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Relation of Study Factors to Performance in Navy Technical Schools

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Foreword

This research and development effort was conducted under program element 0603720N (Education and Training), work unit R1772 (Education and Training Development), task ET003 (Skill Enhancement Program). It was sponsored by the Chief of Naval Operations (OP-01). The objective of this work unit is to identify Navy school requirements for enhanced student preparation and to develop methods for addressing these requirements.

This study was conducted to determine which study factors lead to success in Navy technical schools and to ascertain whether the effects of study factors vary from one school to another. Study factors refer to all clearly definable elements that may affect student learning and that may be influenced by training.

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¹Randel, J. M., Main, R. E., Seymour, G. E., & Morris, B.A. (1992). Relation of study factors to performance in Navy technical schools. *Military Psychology*, 4, 75-86.

Summary

Background

Administrators and instructors of Navy "A" schools (the first technical school attended by Navy personnel) frequently find their students are deficient in required basic skills, such as reading, mathematics, and study factors. Research was conducted to measure study factors and to evaluate their impact on Navy technical school performance.

Approach

A Study Factors Survey (SFS) was developed and administered to 1,762 students in seven Navy technical schools.¹ Scores on high-failure tests (those failed by 10 percent or more of the students) were collected for the beginning, middle, and end of each course. The schools listed by letter in the report are A--AE school, B--AV school, C--FC school, D--ET1 school, E--ET2 school, F--GM school, G--EW school.

Results

Partial correlations between mean test scores and study factor scales were calculated, controlling for ability as measured by the Armed Services Vocational Aptitude Battery (ASVAB). Of 304 possible correlations, 87 were significant. Four study factors--Concentration, Competition, Memorization, and Motivation--had the greatest number of significant correlations with achievement scores. Anxiety and Mastery Beliefs had the next largest number of significant correlations.

Recommendations

We recommend that further work in the study factors area be conducted with the aim of improving performance in Navy schools. Specifically we recommend that the Study Factors Survey be revised to improve the reliability of the individual scales. With this accomplished, schools will be better able to identify the prerequisite skills appropriate for their particular schools, which is more cost effective than training study skills in general. In the meanwhile, we recommend that training in the four study factors with the greatest number of significant correlations be conducted to determine if this improves performance in Navy schools. Concentration Management and Memory Aids training materials could be borrowed from the Job Oriented Basic Skills (JOBS) School (electronics strand) for use in other Navy schools.

¹Further information on the SFS can be found in the Seymour, Main, Randel, & Morris (1991) article listed in the reference or in Seymour, G. E., Main, R. E., Randel, J. M., & Morris, B. A. (1992). *Study Factors and their impact on military school performance measures* (NPRDC-TR-92-10). San Diego, CA: Navy Personnel Research and Development Center.

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Relation of Study Factors to Performance in Navy Technical Schools

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This study was conducted to determine which study factors lead to success in Navy technical schools and to ascertain whether the effects of study factors vary from one school to another. Study factors refer to all clearly definable elements that may affect student learning and that may be influenced by training. A Study Factors Survey (SFS) was developed and administered to 1,762 students in seven Navy technical schools. Scores on high-failure tests (those failed by 10% or more of the students) were collected for the beginning, middle, and end of each course. Partial correlations between mean test scores and study factor scales were calculated, controlling for ability as measured by the Armed Services Vocational Aptitude Battery (ASVAB). Of 304 possible correlations, 87 were significant. Four study factors—Concentration, Competition, Memorization, and Motivation—had the greatest number of significant correlations with achievement scores. Anxiety and Mastery Beliefs had the next largest number of significant correlations.

Administrators and instructors of Navy "A" schools (the first technical school attended by Navy personnel) frequently find their students are deficient in required basic skills, such as reading, mathematics, and study factors. We define *study factors* as all clearly definable elements that affect learning and can be influenced by training. Study factors could include skills, strategies, or affective components. What we refer to as study factors have been previously discussed under several names such as study skills, learning strategies, and learning to learn.

Although standardized tests have been used to place students into remedial reading and mathematics programs, the Navy has no assessment

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tool to determine which study factors are most effective in technical training courses and which will pay off in higher test performance. The purposes of this research were to identify the study factors related to successful performance in Navy technical schools and to ascertain if different factors affect performance in different schools. Because this study deals with Navy electrical technology and electronics A schools, where there is a single course in a school, the terms *course* and *school* are used interchangeably.

