A Study of the Effects of the Psychology of Learning Course

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ABSTRACT

Students enrolled in the Psychology of Learning course during the fall 1984 and winter 1985 semesters were taught self-control procedures to modify their study behavior. This research evaluated the effect of this course on their study habits and attitudes, self-esteem, locus of control, overall semester average, and on their study time, as compared to control group subjects. A review of the literature included : 1) research on the self-control procedures that were incorporated as key elements in the course ; 2) research on the dependent measures of study behavior including study habits, study time, and overall average that were used in this study, and 3) research on the self-concept and locus of control in relation to study behavior that also were measured in this study. The battery of tests which were administered both pre and post to subjects in the experimental and control groups is described in the section on methods. Also described in this section is the procedure that was used in both the experimental and control groups. Results generally support the first hypothesis in that students in the experimental groups showed significant pre to post-test gains on measures of study habits and attitudes and on locus of control, as compared to control group subjects. Self-esteem however did not change. The second hypothesis was not supported, in that students in the experimental group did not show significant gains in their overall average for the semester in which they were enrolled in the Psychology of Learning course, as compared to their previous semester's average. The third hypothesis was tentatively supported in that students in the fall 1984 experimental group appeared to make more substantial gains in their study time as compared to control group subjects. Suggestions for future research are presented in the discussion section.

Studies conducted across North America show that many college students have inadequate reading, writing and study skills, thus impeding their successful performance in subject areas (Cross, 1976 ; Roueche and Snow, 1977 ; and Maxwell, 1979). Recent research has suggested that this situation holds true for students within the Quebec collegial system, in both the anglophone and francophone sectors (Schwartz, 1977 ; Kerwin-Boudreau and Woodruff, 1980).

Most institutions have attempted to deal with the problem of high student failure and dropout rates in some concrete way. Roueche and Snow (1977) report that by 1968 remedial programs including basic skills courses were common in American community colleges. Typically, students would enroll in basic skills courses that included reading, writing and study skills courses. But these remedial courses have been plagued with problems from the start. For example, Maxwell (1979) maintains that they kill student motivation. Data presented by Roueche and Snow (1977) indicate that 90% of students assigned, advised or counselled into remedial courses never completed them.

A number of important conclusions can be reached from the failure of these traditional remedial courses. Foremost among these, as Robinson (1970) points out, is that simply providing students with information on effective techniques will have little impact in terms of changing behavior. Beneke and Harris (1972) state that in order to improve student learning we have to move beyond merely transmitting theoretical information to students, and focus on persuading them to use this information. In the case of study behavior for example, students must not only be shown how to study but must also be prepared to implement these skills and to engage in the required study time.

Learning proper study habits is crucial for success in college. Because of the importance of this issue, as well as the fact that study behavior lends itself nicely to controlled research, many investigators have explored the area as well as offered their solutions as to how studying might be made more effective. Behavior modification and specifically self-modification techniques have been particularly successful in improving study behavior. Much research supports this fact (Beneke and Harris, 1972 ; Briggs *et al.*, 1971 ; Fox, 1962 ; Jackson and Zoost, 1972 ; Richards, 1976 ; and Richards *et al.*, 1976). Richards (1981) states « the marriage of behavioral self-control techniques and improved study behaviors is a young

one, but the honeymoon is over and the couple is still together, leading us to suspect that their future is auspicious » (p. 160).

The present study is based on the premise, fully supported by the data collected from the research, that teaching students self-control procedures to improve their study behavior will in fact result in significant improvements in this behavior. The review of the literature that follows will focus on some studies in which self-control procedures have been used to modify study behavior. Reference will be made to the specific self-control techniques of self-monitoring, self-reinforcement, stimulus control, contracting, and self-instructions, since these techniques were all incorporated as key elements in this research. The measures of study behavior that were used in the present study include study habits and attitudes, study time, and overall average, and therefore these issues will also be addressed. Finally, this study looked at the relationship of the self-concept and locus of control to study behavior and research pertaining to these topics will also be cited.

