RELATIONSHIP OF LIBRARY SKILLS TO THE USE OF THE

LIBRARY BY FRESHMAN COMMUNITY COLLEGE STUDENTS

DISSERTATION

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Weldon Joe Horton, B.A., M.L.S.

Denton, Texas

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117 titles.

The purpose of this study was to investigate the rela-
tionship between selected basic library skills and the use of
the library by freshman community college students, and to de-
termine or evaluate the extent to which the use of the library
by such students is related to or influenced by the level of
their library skills. The population utilized in this study
was the total enrollment of freshman students beginning their
second semester of study at two typical Texas rural community
colleges, namely Cooke County College at Gainesville, Texas,
and Grayson County College at Sherman, Texas. Data regarding
library skills were obtained through the use of a standardized
test instrument, <u>A Library Orientation Test for College Fresh-</u>
<u>men</u>. Data regarding library use, relevant demographic traits,
and selected control variables (age, sex, hours worked, self-
perceived library skills, school attended, a measure of intell-
igence, marital status, and major course of study) were ob-
tained through the use of a specially prepared questionnaire
instrument.

Library skills were considered to have four component
parts: use of the card catalog, familiarity with terms and
abbreviations commonly used in the library, familiarity with

reference tools, and periodical index skills. Library use was considered to have three component parts: attendance in the library, use of circulation services, and use of reference services. An initial analysis was made considering library skills and library use as global values, composed of the above mentioned components, resulting in a Spearman correlation coefficient of 0.127, significant at the 0.20 level. Fixed point analysis procedures were conducted with the various component parts of both library skills and library use, and yielded a refined Spearman correlation of 0.774 when library use was considered as attendance and the use of circulation services, and when library skills were considered as card catalog skills, familiarity with terms and abbreviations, and periodical index skills.

Using the above refined measures, the possible effects of selected control variables were analyzed. It was determined that there were no significant extraneous, antecedent, or control variables among the variables used in this study. Self-perceived library skills were found to function in part as an intervening variable. The findings of the present study were substantially replicated using pilot study data as reported in Appendix B of the present study. The findings were also replicated, using a split-sample approach with separate groups of subjects from Cooke County College and Grayson County College.

Through the use of generalized scattergrams with both present study and pilot study data a possible simple linear relationship was found to obtain between library skills and library use in both instances. Bivariate Spearman correlations were then computed for all variables considered in the present study. Those variables showing a strength greater than 0.10 were "promoted" to Pearson correlation values and utilized as input for a multiple linear regression analysis. A conjectural model was constructed from the output of the multiple linear regression analysis which suggested that, if the direction of influence is ignored, the relative importance of the variables utilized in this procedure would be, from most important to least important, tested library skills, hours worked other than attending school, age, and self-perceived library skills.

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CHAPTER I

PURPOSE AND PROBLEM

Background and Significance

The purpose of this study is to investigate the
relationship between selected basic library use skills
and the use of libraries by freshman community college
students. The study is intended to determine or evaluate
the extent to which the use of libraries by such students
is related or influenced by the level of their library use
skills. It is hypothesized that library use skills are a
significant factor in relation to the extent of student
use of the library, and that this relationship is possibly
mediated at least in part by student self-perception of
their ability to use the library.

Interest in the subject of library use skills and
student use of libraries is necessarily closely linked to
interest in the instruction of students in library use,
the importance and need of which have long been recognized,
as attested, for example, in the 1883 annual report of the
president of Columbia University that decried the inabil-
ity of the average college student to make effective use
of the bibliographic resources of the library (28, p. 21).
The interest and activities in this area have continued to

increase to date and have become the focus of concern of a number of organizations in this country at the state, regional, and national levels. To be cited in this regard are the American library Association, which has formed a Use of the Library Committee, and the Association of College and Research Libraries, which has addressed the problems involved through its Bibliographic Task Force and through the Instruction and Use Committee of its Junior College Section. There is also a national clearning house for materials and ideas related to library use instruction, Project LOEX (Library Orientation Instruction Exchange), that publishes a newsletter, Loex News, lends instructional materials, and makes referrals, for some five hundred member libraries (35, p. 1). On a regional basis, there are task forces and similar groups concerned with library use instruction in the Southwest, Southeast, and New England. On the state level, there are groups concerned with library use instruction in California, New York, Wisconsin, Texas, and other states (35, p. 2).

Similar manifestations of the importance and need for effective instruction of students in library use are to be noted in other countries. In Great Britain instruction in library use has received attention in a number of studies by various researchers. In 1958, for example, Harvard-Williams (21) reported in the Library Association Record

on a survey of the kinds of instruction in library use
provided by thirty-five university and college libraries.
Carey (8) subsequently surveyed eight hundred British li-
braries in a study conducted between 1964 and 1966, and
reported that two-thirds of these libraries provided some
form of library use instruction. He also noted that a re-
view of the literature revealed that the problem of pro-
viding effective instruction in library use was of world
wide interest (8, p. 67). Another British study was
reported by Fox (16) in 1974, which paralleled and updated
the findings of the earlier surveys of Harvard-Williams
(21) in the 1950's and Carey (8) in the 1960's.

The development of instruction in library use in
Australia has been reviewed in a study by Scrivener (33),
and Canadian experience has been outlined by Gattinger
(17). Both of these authors reflect similar concerns with
the effectiveness and methodology of instruction as mani-
fested in studies conducted in the United States and Great
Britain.

A general survey by Daumas (14) of European experience
in instruction in library use may also be noted, together
with a report submitted by Power (29) to the International
Association of Technical University Libraries about world
wide instruction in library use. Both of these authors
indicate the increasing interest and concern over the

present state of instruction in library use, and they additionally call attention to basic questions which have arisen concerning the methodology of instruction and the role of instruction in library use in relation to the general education of college students.

The principal questions of the latter kind concerning the methodology and the role of library use instruction have arisen in this country and abroad chiefly from the lack of consistency in the findings of some of the studies that have sought to assess the effectiveness and value of various approaches to providing library instruction which have been explored and utilized to date. A number of surveys and studies over the years have indicated, though typically in only general or indirect ways, that library instruction is beneficial to the recipient (34). Some studies, as cited by Cassata (9) for example, show a positive correlation between a student's grade point average and library use. However, in a study of freshmen students at Tuskegee Institute, Riley (32) found no significant relation between the possession or lack of library skills and student academic performance. In an extensive study of 1,995 students at Wright Junior College in Chicago, Clark (10) also found that the type of library instruction method used, or which librarian gave the instruction, appeared to have little effect on the scores made by students

on a test of library skills. In another study of disadvantaged college freshmen, Brevik (6) found that the academic success of a control group of students who did not receive library instruction was greater than the academic success of a test group of students who did receive library instruction.

Despite the questions thus raised by some studies concerning the effectiveness and value of library instruction, there still appears to be a general consensus that library instruction is needed to develop library skills, that library skills are needed for effective library use, and that effective library use is a significant factor in the proper functioning of most, if not all, academic programs, and in the academic success of most, if not all, students.

The importance of library use is also to be noted as a principal factor with regard to the development and administration of library services, whatever the particular library setting. The latter importance is attested by the extent to which the kinds and levels of library use necessarily figure in the preparation of annual budget requests, the development of public user services, the planning of physical facilities, and the recruitment and training of library staffs. This importance is similarly reflected in the keeping of records and statistics concerning the attendance of library patrons, the circulation of library

materials, the provision of reference and instructional services, and other activities and operations directly or indirectly related to the use of the library and its resources. In summary, as stated by McDarmid, "The final criterion of the library's services is the extent to which these services are used (25, p. 119)."

Variables and Definitions

As previously noted, this study is concerned primarily with the relationship between selected basic library skills and the use of libraries by freshmen community college students. Attention is also given to the possible role in this relationship of student self-perceptions of their ability to use the library.

Different kinds of basic library skills have been identified by librarians and others who have been involved in studying the problems of library use and in providing instruction designed to develop or improve the skills of students in using libraries. A general agreement may be noted that three of the basic kinds of library skills are those concerned with the use of the card catalog, the use of periodical indexes, and the use of reference tools. Closely related to each of these is a fourth basic skill: the ability to use the terminology and abbreviations commonly encountered in library catalogs, indexes, and reference tools. Closely related to each of these is a fourth

basic skill: the ability to use the terminology and abbreviations commonly encountered in library catalogs, indexes, and reference tools. In 1939, for example, Meyering and Pierson (27) reported on their efforts to improve these same four kinds of skills in a course which they developed experimentally over a ten year period to provide instruction in library use for freshmen students at the Teachers College of Kansas in Kansas City, Missouri. Similarly, in a later general survey of library use studies reported since the 1940's, Givens (18) noted a general consensus that the effective use of the library required basis skills in the use of card catalogs, the use of periodical indexes, and the use of general reference sources. A further illustration of this consensus may be cited in a study of library instruction, reported in 1966 in the Library Journal (37), which compared a conventional lecture method of instruction and an innovative method of instruction for their relative effectiveness in developing library skills, which included the use of the card catalog, the use of periodical indexes, and the use of general reference sources.

In the present study, library skills are initially considered as a composite independent variable, which includes as consistituent dimensions the four basic kinds of abilities involved in using the card catalog, using

periodical indexes, using reference tools, and using terms and abbreviations commonly employed in libraries. These constituent dimensions, or kinds of skills, are operationally assessed by A Library Orientation Test for College Freshmen (15) which consists of nine parts. Three of these parts are concerned with evaluating the use of the card catalog, two are concerned with the recognition and definition of bibliographic terms, and four are concerned with evaluating the familiarity with and use of specific reference tools commonly found in most libraries (15; 7, p. 787). Of the latter four parts, one part covers the use of the Readers' Guide to Periodical Literature (31). Since this is one of the most frequently used sources of information by freshmen college students (7, p. 694), it is considered independently of other indexes of lesser importance. The remaining three parts of the test are concerned with other general reference tools. The scores from A Library Orientation Test for College Freshmen thus provide separate measures as well as an overall measure of these basic library skills, which may be viewed individually as single variables or collectively as a composite variable.