Review articles in the 1960s and 1970s reported that study factors courses are effective in helping students improve their academic performance (Brozo, Schmelzer, & Thurber, 1982). High-risk and disadvantaged college students have also shown some improvement in academic achievement when enrolled in special programs that included study skills courses (Kulik, Kulik, & Shwalb, 1983). Weinstein and Underwood (1985) reported increased grade point average (GPA) and reading comprehension and reduced anxiety after a 3-credit semester course on learning strategies. Similar results were found for GPAs by Pintrich, McKeachie, and Lin (1987). Students who completed a 5-hr self-paced Air Force package on four study skills improved their test scores and completion times in a computer-managed technical training course (Dobrovolny, McCombs, & Judd, 1980). Not all study factors training efforts have improved performance, however. A 4.5-hr training program for Army personnel was not successful (Weinstein, Rood, Roper, Underwood, & Wicker, 1980).

The success of study factors training depends on how appropriate the skills taught are for the school in which they are to be applied. Selection of appropriate study factors is particularly important for technical training environments, such as the Navy's, where training time is limited. Training in study factors would probably reduce the time available for teaching technical subject matter.

To identify the study factors appropriate for Navy technical training, we developed an instrument suitable for this population. We were interested in measuring some of the more traditional study factors such as note taking and test preparation, but we also wished to measure metacognitive skills such as elaboration and self-monitoring. *Metacognition* refers to learners' knowledge about and control over their cognitive processes (Wittrock, 1986). By using metacognitive processes, students strive to organize new material to be learned and to relate it to what they already know. Students also check for integration and understanding.

A search of the literature for an appropriate instrument for measuring the desired study factors uncovered no suitable test. Brozo et al. (1982) used the Minnesota Study Habits Bank to link specific study skills to academic performance at the college level. They found that successful and failing students can be differentiated by their use of some study skills. However,

this questionnaire measured mainly traditional types of study skills such as scheduling, note taking, concentration, and motivation.

Most of the study factors instruments we reviewed covered these and other traditional study skills such as time management, work habits, and student attitudes toward school and study (Evans & Tribble, 1987; Nadson, Michael, & Michael, 1988; O'Neil & Child, 1984). A few included some of the cognitive or metacognitive learning strategies (Weinstein, Zimmerman, & Palmer, 1988). The Study Skills Questionnaire measures the metacognitive level, but it is not comprehensive and is impractical in that it requires each item to "be explained by the study instructor . . . because of its specialized vocabulary" (Bartlett & Knoblock, 1988, p. 364).

Two instruments that combine more traditional study skills and metacognitive skills are (a) the Learning and Study Strategies Inventory (Weinstein & Palmer, 1987) and (b) the Motivated Strategies for Learning Questionnaire (Pintrich, 1987). Both address a college population with a schedule of classes and requirements unlike those of Navy technical schools, and several of the questions were inappropriate for our population. For example, these questionnaires assume a student is taking general education and a variety of other courses as is common in college, rather than one course as is common in a military technical training school. The questionnaires also assume greater flexibility in planning study time than is possible for military students. Consequently, we decided to develop a tool to assess the study factors appropriate for military enlistees.

We conducted a literature search to select the most appropriate study factors for a technical school population. The selection of the study factors and development of the SFS questionnaire are described in detail in Seymour, Main, Randel, and Morris (1991). This article describes the application of the SFS to determine the relationship between study factor practices and test performance at seven Navy A schools.

The relative effects of study factor usage at different schools and at different course segments are of interest. Study factors may vary in importance from one school to another due to variations in course difficulty and type of content. All schools in our study teach electronics and electrical technology. Although these subjects are highly technical, the level of difficulty (as indicated by attrition) can vary greatly among schools (Main, Seymour, & Morris, 1989). A prerequisite for tailoring study skill preparation to individual schools is to determine school requirement similarities. In all of these schools, content varies over the length of the course. Initial sections typically deal with theory and mathematics, middle sections with basic circuits, and end sections with advanced circuit applications. Because study factors may vary in their relevance to different types of content, it was appropriate to determine whether relationships between study skill usage and test scores also varied among course sections.

METHOD

Subjects

A total of 1,762 enlisted students in seven Navy technical schools completed the SFS. These schools train students for occupations in the fields of electronics and electrical technology. The majority of students are high school graduates who range from 18 to 21 years in age.

