DOCUMENT RESUME

ED 025 810 CG 003 529

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Final Report on an Independent Study Program for the Academically Able.

Manhattan Coll., Bronx, N.Y.
Spons Agency-New York State Education Dept., Albany.
Pub Date 30 Aug 68
Note-36p.
EDRS Price MF-$0.25 HC-$1.90
Descriptors-*Academic Achievement, *Independent Study, Individualized Curriculum, *Individual Reading, *Individual Study, Secondary School Students, Student Grouping, Student Projects, *Superior Students

Released time from classes for independent study by academically able high-school juniors and seniors is evaluated here after a four-year study. Concern was centered on the effects of this program on high school functioning and, later, on college records. Major hypotheses of the study were that: (1) independent reading groups would show greater gains in school satisfaction, study habits, and library skills; (2) certain cognitive and affective measures would not be useful in predicting success in independent study; and (3) achievement in areas other than the independently studied areas would differ little from that of control groups. These hypotheses were largely supported. Absences from class had no adverse effects, and trends indicated favorable effects of independent study. Significantly more experimental students chose majors in their freshman year in college than did matched controls. Tendencies that did not reach statistical significance favored experimental groups in other areas of the college investigation as well. (BP)

Final Report

on

An Independent Study Program

For

The Academically Able

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August 30, 1968

The work upon which this report is based was supported jointly by the Manhattan College and the New York State Education Department under article 72, section 3602, subdivision 14 of the State Education Law. Agencies undertaking such projects are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official policy of the New York State Education Department.

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Introduction

This was the fourth and final year of a study devoted to determining the effectiveness of independent study programs for eleventh and twelfth grade students. During the first years of the study the investigators were primarily concerned with the effects of the program on the students' functioning in high school. Since the findings in the second and third years of the program indicated significant superiority of the independent study students over the control students in a number of dimensions at the secondary school level, our efforts during the last year of the study were focused primarily at the college level. We sought to discover answers to such questions as, "Do students tend to major at college in areas in which they did independent study?" "Are students who have pursued independent study at the secondary level more sure of what their major will be at college in the freshman year?" "Do students who have been involved in the independent study program secure better grades than do students who have not been involved in independent study?

The Problem

The present study was conducted for the purpose of ascertaining whether either of two different approaches to independent study, namely independent projects or independent reading is more effective in producing superior gains in achievement, school grades, study skills, research and library techniques, originality and enthusiasm for school than is the regular classroom program, whether certain tests, techniques and assessments are more effective in predicting which students will derive the most benefits from the programs of independent study, whether students who have been enrolled in this program for two years are more effective than those who have been enrolled in the program for one year, and whether participation in the independent study program in high school has any effect on several aspects of college functioning.

Review of the Literature

A number of new studies, articles and texts on independent study at the high school level have been published since our initial review of the literature. Although there have been some excellent descriptions of individual school's approaches (5,7), as well as descriptions of various approaches (1,4), the research evidence as to the efficacy of independent study is still meager (1,2,6). The few experimental studies that have been conducted in this area generally involved fewer than twenty students (3). In the light of the increasing popularity of independent study programs at the secondary level (1,2), the need for research is even more imperative than it was four years ago.

Hypotheses to be Tested

Many more of the original hypotheses were supported in the second and third years than were supported in the first year of the study. In general, at the end of the third year it was concluded that absence from class for the purpose of independent study had no adverse effects and some beneficial

effects on the accomplishments of students. The hypothesis made at the end of the first year, namely, that the benefits to be derived from this program would increase markedly as teachers and students became more familiar with the program was substantiated again last year, and this hypothesis will be repeated this year. The hypotheses that were supported most strongly last year and seem to justify restatement are as follow:

> Independent reading groups will show greater gains with respect to satisfaction with school, study habits scores and library skills scores.
>
> Certain cognitive and affective measures will not be useful in predicting success in independent study programs.
>
> There will be no significant differences in the achievement scores obtained by the experimental and control groups in the subject areas other than those in which the independent reading was undertaken.

Although results from the last two years have indicated no significant differences between the experimental and control groups with respect to college variables, these findings were based on small samples. This year we will cumulate some of the data, and we hypothesize that more of the students in the experimental groups will choose a major in their freshman year than will students in the control groups.

Procedures

The sample for this study was to be chosen by a procedure described in the application for the initial grant. The procedure can be outlined in the following manner. A large number of juniors and seniors of above average intelligence were to be allocated primarily on the basis of screening committee recommendations to four different groups, the independent reading group, the reading control group, the independent project group and the project control group. The independent reading program permitted students to be released from their regularly scheduled English, American history, physics, chemistry or biology classes three periods a week in order that they might go to the school library or study hall to read independently in the subject matter area in which they had been excused from regularly scheduled classes. The independent reading program was characterized primarily by broad reading in one of the subject areas rather than by the undertaking of a particular project. It was expected that these students would continue this type of reading outside these three periods, but this was not required. The independent project program permitted students to be released from their regularly scheduled classes in English, American history, physics, chemistry, or biology classes three periods a week in order that they might go to the laboratory, the school library or study hall to work on an independent project of their own choosing in the subject matter area in which they had been excused from regularly scheduled classes. It was expected that these students would continue this type of activity outside these three periods but this was not a requirement. This program was directed toward the development of projects which might vary from construction of a digital computer to writing a short story. The two control groups remained in all regularly

scheduled classes.