While A Library Orientation Test for College Freshmen can provide evaluations of student abilities in the four major areas outlined above, student self-perceptions of their abilities in these areas may, or may not, agree with

the tested evaluations. Since the present study considers the possibility that the self-perception of library skills as well as the actual levels of tested skills may be a significant factor influencing library use by students, a questionnaire instrument (See Appendix A) is used which includes items concerning student perceptions of their library use skills in the four major areas outlined above. A composite score based on items U, V, W, and X in this questionnaire thus provides an operational measure of the level of these self-perceived library use skills. These self-perceived library use skills parallel the four major areas of library use skills as tested by A Library Orientation Test for College Freshmen.

The dependent variable of interest in this study, the use of the library by freshmen community college students, is also viewed initially as a composite factor which is understood to include students of circulation services, reference services, and attendance in the library. In the present study, the extent of such use is assessed by questionnaire (see Appendix A) with an initial composite score being based on responses to items G, H, I, N, O, P, Q, R, and S.

Mendelhson, in his study of library use, notes that there is a lack of general agreement as to what constitutes use of the library (26, p. 2). Further, he notes that the

literature on this subject is fragmented, non-comparable, and not particularly sophisticated either in method or scope (26, pp. 2-3). In support of this view on the state of research in library use, he observes that nine of the twelve library experts whom he surveyed on this subject rated the state of general research on library use as "fair" to "poor", rather than "good" or "excellent" (26, p. 6).

McDarmid, in his study of library use, notes that any classification of the library's services and their use may be open to question (24, p. 120). The present study includes, in modified form, all of these categories of library use as identified by McDarmid. A pilot study was conducted which indicated that these categories could provide a satisfactory classification of library use. Due to the differing settings of McDarmid's study and this study, however, library attendance is also considered as a separate category or factor which is operationally defined by questionnaire items G, H, and I. The use of pamphlets, clippings and records is subsumed under the use of reserve materials, since these types of items are usually reserve items in the present research setting. Reserve item use is operationally defined by questionnaire item P. The use of reserve items is considered as a part of circulation services, as defined in the present study, which also

includes the use of the book collection as operationalized by questionnaire items N and O. The use of reference and information services is operationalized by questionnaire items Q, R, and S. Further evidence of the suitibility of the factors of library attendance, use of circulation services, and use of reference and information services is found in a study sponsored by the Association of Research Libraries (3). This study was based on an analysis of data relating to library use as separately collected and reported by nineteen academic libraries. All of these libraries included one or more of the three factors of library use mentioned above in their local survey instruments. The surveys reported by the University of California at San Diego and the University of Colorado contained all three factors.

Previous studies relating to library use and library skills have employed a variety of control variables in their analyses which could be relevant to the present study. In his study of the student use of the libraries of seven North-Central colleges, McDarmid (24) employed groupings of students according to academic major or course of study (science, liberal arts, etc.), sex and academic success. In a later study of public library use, Berelson (5) additionally considered marital status as a control variable. A further study of library use at the University

Washington at Seattle included both age and sex as control variables (5), and major field of study was used as a control variable by most of the nineteen cooperating libraries in the surveys of library use reported by the Association of Research Libraries in 1976 (3). Mendelhson used both sex and academic success as control variables in his study of library use by 1,549 subjects who were selected to approximate the adult civilian population living in households in the United States (26, p. 5). For the purposes of the present investigation, preliminary analyses were conducted which indicated the feasibility of utilizing such control variables as reported by earlier studies, as noted above. The same preliminary analyses also indicated that a further control variable, hours worked in addition to attending school, might be potentially revelant to the study of library use. Accordingly, it is also considered in the present study.

Problem and Hypotheses

The main problem or question addressed by the present study concerns the general relationship between library use and library skills. The initial guiding hypothesis is that differing levels of library use are influenced by differing levels of library skills. It is recognized, however, that a hypothesized relationship expressed in such general or theoretical terms, even if confirmed by

empirical data, whould have less meaning and significance than more specific refinements of such a relationship reflecting particular operational indicators of these theoretical constructs and particular conditions under which the relationship may be manifested in varying strength. The effort is made, accordingly, in the present study to consider the question of the relationship between levels of library use and levels of library skills, viewed as global variables, primarily as a point of departure and theoretical frame of reference. This approach calls for a series of subordinate or derivitive hypotheses to be identified and tested according to the particular operational indicators identified and selected for the independent and dependent variables through fixed point analysis procedures, and according to the particular control variables suggested for use in analysis.

The main concern of the present study is accordingly, not with the single larger question of whether, or to what extent library use is related to library skills, but with the more particular questions concerning how and under what conditions library use is related to library skills, using selected operational measures and selected control factors. Stated somewhat differently, the present study is concerned more with identifying what kinds of library use are related to what kinds of library skills, and under what conditions.

As previously discussed, kinds of library use are broadly defined to include library attendance, use of circulation services, and use of reference services. Similarly, kinds of library skills are defined to include skill in using the card catalog, skill in recognizing library related terms and abbreviations, skill in using basic reference tools, and skill in using periodical indexes. Control factors, as identified through previous investigations and preliminary analyses are defined to include the following characteristics of library users: age, sex, marital status, major course of study, and hours worked at a non-academic job. Student self-perception of library skills and the school attended by students are also considered as analytical control variables.

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CHAPTER II

METHODS AND PROCEDURES

Population and Sample

While the potential population of interest is implic-
itly inclusive of freshmen community college students in
general, the particular population actually utilized in
this study was limited for practical reasons to the total
enrollment of freshman students beginning their second se-
mester of study at two typical Texas rural community col-
leges, namely Cooke County College at Gainesville, Texas,
and Grayson County College at Sherman, Texas. Freshman
students at these two colleges are defined in the present
study to be those regularly enrolled students who have
earned less than thirty semester hours of total college
credit. Both Cooke County College and Grayson County Col-
lege are rural community junior colleges as defined by the
American Association of Junior Colleges, in that they are
located in and serve geographic areas with populations of
100,000 and under (2, p. 3).

Cooke County has the same geographic boundaries as
the Cooke County College District. Cooke County has a
total population of 25,106, and is located in North-Central
Texas, adjoining Oklahoma. The average annual income of

Cooke County is 130,720,000 dollars, of which 23.5 million is derived from agricultural sources. The county seat of Cooke County is Gainesville, with a population of 13,583. The only other town of appreciable size in Cooke County is Muenster, with a population of 1,376. Cooke County was created in 1848 from Fannin County, and is named for Captain W. G. Cooke, who served in the Texas Revolution (17, p. 276).

Cooke County College is the oldest continuously operating two-year institution of post-secondary education in the State of Texas. Cooke County College was first established as Gainesville College, in 1924, as a part of the Gainesville Independent School District. In 1960, the college district was expanded to include all of Cooke County, and the name was changed to Cooke County Junior College. In 1974 the name was further changed to Cooke County College, in order to reflect the college's expanding role as a true community college (6, p. 20). Total enrollment of the freshman class during the Fall of 1978 was 519. The college is authorized to offer the Associate of Arts, Associate of Science, and Associate of Applied Science degrees. Regional accreditation is by the Southern Association of Colleges and Schools (12, p. 383).

Grayson County has the same geographical boundaries as the Grayson County College District. Grayson County

has a total population of 78,831, and is located in North-Central Texas, adjoining Oklahoma. The average annual income of the county is 416,926,000 dollars, of which twenty-one million is derived from agricultural sources. The county seat of Grayson County is Sherman, population 26,049. Denison, located near Sherman, is the next largest city in Grayson County, with a population of 22,413. Grayson County was created in 1846 from Fannin County, and was named for an Attorney General of the Republic of Texas, Peter W. Grayson (17, pp. 299-300).

The Grayson County College District was organized in 1963, under the direction of the Grayson County Development Council. The first class of students was admitted in September of 1965 (10, p. 31). Total enrollment of the freshman class during the Fall of 1978 was 2599, and the college is authorized to offer various associate degrees. Regional accreditation is by the Southern Association of Colleges and Schools (5, p. 689).

The sample for the present study was obtained by a random selection of required English course sections having as a prerequisite the completion of the first semester of freshman English at both Cooke County College and Grayson County College. Only day classes open to regular freshman students were utilized. Special classes and night classes were not included. Item B on the questionnaire was used to

screen out any sophomore students who might have enrolled in a freshman course for some special reason. Item D on the questionnaire was similarly used to screen out any foreign students who might have enrolled in these regular English courses.

At Grayson County College, the course ENG 132, Composition and Literature, was identified as meeting the above criteria for utilization in the present study (10, p. 142). During the Spring semester of 1979 fifteen sections of this course were offered at Grayson County College (11). Two of these sections were randomly selected for this study.

At Cooke County College, two series of English courses are offered which group students according to their scores on the American College Test: English Section (1). If a first semester freshman's score on this test is below fourteen, he or she is required to take EN 1003, Basic English. However, if a first semester freshman's test score is fourteen or above, he or she is required to take eigher EN 1043, Grammar and Composition, or EN 1143, Writing Concepts (6, p. 29). In the Spring semester the one course available for second semester freshmen who had successfully completed Basic English was EN 1043, Grammar and Composition (7). Four sections of this course were offered, and two of these sections were randomly selected for use in this study. Students in these sections were screened to exclude

first semester freshmen entering school at mid-year. In
the Spring semester of 1979 the one course available for
second semester freshmen who had successfully completed
EN 1043, Grammar and Composition or EN 1143, Writing Con-
cepts, was EN 1053, Literature and Composition (7). Two
of the four sections of this course that were offered were
randomly selected for inclusion in the present study.

Since a large majority of students at both Cooke
County College and Grayson County College pursue courses
that require the completion of at least two courses of Eng-
lish, only a relatively small number of students pursuing
specialized technical programs, or taking individual
courses for self-improvement, were excluded from this study.
It may also be noted that when the course sections from
Cooke County College are subsequently considered in combi-
nation with the course sections selected from Grayson
County College, they are assigned a weighting factor in-
versely proportional to the probability of their selection
for this study (16, pp. 102-104). It is recognized that
the sample selected for the present study necessarily
limits any formal generalizations to the population of the
freshman students at the community colleges involved. As
in other such investigations, however, it is believed that
findings of the present study might also be of wider inter-
est to the extent that the two community colleges involved

may be viewed as resembling other such institutions with regard to their organization, program, student body, and environmental settings.

Instruments

The data for this study were collected through the use of a specially prepared questionnaire and a standard library skills test, A Library Orientation Test for College Freshmen, by Ethel M. Feagley, and others (8).

