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ABSTRACT

This study examined the effects of residence hall homogeneous housing and tutoring on college freshmen. The following areas were investigated: (1) achievement patterns; (2) attrition; (3) achievement of average or high ability students; (4) achievement of students from various socio-economic backgrounds; and (5) study habits. The results show that cumulative achievement is significantly higher for residence hall students compared to randomly assigned nonresidence hall students. The potential of tutors is emphasized only when dealing with average ability students. The percentage of withdrawing or transferring freshmen did not differ significantly between the experimental and the control group. Study habit changes suggest that freshmen feel less confident in personal life and more conscious of academic difficulties. In general the results indicate that homogeneous housing and tutoring is one way to positively influence achievement and that the freshmen year affects a student's attitude about his academic skills and study habits, but this does not seem related to living environment. (MC/Author)

EFFECTS OF LIVING ENVIRONMENT ON ACHIEVEMENT AND STUDY HABITS[1]

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Humanizing and individualizing the student's college experiences has been a major goal of student personnel for many years. Focusing on immediate academic problems, Taylor (1968) and Taylor, Cartwright and Hansen (1969) concluded that academic tutoring had a positive effect on a student's grades and reduced attrition.

This study focuses on the freshman engineering student's nonclassroom learning environment, his home or residence hall. Accepting the assumption that students can and do educate one another, then interaction with others in his learning environment should influence a student's grades and study habits in a measurable way.

The purpose of this program was to provide an atmosphere that encouraged academic excellence where the student would have the best opportunity to enjoy and benefit from his residence hall environment. Idealistically this residence hall program attempted to construct a residence community that promoted learning for students of all ability levels.

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[2]The author gratefully acknowledges the support and encouragement of Paul Cartwright, Assistant Dean of the Institute of Technology and to the local industries underwriting the cost for this program.

PURPOSE

The major purpose of this study was to examine the effects of residence hall homogeneous housing and tutoring on Institute of Technology (I.T.) freshmen during the 1968-69 school year. The following questions were studied.

1. What effect does homogeneous housing and tutoring have on quarterly and yearly achievement patterns?
2. What effect does homogeneous housing and tutoring have on attrition?
3. Does the homogeneous housing and tutoring situation more effectively influence the achievement of average or high ability students?
4. What effect does homogeneous housing and tutoring have on the achievement of students from various socio-economic backgrounds?
5. What is the effect of homogeneous housing and tutoring on study habits?

DESCRIPTION OF PROGRAM

Sample. To study these questions, two experimental freshmen residence hall houses (territorial and frontier) were established for the 1968-69 school year. Each house accommodated 46 students. A letter was sent to accepted Institute of Technology freshmen prior to the fall quarter informing them of the experimental houses. Students were assigned to the two houses on a first come first serve basis. Therefore, the first 92 students requesting such an assignment were placed in the experimental houses. Eighty-two (82) of the remaining 105 residence hall freshmen also specifically requested a room in the experimental house but were unable to be accommodated. The control groups were engineering freshmen; 1) randomly assigned throughout the residence hall (N=105), and 2) random samples of students living outside the residence hall (N=491).

Several steps were taken to assure that the students within the above classifications were comparable. Analysis of variance of the means for the four groups (territorial, frontier, randomly assigned and a random sample

of non residence hall students) revealed no significant differences that could not have been a function of chance for the following variables: Fourteen (14) ability and achievement variables, Strong Vocational Interest Blank for Men (SVIB), Minnesota Counseling Inventory (MCI), and Minnesota Study Habits Blank (MSHB).

Tutors. Juniors who had above a 3.2 CGPA were contacted in the spring of 1968 regarding the tutorial positions. Interviews with 12 juniors who expressed an interest in the position provided four (4) high ability seniors who presented a reasonably high degree of self-confidence and expressed satisfaction with their engineering program.

Each house had an I.T. senior who served the freshmen in the capacity of academic tutor. Two other seniors were assigned as an academic tutoring source for randomly placed I.T. freshmen. Each tutor was assigned to a single room.