The students participating in the study were to be assigned to one of the four groups in the following manner:

1. Any student who was to be a junior or senior the following fall and who was interested in participating in either of the experimental programs would file an application for admission to the programs through the guidance counselors.

2. The guidance counselors searched the cumulative records of each applicant for admission to the program. The overall grade average and the I.Q. of each student was ascertained.

3. Each student who had applied to participate in one of the experimental programs and had survived the preliminary screening by the guidance counselor received a letter which his parents signed indicating their willingness to allow their child to participate in one of the experimental programs if he was elected by a screening committee.

4. After a student had presented his letter of permission to his guidance counselor, an appointment for a meeting with the screening committee was scheduled. The screening committees, although varying from school to school would usually be composed of high school principal or assistant principal, the project coordinator, the guidance director, the chairman of the department in which the student intended to do his work and the student's guidance counselor.

5. From the group of students that had evinced a desire to participate in the independent reading program, the screening committee, on the basis of test scores, previous performance, and interview, selected those whom they felt would profit most from such a program. The resultant group was then broken down into subject matter, class, and sex groups. Approximately half of each of these class groups were then randomly assigned to the independent reading group and half were assigned to the reading control group. This procedure was employed in an endeavor to hold teacher competence and pupil desire constant.

A similar procedure was to be utilized for assigning students to the independent project program thereby insuring equal teacher competence and pupil desire in the independent project and the project control groups. However, this program never attracted enough students to succeed.

It should be pointed out that although the study was originally intended for above average students, some schools included a few average students in the program.

The sample during the present year included 389 eleventh and twelfth grade students distributed among five high schools, and 151 college students who had previously participated in our independent study program. It was necessary to discard a good part of our high school student sample for a number of reasons. One of the high schools assigned all of their students

to independent study thereby precluding a control group. Another high school only provided for control groups in some of the subject matter areas.

The investigation into the independent project phase of this study was, once again, thwarted due to the limited number of students who chose projects over reading during the past school year. The findings presented in this study involve comparisons made between the performances of students who participated in independent reading programs in English and history and control groups in regular classes. These comparisons were made at the eleventh grade level for students participating in the program for the first time and at the twelfth grade level for students participating in the program for the second year. The sample in the other areas such as Mathematics and Science was too limited to be analyzed statistically. Although school districts had been requested to stress participation in independent reading in the areas of Mathematics and Science and in independent projects in all the subject matter areas during the past three school years, the total sample comprising all of these areas was 16 during the present year.

The final high school sample utilized in the analysis of this year's data can be found in Table 1.

The programs being investigated in this study provided high school juniors and seniors with the opportunity to do independent reading or independent research projects in any of the following fields of their own choosing: American history, biology, chemistry, social studies, English and physics. The objectives of the program were to promote the development of individual potentials, self-reliance, critical thinking, enthusiasm for learning, skills of research and a creative approach to problems.

At the beginning of the school year orientation lectures were delivered to the experimental groups by the project coordinators. The various departmental chairmen then delivered lectures to the experimental students who were working in their areas.

Each experimental student conferred with the classroom teacher of the course in which he was doing his independent study. If the regular classroom teacher was not able to assist the student because of lack of familiarity with a particular problem, the teacher would refer the student to the departmental chairman. Although the experimental student was not present for three of the five regularly scheduled class meetings, he was responsible for completing all regularly assigned readings and written exercises.

No special requirements were drawn up for the teachers who were to participate in the study. The same attitude prevailed toward the schools participating in the study.

It was expected that students participating in the independent reading program would be presented with a suggested reading list developed by the department in which the student was to do his work. However, such a list was to be considered merely a guide, and students were not bound to the guide. As long as the faculty adviser was satisfied that the student was reading in

his area, he was permitted to continue his reading without interruption.

It was expected that students participating in the independent project program would receive some guidance on their special projects from their faculty advisers. It was also anticipated that faculty advisers would be particularly careful about emphasizing the importance of studying the feasibility of a project and the resources which would or would not be available to the student. Faculty advisers were cautioned to refrain from suggesting projects. If at one of the conferences it was decided that a previously suggested project was not feasible, the student was encouraged to develop plans for a new project. As has been pointed out previously, the sample in the independent projects was too limited to analyze in meaningful fashion.

Most of the school systems participating in the investigation adhered to the program outlined in the original proposal quite closely. Notable exceptions were the general failure of school districts to obtain sufficient numbers of students in the various subject matter areas for independent projects, and in the subject matter areas other than history and English for independent reading. As time progressed, some school districts also failed to provide adequate numbers of control students.