In a surveyof over one hundred colleges made in 1965 by Phipps (13), A Library Orientation Test for College Freshmen did not continue to be the most popular test of library skills (4, p. 221). This test of library skills was developed over a period of five years, and is presently in its third edition. It was first published in 1955, and has remained unchanged in content to date (7, p. 5).

The norm group for A Library Orientation Test for College Freshmen totals over four thousand college students, drawn from fourteen colleges in the United States. These colleges were distributed as follows: Eastern, six; North Central, four; Far West, three; and South, one (9, p. 6). A mean score of 48.9 and a standard deviation of 11.3 are reported for the total of the eighty items that comprise the test (9, p. 3). The percentile scores and a standard scores provided in the manual for this test have been not normalized, but it is noted that the median, mean and mode

of the normative frequency distribution are not significantly different, and that this tends to indicate normality. A Library Orientation Test for College Freshmen was evaluated through the use of Kuder-Richardson formula twenty-one which yielded a reliability coefficient of 0.86 based on the total normative population (7, p. 6). The authors note evidence for the rational validity of this test; however, a formal statistical validation is not available (9, p. 7). This test has been extensively analyzed item by item by Perkins (14), based on an administration to 2,466 college seniors representing thirty-eight colleges and universities across the country. Perkins notes that no geographical weaknesses were found and that a wide range of scores was evidenced, being sixty-three points on raw scores and forty-five points on percentile scores (14, pp. 192-193).

For the questionnaire instrument used in this study, the parameters of reliability were established for the dependent variable, library use, (items G, H, I, N, O, P, Q, R, and S) by Kuder-Richardson Formula number twenty-one (16, p. 135), in the following manner. The data obtained for the dependent variable as described above were "demoted" to dichotomous values by taking each individual questionnaire item and considering that each response having a lower value than the mean of all responses for that

individual questionnaire item to be an incorrect answer. Responses having a value equal to, or greater than the mean, were considered to be correct answers. A reliability coefficient of 0.89 was obtained.

Further validation of the dependent variable, use of the library and validation of the control variable, self-perceived library skills, was obtained by use of the Wilcoxon matched-pairs signed-ranks test. A random sample of freshman students at both Cooke County College and Grayson County College were administered the questionnaire instrument. This sample consisted of seventy-four subjects at Cooke County College and fifty-two subjects at Grayson County College, for a total of one hundred twenty-six subjects, the same number of subjects surveyed in the final study. The questionnaire scores for the dependent variable, library use, and the control variable, self-perceived library skills, as obtained from this random sample were compared (using the Wilcoxon matched-pairs signed-ranks test) with the corresponding scores obtained from those respondents in the final study who completed both the questionnaire and A Library Orientation Test for College Freshmen. The test was made in the usual form of the null hypothesis that there is no significant difference between the two samples tested, however, in this case it is desired that the null hypothesis not be rejected. Since the null

hypothesis was not rejected in this case, it was concluded that there was no significance difference between the final study sample used and the random validation sample from the same student population, with regard to library use and self-perceived library skills.

A subset of the respondents who took both the questionnaire _A Library Orientation Test for College Freshmen_ was also interviewed using the questionnaire instrument only, which includes the items that indicate the composite scores for the library use value and the self-perceived library skills value. This subset was selected at random from all respondents, and consisted of thirty-four individuals. The responses from this subset, which were taken orally several days after the administration of the original questionnaire, were then compared with the original responses of these same individuals, through the use of the Wilcoxon matched-pairs signed-ranks test. A two-tailed test was used to test the null hypothesis that there is no difference between the scores of the two test administrations of the same instrument. The rentention of the null hypothesis in this instance indicated that there was no significant difference between the two administration of the test, providing further support for the validity of the questionnaire instrument.

The scores from the initial, written administration of the questionnaire instrument of the thirty-four individuals included in the subset mentioned above were compared with the scores from a second, oral administration of the questionnaire instrument to these same individuals in a test-retest reliability evaluation of the questionnaire instrument. No more than one week elapsed between the first and the second administration of the questionnaire instrument to any one individual. A Spearman correlation coefficient of 0.931 was obtained, indicating further support for the validity of the questionnaire instrument.

Data Collection and Processing

Data for the present study were collected at Cooke County College and Grayson County College during the first part of the Spring Semester of 1979, from January Fifteen to January Thirty. Data were obtained by administering the specially prepared questionnaire instrument and A Library Orientation Test for College Freshmen during a regularly scheduled class period by the present investigator. The instructor for each class participated in the data collection only to the extent of introducing the present investigator, taking class roll, and making the necessary class assignments.

The present investigator informed the test subjects that the scores on this test were not to count in the computation of the final class grade, and then distributed the specially prepared questionnaire instrument and A Library Orientation Test for College Freshmen. During the fifty minute class period allowed for the completion of both the questionnaire and the test, the present investigator remained in the room with the respondents, and answered the few questions which arose, regarding procedures, etc. All questionnaires and tests were completed and returned in the allotted class period. No questionnaires or tests were returned incomplete, due to a lack of adequate time.

The test data were reviewed for obvious discrepancies and screened to eliminate test subjects not within the parameters of the test sample as previously defined. The raw data were evaluated and coded in machine readable format on standard Hollerith cards. Unit record equipment at Cooke County College was then utilized to duplicate and sort the various data groupings in preparation for fixed point analysis procedures. Fixed point analysis procedures (see Appendix C) were performed at Cooke County College, utilizing a Honeywell 2000 type computer. The resulting selected groupings from the fixed point analysis procedures were entered on coding forms specially prepared for this procedure, and then taken to the Computing Center at North Texas

State University, where the data were processed on the Hewlett-Packard time sharing computer system through the utilization of the SPSSHP statistics program. Spearman correlations as reported in the present study were obtained utilizing the SPEARMAN CORR routine of the SPSSHP statistical package.

The data for the pilot study were collected during the last part of the Fall semester of 1978 at Cooke County College and Grayson County College, fron November twenty-seventh to December first. Data were obtained in this case also by administering a questionnaire and A Library Orientation Test for College Freshmen. The questionnaire used in the pilot study was essentially the same as that used in the present study, except for the inclusion in the latter of one new item, the use of reference services. The circumstances and conditions of data collection for the pilot study were essentially the same as for the present study, as reported above.

The processing of the data collected for the pilot study began with the entry of the raw data on specially prepared coding forms. Fixed point analysis procedures were not performed with the data from the pilot study; however, the identical items on the questionnaire which were utilized in the present study as the best indicators of library skills and as the best indicators of library

use, were also subsequently utilized in computing Spearman correlation coefficients for the pilot study. The data for the pilot study were also processed on the Hewlett-Packard time sharing system at North Texas State University in the same manner as the data for the present study were processed.

Each item of the questionnaire and the standardized library skills test as defined above was handled separately during the processing of the data. As the data were processed, these items were combined in an additive manner. The use of addition on data of this type produced built-in weighting factors according to the numerical range of each individual item. That is to say, an item having a possible range of from one to fifty would have a potential built in weighting factor of approximately twice that of an item with a possible range of from one to twenty-five. Since data were not available to assign evaluated weighting factors to the questionnaire and test items, this built-in manner of weighting was permitted to act without intervention. Also, the assumption in the present study that a linear relationship exists between library skills and library use tends to make the inherent linear assumptions in the combining of data by additive means appropriate. It should be noted that data handled in this manner provide an index, rather than a scale. An index is understood to be

constructed through the simple cumulation of scores assigned to specific responses to individual items. Therefore, any interpretation as to intensity structure in the data presented in the present study does not appear to be warranted (3, p. 254).

In retrospect, it might be observed that the handling of the raw data, particularly the evaluation of the results of A Library Orientation Test for College Freshmen might have been greatly expedited through the use of machine readable answer sheets. Optical character recognition answer sheets would allow for rapid evaluation of test results, which might then be entered on coding forms for entry into the computer system utilized. Alternatively, specially prepared Hollerith cards might have been utilized for direct input into the computer system, where subsequent evaluation and establishment of the data base might take place, according to a pre-programmed procedure.

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CHAPTER III

ANALYSIS AND FINDINGS

This chapter reports the analysis of data and the
basic findings of the present study. In all analyses which
follow, Spearman correlation coefficients are used with a
two-tailed significance test. Unless otherwise noted, all
levels of significance are at the 0.01 level or less. Per
cent figures and number of cases are given in order to
clarify the basis for determining correlation coefficients
and to provide data relevant to possible subsequent repli-
cations of the present study.

Refinement of the Dependent and Independent Variables

The dependent variable, library use, was initially
considered to be a composite variable, consisting of three
component parts. The first of these parts is defined as
attendance in the library, or the use of library materials
in the library, and is operationalized by questionnaire
items G, H, and I. The second component of library use is
considered to be circulation services, including reserve
and audiovisual items as well as books, and it is opera-
tionalized by questionnaire items N, O, and P. The final
component part of library use is considered to be the use

of reference services, which include reference materials and personnel, and is operationalized by questionnaire items Q, R, and S.

The independent variable, library skills, was also initially considered to be a composite variable, consisting of four parts. These four parts are operationalized by sections of A Library Orientation Test for College Freshmen as follows. The first part of the composite independent variable, library use, is considered to be the use of the card catalog, and is operationalized by sections II, III, and IV of A Library Orientation Test for College Freshmen. The second part of the independent variable is considered to be familiarity with terms and abbreviations commonly used in libraries, and is operationalized by sections I and IX of the test. The third part of the composite independent variable is considered to be familiarity with reference tools, and it is operationalized by sections V, VI, and VII of the test. The final part of the independent variable is considered to be the ability to use periodical indexes, specifically the Readers' Guide to Periodical Literature, and is operationalized by section VIII of the test.

The Spearman correlation coefficients for all cases of the composite variables library skills and library use are shown in Table I.

TABLE I

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS
AS COMPOSITE INDICATORS

Coefficient	0.1272
Per Cent	100.0
Cases	126
Significance	0.20

In view of the low correlation thus obtained between
library use and library skills as shown in Table I, a re-
finement of the variables, library skills and library use,
was deemed to be in order. Consequently, fixed point anal-
ysis (see Appendix C) was undertaken in the following
manner. Library use was designated as Y, with the compon-
ent parts as being designated y_1 for library attendance, y_2
for circulation services, and y_3 for reference services;
that is, $Y = y_1, y_2, y_3$. The independent variable, library
skills, was designated X, representing all four component
parts in combination. The composite value of library
skills was then first fixed as X, and library use was al-
lowed to vary against it in order to determine the compon-
ent part, or combination of component parts, of Y which
would yield the largest correlation with X. Stated in
another way, using X as a composite indicator of library
skills (reflecting x_1, x_2, x_3, and x_4) correlations were
then computed for each of the following cases: $y_1 = f(X)$,

$y_2 = f(X)$, $y_3 = f(X)$, y_1, $y_2 = f(X)$, y_1, $y_3 = f(X)$,

y_2, $y_3 = f(X)$, y_1, y_2, $y_3 = f(X)$. The results are shown in Table II.