Program. The selected tutors (two tutors living in the freshman houses and two placed elsewhere in the residence halls) were charged with the responsibility of making fifteen (15) hours a week available to the freshmen for tutoring purposes. Tutoring was in any one or all subjects taken by freshmen, i.e., mathematics, physics, chemistry, and English. Other responsibilities were: 1) keeping a log of students contacts (log sheets were made available with a place for the name, subject tutored, and time); 2) referring students to appropriate personnel services (selected University of Minnesota referral sources were made available); 3) discussion of appropriate study skills techniques (a reading and study skills handbook compiled by the Reading and Study Skills Clinic was made available). Finally, quarterly meetings were

held to discuss the progress and problems encountered by the tutors.[1] No attempt was made to restrict or limit the type or amount of tutoring provided. The tutors themselves evolved via their experiences during the fall quarter; the best hours for tutoring, i.e., evenings the best, weekends the worst; and tutoring styles, i.e., group tutoring most appropriate for homogeneous house situations and individual tutoring was most appropriate for randomly assigned tutors.

METHOD

Cumulative academic performance by I.T. students living in the experimental houses, at random in the residence halls, and not living in the residence halls were obtained for all three quarters of their freshmen year.

Predicted grades in English, mathematics, social science, natural science, plus a predicted cumulative grade were available for a predicted actual grade comparison of I.T. freshmen in the experimental and control groups.

The experimental and control groups were divided into low, middle, and high socio-economic categories by using a combination of father's education and occupational information available on the student's high school transcripts.

The Minnesota Study Habits Blank (MSHB), (Raygor and Robertson 1968) was the inventory used to examine change in study habits of I.T. freshmen living in the homogeneous house and random residence hall environment. The

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[1] At the first fall meeting it was found that the randomly placed tutors were having difficulty contacting the freshmen under their charge. A newsletter announcing the tutoring services followed by a personal contact by the tutor with the freshmen was initiated, and replicated at the beginning of the Winter and Spring quarters. In spite of these efforts, it was found by checking the log sheets that the house tutors came into contact with approximately 80 percent (76% and 82%) of the freshmen primarily on a group basis, and the randomly placed tutors were working with only 30 percent of the freshmen, primarily on an individual basis.

MSHB profile consists of (1) Four reading and study skills sub scales, exams, time scheduling, note taking, and basic skills; and (2) Four personal problems sub scales, organizations of study effort, concentration-distraction, motivation-attitudes-goals, and possible emotional problems. A total score provides a composite of the eight sub scales scores.

Analyses across samples. Statistical analysis was made across samples for academic achievement. Chi Square comparisons were made between the I.T. houses and the randomly placed students, the I.T. houses and commuters, and the randomly placed and the commuters. Each sample was divided into: (1) Students who achieved a cumulative grade point average (CGPA) of 2.00 (A=4.00) or higher; (2) Students who achieved less than a 2.00 CGPA; (3) Students who cancelled, transferred or were dropped from I.T. A Chi Square test of significance was calculated for each sample comparison.

Pre-Post change analyses within samples. The difference between the pre and post measure was used as an index of the magnitude and direction of change. A correlated t-test was calculated to test the significance of the mean differences between predicted-actual grades and pre-post MSHB[2] scores (Ferguson, 1959).

RESULTS

Achievement Pattern. Would the achievement patterns of students in the homogeneous housing and tutoring situation differ from that of the control groups? The cumulative fall quarter, through winter and through spring achievement patterns are presented in Table 1. A significantly higher percentage of experimently housed students achieved about a 2.00 CGPA each quarter and

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[2]The pre-post MSHB matched comparisons of homogenous housed and randomly housed I.T. freshmen resulted in a considerable loss of data. Therefore, for this specific comparison, 42 of 92 homogeneous and 42 of 105 randomly housed students were available for a pre-post comparison. Because of the severe reduction of sample size, the authors of this study again checked the possibility that the samples were not representative of their groups. Again the findings re negative.

conversely a significantly lower percentage of experimently housed students achieved below a 2.00 CGPA each quarter in comparison to the random and non-residence hall groups. None of the randomly assigned versus nonresidence hall comparisons approached significance.

Examination of Table 1 suggests that the cancellation, drop, and transfer patterns of the three groups did not differ substantially after one year (House 15%, Random 22%, and Nonresidence hall 19%). Actual effects of the experimental housing and tutoring will probably not be answered for a number of years.