In most of the cooperating school districts the responsibility for coordinating the independent reading program was assigned to a particular individual. Unfortunately, some of these liaison persons are replaced from year to year, resulting in a lack of continuity in the program. This was not as severe a problem this year as it had been in previous years. Yet changes in school administrators led to a quasi lack of commitment. Once again, there existed in one or two schools a lack of clear cut commitment on the part of some staff members. Their superiors had involved them in a study without consulting with them in advance, or had not communicated the details of the study to them. Their participation was more an exercise in obedience than a desire to investigate an educational innovation. Record keeping in the schools improved over the four years. Occasionally, and most particularly during the current year deadlines were not met resulting in delayed reports and additional time on the part of the principal investigator and field coordinator. These deadlines not being met were particularly evident when school personnel were requested to secure college grades of previously tested students who had participated in the Independent Study. This responsibility then had to be assumed by the field coordinator and caused considerable delay in preparing the final report. In fact, the final reports from some of the schools did not arrive in the project director's office until after the deadline for his report to Albany.

All of the tests and inventories which were part of the Pre-test battery were administered in the spring between May 15, 1967 and June 1, 1967. The following tests were administered to all of the pupils participating in the program: Henmon-Nelson Tests of Mental Ability, High School Personality Questionnaire, The School Inventory, Survey of Study Habits and Attitudes, A Library Orientation Test for College Freshmen, Uses for Things Test, Metropolitan Achievement Tests.

Most of these tests were again administered between May 15th and June 1st, 1968 in the Post-testing battery. The test material was then either hand or machine scored. The data was then punched on I.B.M. cards, and processed by computers.

The schedule as outlined in last year's annual report has been complied with in all respects with regard to the screening, testing and selecting of students to participate in the experimental and control groups. All of the pre-testing was completed between May 15, 1967 and June 1, 1967. The post testing was completed between May 15, 1968 and June 1, 1968.

In order to facilitate the operation of the program and to insure compliance with the outline, a number of meetings with the principal investigators, with all of the coordinators, and with participants in individual school districts were scheduled. The following are the scheduled meetings and visitations up to July 1, 1968.

General Conferences with Coordinators

December 6, 1967
February 8, 1968
March 20, 1968

Visitations to School Districts by Dr. Lodato and Dr. Ansbro

Dr. Lodato	Visits
Half Hollow Hills	3
Northport	3
Rye Neck	3
Valhalla	10
Wappingers Falls	0

Dr. Ansbro	Visits
Half Hollow Hills	4
Northport	4
Rye Neck	4
Valhalla	4
Wappingers Falls	4

The statistical analyses utilized in this study were contingent upon the amount, type and distribution of data available. Since, in most cases, school systems tended to match students rather than randomly assign them, most of the comparisons between the experimental and control groups were submitted to a simple t test rather than to analysis of covariance. The scores on the predictive instruments in the pre-test battery were correlated with criterion variables by means of the Pearson Product Moment r. A number of the comparisons at the college level were submitted to chi-square tests since most of this data was not normally distributed.

Results

The data relative to the mean I.Q.'s of the independent reading and control groups in the areas of eleventh grade English, twelfth grade English, eleventh grade history, and twelfth grade history is presented according to group in Table 1. Since the findings in the last three years indicated that there was no need to treat the data separately according to sex and since our samples were smaller this year, the boys and girls were combined in the data analysis. Analysis of the data presented in Table 1 indicated that none of the differences between the mean I.Q.'s of the experimental and control groups was significant. In fact, not one of the mean differences resulted in a t value of 1.00 or more. On the basis of the data included in this table, it was obvious that the experimental and control groups were similar with respect to intelligence test scores, and that any differences in scores or in gains between the experimental and control groups from pre-test to post-test scores on any variables investigated could not be attributed to differences in intelligence. This finding is similar to those obtained in the previous three years.

The data relative to the grades obtained by the independent reading and control groups in the subject matter area in which the independent reading was undertaken is presented according to subject matter area, year and group in Table 2. Analysis of the data in Table 2 indicated that none of the differences in final grades assigned by the teachers to the independent reading and control groups in the subject matter area in which the independent study was undertaken was significant. On the basis of the data presented in Table 2 it would appear that although students who participated in the independent reading programs spent 3/5 of their class periods in the independent study subject outside of the classroom, their absence from class did not have a detrimental effect on the grades assigned to them by teachers. Although none of the differences was significant, three of the four differences favored the experimental groups.

The data concerning the Regent's grades obtained by the independent reading and control groups in the subject matter area in which the independent reading was undertaken is presented according to subject matter area, year and group in Table 3. Since the second year (senior) English and history groups did not take the Regents examinations, the data is limited to eleventh grade English and history groups. It was evident from the data in Table 3 that neither of the two differences in Regents grades obtained by the independent reading and control groups in the subject matter area in which the independent reading was undertaken was significant. Although the experimental English students obtained higher Regent's scores, the difference was not significant despite a t of 1.99. Had the sample been larger t would have been significant. Although higher scores were obtained by the independent reading groups in American history, the difference was not significant. Again, it would appear obvious that, at the very least, absence from class on the part of students in independent reading programs does not have an adverse effect on the Regents grades obtained by such students in the subject areas in which they undertook independent reading and that in the light of last year's results and the trend apparent in this year's data,

TABLE 1

I.Q. Scores of Independent Study and Control Groups

Section	Year in Program	Independent Study N	Independent Study Mean I.Q.	Control N	Control Mean I.Q.	t	P
English 11	1	10	121.3	14	119.5	.39	N.S.
History 11	1	62	119.9	30	121.0	.37	N.S.
English 12	2	56	117.5	42	115.4	.83	N.S.
History 12	2	54	117.8	41	116.3	.58	N.S.