TABLE II

CORRELATION OF LIBRARY USE (Y) CONSIDERED AS A
FUNCTION OF LIBRARY SKILLS (X)*

Library Use Indicators	Correlation	Significance
y_1	0.4908	0.01
y_2	.1711	.05
y_3	.1392	.20
y_1, y_2	.4432	.01
y_1, y_3	.3741	.01
y_2, y_3	.1109	.20
y_1, y_2, y_3	0.1272	0.20

*X is a composite measure reflecting x_1, x_2, x_3, x_4

Examination of the correlation coefficients presented in Table II reveals that the highest correlation (0.4908) is $y_1 = f(X)$. The best indicator of library skills, when library skills is considered as a composite value of four

indicators, is thus identified as the component of library use designated y_1, or library attendance.

With library use thus fixed as y_1, the variable library skills is next allowed to vary against it. Library skills is designated X, with the component parts being designated x_1 for card catalog skills, x_2 for terms and abbreviations familiarity, x_3 for reference tool skills, and x_4 for periodical indexes skills. That is to say, $X = x_1, x_2, x_3, x_4$. Stated in other terms, since the theoretical hypothesis in question predicates a functional relationship between library use and library skills in the manner of $y_1 = f(X)$, it also follows that we may evaluate $y_1 = f(x_1)$, $y_1 = f(x_2)$, $y_1 = f(x_3)$, $y_1 = f(x_4)$, or any possible combination of x_1, x_2, x_3, and x_4. Table III shows the results of the Spearman correlations computed accordingly, with all possible combinations of x_1, x_2, x_3, and x_4 while fixing the value of y_1 as the value of library use.

Table III indicates that in this case the highest correlation between library use and library skills (0.7472) is obtained when $y_1 = f(x_1, x_4)$. That is to say, in this case the best combination of indicators of library skills in relation to library are identified as x_1, card catalog skills, and x_4, periodical index skills. Thus, the first level of refinement yields an indicator of x_1, x_4 as the

best indicator of library skills, and an indicator of y_1 as the best indicator of library use.

TABLE III

CORRELATION OF LIBRARY USE (Y) CONSIDERED AS
A FUNCTION OF LIBRARY SKILLS (X)*

Library Skill Indicator	Correlation
x_1	0.6941
x_2	.3736
x_3	.3324
x_4	.6605
x_1, x_2	.4902
x_1, x_3	.4271
x_1, x_4	.7472
x_2, x_3	.3473
x_2, x_4	.5162
x_3, x_4	.5634
x_1, x_2, x_3	.5207
x_1, x_2, x_4	.7101
x_1, x_3, x_4	.6998
x_2, x_3, x_4	.6423
x_1, x_2, x_3, x_4	0.4908

*Y = y_1

Moving to a higher level of refinement, the value of library skills which was determined as the best indicator of library skills in the first level of analysis, x_1, x_4, is now fixed as the value of library skills for the second round of analysis. Library use is again designated as Y, with the component parts being designated y_1 for library attendance, y_2 for circulation services, and y_3 for reference services. The various component parts of library use are not permitted to vary against the fixed value of library skills, x_1, x_4 in order to determine the combination of component parts which will yield the largest correlation value on this level of analysis. Table IV shows the results of the Spearman correlations computed in this manner with all possible combinations of y_1, y_2, and y_3 while fixing the value of library skills as x_1, x_4.

Examination of the correlation coefficients presented in Table IV reveals that the highest correlation (0.7584) is y_1, $y_2 = f(x_1, x_4)$. The best indicators of library skills, when library skills is considered or indexed as a value of x_1, x_4, are thus identified as the components of library use designated y_1, library attendance, and y_2, use of circulation services.

TABLE IV

CORRELATION OF LIBRARY USE (Y) CONSIDERED
AS A FUNCTION OF LIBRARY SKILLS (X)*

Library Use Indicators	Correlation
y_1	0.7472
y_2	.6821
y_3	.5137
y_1, y_2	.7584
y_1, y_3	.7302
y_2, y_3	.5096
y_1, y_2, y_3	0.6521

*$X = x_1$, x_4

Library use is not fixed as y_1, y_2 and the variable skills is allowed to vary against it. Library skills is designated X, with the component parts being designated x_1 for card catalog skills, x_2 for familiarity with terms and abbreviations, x_3 for reference tool familiarity, and x_4 for periodical indexes skills. Therefore, $X = x_1$, x_2, x_3, x_4. Stated in other terms, since the theoretical hypothesis in question predicates a functional relationship between library use and library skills in the manner of y_1, $y_2 = f(X)$, it follows that we may evaluate

y_1, y_2 = $f(x_1)$, y_1, y_2 = $f(x_2)$, y_1, y_2 = $f(x_3)$,

y_1, y_2 = $f(x_4)$, or any possible combination of x_1, x_2, x_3,

and x_4 while fixing the value of library use as y_1, y_2, as

shown in Table V.

TABLE V

CORRELATION OF LIBRARY USE (Y) CONSIDERED AS
A FUNCTION OF LIBRARY SKILLS (X)*

Library Skill Indicators	Correlation
x_1	0.7360
x_2	.5313
x_3	.5443
x_4	.7442
x_1, x_2	.7501
x_1, x_3	.6253
x_1, x_4	.7584
x_2, x_3	.5204
x_2, x_4	.7621
x_3, x_4	.4633
x_1, x_2, x_3	.7617
x_1, x_2, x_4	.7742
x_1, x_3, x_4	.7686
x_2, x_3, x_4	.7677
x_1, x_2, x_3, x_4	0.7603

*Y = y_1, y_2

It may be observed from Table V that the highest correlation coefficient is obtained when the value of library use is fixed as x_1, x_2, x_4, and that this coefficient is 0.7742. Accordingly, for the purposes of the present study, the best indicator of library use was identified as y_1, y_2, library attendance and use of circulation services, and the best indicator of library skills was thus identified as x_1, x_2, x_4, card catalog skills, familiarity with terms and abbreviations, and periodical index skills. It was judged that no further refinement of the indicators of library skills and library use was required for the purposes of the present study.

Analysis of the Effects of Selected Control Variables

In the following calculations all of the percentages are computed on the basis of a total of one hundred twenty-six respondents, with the exception of the American College Test score group. The data for the American College Test score group was available for the Cooke County College sample only, and, consequently, the percentages for this group are computed on the basis of seventy-four cases. A total of two sections of the fifteen sections offered of the English class used as the vehicle for this study at Grayson County College were selected at random for the administration of the questionnaire and the test instrument.

This is a total of 13.3 per cent of the available sections.
A total of four sections of the eight sections offered of
the English class used as the vehicle for this study at
Cooke County College were selected at random for the admin-
istration of the questionnaire and the test instrument.
This is a total of fifty per cent of the available sec-
tions. For the following statistical procedures all of the
sections were weighted in inverse proportion to their prob-
ability of selection and combined to yield a 26.1 per cent
total sample of all available class sections. Seventy-four
cases are from Cooke County College and fifty-two are from
Grayson County College.

Extraneous Variables

The relationship between library use and library
skills is viewed in this study as being basically asymme-
trical. That is to say, it is assumed that there must be
some level of library skills, however low, before use may
be made of the library. It is similarly assumed that the
dominant direction of primary influence is from library
skills, considered as the independent variable, to library
use, considered as the dependent variable. Accordingly,
having identified and refined the indicators for the inde-
pendent and dependent variables as described in the preced-
ing section (using fixed point analysis) and having found

a Spearman correlation coefficient of 0.7742 between these variables (using the indicators noted), the next step in the present study is the examination of this relationship to determine if this might indeed be a true relationship, or if this relationship might be attributable to an extraneous variable. Through a review of the literature and preliminary analyses as previously discussed, potential extraneous variables were identified as: school attended, age, sex, intelligence as measured by the American College Test: English Section for the Cooke County College sample, marital status, major course of study, and hours worked at a job other than attending school.

The results of controlling for the potential extraneous variable school attended are shown in Table VI.

TABLE VI

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR SCHOOL ATTENDED

	School Attended	
	Cooke County College	Grayson County College
Correlation	0.7737	0.7698
Per Cent	58.7	41.3
Cases	74	52

The relationship between library skills and library use without controlling for the extraneous variables yielded a Spearman correlation coefficient of 0.7742. The Spearman correlation coefficients evidenced when controlling for school attended are thus virtually the same as the original relationship. This result indicsted that the factor of school attended was not an extraneous variable affecting the original relationship.

The variable of age is next considered as a potential extraneous variable. The results of the computation of the Spearman correlation coefficients while controlling for age are shown in Table VII.

TABLE VII

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR AGE

	AGE	
	20 and below	21 and above
Correlation	0.7662	0.7685
Per Cent	77,8	22.2
Cases	98	28

The variable of age was controlled for by separating the respondents into two groups. One group was twenty

years of age or below, and one group was twenty-one years of age or above. The dividing line for the age grouping was decided on by consulting with the counseling staff at Cooke County College. The main consideration was that the students in the lower age group had not had the opportunity to be out of an academic environment for more than one year and that those graduating from secondary school late be included in the lower age group. The results of controlling for the variable of age in this manner serves to strengthen confidence in the original non-controlled relationship between library skills and library use, since the Spearman correlation coefficients when age is controlled are virtually the same as the Spearman correlation coefficient in the original non-controlled relationship.

The potential extraneous variable of sex was next controlled for, with the results as shown in Table VIII.

TABLE VIII

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR SEX

| | SEX | |
	Male	Female
Correlation	0.7743	0.7862
Per Cent	50.1	49.9
Cases	64	62

Again, there is virtually no difference in the Spearman correlation coefficients for the original, non-controlled relationship and the controlled relationship. The two sample categories, male and female, are almost evenly divided in this instance, with 50.1 per cent male and 49.9 per cent female.