Self-control of study behavior

Self-control techniques teach students how to monitor their own behavior and allow them to become their own counselors. In one study by Sappington *et al.* (1980), college students were taught study skills. In addition, half of the subjects were given three hours of instruction in principles of self-control and were shown how to set up self-administered behavior modification programs to improve study habits. Self-control subjects succeeded in almost doubling both total study time and estimated effective study time. Overall grade point averages (GPAs) also increased for self-control subjects. In a second study by Richards (1975), two behavioral self-control procedures were compared to the typical treatment for college students' study problems, that of study skills advice. As predicted, the self-control procedure of self-monitoring was an effective (*i.e.* resulting in higher course exam scores) treatment addition to study skills advice and study skills advice was superior to the no-treatment groups.

Many other procedures do not seem to produce the long-term gains in grade point averages (GPAs) that are frequently noted with self-modification procedures. For example, Landward and Hepworth (1984) report on the effects of an Academic Enrichment Program, a support group for high risk freshmen designed to provide an atmosphere of empathy, conducive to free discussion and problem-solving related to obstacles that impede academic success. Students in this program substantially outperformed other students in control groups in their overall GPA, but these effects were noted only for the quarter in which the program was implemented. The authors conclude « the most plausible explanation for this finding is that the program served as an academic crutch for some of the students and the abrupt withdrawal of the support resulted in regression on their part to their former inadequate approaches to academic work » (p. 126). These results are in sharp contrast with those of Beneke and Harris (1972) who report that subjects who were taught self-control procedures to improve study habits showed a significant gain in GPA for the three semesters following the study, over the two preceding semesters. These GPA gains were not found for subjects who merely received and discussed the self-modification lessons in group meetings or for those who simply received the lessons individually in written form, attesting once more to the importance not only of introducing students to these techniques, but of actually getting them to implement them.

Because self-control techniques are useful for academic problems and academic problems are useful for self-control investigations (Richards, 1981), the research on these two factors is quite extensive. Several studies support the effectiveness of techniques such as the self-monitoring of study behavior (Johnson and White, 1971 ; Mount and Tirrell, 1977 ; Richards, 1975 ; and Sagotsky *et al.*, 1978) ; the self-reinforcement of study behavior (Tichenor, 1977), the establishment of stimulus control over study behavior (Goldiamond, 1965 ; Harris and Trujillo, 1975), the use of self-instructions (Meichenbaum, 1975), and the use of contracts (Brooke and Ruthven, 1984 ; Goldman, 1978). But while these self-control techniques can and do change study behavior for the better, some techniques (*e.g.* self-monitoring) are more effective than others (Richards, 1981 ; Ronnback, 1983). Ronnback (1983) states that little is known as to why this change comes about and more theoretical and methodological rigor in future studies is needed in order to add basic knowledge to the research area.

The following sections will address the direct measures of study behavior that were assessed in this research, *i.e.* study habits, study time, and grades. The relationship of the self-concept and locus of control to study behavior will also be examined.

Study habits

The relationship between good study habits and academic achievement cannot be overstated. Research

repeatedly attests to the fact that high academic attainers, as measured by GPA, are those who possess good study skills (Brown *et al.*, 1971 ; Gadzella *et al.*, 1976 ; Gadzella and Williamson, 1984a ; Jain and Robson, 1969 ; Kirkland and Hollandsworth, 1979 ; Lazarus *et al.*, 1979 ; Mussano, 1977 ; and Zimmerman *et al.*, 1977). Conversely, poor study habits are perceived as being among the major causes of poor academic performance (Blai, 1976 ; Keller, 1978). Both Biggs (1978) and Howe and Godfrey (1977) clearly state that good learners do not utilize any one particular strategy that guarantees success, but rather they are able to call upon a wider range of study techniques than others. Joshi and Chaudhari (1966) identify some of the study strategies used by industrious students : they study more than three hours at night, use the sitting posture while reading, read by themselves, prefer a quiet atmosphere, take notes, read extensively, prepare their own timetable and accept help from other students.

Study habits and attitudes are sometimes measured by a particular inventory known as the Survey of Study Habits and Attitudes (SSHA). Much research has indicated that significant correlations exist between SSHA scores and GPA (for example Pierog, 1976), however, other research has not found this to be the case (Dutrow and Houston, 1982).