Materials

The SFS is a 16-factor, 98-item questionnaire with a four-choice Likert-type scale; scores on any item range from *almost never* (1) to *almost always* (4).

As a result of a reliability analysis, 12 of the 98 items were not used, leaving 86 items for this study. Each study factor has three to eight questions. For each study factor, a mean score was computed for each student by averaging the responses to the questions for that study factor. Reliability of the whole scale, as measured by coefficient alpha, is .92; reliability of the individual scales ranges from .59 to .90, all of which are significant. Alpha coefficients and the number of items in each scale are presented in Table 1.

TABLE 1
Study Factors Survey Scales: Number of Items and Coefficient Alphas

<i>Study Factor</i>	<i>Number of Items</i>	<i>Alpha</i>
Anxiety	5	.712
Competition	3	.626
Concentration	7	.669
Elaboration	6	.731
Graphic Study Aids	3	.680
Group Study	5	.903
Mastery Beliefs	7	.585
Memorization	5	.632
Motivation	8	.732
Organization	8	.728
Questioning	3	.727
Review	5	.650
Self-Monitoring	8	.668
Study Resource Management	5	.716
Test Anticipation	5	.645
Test Strategy	3	.625

The study factors are defined as follows:

Anxiety: Generalized fear associated with learning or testing situations.

Competition: A tendency to compare one's performance with that of classmates or the perception of one's performance as being evaluated in comparison to others.

Concentration: The ability to focus on learning, despite either internal or external distractions.

Elaboration: The tendency to relate new course information to what is already known or to other course information by use of representational strategies such as diagrams.

Graphic Study Aids: The use and understanding of charts, figures, and tables provided for study.

Group Study: The tendency to interact with other students to share ideas and information during study.

Mastery Beliefs: Attitudes relating academic achievement to personal effort.

Memorization: The ability to retain learned information and/or the use of memory techniques such as associations, repetition, or imaging.

Motivation: The level of drive or perceived incentive to complete training at this school or to learn assigned training content.

Organization: The ability or tendency to find or record key points in instructional presentations and relate them to each other.

Questioning: The process of seeking clarification in class from the instructor.

Review: The selective examination of previously read course material to enhance learning.

Self-Monitoring: The ability or tendency to check the accuracy of one's ideas or conclusions against related knowledge or criteria while gaining new information or processing data.

Study Resource Management: The tendency to allot adequate study time and to study in appropriate surroundings.

Test Anticipation: The tendency to try to anticipate test content.

Test Strategy: The use of techniques during a test to maximize the number of correct responses, such as skipping hard items or eliminating obviously incorrect answers from multiple-choice-type tests.

Procedure

The failure rates for all written tests given by the seven Navy technical schools over a 6-month period were obtained from a Navy data base.

High-failure tests—those failed by 10% or more of the students—were selected for each course. Restricting our analysis to high-failure tests reduced the possibility of ceiling effects and prevented a restricted range of scores to correlate with the questionnaire results.

Each course was divided into beginning, middle, and end segments, and the high-failure tests were designated as belonging to one of these segments. For each course segment, available high-failure test scores were converted into standard scores and averaged to provide a combined segment score. Although we had planned to use three test scores per segment in obtaining combined scores, this was not always possible. For some segments, only one or two high-failure tests were available. For others, all test scores were not available for some students due to missing data in the data base. Use of tests with missing scores could reduce the sample size because subjects who did not have test data for all tests would be eliminated. Therefore, some high-failure tests with missing scores were eliminated from the study. As a result, one to three high-failure tests were used for each segment of each course with one exception. For School G, test data were available for the first segment only, and combined scores for the first segment were based on four high-failure tests.

Schools were instructed to administer the SFS to three groups of 100 students each. Each group was at a different segment of the course, and students were administered the SFS before they took any of the high-failure tests for that segment. In practice, the number of students administered the SFS for a course varied from 245 to 333 in each of six schools, with 92 students in one school (School G).