The data in Table IX present the relationship between library use and library skills when controlling for the potential extraneous variable American College Test: English Section as a measure of intelligence.

TABLE IX

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR ACT SCORES

| | ACT SCores | |
	13 and below	14 and below
Correlation	0.7597	0.7672
Per Cent	38.9	61.1
Cases	21	33

*ACT scores are available for the Cooke County College sample only.

In this instance, the sample with groupings by score on the American College Test: English Section was available for

the Cooke County College students (totaling seventy-four respondents), due to the inaccessability of comparable data or groupings for the Grayson County College sample. The Spearman correlation coefficients obtained for the original non-controlled sample and for the sample controlled for the American College Test: English Section scores again are not significantly different. It might be well to note also that these findings replicate those of a similar pilot study sample of one hundred forty-eight respondents as reported in Appendix B, with similar results. Therefore, this factor as utilized in the present study was not considered to be an extraneous variable.

The possible extraneous variable of marital status was next controlled for in analyzing the relationship between library skills and library use as shown in Table X.

TABLE X

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR MARITAL STATUS

| | Marital Status | |
	Married	Single
Correlation	0.7663	0.7787
Per Cent	9.5	90.5
Cases	12	114

In order to increase the reliability of the data in this case, only two categories of marital status (married and single) were used when requesting information from the respondents. The respondents were verbally instructed to consider only their present marital status, and to disregard any previous marital status. The majority of the respondents reported their present marital status as single. The Spearman correlation coefficients for this potential extraneous variable were found to be virtually the same as the Spearman correlation coefficient for the original non-controlled relationship between library skills and library use. Therefore, marital status was not considered to be an extraneous variable in the present study.

The potential extraneous variable major course of study was next controlled for. The results of the Spearman correlation coefficients thus obtained are shown in Table XI. The potential extraneous variable, major course of study, was divided into two major groups, science and non-science. The science group is understood to encompass both pure science and applied science. The non-science group is understood to encompass all other disciplines other than pure science or applied science. If any respondents were in doubt at the time of completing the questionnaire, or did not respond to this item, they were randomly assigned to a group. Since no significant difference was found

between the Spearman correlation for the original non-controlled group and the Spearman correlations for the group controlled for by major course of study, the latter variable was not considered to be an extraneous variable.

TABLE XI

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR MAJOR COURSE OF STUDY

| | Major Course of Study | |
	Science	Non-Science
Correlation	0.7668	0.7590
Per Cent	47.6	52.4
Cases	60	66

The data presented next in Table XII show the relationship between library skills and library use, when controlling for hours worked at a non-academic job. When data for the present study were gathered, the respondents were instructed to consider a non-academic job as one for which they received pay, and not to consider their regular school attendance and the resulting class preparation as a job in this category. Purely voluntary work was also excluded, if not performed for remuneration.

TABLE XII

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS, CONTROLLING
FOR HOURS WORKED OTHER THAN ATTENDING SCHOOL

| | Hours Worked Other Than Attending School | | |
	Zero	Part time 1 to 39	Full time 40 and above
Correlation	0.7704	0.7646	0.7673
Per Cent	34.9	52.4	12.7
Cases	44	60	22

The division of hours worked at a non-academic job into
zero hours, one to thirty-nine hours, and forty or more
house, corresponds to a division into the customary catego-
ries of do not work, work part time, and work full time.
As shown in Table XII, the results of controlling for hours
worked at a non-academic job in the relationship between
library skills and library use also serves to strengthen
confidence in the original non-controlled relationship be-
tween library skills and library use, since the Spearman
correlation coefficients for the groups controlled for by
hours worked at an non-academic job again remain virtually
the same.

In summary, it may be observed that none of the varia-
bles identified as potential extraneous variables through a
survey and earlier pilot studies were found to invalidate
the originally established relationship between library use
and library skills.

Intervening Variable

The next area of interest in the present study is the
consideration of possible intervening variables which might
extend or explicate the connection between library skills
and library use. Of two potential intervening variables,
attitude toward the library and self-perceived library
skills, the latter was selected for investigation. It was

hypothesized, accordingly, that self-perception of library skills might function to some extent as an intervening variable in the following manner. Given the acquisition of library skills, of whatever level, some degree of perception that one possesses these skills must be assumed. This self-perception of library skills may be regarded as leading in turn to library use. It is deemed highly unlikely that one would possess library skills and not perceive them, and that this perception would not influence the use of the library to some meaningful extent. The broader question of whether a skill might be possessed and not perceived is not addressed in the present study, nor is the question considered of possible reciprocal effects of library use on library skills. Some reciprocal effects doubtlessly exists, but it is assumed that it does not significantly alter the direction of primary influence between these variables. The hypothesized relationship between library skills and library use as mediated by the intervening variable may thus be graphically illustrated as follows:

| Library skills | $\longrightarrow$ | Self-perceived library skills | $\longrightarrow$ | Library use |
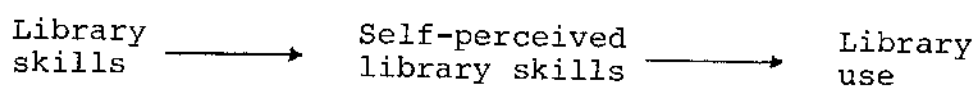
Figure 1 -- The hypothesized relationship between library skills and library use as mediated by self-perceived library skills.

Table XIII shows the Spearman correlation coefficients when the potential intervening variable self-perceived library skills is controlled for in such a relationship between library use and library skills.

TABLE XIII

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS, CONTROLLING FOR SELF-PERCEIVED LIBRARY SKILLS

| | Self-Perceived Library Skills | |
	Low 0-48	High 49-96
Correlation	0.2947	0.3211
Per Cent	42.9	57.1
Cases	54	72

As previously noted, the original correlation between library skills and library use when no variables are controlled was found to be 0.7742. As illustrated in Table XIII, the Spearman correlation coefficient for the low group of self-perceived library skills is 0.2947, and the Spearman correlation coefficient for the high group of self-perceived librsry skills is 0.3211. In view of the substantial reduction thus noted for the correlation coefficients, self-perception of library skills is thus

interpreted as functioning to a substantial degree as an
intervening variable in the relationship between library
skills and library use. The fact that the partial correla-
tion coefficients do not reduce to zero in this case is
presumably attributable primarily to the direct action of
library skills upon library use, and secondarily to some
degree of measurement error.

Antecedent Variables

While all of the variables used in the present study,
as determined by literature searching and pilot studies,
may be investigated as either extraneous or intervening
variables, it is reasonable also to consider certain of
these variables as possible antecedent variables, which
might extend the casual chain in the relationship between
library skills and library use. Of the variables selected
for analysis in the present study only sex and intelligence
(as measured by at two levels by the grouping of students
according to their scores on the American College Test:
English Section) would appear to be potential antecedent
variables. If either of these potential antecedent varia-
bles are true antecedent variables, when the relationship
between library use and the potential antecedent variable
is controlled for by library skills, the relationship be-
tween library use and the potential antecedent variable
should be greatly reduced when compared with the original

relationship between library skills and library use. Earlier in the present study, it was found that when either sex or intelligence as measured in the present study are controlled for with respect to the relationship between library skills and library use, the relationship remained virtually the same. Table XIV illustrates the results of the Spearman correlation coefficients when the relationship between library use and sex is controlled for library skills. The Spearman correlations in Table XIV are virtually the same as the Spearman correlation coefficients for the uncontrolled relationship between library skills and library use. Accordingly, sex was not deemed to function as a true antecedent variable in the present study.

TABLE XIV

CORRELATION OF LIBRARY USE WITH SEX CONTROLLING
FOR LIBRARY SKILLS

	Library Skills	
	Low	High
Coefficient	0.7709	0.7839
Per Cent	46.1	53.9
Cases	58	68

The relationship between library use and intelligence as reflected in the grouping of students by their American College Test: English Section scores when controlled by library skills is shown by the Spearman correlation coefficients in Table XV.

TABLE XV

CORRELATION OF LIBRARY USE WITH ACT*, CONTROLLING
FOR LIBRARY SKILLS

	Library Skills	
	Low	High
Coefficient	0.7612	0.7713
Per Cent	44.4	66.6
Cases	24	30

*ACT scores are available for the Cooke County College group only.

It should be noted that the data for the computation of this table were available for the Cooke County College sample only. The Spearman correlation coefficients presented in this table are virtually the same as the Spearman correlation coefficients for the relationship between library use without any control variable. Therefore, it is indicated that intelligence as measured by the American

College Test: English Section is not an antecedent variable to the relationship between library skills and library use.

Conditional Variables

While the number of cases in certain cells becomes less than desirable when more than one additional variable is introduced into the analysis, in view of the nature and strengths of the relationship at the bivariate level, the possible simultaneous effects of two conditional variables were considered, but without significant results. As shown in Table XVI, for example, when both sex and marital status are simultaneously analyzed as conditional variables, the original Spearman correlation coefficients between library skills and library use remain virtually unchanged.

TABLE XVI

CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR SEX AND MARITAL STATUS

	SEX			
	MALE		FEMALE	
	MARITAL STATUS		MARITAL STATUS	
	MARRIED	SINGLE	MARRIED	SINGLE
Correlation	0.7843	0.7796	0.7984	9.8012
Per Cent	7.1	43.7	2.4	46.8
Cases	9	55	3	59

Similar analyses were performed with similar results for other possible combinations of the variables for which the data were collected.

Comparison of Findings of Present Study and Pilot Study

A pilot study quite similar to the present study was conducted, the principal results of which are summarized in Appendix B of the present study. The pilot study differed from the present study only with regard to certain minor questionnair items relative to library use. Consequently, the present study may be viewed also as a replication of the pilot study, which it resembles in all essential respects, except for the use of fixed point analysis procedures only in the present study to identify the best indicators of library skills and library use. The same indicators of X and Y were used, however, with the pilot study data (as summarized in Appendix B) as with the present study data. To facilitate comparisons, the results of this approach may be noted as follows.

1. A Spearman correlation coefficient of 0.7826 was found in the pilot study between library skills (using x_1, x_2, x_4) and library use (using y_1, y_2). This value compares with a Spearman correlation coefficient of 0.7742 found in the present study.