Study time

In addition to study habits, study time is another variable that is used to measure study behavior. According to Annis (1983), « research makes it quite clear that there is no substitute for the amount of time spent studying. An increase in the amount of study time is strongly related to an increase in the amount of learning » (p. 3). This finding is also reported by Keith (1982) with high school seniors, wherein an increase in study time contributed significantly to an increase in student grades. However Tichenor's (1977) work with introductory psychology students indicates that increasing study time in the course did not lead to an increase in test scores. Perhaps a basic methodological weakness of these studies is the fact that students recorded total study time and not the efficacy of their study time (or concentrated study). Because of this, it is difficult to reach any definitive conclusions in the area.

On the subject of time management, there is some evidence to suggest that females manage their time better than males, and that senior-level students study more than other students in college (Cranney and Kirby, 1981).

RÉSUMÉ

Les étudiants qui ont suivi le cours de Psychologie de l'apprentissage aux sessions d'automne 1984 et d'hiver 1985 ont été initiés aux techniques de contrôle de soi afin de modifier leur comportement scolaire. Cette recherche évalue les effets du cours sur leur attitude et leurs habitudes d'étude, l'estime de soi, le lieu de contrôle*, leur moyenne générale ainsi que le temps consacré à l'étude et ce, comparativement à un groupe témoin.

L'examen de la documentation fait état de la recherche sur les techniques de contrôle de soi, qui constituent les éléments clés du cours ; elle examine aussi les mesures de comportement scolaire, soit les habitudes d'étude, le temps consacré à l'étude et la moyenne générale, ainsi que le lieu de contrôle et le concept de soi par rapport au comportement scolaire, mesures qui ont fait l'objet de cette recherche.

La batterie de tests administrés au début et à la fin du cours aux sujets des groupes expérimental et témoin est décrite dans la méthodologie, section où est aussi présentée la démarche suivie avec les deux groupes.

Les résultats appuient en général la première hypothèse : les étudiants du groupe expérimental ont obtenu des gains significatifs aux post-tests sur l'attitude et les habitudes d'étude ainsi que le lieu de contrôle comparativement aux sujets du groupe témoin. L'estime de soi n'a cependant pas changé. La seconde hypothèse n'a pas été confirmée, la moyenne générale des étudiants du groupe expérimental n'ayant pas indiqué de gains significatifs à la session où ils ont suivi le cours de Psychologie de l'apprentissage par rapport aux sessions antérieures. La troisième hypothèse a été partiellement confirmée par le fait que les sujets du groupe expérimental de la session d'automne 1984 ont réalisé des gains plus importants dans le temps consacré à l'étude que ceux du groupe témoin.

La discussion comporte des suggestions qui pourraient faire l'objet d'une future recherche.

* Représentation qu'on se fait de l'origine de sa conduite : on a le contrôle de sa vie ou, inversement, la vie est contrôlée par le hasard ou le destin.

Self-concept

The self-concept, described as one's perception of oneself, has been shown to be positively related to academic achievement for students in various grades (Brookover, 1969 ; Brookover *et al.*, 1967 ; Caplin, 1969 ; Coopersmith, 1959 ; Hamacek, 1979 ; Purkey, 1970 ; Williams and Cole, 1968), even when ability was controlled (Brookover *et al.*, 1967). Gadzella and Williamson (1984a) found a significant positive correlation between study skills and self-concept. Their research also showed that significant correlations existed among the three variables of study skills, self-concept and academic achievement at both the university (Gadzella and Williamson 1984a) and

high school levels (Gadzella and Williamson 1984b). This interrelationship is also described by Zarb (1981) who reported that academic self-concept and study habits were significant predictors of GPA for both male and female samples. Also Sontakey (1975) reported that high achievers had better study habits and clearer and more positive self-concepts than did underachievers.

