from one person to another are: a. non-communicable b. communicable c. hereditary d. congenital
5. Which of the following is a communicable disease against which high school students cannot be immunized: a. smallpox
b. polio c. tetanus d. gonorrhea.
6. Protective agents developed by the body that renders a person immune are: a. allergens b. antibodies c. antigens
d. toxins.
7. The sensitivity of the body to substances which in themselves are not irritable to the normal body is: a. alveoli b. allergy
c. antibodies d. alleviate.
8. Substances which affect the growth of bacteria and help the body overcome infection are: a. anticoagulants b. antibiotics
c. antacids d. antidepressants.

9. Disease-reducing organisms are classified as: a. anerobes
b. pathogenic c. toxins d. none of the proceeding.
10. Congenital means: a. present at birth b. inherited
c. heart-related d. contagious.
11. Diseases of emotional origin but with physical symptoms are:
a. psychosomatic b. structural c. neurosis d. psychosis.
12. Diseases characterized by lack of certain materials or
inability of body to use these materials are: a. degenerative
b. deficiency c. psychosomatic d. congenital.
13. Whether one contracts a disease depends upon three major con-
ditions: a. body resistance b. number of organisms
c. viability of organisms. Which of the three is most significant?
14. Water, food, air droplets are examples of: a. pathogens
b. incubation c. modes of transmission d. invasion.
15. Which is not an example of a first line of defense? a. skin
b. blood system c. gastric juices d. mucous linings.
16. Once organisms enter the body and begin tissue destruction we
have: a. infection b. invasion c. incubation d. fastigium.
17. One has been immunized against smallpox.
a. This immunity is life-long.
b. After adulthood he need not be concerned.
c. Boosters are required at regular intervals through life.
d. Once a negative reaction has been established, boosters
may be discontinued.
18. An individual is given a vaccine which contains weakened
organisms. The immunity obtained will be: a. passively
acquired b. naturally acquired c. actively acquired
d. natural-passive.
19. An advantage of active immunity is: a. one never need have the
disease b. no boosters are required c. life-long immunity is
obtained d. usually lasts longer than passive.
20. An antitoxin is administered. This immunity is: a. active-
natural b. passive-natural c. passive-acquired d. none of
the above.

For the next four, choose the answer which is not true.

21. Medical examinations:
- a. Establish a basis of comparison for changes in health.
 - b. May aid the individual in prevention of disease.
 - c. Medical history is of the least importance in the examination.
 - d. Should include adequate laboratory tests at any age.
22. Family or regular physician
- a. Knows the family background of the patient.
 - b. Has a record of previous illness or conditions.
 - c. Patient may feel more at ease or have more confidence.
 - d. Eliminates the need for specialists or other doctors.
23. The school health nurse
- a. Handles school emergencies.
 - b. Can make home calls when needed.
 - c. Gives medication if student needs it at school.
 - d. Knows the community and may bring others into solution of problems.
24. In the counseling center a student may receive help in:
- a. personal problems
 - b. school or academic problems
 - c. employment
 - d. from his assigned counselor only
 - e. from any counselor he selects.

CHOOSE THE DISEASE WHICH BEST ANSWERS THE QUESTION OR STATEMENT:

25. Leads all other diseases as a leading cause of death in the U.S.
- a. cancer b. heart disease c. diabetes d. stroke
26. Results when pancreas fails to secrete sufficient hormones.
- a. cancer b. diabetes c. cirrhosis d. hepatitis
27. Results when alveoli of lungs are over-extended.
- a. cancer b. tuberculosis c. emphysema d. hepatitis
28. Group of diseases characterized by over-multiplication of abnormal cells.
- a. cancer b. emphysema c. tuberculosis d. none of these three.