RESULTS

In examining the effects of study factors on performance, there was concern that the effects of study factors might be confounded with student ability. Previous research reported a significant correlation between study habits and ability as measured by the Wonderlic intelligence test (Davou & McKelvie, 1984). Student ability, as measured by the ASVAB, is also known to be a good predictor of technical school performance. To control for the effect of ability, we obtained student scores on the ASVAB as a measure of ability. Because ASVAB scores were available for 1,533 of the 1,762 students in the sample, the total sample size was reduced. We calculated partial correlations between the mean score for each study factor on the SFS and the mean test score for each segment of each course, adjusting for the effect of ability as measured by the ASVAB. That is, the effect of ASVAB scores was partialled out. The results of the partial correlations between each study factor and performance (controlled for the

effect of ability) can be seen in Table 2 for the first segment of the course, Table 3 for the second segment of the course, and Table 4 for the third segment of the course. Schools A through F have data for three course segments, whereas School G has data for only the beginning segment.

A total of 87 significant correlations out of a possible 304 were obtained. The study factors showing the greatest number of significant correlations with achievement test scores were Concentration (13), followed by Competition and Memorization (10 each) and Motivation (9). Anxiety, Questioning, and Mastery Beliefs each had 6 significant correlations. The remaining study factors had 5 or fewer significant correlations.

The number of significant correlations per course segment was 41 for the beginning segment, 23 for the middle segment, and 18 for the end segment.

The number of significant correlations per school is shown in Table 5. School D has the largest number (14), followed by School C (11), School E (9), and Schools B and G (8 each).

DISCUSSION

Of the 16 study factors chosen for study, the 4 with the largest number of significant correlations with achievement were Concentration, Competi-

TABLE 2
Partial Correlations Between Study Factor Scales and School Performance for the First Segment of the Course

Study Factor	School						
	A	B	C	D	E	F	G
Anxiety	-.16*	-.31**	-.25**	-.10	-.28**	-.06	-.03
Competition	.09	.12*	.28**	.30**	.19*	.08	.27**
Concentration	.16*	.17**	.23*	.31**	.37**	-.05	.28**
Elaboration	-.05	.06	-.05	.17**	.11	.20*	.18*
Graphic Study							
Aids	-.07	.09	-.00	.15**	.04	.13	.18*
Group Study	-.13	-.09	-.11	-.13*	-.12	.01	.06
Mastery Beliefs	.07	.09	.05	.23**	.12	.31**	.10
Memorization	.08	.16**	.12	.27**	.23**	.28**	.43**
Motivation	.08	.08	.15	.31**	.17*	.22*	.28**
Organization	-.05	-.04	-.04	.19**	.08	.16	.21*
Questioning	-.03	.09	.08	.22**	.08	.17	.12
Review	-.02	.09	.02	.14*	.12	.15	.25**
Self-Monitoring	.06	.08	-.04	.21**	.17*	.11	.08
Study Resource							
Management	-.05	-.08	-.04	.11*	.04	.19*	-.07
Test Anticipation	.06	.06	-.10	.14*	.03	.16	.01
Test Strategy	-.07	-.17**	-.42**	.02	-.07	-.02	-.07

* $p < .05$. ** $p < .01$.

TABLE 3
Partial Correlations Between Study Factor Scales and School Performance for
the Second Segment of the Course

Study Factor	School						
	A	B	C	D	E	F	G ^a
Anxiety	-.10	-.19**	-.04	-.02	-.15	-.27*	-
Competition	.18*	.11	.28**	.20**	.21**	.21	-
Concentration	.13	.13*	.37**	.14*	.15	.17	-
Elaboration	.09	-.00	.09	.10	-.14	.22	-
Graphic Study							
Aids	.10	-.03	-.05	.13*	-.01	-.16	-
Group Study	-.10	-.03	.04	-.07	-.11	-.01	-
Mastery Beliefs	.16*	.12	-.04	.11*	-.00	-.01	-
Memorization	.10	.07	.25**	.24**	-.01	.19	-
Motivation	.18*	.04	.18*	.18**	.16*	.06	-
Organization	.07	-.10	.02	.11	-.15	.14	-
Questioning	.05	.08	.35**	.17**	.12	.17	-
Review	.10	-.00	.15	.10	-.00	.19	-
Self-Monitoring	.10	-.03	.12	.16**	.11	.21	-
Study Resource							
Management	.03	-.13*	-.01	.04	.02	.21	-
Test Anticipation	.09	.06	.12	.11	.10	.25*	-
Test Strategy	-.07	-.09	-.13	-.05	-.16*	-.13	-

^aTest scores were available only for beginning course segment.

* $p < .05$. ** $p < .01$.

tion, Memorization, and Motivation. These study factors should receive the greatest attention in any study factors training program for technical training schools, especially those schools related to electrical technology or electronics. Time permitting, Anxiety reduction and Mastery Beliefs should be given training consideration. However, because the results obtained from this study are based on correlations, we can only suggest changes to training; further experimental studies are needed to confirm the observed relationships.