Locus of control

The dimension of internal versus external locus of control can be described as follows : internals generally believe that they have some control over their successes and failures, while externals believe that the outcomes of their actions are mostly determined by fate, chance, or powerful others (Ramanaiah *et al.*, 1975). Rotter (1966) has developed one of the most frequently used scales to measure locus of control, known as the Internal-External Control Scale (I-E scale). Rotter (1966) hypothesized that internals would manifest more overt striving for achievement than externals. Rotter's (1966) hypothesis was supported by research such as that of Crandall *et al.* (1962), Crandall and Katkovsky (1965), and McGhee and Crandall (1968) in which internals were found to spend more time in intellectual activities and exhibit more interest in academic pursuits. In a study by Ramanaiah *et al.* (1975), the average SSHA profile of internals was found to be significantly different from that of externals in both the male and female samples. The fact that internals in this study had better study habits and academic attitudes than externals lends further and more direct credence to Rotter's (1966) hypothesis that internals show more overt achievement — striving behavior than do externals. In a similar study by Keller *et al.* (1978), students were again administered both the I-E and the SSHA scales. However in this study the I-E scale was found to be related only to academic attitudes and not also to study habits as in the previous (Ramanaiah *et al.*, (1975) study. But other research such as that of Faroqi and Tharakan (1978) again supports the strong correlation between both study habits and attitudes (as measured by the SSHA) and locus of control scores (as measured by the I-E scale).

Some studies, such as those of Eisenman and Platt (1968) and Hjelle (1970) did not find evidence for the relationship between locus of control and academic achievement (as measured by GPA) in college students. However, research by Prociuk and Breen (1974) found that internal control (as measured by the I-E scale) was positively related to effective study habits and attitudes (as measured by the SSHA scale) and to college academic success (as measured by GPA). Furthermore, in a study by Griffin (1979), locus of control, self-concept of academic ability, and study habits and attitudes were all found to be significantly correlated with GPA, as were age, sex, race, and marital status.

The research

Much of the previously-cited research has sought to examine the impact either of individual factors, or of a small number of factors on study behavior. For example, the research on self-control techniques for the most part has attempted to partial out the relative effects of various techniques on study behavior. In other studies, either study habits or study time or GPA was often the only criterion that was measured.

This research seeks to evaluate the effects of the Psychology of Learning course (350-360) in which students were taught to modify their own study behavior. All of the previously-cited self-control techniques including self-monitoring, self-reinforcement, stimulus control, self-instructions, and contracting were incorporated as key elements in this course. The impact of the Psychology of Learning course was assessed on several fronts including students' study habits, study attitudes, locus of control, self-esteem and on their study time and overall grade average.

Objectives

The specific objectives of this research were as follows :

1. to measure the effect of the Psychology of Learning course (350-360) on students' study habits, attitudes towards school, locus of control, and self-esteem, by comparing the pre and post-test results of students enrolled in this course with the results obtained from control group subjects enrolled in another Psychology course (350-205) ;
2. to measure the effect of the Psychology of Learning course on the student's overall average by comparing the previous semester's average and the current semester's (*i.e.* semester in which the student was enrolled in the course) average with those of students in the control group ;
3. to measure the effect of the Psychology of Learning course on the amount of time spent studying by comparing the total number of study hours reported during the baseline phase (week 6 of the semester) and during the final week of the study project, for students enrolled in this course with results obtained from students in the control group.

Hypotheses

It was hypothesized that students enrolled in the Psychology of Learning course (350-360) would show greater improvement on pre versus post-test measures of study habits, attitudes towards school, locus of control, and self-esteem, as compared with the results of control group subjects enrolled in another psychology course (350-205).

It was also hypothesized that students in the Psychology of Learning course would show a significant improvement in overall average for the semester in which they were enrolled in the course as opposed to their previous semester's record, as compared with the overall averages of students in the control group.

Furthermore, it was hypothesized that there would be a significant difference between the number of hours of study reported during the baseline phase (week 6 of the semester) of the study project and the final week of the project, for students enrolled in the Psychology of Learning course, compared with the results of students in the control group.

METHOD

Subjects

The experimental group subjects included 20 students (13 female, 7 male) enrolled in the Psychology of Learning course (350-360) at Champlain Regional College, Saint-Lambert, during the fall 1984 semester, and 28 students (23 female, 5 male) enrolled in the Psychology of Learning course during the winter 1985 semester. Control group subjects included students who were registered in a comparable psychology course (Child Psychology, 350-205), also taught by the author. These subjects included 23 students (17 female, 6 male) enrolled during the fall 1984 semester and 32 students (28 female, 4 male) enrolled during the winter 1985 semester.