TABLE 2

Final Grades of Independent Study and Control Groups in the Subject Matter Areas in Which Independent Study Was Undertaken

		Independent Study		Control			
Section	Year in Program	N	Mean Grade	N	Mean Grade	t	P
English 11	1	10	85.73	14	83.13	1.02	N.S.
History 11	1	62	84.20	30	83.19	.58	N.S.
English 12	2	56	85.37	42	84.38	.69	N.S.
History 12	2	54	84.62	41	85.42	.74	N.S.

TABLE 3

Regents Grades of Independent Study and Control Groups in the Subject Matter Areas in Which Independent Study was Undertaken

Section	Year in Program	Independent Study N	Independent Study Mean Regents Grade	Control N	Control Mean Regents Grade	t	P
English 11	1	10	85.7	12	81.9	1.99	N.S.
History 11	1	58	83.9	29	81.9	1.49	N.S.

there is some reason to believe that such absence had a beneficial effect.

The data relative to the achievement gains on the Metropolitan Achievement Tests from pre-test to post-test for the independent reading and control groups in the different subject matter areas is presented in Tables 4 through 7. In each of these tables the effects of pre-test scores were held constant by means of analysis of covariance. The adjusted mean differences were submitted to a t test, and the resultant P values included.

The data concerning the achievement gains made by the students who participated in the eleventh grade independent reading program in English and the control group is presented according to subject matter area in Table 4. It was readily apparent from analyzing the data in Table 4 that independent reading in English had no effect on the achievement gains of eleventh grade students in the language area. It was further evident that there were no significantly superior gains in achievement for either the independent reading groups or the control groups in the six other subject matter areas tested.

The data concerning the achievement gains recorded by the students who participated in the eleventh grade independent reading program in history and in the control group is presented according to subject matter area in Table 5. Analysis of the data in Table 5 indicated that there were two significant differences, those favoring the independent reading group on the social studies vocabulary test at the .05 level of confidence and on the social studies information test at the .01 level of confidence.

The data relative to the achievement gains made by the students who participated in the twelfth grade independent reading program in English and in the control group is presented according to subject matter area in Table 6. Analysis of the data in Table 6 indicated that there was no significant difference between the independent reading and control groups in the language area. Further analysis of the data in Table 6 revealed that in the six other subject matter areas investigated none of the achievement gains significantly favored either of the groups.

The data concerning the achievement gains registered by the students who participated in the twelfth grade independent reading program in history and social studies and in the control group is presented according to subject matter area in Table 7. It was readily apparent from the analysis of the data in Table 7 that independent reading in history had beneficial effects, at the .05 level of significance, on achievement on the social studies sections of the Metropolitan Achievement Test. It was further evident that there was only one other significant gain in achievement, that recorded by the independent reading group over the control group in the area of arithmetic computation.

The finding with respect to the significant improvement of the 12th grade experimental group in social studies in arithmetic computation is not too easy to explain or hypothesize. It would appear that this finding was a chance finding, similar to the finding last year in which the experimental

TABLE 4

Achievement Scores of Students in 11th Grade English Groups

Subject	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Language	10	56.8	58.8	12	50.4	51.7	.69	.36	N.S.
S.S. Vocab.	10	44.2	46.9	12	41.9	43.1	1.21	.77	N.S.
S.S. Info.	10	46.8	49.7	12	45.8	47.1	1.31	.84	N.S.
Computation	10	29.3	30.8	12	28.7	29.0	1.04	.67	N.S.
Prob. Solving	10	24.2	26.7	12	24.2	25.9	.61	.31	N.S.
Sci. Concepts	10	48.9	49.1	12	49.2	49.9	.39	.19	N.S.
Sci. Info.	10	44.8	45.2	12	44.7	45.9	.68	.40	N.S.

TABLE 5

Achievement Scores of Students in 11th Grade History Groups

Subject	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Language	62	54.5	54.9	30	51.4	52.8	.83	.65	N.S.
S.S. Vocab.	62	42.2	46.1	30	42.7	43.6	2.74	2.41	.05
S.S. Info.	62	39.5	44.7	30	38.3	40.0	3.38	2.96	.01
Computation	62	26.6	28.7	30	29.7	31.9	.13	.08	N.S.
Prob. Solving	62	24.3	26.8	30	25.6	27.4	.61	.53	N.S.
Sci. Concept	62	50.8	52.9	30	54.1	58.1	1.84	1.61	N.S.
Sci. Info.	62	41.9	43.6	30	43.2	45.5	.53	.39	N.S.