The fact that the same factors showed up across schools suggests that all schools similar to those in this study might benefit from the same training. On the other hand, there were differences across schools. Time permitting, a school administrator should consider giving the SFS to his or her own students and using the results to determine the study factors most appropriate for training.

The greatest number of significant correlations between study factors and performance occurred in the early segments. Two notable exceptions to this general rule were Questioning and Test Anticipation. Each of these factors may be affected by experience with instructors. Students may be able to anticipate test questions effectively only after becoming familiar with the

TABLE 4
Partial Correlations Between Study Factor Scales and School Performance for
the Third Segment of the Course

Study Factor	School						
	A	B	C	D	E	F	G ^a
Anxiety	-.01	-.10	-.01	-.08	-.12	-.08	-
Competition	.18	.07	.37**	.08	.19	.14	-
Concentration	.21*	.15*	.29**	.22**	.12	.12	-
Elaboration	-.04	.13	.19*	.11	-.00	.03	-
Graphic Study							
Aids	.05	.03	.09	.08	-.15	.12	-
Group Study	-.02	.07	.02	-.07	.17	-.07	-
Mastery Beliefs	.11	.12	.24*	.07	.24*	-.09	-
Memorization	.08	.11	.37**	.19**	-.10	.21*	-
Motivation	.12	.07	.22*	.11	.02	.19	-
Organization	-.06	.03	.11	.06	-.04	.15	-
Questioning	.02	.20**	.33**	.21**	.12	.12	-
Review	-.03	.07	.21*	.08	-.01	.16	-
Self-Monitoring	.02	-.03	.07	.06	-.08	.04	-
Study Resource							
Management	.10	-.05	.07	.02	.02	.02	-
Test Anticipation	.10	.17*	.26**	.00	-.22*	.01	-
Test Strategy	.01	-.02	-.01	-.05	-.11	-.08	-

^aTest scores were available only for beginning course segment.

* $p < .05$. ** $p < .01$.

TABLE 5
Number of Significant Correlations and Study Factors Per School

	School						
	A	B	C	D	E	F	G
Number of significant correlations per school	6	11	18	25	11	8	8
Number of significant study factors per school	5	8	11	14	9	7	8

types of test questions that the instructor asks. Similarly, students may become more relaxed about asking questions as they become more familiar with the instructor. This possibility is supported by the fact that Anxiety becomes a nonsignificant factor late in the course.

There are several possible reasons for the general decline in significant factors in the later portions of courses. Affective factors such as Anxiety and Motivation might be expected to be more important at the start of a course. Toward the end of a course, Anxiety may be reduced by familiarity and success, and students with low Motivation may have attrited. Another

possibility is that differences in the way that students respond to the SFS are reduced by attrition during the course. Those students remaining in the course may be more homogeneous with respect to their attitudes and the study skills they employ. A third possibility is that the effectiveness of study factor usage varies with course content and that study skills have a greater impact on the early segments of electrical technology and electronics courses, which typically emphasize basic theory and mathematics skills. Relative contributions of course and student variables in affecting study factors must be determined by further research.

Anxiety and Test Strategy showed consistently negative correlations with test performance. For the Anxiety scale, a negative correlation with test performance was expected. However, a negative correlation for Test Strategy and performance is counterintuitive, and a revision of the Test Strategy scale is indicated. The Group Study factor showed only one correlation, which was negative, and also should be revised.

School D had significant correlations with achievement in all but two of the study factors. Schools C and D had the highest number of significant correlations and the highest number of significant study factors. These schools are electronics schools in Navy ratings that traditionally have had problems with attrition or setbacks. Administrators in these schools should consider providing training in some additional study factors beyond those showing up across most of the schools.

The more metacognitively oriented study factors—Self-Monitoring, Organization, Review, and Elaboration—had few significant correlations with test performance in very few schools. This might be explained by the fact that all written tests used in these Navy technical schools were multiple choice, which may not have required these skills. It has been shown that, for multiple-choice tests, networking (a technique for organizing learning materials) was not successful (Dansereau et al., 1979). Casteñeda (cited in Pintrich, Cross, Kozma, & McKeachie, 1986) found deeper processing strategies to be less effective than repetition or grouping concepts for dealing with well-structured, technical text. On the other hand, concentration management, which involved self-initiated relaxation and positive self-talk, had a positive effect for multiple-choice tests (Dansereau, 1985).