2. As in the present study, no effects of extraneous variables were found in the pilot study among those tested for this purpose, which included school attended, age, sex, major field of study, intelligence as measured by the American College Test: English Section, marital status, and hours worked other than attending school.

3. In the pilot study, self-perceived skills was found to function as an intervening variable which reduced the value of the original correlation of 0.7826 between library skills and library use to levels of 0.2565 for low and 0.3182 for high self-perception of library skills. This finding compares with an original correlation of 0.7742 between library skills and library use in the present study, which was reduced to levels of 0.2947 for low and 0.3211 for high self-perception of library skills.

4. In the pilot study, sex and intelligence were tested and found not to function as antecedent variables, and similar results were obtained in the present study.

5. In the pilot study, combinations of the different control variables were tested for possible simultaneous effects of two conditional variables, but no such effects were found. Again, similar results were obtained in the present study.

Split-Sample Replication

The supportive pattern of replication manifested by
the comparison of pilot study results with present study
results was also found in the next stage of the analysis,
which was performed by a split-sample approach utilizing
comparisons of Cooke County College data with Grayson
County College data. These latter comparisons are present-
ed in the tables which follow.

Table XVII shows the correlation coefficients between
library skills and library use when using composite indica-
tors, for the Cooke County College sample (0.126) and the
Grayson County College sample (0.131). In view of the low
value of these coefficients, using all indicators of libra-
ry skills and library use, fixed point analysis was per-
formed as shown in Tables XVIII to XXI in the same manner
as previously described for the present study as a whole.
The results ofthis fixed point analysis using a split-
sample approach are presented in Table XXI, where the best
indicators of library skills are shown to be x_1, card cata-
log skills, x_2, familiarity with terms and abbreviations,
and x_4, periodical index skills, and the best indicator of
library use are shown to be y_1, library attendance, and
y , use of circulation services. Correlation coefficients
are thus obtained of 0.774 for the Cooke County College
sample and 0.780 for the Grayson County College sample.

TABLE XVII

COMPARISON OF CORRELATION OF LIBRARY USE WITH
LIBRARY SKILLS AS COMPOSITE INDICATORS

	Cooke County College	Grayson County College
Coefficient	0.126	0.131
Per Cent	100	100
Cases	54	72
Significance	0.20	0.20

TABLE XVIII

COMPARISON OF CORRELATION OF LIBRARY USE (Y) CONSIDERED
AS A FUNCTION OF LIBRARY SKILLS (X) *

Library Use Indicators	Cooke County College		Grayson County College	
	Correlation	Significance	Correlation	Significance
Y_1	0.488	0.01	0.491	0.01
Y_2	.169	.05	.174	.05
Y_3	.140	.20	.144	.20
Y_1, Y_2	.438	.01	.445	.01
Y_1, Y_3	.366	.01	.381	.01
Y_2, Y_3	.103	.20	.120	.20
Y_1, Y_2, Y_3	.126	.20	.131	.20

*X is a composite measure reflecting x_1, x_2, x_3, x_4

TABLE XIX

COMPARISON OF CORRELATION OF LIBRARY USE (Y) CONSIDERED
AS A FUNCTION OF LIBRARY SKILLS (X)*

Library Skill Indicators	Correlation	
	Cooke County College	Grayson County College
x_1	0.702	0.705
x_2	.368	.369
x_3	.334	.335
x_4	.660	.670
x_1, x_2	.490	.489
x_1, x_3	.426	.429
x_1, x_4	.746	.750
x_2, x_3	.348	.350
x_2, x_4	.526	.515
x_3, x_4	.564	.568
x_1, x_2, x_3	.510	.521
x_1, x_2, x_4	.710	.706
x_1, x_3, x_4	.700	.721
x_2, x_3, x_4	.632	.642
x_1, x_2, x_3, x_4	0.488	0.491

*$Y = y_1$, Library attendance

TABLE XX

COMPARISON OF CORRELATION OF LIBRARY USE (Y) CONSIDERED
AS A FUNCTION OF LIBRARY SKILLS (X)*

Library Use Indicators	Correlation	
	Cooke County College	Grayson County College
y_1	0.746	0.750
y_2	.682	.693
y_3	.514	.517
y_1, y_2	.761	.767
y_1, y_3	.730	.733
y_2, y_3	.510	.504
y_1, y_2, y_3	0.653	0.661

*$X = x_1, x_4$

TABLE XXI

COMPARISON OF CORRELATION OF LIBRARY USE (Y) CONSIDERED
AS A FUNCTION OF LIBRARY SKILLS (X)*

Library Skill Indicators	Correlation	
	Cooke County College	Grayson County College
x_1	0.736	0.741
x_2	.531	.529
x_3	.544	.551
x_4	.743	.750
x_1, x_2	.750	.751
x_1, x_3	.625	.633
x_1, x_4	.761	.767
x_2, x_3	.521	.519
x_2, x_4	.762	.757
x_3, x_4	.451	.463
x_1, x_2, x_3	.770	.764
x_1, x_2, x_4	.774	.780
x_1, x_3, x_4	.768	.769
x_2, x_3, x_4	.757	.768
x_1, x_2, x_3, x_4	0.754	0.760

*Y = y_1, y_2

Tables XXII to XXVI show the results of the split-sample comparisons when the relationship between library skills and library use is controlled for by the possible extraneous variables of age, sex, marital status, major course of study, and employment status. In each case the correlation coefficients are virtually the same for the Cooke County College sample and the Grayson County College sample.

TABLE XXII

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CROSS TABULATED BY AGE

| | Cooke County College | | Grayson County College | |
	20 and below	21 and above	20 and below	21 and above
Correlation	0.759	0.758	0.761	0.763
Per Cent	75.9	24.1	79.2	20.8
Cases	41	13	57	15

TABLE XXIII

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CROSS TABULATED BY SEX

| | Cooke County College | | Grayson County College | |
	Male	Female	Male	Female
Correlation	0.774	0.780	0.779	0.785
Per Cent	53.7	46.3	48.6	51.4
Cases	29	25	35	37

TABLE XXIV

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CROSS TABULATED BY MARITAL STATUS

| | Cooke County College | | Grayson County College | |
	Married	Single	Married	Single
Correlation	0.772	0.776	0.770	0.773
Per Cent	11.1	88.9	8.3	01.7
Cases	6	48	6	66

TABLE XXV

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CROSS TABULATED BY MAJOR COURSE OF STUDY

| | Cooke County College | | Grayson County College | |
	Science	Non-Science	Science	Non-Science
Correlation	0.758	0.765	0.762	0.757
Per Cent	48.1	51.9	47.2	52.8
Cases	26	28	34	38

TABLE XXVI

COMPARISON OF CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE, CROSS TABULATED BY HOURS WORKED OTHER THAN ATTENDING SCHOOL

	Cooke County College			Grayson County College		
	Zero	Part time 1 to 39	Full time 40 & above	Zero	Part time 1 to 39	Full time 40 & above
Correlation	0.772	0.770	0.768	0.768	0.774	0.769
Per Cent	27.8	51.9	20.3	40.3	44.4	15.3
Cases	15	28	11	29	32	11

Table XXVII shows the results of the split-sample comparison when the relationship between library skills and library use is analyzed for the effects of self-perceived library skills as a possible intervening variable. In this instance a substantial reduction in the correlation coeffcient is to be noted, as expected, both for the Cooke County College sample and the Grayson County College sample, with the partial coefficients 0.306 and 0.326 respectively for low and high self-percention levels in the case of Cooke County College, and with the partial coefficients being 0.320 and 0.332 respectively for low and high self-perception levels in the case of Grayson County College.

TABLE XXVII

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CROSS TABULATED BY SELF-PERCEIVED LIBRARY SKILLS

| | Cooke County College | | Grayson County College | |
	Low 0-48	High 49-96	Low 0-48	High 49-96
Correlation	0.306	0.326	0.320	0.332
Per Cent	46.3	53.7	40.3	59.7
Cases	25	29	29	43

Table XXVIII shows the results of the split-sample comparison when the relationship between library use and library skills is analyzed for the effects of sex as a possible antecedent variable. In this instance, as expected, the correlation coefficients remain virtually unchanged in the partial tables for both the Cooke County College sample and the Grayson County College sample.

No comparable analysis could be made regarding intelligence as a possible antecedent variable, since the data concerning this variable were available only for the Cooke County College sample.

TABLE XXVIII

COMPARISON OF CORRELATION OF LIBRARY USE WITH SEX,
CONTROLLING FOR LIBRARY SKILLS

| | Library Skills | | | |
| | Low | | High | |
	Cooke County College	Grayson County College	Cooke County College	Grayson County College
Coefficient	0.763	0.770	0.785	0.789
Per Cent	44.4	47.2	55.6	52.8
Cases	24	34	30	38

As for the present study as a whole, the Cooke County College sample and the Grayson County College sample were also further analyzed for possible conditional effects when considering combinations of the preceding analytic variables. Table XXIX shows the results in this regard when controlling simultaneously for sex and marital status. The correlation coefficients in the partial tables remain virtually the same for each sample, and similar results (not shown) were obtained in the case of all other combinations of variables.

TABLE XXIX

COMPARISON OF CORRELATION OF LIBRARY USE WITH LIBRARY SKILLS,
CONTROLLING FOR SEX AND MARITAL STATUS

	Male				Female			
	Married		Single		Married		Single	
	Cooke County College	Grayson County College	Cooke County College	Grayson County College	Cooke County College	Grayson County College	Cooke County College	Grayson County College
Correlation	0.783	0.783	0.780	0.782	0.797	0.798	0.800	0.803
Per Cent	5.5	8.3	38.9	47.2	0.2	2.8	55.4	41.7
Cases	3	6	21	34	1	2	29	30

In surveying the results of all of the preceding split-sample comparisons, it is noted that they reflect a striking similarity in the findings for the Cooke County College sample and in the findings for the Grayson County College sample. This is regarded accordingly as supportive evidence in view of the replicative pattern thus manifested.

Functional Relationship Between Library Skills and Library Use

The preceding analyses of the pilot and present study data have been structured and expressed essentially in bivalent terms. That is to say, correlation analyses have been performed to affirm or reject statements asserting some degree of relationship between variables, i.e., that Y is some function of X (Y = f(X). In view of the nature and quality of the data, this conservative approach and interpretation would seem preferred. At the same time, it is possibly of interest to consider the nature of the functional relationship that might be described if the data were of higher quality, i.e., more reliable and at the interval rather than the ordinal or nominal level of measurement.