TABLE 6

Achievement Scores of Students in 12th Grade English Groups

Subject	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Language	56	56.2	59.7	42	53.1	55.1	1.41	1.23	N.S.
S.S. Vocab.	56	38.4	39.5	42	38.3	41.4	1.80	1.40	N.S.
S.S. Infor.	56	42.8	44.8	42	40.7	43.8	.82	.57	N.S.
Computation	56	38.5	40.8	42	39.7	40.9	.91	.67	N.S.
Prob. Solving	56	27.7	31.7	42	24.1	26.0	1.91	1.61	N.S.
Sci. Concept	56	43.3	45.4	42	47.8	49.7	.06	.04	N.S.
Sci. Info.	56	36.9	40.2	42	38.7	41.5	.18	.13	N.S.

TABLE 7

Achievement Scores of Students in 12th Grade Social Studies Groups

	Independent Study			Control					
Subject	N	Mean Pre Test	Mean Post Test	N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Language	54	55.3	57.9	41	51.4	53.7	.27	.18	N.S.
S.S. Vocab.	54	44.8	48.8	41	43.7	44.9	2.31	2.06	.05
S.S. Info.	54	42.8	47.3	41	43.7	45.6	2.43	2.13	.05
Computation	54	33.7	39.6	41	30.3	33.3	2.70	2.31	.05
Prob. Solving	54	27.2	29.4	41	30.4	32.5	.08	.05	N.S.
Sci. Concept	54	46.9	48.8	41	45.7	48.0	.34	.21	N.S.
Sci. Info.	54	39.8	41.4	41	39.8	41.1	.24	.16	N.S.

12th grade English group registered a significant gain over its control group in the science concepts area. Probably the best explanation of this finding would be that by chance, we should expect to find one significant difference out of every twenty differences in the subject matter areas other than that in which the independent study was undertaken. Since the number of mean differences between the independent reading and control groups in subject matter areas other than that in which the independent study was undertaken was twenty-two (see Tables 4-7), we should expect approximately one significant difference at the .05 level of confidence due to chance factors alone. In fact, a perusal of Tables 4-7 indicates that this is the number of significant differences found in these other subject matter areas.

This year the gains in achievement recorded by the independent reading groups in the subject matter areas in which the independent reading was undertaken were much more impressive in the social studies areas than in the English area. Of the four mean differences in the social studies areas, all four significantly favored the experimental groups. Of the two mean differences in the language area, both favored the experimental English groups, but neither was significant. These results may very well reflect the types of tests included in the different areas. Inspectional analysis would lead one to suspect that independent reading in literature, for example, might not affect the language score on the Metropolitan Achievement Test very much.

It is interesting to note, once again, that independent reading in a particular subject matter area did not carry over to other subject matter areas at either the eleventh or twelfth grade levels.

The data concerning gains in creativity, school satisfaction, study habit skills and library skills from pre-test to post-test for the independent reading and control groups is presented in Tables 8 through 11. The tests employed to measure the gains in creativity, school satisfaction, study habit skills and library skills were Getzels and Jackson's Uses for Things Test, Bell's The School Inventory, Brown-Holtzman's Survey of Study Habits and Attitudes and The Teacher's College Library Orientation Test for College Freshmen respectively. In each of these Tables the effects of pre-test scores were held constant by means of analysis of covariance. The adjusted mean differences were submitted to a t test, and the resultant P values included.

The data concerning the gains in creativity made by the experimental and control groups is presented according to subject of study and group in Table 8. Analysis of the data in Table 8 indicated that none of the independent reading groups made significantly superior or inferior progress in creativity scores than did the control groups. On the basis of the data appearing in Table 8, it would seem safe to assert that absence from class on the part of students in independent reading programs does not have an adverse or beneficial effect on growth in creativity as measured by the Uses for Things Test.

TABLE 8

Creativity Scores

Section	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Eng. 11	10	31.8	33.6	14	34.1	35.5	.36	.22	N.S.
Hist. 11	62	33.1	34.6	30	31.6	33.9	.72	.61	N.S.
Eng. 12	56	30.9	32.8	42	30.3	32.0	.17	.13	N.S.
Hist. 12	54	32.7	32.9	41	28.9	30.4	1.40	1.22	N.S.

The data relative to gains in satisfaction with school as measured by The School Inventory made by the independent reading and control groups is presented according to subject of study and group in Table 9. It is necessary to note that higher scores on this inventory indicate less satisfaction with school. Analysis of the data in Table 9 yielded significant findings favoring the independent reading groups in three of the four mean differences. Among the first year independent study groups, one of the differences was significant whereas among the second year independent study groups, both of the differences in scores were significant.

The data concerning the gains in study habits and attitudes made by the independent reading and control groups is presented according to subject of study, and group in Table 10. Analysis of the data in Table 10 revealed that three of the mean differences in gain were significant. All three of these significant differences in gain favored the experimental groups. Among the second year groups, both of the mean differences in study habits gains as measured by the Brown-Holtzman Survey of Study Habits and Attitudes significantly favored the experimental group, whereas only one of the mean differences in study habits gain significantly favored the first year experimental group. However, the other difference at the eleventh grade level would have been significant if the sample had been larger.