The next step in this program would be to design and administer study factors training for the most significant factors to determine if this improves test scores in a course.

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The opinions expressed in this article are those of the authors, are not official, and do not necessarily reflect the views of the Navy Department.

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Appendix
Study Factors Survey

NPRDC Study Factors Survey

Form B:900130

Privacy Act Statement:

The information requested in this Navy Survey will only be used in a research project about studying. It is subject to the provisions of Public Law 93-579, called the Privacy Act. Thus, failure to answer any particular question or questions in this Survey will have no impact on you. It may, however, affect the representativeness of the results.

Directions:

1. PRINT your full name, Social Security Number, school & class below:

Name: _____ SSN: _____
 First MI LAST

School: _____ Class number: _____

2. Answer all of the following questions and indicate how often you do the following behaviors. Put a check mark or an X in one of the columns after each question. Almost always your first impression will be accurate, so do not spend a lot of time answering any one question. There are no right or wrong answers in this Survey. Therefore answer each question as accurately as you can using the following scale.

Almost		Almost		
A = Always,	U = Usually,	S = Sometimes,	N = Never	
	A	U	S	N
1. I rewrite my course notes to organize them when necessary.....	—	—	—	—
2. I like being in this A school.....	—	—	—	—
3. Asking questions in class is a waste of time....	—	—	—	—
4. I try to do better than most of my classmates...	—	—	—	—
5. I can concentrate when I study.....	—	—	—	—
6. Memorization causes me problems in school.....	—	—	—	—
7. If I don't understand something, I do something about it.....	—	—	—	—
8. I try to study each day.....	—	—	—	—

(Continue to the next page)

Almost
A = Always, U = Usually, S = Sometimes,

Almost
N = Never

	A	U	S	N
9. I outline my course materials.....	—	—	—	—
10. Reading something once without review is enough.	—	—	—	—
11. I have trouble paying attention when reading my text books.....	—	—	—	—
12. How well I do in this course depends on how well I try.....	—	—	—	—
13. I look over a chapter before I read it.....	—	—	—	—
14. My ability to pass the tests in this course depends on other student's grades.....	—	—	—	—
15. If it's noisy, then I can't study.....	—	—	—	—
16. I feel anxious just before a test.....	—	—	—	—
17. I look to see how things I study are similar and different from each other.....	—	—	—	—
18. When I study I imagine how to use what I read..	—	—	—	—
19. I prefer to study alone.....	—	—	—	—
20. I have trouble reading charts and diagrams.....	—	—	—	—
21. I review my course materials for a test.....	—	—	—	—
22. I ask questions in class.....	—	—	—	—
23. I write possible test questions before the test	—	—	—	—
24. Do you get together with other students when you study?.....	—	—	—	—
25. Doing my best in school is very important.....	—	—	—	—
26. When I do poorly in a course it is because I have a poor instructor.....	—	—	—	—
27. I try to relate new information to what I already know.....	—	—	—	—
28. It's hard for me to ask questions in class.....	—	—	—	—

(Continue to the next page)

Almost
A = Always, U = Usually, S = Sometimes,

Almost
N = Never

	A	U	S	N
29. I am able to memorize important facts.....	—	—	—	—
30. I'm tired when studying because I study at the wrong times.....	—	—	—	—
31. I draw diagrams to help me understand what I am studying.....	—	—	—	—
32. I study at a regular time and place.....	—	—	—	—
33. Class work and homework come before party time..	—	—	—	—
34. I avoid asking questions in class.....	—	—	—	—
35. I put forth my best effort in school	—	—	—	—
36. I associate things that I want to remember.....	—	—	—	—
37. Studying with others is a waste of time.....	—	—	—	—
38. I have trouble reading or understanding tables.	—	—	—	—
39. My ability to pass the tests in this course depends on how hard I study.....	—	—	—	—
40. I try to see relationships between things I study	—	—	—	—
41. When I make an error I try to find out why.....	—	—	—	—
42. If a textbook has a self-test, I answer the questions.....	—	—	—	—
43. Studying with others helps me to learn.....	—	—	—	—
44. I study the tables in my course materials.....	—	—	—	—
45. When I do well in a course it is because I have a good instructor.....	—	—	—	—
46. How often do you read course material without really understanding what you are reading.....	—	—	—	—
47. I rewrite course information in my own words....	—	—	—	—
48. When answering multiple choice questions, I try to eliminate some answers first.....	—	—	—	—