Instruments

During the first class meeting, students in the experimental and in the control groups were administered the following battery of pretests :

1. Study habits were measured by the Preston and Botel (1967) Study Habits Checklist.
2. Study habits and attitudes were measured by the Brown and Holtzman (1965) Survey of Study Habits and Attitudes.
3. Locus of control was measured by the Rotter (1966) Internal-External (I-E) Scale.
4. Self-concept was measured by the Coopersmith (1967) Self-Esteem Inventory.

The same tests were administered as posttests to students in both the experimental and control groups fifteen weeks later, during the final week of classes.

Procedure

Students enrolled in the Psychology of Learning course (experimental group) were introduced to the basic theory of behavioral psychology during the first five weeks of the course. A manual entitled *A guide to behavior change* (1982), developed by the author, was used as a basic text for the course. From the very beginning of the course, the emphasis was placed on self-modification, in that students were shown how these basic principles of behavior change could be applied to themselves in order to modify their own behavior, and specifically their own study behavior. The modification of study behavior (or the study project) was carried out through a series of assignments, described below.

1. During the sixth week of both the fall 1984 and winter 1985 semesters, each student made a list of personal reasons why they felt it was important for them to improve their study behavior. This was in line with suggestions by Annis (1983), Beneke and Harris (1971), and Kremer *et al.* (1983) that the stronger the commitment to behavior change, the greater the chances for success in a self-modification program.
2. During the sixth and seventh week of the semester students in the Psychology of Learning course (experimental group) began their study project by recording two weeks of baseline data on the total daily amount of time spent studying all subjects. During this two-week period, students in the control group were also recording the total daily amount of time spent studying all subjects.
3. During the eighth week of the semester, students in the Psychology of Learning course decided on a menu of personal self-reinforcers that would follow appropriate study behavior. It was emphasized that they could select from among overt and covert reinforcers and also from high-probability behaviors. During this week, students also wrote up their individualized study contract in which they specified their goals and the steps that they would follow in order to meet their goals. This plan for change was written out and signed by both student and instructor.

4. From the ninth through the fourteenth week of the semester, the study contract was implemented. It was emphasized that the purpose of the entire project was to improve study behavior in all subject areas. During this implementation phase, students were required : a) to make a daily schedule and study plan ; b) to establish stimulus control over their study behavior ; c) to self-monitor both their total and their concentrated study times, and d) to provide both daily and weekly feedback on such topics as their ability to establish stimulus control, use of study skills, use of self-reinforcement, and use of self-instructions.

Throughout the semester students provided the instructor, and were, in turn, provided by the instructor with regular feedback concerning the progress of their study project. After the first week of implementation, each student met privately with the instructor in her office to discuss the project. Additional written feedback was provided by the instructor after students had completed the fourth and the sixth week of the project.

During the final two full weeks of classes, students in the control groups were again asked to keep a daily two-week record of the total daily amount of time spent studying all subjects. Both total study time and concentrated study time were recorded for the experimental groups, as a regular part of their study projects.

Academic grades, specifically the previous and the current semester's average for each subject, were obtained through the registrar's office, at the end of the term.

Statistics

Elementary statistics were done for the population. Analyses of variance and Pearson correlations were done for the experimental and control groups. Post-hoc tests were done using Tukey H.S.D. Because of considerations of possible time differences, the fall 1984 and winter 1985 data were analysed separately. In effect, the winter 1985 data represent a replication of the fall 1984 study.

RESULTS

Chi-square tests of between-group differences on sex and mother tongue for both the fall 1984 and winter 1985 data did not yield significant differences.

Group comparisons on pre-scores for the fall 1984 data yielded only two differences. On the Study Habits Checklist, decile rank, the control group scored marginally higher than the experimental group ($F(1,41) = 3.97$, $p. = .05$). On the I-E Scale, Academic, the experimental group scored higher than the control group ($F(1,41) = 5.46$, $p < .05$).

For the winter 1985 data, there were no significant differences on pre-scores between groups. Two marginal differences were noted, with the control group scoring higher than the experimental group on both the Coopersmith Inventory ($F(1,58) = 3.19$, $p < .08$) and on the Teacher Approval, raw score ($F(1,58) = 3.65$, $p < .07$).