Figures two and three show the results obtained, assuming that the data would support such an analysis, viewing Y as a more specific function of X. In the case of both the pilot and present studies, a possible simple

linear relation would appear to be manifested in which, by visual inspection, increments in X would appear to correspond with approximately parallel increments in Y. That is, given the linear equation $Y = a + bX$, "b" would appear to approach a value of one, and "a" might also be noted to approach zero. It may also be noted further that the b-values, or "slopes", would appear to be approximately the same for each sample, and hence to manifest a generally replicative pattern. The a-value, or near zero intercept, in this case would also tend to agree with the intuitive assumption that at least a minimum level of library skills is needed for a minimum level of library use.

Y-scale

Y = y_1, y_2

X-scale

X = x_1, x_2, x_4
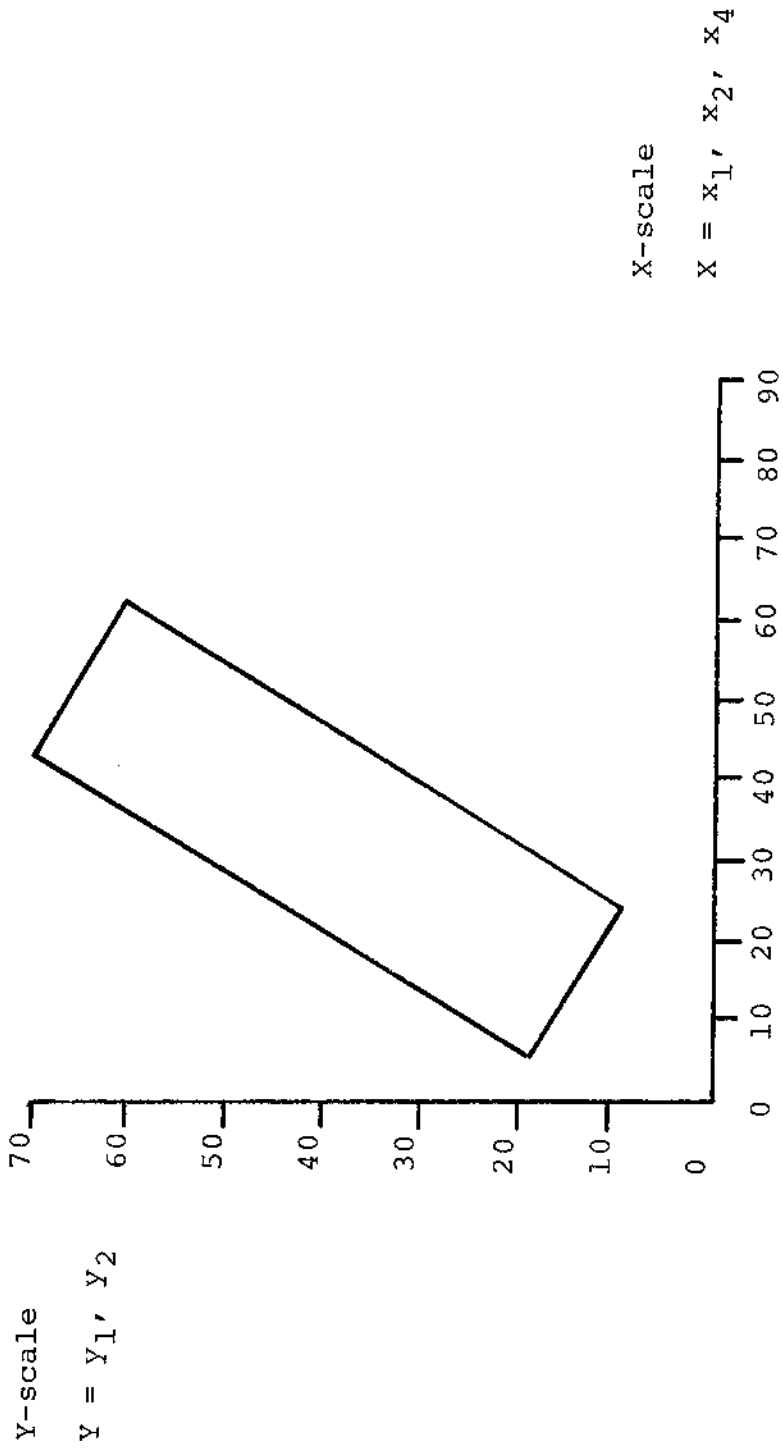
Figure 2 -- Summary range of the scatter
diagram for the present study.

X-scale

$X = x_1, x_2, x_4$

Y-scale

$Y = y_1, y_2$
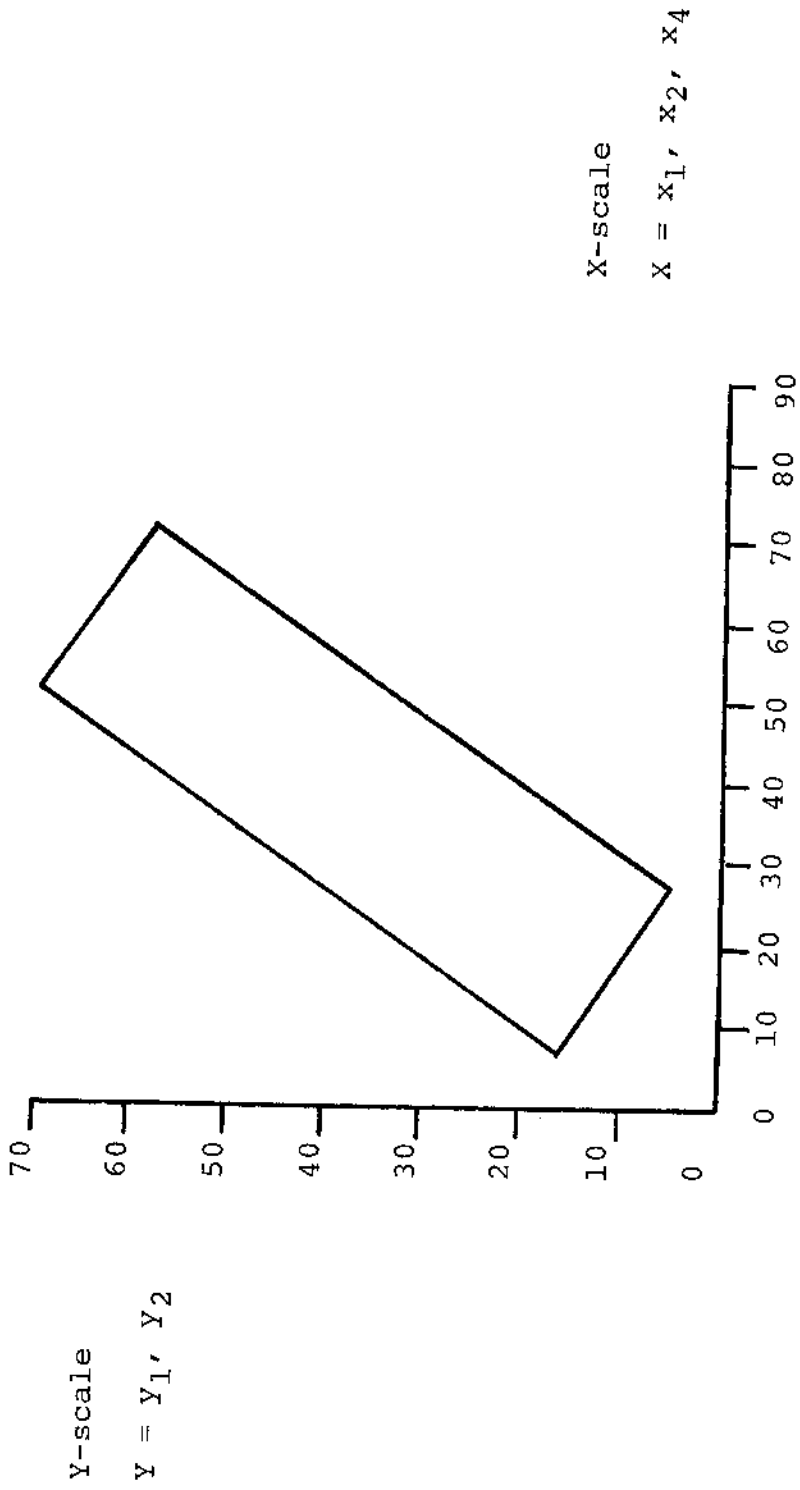
Figure 3 -- Summary range of the scatter diagram for the pilot study.

Explanatory Model

As a final stage in the analysis of data it was also deemed to be of interest to consider the nature of a limited explanatory model that might be further indicated, although again recognizing at the same time the deficiencies in the quality and extent of the data actually collected. Pursuing this approach, bivariate Spearman correlations were first computed between all variables considered in the present study. Table XXX shows the correlation matrix thus obtained for those variables correlating with library use, Y, with a strength greater than 0.10. These variables included: tested library skills, X_1; hours worked other than attending school, X_2; age, X_3; and self-perceived library skills, X_4. Excluded from the matrix by the same criterion are the variables sex, intelligence, marital status and major subject, for which bivariate correlations with library use were found to be less than 0.10.

TABLE XXX

CORRELATION OF LIBRARY USE WITH SELECTED VARIABLES

	Y	X_1	X_2	X_3	X_4
Y	1.000	0.774	-0.408	-0.243	0.252
X_1	.774	1.000	.046	.013	.187
X_2	- .408	.046	1.000	.025	.037
X_3	- .243	.013	.025	1.000	.026
X_4	0.252	0.187	0.037	0.026	1.000

The Spearman correlation values shown in Table XXX were next "promoted" and used as input for a multiple linear regression analysis (assuming Pearson correlation values) with the results as shown in Table XXXI and accompanying Figure 4.