One additional comparison seems relevant. House students who left had a mean 2.32 CGPA, randomly assigned a 1.96 CGPA and the nonresidence hall students a 1.71 CGPA at the time of withdrawal. The two extreme CGPA's were significantly different at the .02 level of significance.

Ability and Subject Area Grades. Preliminary achievement data collected during the year that this study was in progress suggested that homogeneous housing and tutoring was having a greater effect on average ability I.T. freshmen than on high ability freshmen. Therefore, students in the control and experimental groups were divided into high and average ability subgroups, and predicted versus actual grades by subject areas were examined. The experimental group was also divided so that any individual house difference could be examined. The achievement of high ability students was not affected by their living environment (see Table 2). Actual English grades for the territorial house and nonresidence hall high ability students were significantly higher than predicted. Actual social science grades for randomly assigned and nonresidence hall high ability students were higher than predicted, and this difference approached significance. Regardless of whether a high ability student lived

in the homogeneous house, randomly in the residence hall or outside the residence hall complex, his actual grades were likely to be slightly higher than predicted.

The predicted-actual differences for average ability I.T. freshmen presented a slightly different picture (see Table 3). For one homogeneous house the actual English, mathematics and cumulative grades were significantly higher and the actual natural science grades were higher and the difference approached significance in comparison with predicted grades. For the second house group of average ability students none of the actual grades were significantly different than predicted. The actual English grades for both the randomly assigned and nonresidence hall average ability students were significantly higher than predicted. The actual grades for some of the groups were lower than predicted, i.e., mathematics grades for randomly assigned, natural science grades for frontier house, randomly assigned and nonresidence hall, and social science grades for randomly assigned and non-residence hall groups.

Socio-Economic Status. Would the homogeneous house and tutoring situation effect the cumulative achievement patterns differently for students from various socio-economic backgrounds?

Students in each house, randomly assigned, and outside the residence hall were divided into high, middle, and low socio-economic groups. The actual cumulative grades of high and middle socio-economic groups were significantly higher than predicted for one homogeneous house (see Table 4). Actual cumulative grades for the high and middle socio-economic groups for the other house were also higher than predicted and approached significance. The actual grades for the low socio-economic group from each house were slightly higher than predicted. None of the predicted-actual grade differences for the

random and nonresidence hall socio-economic groups approached significance. In fact, the actual cumulative grades of the low socio-economic groups randomly assigned and outside the residence hall were slightly lower than predicted. This was also true of the high socio-economic group living outside the residence hall.

Study Habits. A student's score on a study habits blank should describe his attitudes and feelings about his own ability to cope with academic situations. In one way the study habit blank could be viewed as an indication of a student's academic self-confidence. The I.T. freshmen prior to college entrance expressed confidence in their own ability to cope with academic situations. This confidence was reflected in their generally high MSHB mean scale scores on the total and eight sub scales. This was not surprising because most I.T. freshmen were near the top of their respective high school classes and therefore had experienced considerable academic success. In Table 5 are presented the pre and post means plus the significance level obtained for each scale comparison. A minus sign in front of the significance level indicates that the post mean scores express less self-confidence and more difficulty related to that specific sub scale area. A plus sign indicates that students were expressing less difficulty.

Examination of Table 5 suggests that considerable change took place in the freshmen student's feelings regarding his ability to cope with academic problems during the first year. The changes did not seem to be related to the environmental living situation.

Exams, i.e., "I sometimes study the wrong materials for tests." None of the pre-post exam sub scale scores were significantly different, although both the frontier and random group scores approached significance. Generally, I.T. freshmen seemed to be saying that they were experiencing more difficulty with

exams than they initially anticipated. Time Scheduling, i.e., "I find it hard to stick to a study schedule." The pre-post time scheduling means for all three groups were essentially the same. Note Taking, i.e., "I take very poor notes." All three groups expressed significantly less difficulty with note taking after one year of college. Basic Skills, i.e., "I read much too slowly to get all my studying done." This sub scale was the only one which seemed to reflect a difference reflecting the environmental living situation. There was no significant pre-post differences for the frontier and territorial groups. The randomly placed students post mean scores were significantly lower and suggested more concern with basic reading and English skills. Organization of Study Effort, i.e., "I can find all kinds of excuses for not studying." All three groups expressed more difficulty organizing their study effort. Concentration-Distraction, i.e., "I have trouble concentrating on my school work." The pre-post comparison indicated that the frontier groups experienced significantly more problems concentrating on their school work. The territorial group score was in the same direction, but the pre-post difference did not reach significance. The randomly housed group had exactly the same pre-post mean. Motivation-Attitude-Goals, i.e., "I never put studying first." All three groups expressed significantly more motivational difficulties after one year of college. Possible Emotional Problems, i.e., "Worry about personal problems prevents my studying." Frontier and territorial house post-test scores were significantly lower, and the randomly placed post-test scores were also lower and approached significance. This implies that the I.T. students were more aware of the possibility of personal problems affecting grades after one year of college. Total Score, all four groups' total scores were significantly lower after one year of college.