Elementary statistics (*i.e.* calculation of the mean and standard deviation) were conducted on the pre and post-test scores, and on the data related to study time and to academic grades for the fall 1984 and for the winter 1985 experimental and control groups separately.

Pearson correlation coefficients were computed on all of the fall 1984 pre and post-test scores and on the data related to study time and to academic grades. Correlations were also computed on the same measures for the winter 1985 semester. Results indicated that a very large number of variables were correlated at the $p < .05$ level of significance for both the fall 1984 and the winter 1985 semesters. Correlations were especially evident among the test variables.

For the fall 1984 semester, a significant group by pre-post interaction emerged for all of the Study Habits Checklist and the Survey of Study Habits and Attitudes variables. The experimental group scored significantly higher at posttesting than at pretesting. At posttesting, the experimental group scored significantly higher than the control group. As well, a significant pre-post main effect emerged for all of the Study Habits Checklist and the Survey of Study Habits and Attitudes variables, with postscores higher than prescores averaged over both groups. A significant pre-post main effect was noted for the Internal-External (Total) Scale ($F(1,41) = 4.89$, $p < .05$). A significant group by pre-post interaction emerged on the Internal-External (Academic) Scale ($F(1,41) = 5.24$, $p < .05$) with the experimental group showing significant improvements at posttesting. A marginal group by pre-post interaction appeared on the Coopersmith Inventory with the control group scoring higher at pre-testing than at posttesting ($F(1,41) = 3.44$, $p < .08$).

For the winter 1985 semester, similar results were obtained on all of the Study Habits Checklist and the

Survey of Study Habits and Attitudes test scores. In addition to the significant group by pre-post interactions and the significant pre-post main effects that were noted in the fall 1984 data, a significant group main effect also emerged on these variables in the winter 1985 data, with the experimental group scoring higher than the control group, averaged over both pre and posttest scores. A significant group by pre-post interaction was noted for the Internal-External (Total) Scale ($F(1,58) = 8.72$, $p < .05$) with the experimental group alone showing significant improvements at posttesting. A marginal group effect emerged fro the Internal-External (Academic) Scale ($F(1,58) = 3.23$, $p < .08$) with the experimental group scoring more favorably than the control group, averaged over both pre and posttesting. Finally, the winter 1985 results on the Coopersmith Inventory yielded both a significant group main effect ($F(1,58) = 6.17$, $p < .05$) with the experimental group scoring higher than the control group and a significant pre-post main effect ($F(1,58) = 4.20$, $p < .05$) with post-scores higher than pre-scores, averaged over both groups.

For the fall 1984 data, a multivariate comparison of group profiles on post-scores by discriminant analysis, equivalent to a one-way multivariate analysis of variance with Wilks Lambda (λ) criterion was performed. The analysis was done stepwise (an exploratory analysis) due to the small number of subjects and the large number of possible discriminatory variables. The two variables, Study Habits Checklist, decile score, ($F(1,41) = 28.05$, $p < .001$), and Study Habits Checklist, raw score, ($F(2,40) = 15.57$, $p < .001$), successfully discriminated between the experimental and control groups ($F(2,41) = 15.570$, $p < .001$). No other variable added significantly to the discrimination, although there were many significant univariate differences probably due to the strong inter-variable correlations. Due to the very high correlation between raw and percentile scores which could cause unreliable coefficients in the discriminatory function, a second discriminant analysis on raw scores only was performed and the results were identical to the first discriminant analysis. The Study Habits Checklist, raw score, was the best discriminating variable (univariately) ($F(,41) = 17.53$, $p < .001$) and no other variable added to the discrimination in a significant way, due to the high correlations among the variables.

For the winter 1985 data, a discriminant analysis on post-scores indicated significant univariate differences between groups on all test variables. Significant multivariate differences appeared on the Study Habits Checklist, raw score ($F(1,58) = 31.45$, $p < .001$) and on the Delay Avoidance, raw score ($F(2,57) = 16.52$, $p < .001$).