(Continue to the next page)

Almost
A = Always, U = Usually, S = Sometimes, N = Never

	A	U	S	N
49. Are you concerned about competing with classmates	—	—	—	—
50. Taking a test makes me nervous.....	—	—	—	—
51. When working a math problem I have an idea about the size of the answer	—	—	—	—
52. I allow enough time to study for exams.....	—	—	—	—
53. I use a specific memory method for studying.....	—	—	—	—
54. When studying I reword things my own way.....	—	—	—	—
55. I try to complete all school assignments.....	—	—	—	—
56. I go over my notes or outlines until I know them	—	—	—	—
57. How hard I work in school does not seem to affect how well I learn.....	—	—	—	—
58. I try to figure out what will be on each test...	—	—	—	—
59. I repeat things over and over to remember them..	—	—	—	—
60. I check to see if what I am learning agrees with what I already know.....	—	—	—	—
61. Studying is more important than being with friends.....	—	—	—	—
62. How often can you tell if your studying is not being effective or useful.....	—	—	—	—
63. I can concentrate even when its noisy.....	—	—	—	—
64. To get high grades on a test in this course I have to do better than most of my classmates...	—	—	—	—
65. I would rather study in a small group than study alone.....	—	—	—	—
66. Studying charts and tables is a waste of time..	—	—	—	—
67. I study the key points of a textbook.....	—	—	—	—
68. Taking notes in class is important to me.....	—	—	—	—

(Continue to the next page)

Almost
A = Always, U = Usually, S = Sometimes, N = Never

A U S N

69. When I do well in a test it is because of an easy grading system.....	—	—	—	—
70. I try to compare what I am studying to other material in the course.....	—	—	—	—
71. I learn new information when I review a chapter	—	—	—	—
72. When an answer doesn't look right to me I recheck my work.....	—	—	—	—
73. I can picture in my mind what I want to remember	—	—	—	—
74. Before studying, I ask myself what I am supposed to learn.....	—	—	—	—
75. When taking a test I skip hard questions and work on them later.....	—	—	—	—
76. While studying my eyes wander around the room...	—	—	—	—
77. I can tell when I make an error while working a problem.....	—	—	—	—
78. When I take multiple choice tests there are honest methods I use to improve my score.....	—	—	—	—
79. I find it difficult to pay attention in class...	—	—	—	—
80. When taking a test my mind goes blank and I can't think.....	—	—	—	—
81. I tend to read test questions incorrectly.....	—	—	—	—
82. I have little idea of what is going to be asked on a test.....	—	—	—	—
83. I can tell when I've done something that is not logical.....	—	—	—	—
84. I get together with classmates to study.....	—	—	—	—
85. I memorize school work without understanding it.	—	—	—	—
86. I wish I were assigned to another school.....	—	—	—	—
87. I try to study where I won't be distracted.....	—	—	—	—

(Continue to the next page)

Almost
A = Always, U = Usually, S = Sometimes, Almost
N = Never

A U S N

- | | | | | |
|---|-----|-----|-----|-----|
| 88. I write a summary about what I have just studied. | ___ | ___ | ___ | ___ |
| 89. In general, it is a bad idea to guess at a test answer..... | ___ | ___ | ___ | ___ |
| 90. I study the charts and diagrams that appear in my course materials..... | ___ | ___ | ___ | ___ |
| 91. I tend to worry about my school performance..... | ___ | ___ | ___ | ___ |
| 92. When studying for a course I think about what may be on the test..... | ___ | ___ | ___ | ___ |
| 93. I become bored if I have to review course materials I have already covered..... | ___ | ___ | ___ | ___ |
| 94. I tend to put off studying until I don't have enough time..... | ___ | ___ | ___ | ___ |
| 95. I worry about failing courses I take..... | ___ | ___ | ___ | ___ |
| 96. On tests, I answer the easy questions first..... | ___ | ___ | ___ | ___ |
| 97. I try to pay special attention to what is emphasized by the instructor..... | ___ | ___ | ___ | ___ |
| 98. I look to see how things I study are similar and different..... | ___ | ___ | ___ | ___ |

Please go back and check to see if every question has been answered. Thank you for your cooperation in completing all of the questions in this Survey.

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