29. Results from an insufficient supply of insulin. a. epilepsy
b. diabetes c. cardiovascular disease d. emphysema.
30. Anticoagulants effective in the control of this group.
a. epilepsy b. heart c. diabetes d. hepatitis
31. Requires control for balance of food, insulin, exercise.
a. hepatitis b. gonorrhea c. diabetes d. epilepsy.
32. Results from an "explosion" of electrical discharges in the
brain. a. brain tumor b. epilepsy c. stroke d. none of
the three.
33. Victims likely to fit classification of "female, fat, and forty".
a. cancer b. diabetes c. heart d. hepatitis.
34. Anticonvulsants are drugs effectively used for control:
a. cardiovascular b. diabetes c. epilepsy d. gonorrhea
35. Chronic respiratory disease due to the blockage of bronchiols.
a. pneumonia b. tuberculosis c. emphysema d. cancer
36. Caused by damage to brain due to illness or injury.
a. emphysema b. epilepsy c. coronary d. hepatitis
37. Widespread skin testing has been very effective in case-finding.
a. cancer b. tuberculosis c. emphysema d. epilepsy
38. Alveoli have become over-extended due to blockage of air.
a. pneumonia b. tuberculosis c. emphysema d. diabetes
39. Glucose-tolerance test is an effective diagnostic tool.
a. epilepsy b. emphysema c. diabetes d. none of three
40. First stage is characterized by chancre. a. tuberculosis
b. syphilis c. gonorrhea d. hepatitis
41. Cigarette smoking, stress, and faulty diet all contribute to onset.
a. cancer b. heart disease c. diabetes d. epilepsy.
42. A venereal disease which is now considered of epidemic propor-
tions in Oregon. a. tuberculosis b. syphilis c. gonorrhea
d. none of three.

43. Surgery and radiation are the two most successful methods of treatment. a. heart b. diabetes c. emphysema d. cancer.
44. Infectious disease which results in congenital deformation of fetus. a. gonorrhea b. tuberculosis c. diabetes d. syphilis.
45. Was once referred to as the "falling-sickness".
a. gonorrhea b. syphilis c. epilepsy d. none of the three
46. Obesity contributes greatly to onset of these diseases.
a. cancer b. heart disease c. emphysema d. hepatitis
47. Infectious disease which is more easily diagnosed in male than female. a. cancer b. syphilis c. gonorrhea d. tuberculosis.
48. May be generalized throughout body but 90% is pulmonary.
a. cancer b. tuberculosis c. pneumonia d. hepatitis.
49. A very strong hereditary predisposition is evident in this disease. a. tuberculosis b. hepatitis c. cancer d. diabetes.
50. Coronary thrombosis is an example of one type. a. cancer
b. diabetes c. heart disease d. none of the three.
51. A sample of tissue is removed for diagnosis. This technique is referred to as a. biopsy b. radiation c. surgery
d. infiltration.
52. A positive skin test for tuberculosis indicates: a. presence of active tuberculosis b. contact but the person has resisted infection c. contact with tuberculosis and need for further diagnosis d. none of the three.
53. Which of the four is not one of the "seven warning signs" as listed by the American Cancer Society? a. abnormal bleeding from a body opening b. a sore that does not heal c. a lump
d. fatigue and loss of weight.
54. Cigarette smoking appears to increase one's chances to develop which of the following? a. lung cancer b. emphysema
c. heart disease d. all three of the above.
55. The arteries which supply blood to the heart muscle are
a. aorta b. cardiac c. coronary d. systemic.

56. Venereal diseases are spread almost exclusively by
 - a. indirect contact
 - b. kissing
 - c. unclean toilet articles
 - d. sexual intercourse.
57. Gonorrhea
 - a. is very difficult to treat
 - b. may be treated effectively if patient is under good medical care
 - c. treatment renders one immune for a few months
 - d. will eventually disappear if symptoms go away.
58. Which is not a correct statement regarding epilepsy:
 - a. can be effectively controlled with drugs
 - b. in some cases an hereditary predisposition
 - c. may be present even if seizures are not apparent
 - d. victims have a higher incidence of retardation and insanity.
59. One can protect oneself from heart disease by
 - a. maintaining a normal weight
 - b. not smoking
 - c. avoiding stress
 - d. practicing moderation in all aspects of living.
60. Sun's rays are definitely related to development of
 - a. molds
 - b. skin cancer
 - c. eczema
 - d. over secretion of oil in skin
 - e. acne.

APPENDIX III

STATISTICS

Derivation of split-half coefficient of correlation for teacher constructed health test.