Analysis of variance : Study time data

For the fall 1984 experimental group, a comparison of study time (week 6 vs. week 14 (total time) vs. week 14 (concentrated time) indicated a significant difference between weeks ($F(2,38) = 36.21$, $p < .01$). Post-hoc tests using Tukey H.S.D., $p < .01$, indicated a significant difference between the number of hours studied during week 6 and the total number of hours studied during week 14, and also between the total hours studied during week 6 and the concentrated study time during week 14. Parallel results were obtained for the winter 1985 experimental group ($F(2,54) = 19.70$, $p < .001$).

For the fall 1984 experimental group, a comparison of the average number of hours studied during weeks 6 and 7 versus the average of the total hours studied for weeks 13 and 14 and the average of the concentrated hours studied for weeks 13 and 14 also indicated a significant difference between weeks ($F(2,38) = 40.30$, $p < .01$). Post-hoc tests revealed that the average number of hours studied in weeks 6 and 7 was significantly less than the average number of hours for weeks 13 and 14 for both the total study times and the concentrated study times. Parallel results were obtained for the winter 1985 experimental group ($F(2,54) = 29.90$, $p < .001$).

A comparison of the total (control group) vs. the concentrated (experimental group) hours of study at week 14 did not yield any significant differences between the fall 1984 experimental and control groups.

For the winter 1985 semester, significant differences were reported at week 14 with the control group studying significantly more hours (total time) than the experimental group (concentrated time) $F(1,57) = 4.09$, $p < .05$), and on significantly more days than the experimental group ($F(1,57) = 11.10$, $p < .01$). Significant differences were also reported on the average number of days studied during weeks 13 and 14, with the control group scoring significantly higher than the experimental group ($F(1,57) = 9.86$, $p < .01$).

For both the fall 1984 experimental and control groups, a significant time main effect emerged, with both groups studying more at week 14 than at week 6 ($F(1,41) = 68.05$, $p < .01$). No significant group differences were apparent.

For the winter 1985 data, a significant time main effect again emerged ($F(1,57) = 28.12$, $p < .001$). As well, a significant group main effect was noted with the control group studying more than the experimental group ($F(1,57) = 4.06$, $p < .05$).

Although no significant differences were reported in the fall 1984 data for the number of days worked during week 6 vs. week 14, a significant group main effect emerged in the winter 1985 data, with the control group studying significantly more days than the experimental group ($F(1,57) = 6.94$, $p < .05$).

For the fall 1984 data, a significant group by time interaction effect was noted for the average hours studied during weeks 6 and 7 vs. the average hours studied during weeks 13 and 14 ($F(1,41) = 9.48$, $p < .05$). Each group increases from weeks 6 and 7 to weeks 13 and 14. As well, there was a significant difference at weeks 6 and 7 with the control group scoring higher than the experimental group. There were no significant differences between the groups at weeks 13 and 14. Although both groups improved from weeks 5 and 6 to weeks 13 and 14, the interaction suggests that the gains made by the experimental group (8.85 hours) exceed the gains made by the control group (4.00 hours). A significant time main effect was also noted with both groups working more during weeks 13 and 14 than during weeks 6 and 7 ($F(1,41) = 66.43$, $p < .01$). This can be explained by the interaction effect.

For the winter 1985 data, a significant time main effect was also noted on this variable ($F(1,57) = 39.51$, $p < .001$). In addition, a marginal group main effect emerged, with the control group studying more, on the average than the experimental group ($F(1,57) = 3.10$, $p = .08$).

Academic Grades

For the fall 1984 semester, no significant differences were noted between the sessional average that students obtained during the previous semester (winter 1984) as compared to the semester in which they were enrolled in the Psychology of Learning course (fall 1984). A follow-up study of their sessional averages during the following semester (winter 1985) again did not yield any significant differences.

For the winter 1985 semester, results were the same. Students did not show any significant improvements in their sessional averages during the winter 1985 semester, as compared to their previous semester's record (*i.e.* fall 1984).

DISCUSSION

The results of this research generally support the first hypothesis, that students enrolled in the Psychology of Learning course (experimental group) would show greater improvements on pre versus post-test measures of study habits, study attitudes, locus of control, and self-esteem, as compared to control group subjects. Significant pre to post-test gains were made by the experimental group during both the fall 1984 and winter 1985 semesters, on all of the Study Habits Checklist and the Survey of Study Habits and Attitudes variables. This is in keeping with much of the previously-cited research such as that of Beneke and Harris (1972) and Richards (1975), attesting to the success of self-control procedures in improving study behavior. Significant improvements were also noted by the winter 1985 experimental group on the overall locus of control scale (I-E, Total), and by the fall 1984 experimental group on the locus of control, academic subscale (I-E, Academic).