SUMMARY

What impact does an experimental living situation have on freshmen achievement and study habits? The results of this study indicated cumulative achievement was significantly better for engineering students living in a homogeneous residence hall situation when compared with randomly assigned and nonresidence hall engineering freshmen. The influence of peers with common interest and common courses had a strong and positive effect on achievement.

The influence of the experimental living situation on achievement was less clear when the groups were divided into high and average ability sub groups and specific subject areas predicted-actual grade comparisons were made. It was not surprising to observe that high ability students did as well or better than predicted regardless of their living environment. Generally the high ability engineering freshman made good use of his academic potential.

The potential of the tutors in the homogeneous housing situation seems to be emphasized when the predicted-actual subject area grades of average ability freshmen were compared. Average ability students in territorial achieved significantly higher grades than predicted in four of five comparisons. Average ability students in frontier did as well as predicted. In four out of five comparisons their actual grades were slightly higher than predicted. Average ability students randomly assigned and living outside the residence hall obtained actual English grades that were significantly higher than predicted. However, four of the remaining eight actual grades were lower than predicted.

The percentage of I.T. freshmen in the three groups withdrawing or transferring did not differ significantly with 15 percent of house students and 22 percent of the randomly assigned representing the attrition extreme.

The difference between the groups actually expressed itself in the grade point averages that students achieved prior to withdrawal. The homogeneous house students had a mean CGPA of 2.32; the randomly assigned a mean CGPA of 1.96; and the nonresidence hall group a mean CGPA of 1.71 at the time of withdrawal. I.T. freshmen who lived in the homogeneous house situation were more likely than randomly assigned or nonresidence hall students to be achieving at a successful level when they withdrew.

The changes on the study habits blank suggest that the first year of college resulted in the I.T. freshmen feeling less self-confidence in his personal life, and more conscious of academic difficulties. The results also suggest that taking notes in class was the one area that they were having less difficulty than initially anticipated. Only the randomly placed students expressed significantly more difficulty in basic reading and English skills.

The results of this study suggest that homogeneous housing and tutoring is one way to positively influence achievement. The first year of college affects a student's attitude about his academic skills and study habits, but this change does not seem related to living environment. Several questions for future studies seem relevant. Is the tutor's role that of academic assistant, successful student model or both? Do changes in study habits scores reflect academic competition or a change in a student's self-concept? Does the living environment affect students from various socio-economic backgrounds differentially? Finally, what effect would adding sophomores in the house unit have on freshmen achievement patterns? It is anticipated that other questions will be generated as further studies are developed.

The success of this experimental program made it possible to obtain continued funding by local industries. During the 1969-70 school year six

seniors were hired as tutors. Two assigned to I. T. freshman houses, two to I. T. freshman-sophomore combination houses and two assigned for tutoring of the randomly placed I. T. students. An attempt is being made to replicate this study plus obtaining pre-post SVIB data on nonresidence hall freshmen.

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TABLE 1

SUMMARY OF ACADEMIC PERFORMANCE FALL, WINTER AND SPRING QUARTER OF I.T. FRESHMEN IN THREE SEPARATE HOUSING SITUATIONS DURING THE 1968-1969 SCHOOL YEAR[a]