The data relative to the gains in library skills registered by the independent reading and control groups is presented according to subject of study and group in Table 11. Analysis of the data in Table 11 revealed that all of the mean differences in library orientation gains of the experimental and control groups significantly favored the experimental groups. The two differences favoring the first year reading groups were significant at the .01 level of confidence. These findings were identical with last year's findings. On the basis of the analysis of the data in Table 11, it would appear that independent reading programs are quite effective in producing gains in library skills as measured by the Library Orientation Test for College Freshmen.

The data relative to the correlations obtained between predictor variables and gains on the achievement tests, the library orientation test, and the study habits inventory is presented in Tables 12 through 14 respectively. The instruments employed to measure the gains from the pre-tests to the post-tests in achievement, library skills and study habits are the same as those mentioned in the sections describing the findings in Tables 8 through 11. The predictor variables were Getzels and Jackson's Uses for Things Test, Brown and Holtzman's Survey of Study Habits and Attitudes, the Bureau of Publications (T.C.) Library Orientation Test for College Freshmen and five scores of Cattell's High School Personality Questionnaire.

The data concerning the correlations between predictor variables and achievement gains from pre-test to post-test are presented according to subject matter area studied in Table 12. Only four of the correlations in Table 12 were significant. These predictor variables, namely the conscientious vs undependable section of the H.S.P.Q. among eleventh and twelfth grade history students, Study Habits scores among twelfth grade English students

TABLE 9

Satisfaction with School Scores

Section	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Eng. 11	10	25.4	23.5	14	25.8	25.8	1.87	1.47	N.S.
Hist. 11	62	23.7	21.9	30	27.1	28.1	2.71	2.53	.05
Eng. 12	56	24.8	21.7	42	25.6	25.3	2.72	2.51	.05
Hist. 12	54	26.7	25.2	41	26.3	27.6	2.71	2.49	.05

TABLE 10

Study Habits Scores

Section	Independent Reading			Control					
	N	Mean Pre Test	Mean Post Test	N	Mean Pre Test	Mean Post Test	Adj Mean Difference	t	P
Eng. 11	10	38.8	42.7	14	35.3	36.7	2.50	2.01	N.S.
Hist. 11	62	38.3	42.7	30	38.1	39.5	2.93	2.49	.05
Eng. 12	56	35.4	42.4	42	37.2	38.3	5.81	5.07	.01
Hist. 12	54	37.8	43.5	41	32.3	33.2	4.72	4.01	.01

TABLE 11

Library Orientation Scores

Section	Independent Reading N	Mean Pre Test	Mean Post Test	Control N	Mean Pre Test	Mean Post Test	Adj Mean Differences	t	P
Eng. 11	10	67.1	72.1	14	59.9	61.8	3.05	2.13	.05
Hist. 11	62	65.5	69.4	30	64.1	65.4	2.63	2.30	.05
Eng. 12	56	68.7	75.1	42	62.3	63.0	5.60	4.98	.01
Hist. 12	54	70.4	76.7	41	62.8	64.9	4.13	3.46	.01

TABLE 12

Summary of Correlations Between Predictor Variables and Gains on Achievement Test in Area in Which Independent Study was Undertaken

Predictors		11th Grade English	11th Grade History	12th Grade English	12th Grade History
Uses for Things		.14	.09	.11	.13
Study Habits		.23	.19	.28x	.22
Library Orientation		.27	.17	.24	.29x
Satisfaction with School		.09	.06	.08	-.03
Bright vs Dull	HSPQ	.09	.14	.17	.10
Conscientious vs Undependable	HSPQ	.36	.31x	.25	.31x
Individualistic vs Group Oriented	HSPQ	.04	.07	.11	.16
Individually Resourceful vs Group Dependent	HSPQ	.21	.12	.19	.25
Controlled vs Uncontrolled	HSPQ	.07	.07	.11	.03

xSignificant at .05 level.

and Library Orientation Scores among twelfth grade history students were all significant at the .05 level of confidence. It is important to point out that because of the limited sample of eleventh grade English students, it was exceedingly difficult to obtain significance in this group. It was necessary to obtain an r of .60 in order to attain significance. Despite the fact that few significant correlations were obtained, it would appear that three scores appeared to have some limited value in prediction, namely study habits, library orientation, and conscientious versus undependable. The lowest correlation obtained with the latter test was .25.

The data relative to the correlations between predictor variables and gains from the pre-test to the post-test on the Library Orientation Test are presented according to subject matter area studied in Table 13. Only three of the predictor variables were significantly correlated with gains in library skills as measured by the Library Orientation Test for College Freshmen. The three significant correlations between pre-test scores on the Study Habits Inventory and gains in library skills were found among students participating in the eleventh grade independent reading program in history and social studies, and in both the twelfth grade history and English programs. All three correlations were significant at the .05 level of confidence.