The experimental group did not show a significant pre to post-test improvement on the Coopersmith Inventory, the measure of self-esteem that was used in this study. This finding, however, is not particularly surprising. One would expect to see a behavioral characteristic such as study habits change as a result of an intervention like the Psychology of Learning course, since this course was specifically aimed at improving study behavior. But self-esteem is conceptualized as a trait variable which is much less likely to be modified as a result of a specific intervention. In fact, if self-esteem had changed significantly from pre to post-testing, one might begin to suspect a social desirability effect on the part of the experimental group subjects, since this factor had not specifically been targeted for improvement in the course. It is possible that further improvements in measures such as study habits, attitudes towards school, and academic grades might result in changes in self-esteem over time.

An unexpected finding in this research was evidence of redundancy that appears to exist among the test variables. All of the test variables were highly correlated. This is reflected in the multivariate analysis on the postscores which indicated that only two measures were necessary to discriminate between the groups. A suggestion for future application of this program might be to consider reducing the present battery of tests. Since the Study Habits Checklist successfully discriminated between the experimental and control groups for both the fall 1984 and winter 1985 semesters, it would seem that this test in particular should be retained. However, to adequately assess

whether in fact only a single factor such as study habits is operating, a large scale study focusing on the multiple outcome measures that were used in this research would be necessary.

The second hypothesis, that students in the experimental groups as compared to those in the control groups would show a significant improvement in their overall average for the semesters in which they took part in the research, compared to their previous semester's record, was not supported in either the fall 1984 or the winter 1985 semester. A follow-up study of the fall 1984 groups that examined their sessional averages over three semesters (*i.e.* winter 1984 vs. fall 1984 vs. winter 1985) again failed to indicate significant gains. This result is somewhat surprising in view of the fact that previously cited research such as that of Gadzella and Williamson (1984a) attests to the strong relationship that exists between good study habits and GPA. But other research such as Dutrow and Houston (1982) has not found a significant relationship between measures of study habits such as SSHA, and GPA scores. One wonders whether the significant pre to post-test improvements noted with the experimental groups reflect more of a knowledge on their part of which study skills they should be using, as opposed to which skills they are in fact implementing in all of their courses. It would appear that more emphasis should be placed in the Psychology of Learning course on the programmed generalization of study skills to all subject areas, in order to see significant improvements in GPA.

Perhaps a basic flaw in the research design was that there was no way of evaluating the voracity of the students' self-reports on their study behavior. Mercier and Ladouceur (1983), for example, included a dormitory spot check on students' study behavior as a way of verifying their self-reports. This validating of self-reports is a critical element, especially in research such as this with small numbers of subjects. By including this factor in future research, significant gains in GPA scores might become apparent.

Tentative support was offered for the third hypothesis, that significant improvements in study time would be made by the experimental as compared to the control group, from week 6 to week 14. For the fall 1984 semester, a significant group by time interaction suggests that whereas both groups improved from weeks 6 and 7 to weeks13 and 14, the gains made by the experimental group exceed the gains made by the control group. However, since the control group started off at a higher rate initially, their less impressive gains may simply reflect a ceiling effect on their part.

The fact that both groups over both semesters increased their study time significantly from week 6 to week 14 is not particularly surprising, since one would expect most students to study more as the end of the semester approaches.

The winter 1985 data indicates that the control group is studying more hours and on more days at week 14 than is the experimental group. Whereas one might expect this increase in study time to be reflected in significant improvements on the post-test scores, this was not the case. The experimental group studies less, and does better on the post-test results. Also, we must not forget that we are comparing the experimental group's concentrated study time to the control group's total study time. The validity of comparing these two different measures is somewhat questionable. Although the ideal situation might be to have both groups record both total and concentrated study times and then see whether any difference exists between these measures, surely the introduction of this variable into the control group would constitute a treatment of some sort and would contaminate the overall results. Future research should address this issue.

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