Guttman Formula

$$r = \frac{2(1 - S_E^2 + S_O^2)}{S_T^2} = .9024$$

S_E = Standard deviation of even half

S_O = Standard deviation of odd half

S_T = Standard deviation of total test

Analysis of experiment gain (post score - pre score)

Analysis of variance gain in health test scores

between experimental and control groups

Initial Analysis of Gain in Health Test

	T_1	T_2	T_3	T_4
	Experimental- Male	Experimental- Female	Control- Male	Control- Female
n_i	25	20	22	21
\bar{x}_i	6.84	10.85	8.727	5.57

ANOVA(1) Health Test

Source	SS	df	MS	F
Total	3924.443	87		
Treatment	331.026	3	110.342	2.5794*
Error within group	3593.416	84	42.778	

* probability > .05

Orthogonal single degree of freedom comparisons for health test

	<u>T₁</u>	<u>T₂</u>	<u>T₃</u>	<u>T₄</u>
Group Difference	1	1	-1	-1
Sex	1	-1	1	-1
Group Sex Interaction	<u>1</u>	<u>-1</u>	<u>-1</u>	<u>1</u>

For Group Difference

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i^2)}{n_i}} = \frac{(6.84 + 10.85 - 8.727 - 5.57)^2}{1/25 + 1/20 + 1/22 + 1/21} = 62.78$$

For Sex

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i^2)}{n_i}} = \frac{(6.84 - 10.85 + 8.727 - 5.57)^2}{1/25 + 1/20 + 1/22 + 1/21} = 3.865$$

For Group Sex Interaction

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i^2)}{n_i}} = \frac{(6.84 - 10.85 - 8.727 + 5.57)^2}{1/25 + 1/20 + 1/22 + 1/21} = 280.58$$

ANOVA(2) HEALTH TEST

Source	SS	df	MS	F
Total	3924.443	87		
Group Difference	62.78	1	62.78	1.479 N. S.
Sex	3.865	1	3.865	.0901 N. S.
Group Sex Interaction	280.58	1	280.58	6.558*
Error Within Groups	3593.416	84	42.778	

* probability $>.015$

Hence conclude from: above ANOVA that:

- (1) No significant difference in score gain between experimental and control groups
- (2) No significant difference in score gain between male and female averaged over experimental and control groups.
- (3) There is a significant difference in score gain between experimental and control males and females.

Analysis of Experiment Gain (Post Score - Pre Score)
 Analysis of Variance Gain in Tennessee Self Concept Scale
 Scores Between Experimental and Control Groups

Initial Analysis of Gain in Tennessee Self Concept Scale

	T_1	T_2	T_3	T_4
	Experimental Male	Experimental- Female	Control- Male	Control- Female
n_i	25	20	22	21
\bar{x}_i	10.68	4.40	6.727	5.619

ANOVA(1) Tennessee Self Concept Scale

Source	SS	df	MS	F
Total	31594.715	87		
Treatment	515.159	3	171.719	.40 N.S.
Error Within Group	31439.556	84	374.28	

Orthogonal Single Degree of Freedom Comparisons for Tennessee
Self Concept Scale

	T ₁	T ₂	T ₃	T ₄
Group Difference	1	1	-1	-1
Sex	1	-1	1	-1
Group Sex Interaction	1	-1	-1	1

For Group Difference

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i)^2}{n_i}} = \frac{(10.68 + 4.4 - 6.27 - 5.619)^2}{1/25 + 1/20 + 1/22 + 1/21} = 64.06$$

For Sex

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i)^2}{n_i}} = \frac{(10.68 - 4.4 + 6.27 - 5.619)^2}{1/25 + 1/20 + 1/22 + 1/21} = 280.13$$

For Group Sex Interaction

$$Q^2 = \frac{(\sum m_i \bar{x}_i)^2}{\sum \frac{(m_i)^2}{n_i}} = \frac{(10.68 - 4.4 - 6.727 + 5.619)^2}{1/25 + 1/20 + 1/22 + 1/21} = 146.04$$

ANOVA(2) Tennessee Self Concept Scale

Source	SS	df	MS	F
Total	21594.715	87		
Group Difference	64.06	1	64.06	.171 N. S.
Sex	280.13	1	280.13	.748 N. S.
Group Sex Interaction	146.04	1	146.04	.390 N. S.
Error	31439.556	84	374.28	

Hence conclude from above ANOVA that:

- (1) No significant difference in score gain between experimental and control groups
- (2) No significant difference in score gain between male and female averaged over experimental and control groups
- (3) No significant difference in score gain between experimental and control males and females.