The data relative to the correlations between predictor variables and gains from the pre-test to the post-test on the study habits inventory are presented according to subject matter areas studied in Table 14. Analysis of the data in Table 14 indicated that only two of the correlations, between pre-test scores on the library orientation test and the Resourceful versus Groups Dependent sub-test of the H.S.P.Q. and gains in study habits skills among students participating in the eleventh grade independent reading program in history and social studies were significant. Both correlations were significant at the .05 level of confidence. Although these two predictor variables were not significantly correlated with gains on the Study Habits Inventory for the other three groups, the correlations often came close to being significant.

Of the 110 students who participated in the twelfth grade independent reading programs in English and social studies this year, 95 have been accepted for college this fall. Of the 83 students who participated in the corresponding control groups, 64 have been accepted for college this fall. If the independent reading program had no effect on whether students attended college, it could be assumed that there would be no differences in the percentages of students going to colleges from the two groups. The divergence of the observed results from those expected on the basis of equal probability is presented in Table 15. The resultant chi-square value was an insignificant .50. Thus, it appeared that independent study did not significantly increase the probability of college entrance for students. However, it must be borne in mind that the high percentages of students who attend college from these types of schools makes it extremely difficult to find significant differences unless the sample is very large.

Of the 95 experimental students who have been accepted for college, 65

TABLE 13

Summary of Correlations Between Predictor Variables and Gains

On Library Orientation Test for Different Independent Reading Groups

Predictors		11th Grade English	11th Grade History	12th Grade English	12th Grade History
Uses for Things		.11	.03	.06	-.03
Study Habits		.21	.27x	.27x	.33x
Library Orientation		.20	.10	.14	.19
Satisfaction with School		.08	.11	.04	-.05
Bright vs Dull	HSPQ	.17	.09	.13	.08
Conscientious vs Undependable	HSPQ	.13	.14	.09	.18
Individualistic vs Group Oriented	HSPQ	.09	.14	.07	.13
Individually Resourceful vs Group Dependent	HSPQ	.31	.23	.23	.25
Controlled vs Uncontrolled	HSPQ	.07	.12	.13	.19

xSignificant at .05 level

TABLE 14

Summary of Correlations Between Predictor Variables and Gains

On Study Habits Inventory for Different Independent Reading Groups

Predictors		11th Grade English	11th Grade History	12th Grade English	12th Grade History
Uses for Things		.07	.05	.10	.05
Study Habits		.19	.13	.17	.11
Library Orientation		.27	.23	.19	.27x
Satisfaction with School		.09	.04	-.03	-.05
Bright vs Dull	HSPQ	.08	.04	.11	.03
Conscientious vs Undependable	HSPQ	.14	.09	.18	.13
Individualistic vs Group Oriented	HSPQ	.12	.12	.16	.09
Individually Resourceful vs Group Dependent	HSPQ	.28	.23	.21	.29x
Controlled vs Uncontrolled	HSPQ	.15	.11	.22	.18

xSignificant at .05 level.

TABLE 15

Students Attending College from Independent Reading and Control Groups

	Experimental	Control
Observed	95	64
Expected	90.6	68.4

$X^2 = .50$ P is between .30 and .50

TABLE 16

Students Selecting Majors from Independent Reading and Control Groups

	Experimental	Control
Observed	65	31
Expected	57.4	38.7

$X^2 = 2.54$ P is between .10 and .20

have selected majors. Of the 64 control students who have been accepted for college, 31 have selected majors. Following the procedures in Table 15, and assuming equal probability a chi-square test was conducted, and the resultant value presented in Table 16. The resultant value of 2.54 was not significant.

A follow-up of the students who were enrolled in the independent reading programs and control groups at the twelfth grade level last year and the year before was made at the college level in order to ascertain whether participation in independent study had a significant effect on college grades. In view of the small sample of students in the twelfth year programs during 1966-1967, 40 experimental and 46 control students, the difficulty of procuring follow-up data, and attrition, it was decided to pool the grades of all of the previous participants in the independent study experiment from whom we had received data. The results were as follow:

The experimental groups comprising a sample of 90 students had averaged a quality point index of 2.83 whereas the control groups comprising a sample of 61 students had averaged a quality point index of 2.67. Although this difference was not statistically significant, it approached significance closely.

Since the other data on college functioning also was characterized by small samples, it was decided to pool all of the data on decisions to enter college and selection of a major over a three year period. The data are presented in Tables 17 and 18.

Analysis of the data in Table 17 indicates that a pooling of data with respect to numbers of students attending college over a three year period did not yield significant results. As has been pointed out in the discussion on the findings in Table 15, the high percentage of students with this type of ability and from these types of high schools applying for college minimizes the possibilities for obtaining significant findings. Nevertheless, it would seem that a trend is apparent. It might be very worthwhile to explore the effects of independent study on college applications in some of the less advantaged schools.

Analysis of the data in Table 18 indicates clearly that, over a three year period, freshmen who have been involved in independent study in secondary school are far more likely to decide on a major in their freshman year in college. This finding was significant at the .01 level of confidence.

Discussion

In general, the findings this year strongly supported the findings of the previous two years, and most of the hypotheses that were substantiated then were reaffirmed this year.