QUARTER		FALL			CUMULATIVE THROUGH WINTER			CUMULATIVE THROUGH SPRING		
GPA		N			N			N		
	H	31	36%		24	29%		21	25%	
3.00-4.00	R	27	30%		20	22%		22	25%	
	NR	112	23%	H 88%	64	13%	H 82%	65	13%	H 78%
				R 70% H vs. R**			R 70% H vs. R[1]			R 62% H vs. R*
				NR 72% H vs. NR**			NR 59% H vs. NR**			NR 58% H vs. NR**
	H	44	52%		45	53%		45	53%	
2.00-2.99	R	36	40%		43	48%		33	37%	
	NR	242	49%		227	46%		221	45%	
	H	7	8%		3	4%		5	6%	
1.00-1.99	R	22	25%		16	18%		13	15%	
	NR	105	21%	H 11%	100	20%	H 5%	106	22%	H 7%
				R 27% H vs. R**			R 18% H vs. R**			R 16% H vs. R[1]
				NR 26% H vs. NR**			NR 24% H vs. NR**			NR 23% H vs. NR**
	H	3	3%		1	1%		1	1%	
0.00-0.99	R	2	2%		--	--		1	1%	
	NR	25	5%		22	4%		5	1%	
Cancelled	H	--	--		11	13%		13	15%	
Dropped	R	2	2%		11	12%		20	22%	
Transferred	NR	7	1%		78	16%		94	19%	
	H	85			84			85		
TOTAL	R	89			89			85		
	NR	491			491			491		

[a]Students without ability (ITAR) scores were excluded from this summary

H = I.T. experimental house students

R = I.T. students living at random in residence halls

NR = I.T. students not living in residence halls

** Significant at .01 level or better

* Significant at .05 level or better

[1] Approached significance

None of the random versus nonresidence hall comparisons approached significance

Actual Chi Square values can be found in Table 1a

TABLE 2

COMPARISONS OF PREDICTED VERSUS ACTUAL GRADES BY SUBJECT AREA FOR FOUR GROUPS OF HIGH ABILITY I.T. FRESHMEN

SUBJECT	PREDICTED MEAN	SD	ACTUAL MEAN	SD	DIFFERENCE
Territorial (N=16)					
English	2.55	.28	2.87	.74	+.32[1]
Mathematics	2.79	.24	2.96	.68	+.17
Soc. Science	2.62	.40	2.90	.95	+.28
Nat. Science	2.76	.28	2.81	.74	+.05
Cumulative	2.75	.28	2.89	.56	+.14
Frontier (N=18)					
English	2.51	.28	2.67	.54	+.16
Mathematics	2.67	.18	2.87	.80	+.20
Soc. Science	2.67	.35	2.77	.67	+.10
Nat. Science	2.70	.25	2.79	.63	+.09
Cumulative	2.76	.26	2.77	.48	+.01
Random (N=31)					
English	2.47	.33	2.54	.62	+.07
Mathematics	2.78	.28	2.79	.79	+.01
Soc. Science	2.55	.38	2.76	.74	+.21[1]
Nat. Science	2.65	.35	2.80	.70	+.15
Cumulative	2.70	.28	2.79	.57	+.09
Nonresidence Hall (N=25)					
English	2.42	.34	2.68	.71	+.26*
Mathematics	2.65	.40	2.83	.94	+.18
Soc. Science	2.51	.40	2.74	.67	+.23[1]
Nat. Science	2.57	.34	2.66	.57	+.09
Cumulative	2.62	.29	2.79	.53	+.17

* Difference significant at .05 level or better
[1] Difference near significance

TABLE 3

COMPARISONS OF PREDICTED VERSUS ACTUAL GRADES BY SUBJECT AREA FOR FOUR GROUPS OF I.T. FRESHMEN OF AVERAGE ABILITY

SUBJECT	PREDICTED MEAN	PREDICTED SD	ACTUAL MEAN	ACTUAL SD	DIFFERENCE
Territorial (N=24)					
English	2.22	.27	2.54	.46	+.32**
Mathematics	2.11	.43	2.49	.75	+.38*
Soc. Science	2.21	.36	2.40	1.00	+.19
Nat. Science	2.32	.37	2.57	.74	+.25[1]
Cumulative	2.32	.34	2.55	.63	+.32**
Frontier (N=17)					
English	2.19	.28	2.26	.64	+.07
Mathematics	2.14	.28	2.25	.74	+.11
Soc. Science	2.22	.29	2.36	.63	+.14
Nat. Science	2.32	.36	2.26	.70	-.06
Cumulative	2.21	.24	2.28	.40	+.07
Random (N=45)					
English	2.22	.33	2.46	.61	+.24**
Mathematics	2.13	.36	2.08	.73	-.05
Soc. Science	2.28	.44	2.28	.85	.00
Nat. Science	2.34	.39	2.15	.67	-.19[1]
Cumulative	2.28	.30	2.29	.52	+.01
Nonresidence Hall (N=38)					
English	2.15	.32	2.47	.69	+.32**
Mathematics	2.02	.42	2.12	.96	+.10
Soc. Science	2.19	.36	2.16	.83	-.03
Nat. Science	2.25	.41	2.06	.80	-.19
Cumulative	2.14	.31	2.21	.65	+.07