The hypothesis that the independent reading groups would manifest significantly superior gains on standardized achievement tests in the subject matter areas in which the independent reading was done was partially supported. The four mean differences between the experimental and control groups in

TABLE 17

Students Attending College from Independent Reading and Control Groups

Three Year Totals

	Experimental	Control
Observed	235	168
Expected	219.1	183.9

$X^2 = 2.52$ P is between .10 and .20

TABLE 18

Students Selecting Majors from Independent Reading and Control Groups

Three Year Totals

	Experimental	Control
Observed	159	79
Expected	138.8	99.2

$X^2 = 7.05$ P is between .001 and .01

social studies vocabulary and information all significantly favored the social studies independent reading groups over the appropriate control groups.

Neither of the two mean differences between the independent reading groups in English and their controls was significant. However, as was pointed out before, the language test on the Metropolitan does not reflect, to any great degree, the types of literary pursuits that most of the independent reading groups in English were carrying on.

The hypothesis that there would be no significant differences in the achievement scores obtained by the experimental and control groups in the subject areas other than those in which the independent reading was undertaken was supported again this year.

It was necessary to reject the original hypothesis that there would be significant differences favoring the control groups over the independent reading groups in the grades assigned by the teachers in the subject areas in which the independent study was undertaken for the fourth consecutive year. In fact, of the four mean differences, three favored the experimental groups although none of these differences was significant. This finding was similar to the findings in the previous two years.

The hypothesis that there would be no significant differences in the Regent's scores obtained by the experimental and control groups in the subject area in which the independent reading was undertaken was accepted. Both mean differences favored the experimental groups although only neither of these differences was statistically significant.

It was necessary, once again, to reject the hypothesis that the independent reading groups would make significantly superior gains in creativity to the control groups. There were no significant differences.

The hypothesis that the independent reading groups would show greater gains with respect to satisfaction with school was borne out by the findings. All four mean differences favored the independent reading groups, and three of these four differences were significant.

An identical situation was found with respect to the hypothesis that the independent reading groups would make significantly superior gains in study habits scores. All four differences favored the independent reading groups, and three of the four differences were significant. Two of the three significant differences, those registered by the second year groups, were significant at .01 level of confidence.

The hypothesis that the independent study groups would make significantly superior gains in library orientation scores was supported again for the third consecutive year. All four differences significantly favored the experimental groups.

The hypothesis that certain cognitive and affective measures would prove

useful in predicting success in independent study programs was not very strongly supported. Of 108 correlations between nine predictor variables and gains in achievement, library and study habit skills, only 8 were significant. Just through chance (at the .05 level of confidence) it was anticipated that there would be five or six significant correlations. It appeared that study habits scores, library skills scores, and the Conscientious vs. Undependable section of the H.S.P.Q. were the best predictors of gains in achievement in the area in which the independent study was undertaken. Study habits scores appeared to be the best predictor of gains in library skills as measured by the Library Orientation Test. The best predictors of gains in study habits skills were the Library Orientation Test and the Individually Resourceful vs. Group Dependent section of the H.S.P.Q.

The hypothesis that significantly more pupils from the experimental groups would attend college was rejected once again this year.

The hypothesis that significantly more pupils from the experimental groups would select majors upon entering college was not supported for the third consecutive year.

The findings with respect to the college grades obtained by all of the college students who had participated in the independent study program in high school over a three year period yielded insignificant results. However, the probability of the experimental group being superior was between P=.10 and P=.20.

When the data concerning the numbers of students who attended college from the experimental and control groups was cumulated over a three year period, there were no significant differences between the groups.

When the data concerning the selection of a college major were cumulated over a three year period, it was found that students who have participated in independent study at the high school level selected majors in their freshman year in college significantly more than did the control group.

It appears that some of the questions for which we sought answers should be asked in other school situations. It is difficult to test for significant differences between groups in a high school in which the preponderant majority of students enroll in college. On the basis of our findings we would advocate conducting independent study programs in the less advantaged high schools.

Some of the findings which we obtained seem to indicate that greater care must be exercised in selecting tests which truly reflect the objectives of a program. There is a need to explore for some more sensitive and valid evaluation instruments particularly in the areas of personality and creativity.

Summary

In general, on the basis of data collected over a four year period, it

can be stated, that after an initial year of groping, independent reading programs in history and English have demonstrated some real values for high school juniors and seniors. During the last three years of the investigation it was found that absence from class for the purpose of independent study had no adverse effects and some beneficial effects on the accomplishments of students. Students who participated in the independent reading programs consistently gained significantly more than their controls in areas such as library skills, study habits, and satisfaction with school. The experimental students in social studies programs consistently exceeded their controls in gains in achievement whereas the experimental students in English were only occasionally significantly better than their controls.

Few of the predictor variables had any consistent value in predicting gains on the various criterion instruments.

Absence from class for the purpose of participation in an independent reading program had no adverse affect on teacher's grades or Regent's scores. If any trend existed with respect to Regent's scores it was in favor of the experimental groups.

Participation in an independent reading program in high school seems to affect certain types of college functioning. Significantly more experimental students choose majors in their freshman year at college than do their controls. Other areas of the college investigation tended to favor the experimental groups, but not significantly so.

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