** Difference significant at .01 level or better
* Difference significant at .05 level or better
[1] Difference near significance

TABLE 4

PREDICTED-ACTUAL GRADE COMPARISON FOR THREE SOCIO ECONOMIC CATEGORIES FOR TERRITORIAL, FRONTIER, RANDOM AND NONRESIDENCE HALL GROUPS

	HIGH SES			MIDDLE SES			LOW SES		
	PRE MEAN SD	POST MEAN SD	DIFF.	PRE MEAN SD	POST MEAN SD	DIFF.	PRE MEAN SD	POST MEAN SD	DIFF.
TERRITORIAL	2.05/.79	2.81/.68	+.76[1]	2.25/.69	2.53/.80	+.28[1]	2.54/.35	2.56/.82	+.02
HSES - N=10 MSES - N=22 LSES - N=12									
FRONTIER	2.17/.69	2.66/.39	+.49*	2.36/.65	2.65/.55	+.19*	2.32/.88	2.54/.41	+.22
HSES - N=15 MSES - N=20 LSES - N=11									
RANDOM	2.30/.78	2.57/.84	+.27	2.32/.55	2.33/.82	+.01	2.44/.38	2.25/.73	-.19
HSES - N=24 MSES - N=40 LSES - N=25									
NONRESIDENCE HALL	2.32/.31	2.17/.58	-.15	2.10/.68	2.12/.93	+.02	2.36/.41	2.30/.80	-.06
HSES - N=26 MSES - N=34 LSES - N=20									

[1] Difference approached significance

* Difference significant at .05 level or better

TABLE 5

PRE-POST STUDY HABITS BLANK COMPARISON
FOR HOUSE AND RANDOMLY PLACED I.T. FRESHMEN

SUB SCALE VARIABLES	FRONTIER (N=30) $\bar{X}$/SD	TERRITORIAL (N=38) $\bar{X}$/SD	RANDOM (N=45) $\bar{X}$/SD
Exams			
Pre	2.8/.8	2.6/1.1	2.7/1.0
Post	2.4/1.0	2.3/1.1	2.3/1.2^{-a}
Time Schedule			
Pre	2.2/1.5	2.0/1.5	1.9/1.5
Post	2.1/1.5	2.2/1.7	2.1/1.4
Note Taking			
Pre	1.8/1.6	2.1/1.4	2.1/1.4
Post	2.6/1.2^{+**}	3.0/1.2^{+**}	2.7/1.3^{+**}
Basic Skills			
Pre	7.7/1.7	7.8/1.7	7.9/2.3
Post	7.9/2.2	8.0/1.7	7.3/2.0^{-**}
Organ. of Study Effort			
Pre	6.5/1.9	6.4/2.0	6.3/1.7
Post	5.6/2.4^{-**}	5.6/2.2^{-a}	5.3/2.1^{-**}
Concen.-Distraction			
Pre	4.6/1.6	4.8/1.3	4.3/1.5
Post	4.0/1.7^{-*}	4.3/1.4	4.3/1.5
Motivation			
Pre	6.3/1.7	6.6/1.2	6.2/1.9
Post	5.3/2.2^{-**}	5.0/2.1^{-**}	5.4/1.7^{-**}
Emotional Problems			
Pre	6.4/2.4	7.2/2.2	6.6/2.5
Post	5.4/2.4^{-*}	6.0/2.5^{-**}	5.9/2.7^{-a}
TOTAL			
Pre	38.2/8.8	39.5/7.8	38/8.7
Post	35.3/10^{-*}	36.6/8.7^{-*}	35.3/8.5^{-*}

^{a} = near significance
* = significant at .05 level or better
** = significant at .01 level or better