TABLE XXXI

SUMMARY OF MULTIPLE LINEAR REGRESSION ANALYSIS

Dependent* variable	Independent** variable	Regression coefficient	Beta weight
Y	X_1	1.77	0.77
Y	X_2	- .49	- .44
Y	X_3	- .29	- .25
Y	X_4	.09	.13
X_4	X_1	0.65	0.19

*Y = library use, X_4 = self-perceived library skills

**X_1 = tested library skills, X_2 = hours worked, X_3 = age, X_4 = self-perceived library skills.
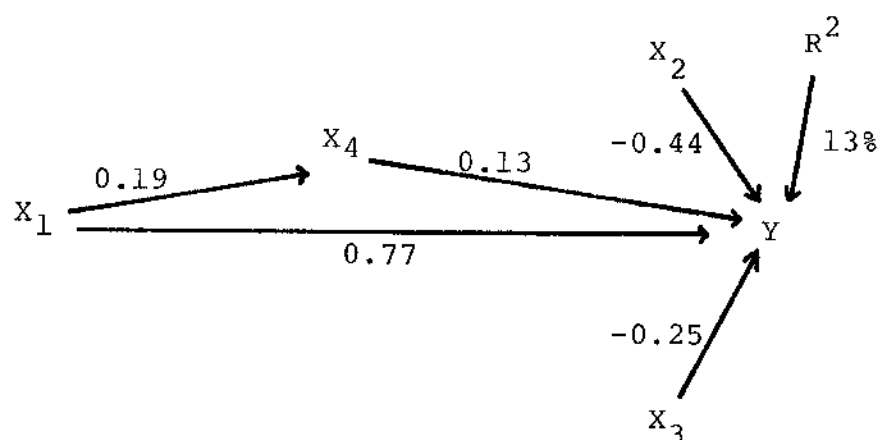
Figure 4 -- Conjectural model of principal factors relating to library use.

Such a regression analysis might be regarded as being at least suggestive of the direction, size, and relative importance of the variables in question. In particular, tested library skills would appear to be the variable most strongly and positively related to library use. Self-perceived skills would also appear to be positively related to library use, although the strength of this relationship would seem to be much less than tested library skills. At the same time, a moderately strong negative relationship is to be noted between hours worked and library use, together with a somewhat less strong negative relationship between age and library use. If direction of influence (i.e., positive and negative signs) is ignored, the relative importance of these variables may also be inferred; that is, tested library skills would appear to be the most important, followed in order by hours worked, age, and self-perception of library skills. Together these four variables would appear to account for roughly some eighty-seven per cent (R^2 = 0.87) of the variation in levels of library use, leaving a residual of some thirteen per cent to be explained by other factors. Figure 4 shows graphically a possible configuration of these variables (with computed beta weights and residual R^2) which is reflective of the earlier analyses that suggested that self-perception of library skills might mediate in some degree the

relationship between library skills and library use. In this particular model, library skills would appear to have a predominant direct influence upon library use, with a lesser indirect influence also exerted through self-perception of library skills. Age and hours worked are shown as having essentially independent effects (both negative) and as acting directly upon library use. These variables would appear to account collectively for the major portion of the variation in levels of library use, leaving only a relatively small portion (less than some thirteen per cent) to be accounted for by other factors. Again it is to be noted, however, that the interpretations such as the preceding are necessarily only conjectural in view of the nature of the limitations attendant on using multiple regression analysis as described with data of the kind and quality actually collected.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The purpose of this study has been to investigate the relationship between library skills and the use of the library by freshmen community college students. The importance of these variables is reflected in the wide attention which they have received in this country and abroad. Surprisingly, however, little if any attention appears to have been given to the consideration of the functional relationship between these variables. It has, presumably, been simply assumed that a positive relationship exists. The present study has sought accordingly, to help meet the need in this regard, by seeking to demonstrate that such a relationship exists and to consider this relationship in the context of a selected number of other analytic or control variables as identified through a search or relevant literature and through preliminary analyses. Library use is understood to include as principal components library attendance, or use of library materials in the library, the use of circulation services, and the use of reference services and materials. Library skills are understood to include skills in using the card catalog, familiarity with terms

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and abbreviations commonly used in the library, familiarity with common reference tools, and skill in using periodical indexes. The analytic or control variables used in the present study include: school attended, age, sex, intelligence, marital status, major course of study, hours worked at a job other than school, and self-perceived library skills.

Methods and Procedures

Procedurally, the present study has employed essentially a survey approach, utilizing a standard instrument, A Library Orientation Test for College Freshmen (3), to collect data concerning the types and levels of library skills, and a special questionnaire instrument to collect data concerning kinds and levels of library use and certain demographic characteristics of the subjects chosen for investigation. The reliability of the former test instrument, A Library Orientation Test for College Freshmen, has been established, and indications of its validity through use in a large number of varied settings are to be noted as reported and discussed by Perkins (5). The reliability of the latter questionnaire was assessed by several methods. The Kuder-Richardson formula number twenty-one was applied to test for reliability, and yielded a reliability coefficient of 0.89, which compares favorably with the 0.86

reliability coefficient obtained through the use of the Kuder-Richardson formula number twenty-one for A Library Orientation Test for College Freshmen. A random sample of freshmen students from the entire campus population was administered the questionnaire instrument. The results of the administration of the questionnaire instrument to the random sample from the entire campus population was then compared with the results of the administration of the questionnaire instrument to the respondents utilized in the present study. Employed for this purpose was the Mann-Whitney U-test with normal approximation and tie correction. This test showed no significant difference in the responses of the two samples. A sub-sample was next selected from the respondents utilized in the present study and orally administered the questionnaire instrument. The results from the original sample and the sub-sample were compared through the use of the Mann-Whitney U-test with normal approximation and tie correction. Again, no significant difference was found between the two groups. From a total population of some 500 freshman students at Cooke County College and some 2600 at Grayson County College a total sample of 126 students was identified among those enrolled in selected freshman English classes at Cooke County College and Grayson County College. Since the programs of study of most students require them to take freshman

English, most of the total population of freshmen students was eligible for selection for inclusion in the present study. However, certain categories of students were excluded. Foreign students and those students taking only night or special courses were excluded, as were those students attending classes at a location other than on the main campus. Other non-degree students and vocational students pursuing diploma programs lasting only one year or less were similarly excluded.

Data were collected at Cooke County College and Grayson County College during the first part of the Spring Semester of 1979, from January 15 to January 30. The questionnaire instrument and A Library Orientation Test for College Freshmen were administered during a regularly scheduled class period by the present investigator. Each regular class period consisted of fifty-five minutes. No students failed to complete the instruments due to lack of time for completion. All instruments were returned at the end of the class period utilized for testing.

The completed instruments were reviewed for obvious discrepancies and to screen out test subjects not falling within the parameters of the sample as defined above, for example, sophomore students repeating a freshman English course, or foreign students. The original results were then tabulated and coded for machine processing.

Statistical procedures were largely performed at the North Texas State University Computing Center. Outputs from the computation of the original data included Spearman correlation coefficients, levels of significance, and number of cases in each computation.

Analysis of Data

The analysis of data followed conventional sequences and procedures, modified as necessary for the particular requirements of the present study. In general it was found that the originally predicated relationship between library skills, considered as a global variable, and library use, considered as a global variable, manifested a Spearman correlation coefficient of only 0.1272, significant at the 0.20 level. In view of this low correlation, fixed point analysis procedures were employed in order to identify the particular component parts of the global variable library skills and the global variable library use which would yield a more viable correlation between library skills and library use. Accordingly, the value of library skills was first fixed as the total of all four of its originally defined component parts, and all possible combinations of the three originally defined component parts of library use were permitted to vary against this fixed point. Of the seven possible combinations of the three component parts of library

use, it was determined that the best indicator of library use as varied with the previously fixed point of library skills was the use of library materials in the library, or library attendance. Using library attendance as the indicator of library use, the relationship between library skills and library use was thus found to yield a Spearman correlation coefficient of 0.4908, significant at the 0.01 level.

The indicator of library use was next fixed as the value of library attendance, and all possible combinations of the previously defined four component parts of library skills, it was determined that the best indicator of library skills as varied with the previously fixed point of library use was the combination of card catalog use skills and skills in using periodical indexes, which yielded a Spearman correlation coefficient of 0.7472.

The indicator of library skills was next fixed as card catalog use skills and skills in using periodical indexes. All possible combinations of the previously defined three components of library use were allowed to vary against this fixed point. The relationship between library skills and library use was then found to yield a Spearman correlation coefficient of 0.7584, when the value of library skills was considered to be card catalog use skills and the value of

library use was considered to be library attendance and the use of library circulation services.

The value of library use was next fixed as library attendance and the use of circulation services, and all possible combinations of library skills were allowed to vary against this fixed point. Using the combination of card catalog skills , familiarity with terms and abbreviations, and periodical index skills as indicators of library skills with the previously defined indicator of library use, a Spearman correlation coefficient of 0.7742 was obtained. These indicators, as thus determined and refined, were then used as the measures of library skills and library use in the computations in the present study.

Extraneous Variables

With the indicators thus identified for library skills and library use, tests of the relationship between these variables were next run for the influence of possible extraneous variables -- notably, school attending, age, sex, intelligence, marital status, major course of study, and hours worked other than attending academic classes -- which might invalidate the relationship between library skills and library use as determined through fixed point analysis. These control variables were selected through a review of the relevant literature and preliminary analyses, as previously discussed.

The Spearman correlation coefficients computed for the above control variables were found to be not significantly different from the Spearman correlation coefficients computed for the non-controlled relationship between library skills and library use. These findings of non-significant difference are deemed supportative of the hypothesis that a positive relationship exists between library skills and library use. Furthersupport may be cited in this regard in noting that these results substantially replicated the earlier findings of a pilot study as reported in Appendix B to the present study.

Intervening and Antecedent Variables

In an attempt to extend or explicate the connection between library skills and library use, the self-perception of library skills was tested as a potential intervening variable. It was reasoned that without the perception that library skills existed, there would be little or no use of these skills. The Spearman correlation coefficients derived when controlling for self-perceived library skills in the relationship between library skills and library use proved to be substantially lower than the original non-controlled Spearman correlation coefficients obtained in the relationship between library skills and library use. Accordingly, the self-perception of library skills is possibly to be viewed as functioning to some extent as an

intervening variable in the relationship between library skills and library use.

Although sex and intelligence as measured by the American College Test: English Section were first considered as potential extraneous variables and determined not to be extraneous variables, they were next considered as potential antecedent variables, in an effort to extend the causal chain. It was reasoned that one's sex and intelligence would be established prior to the development of any library skills and could possibly affect the development of library skills. Since sex and intelligence as defined in the present study had already been determined as not altering significantly the relationship between library skills and library use when controlled for, it remained only to control for library skills in the relationship between library use and the potential antecedent variable. This test should yield a greatly reduced Spearman correlation coefficient when compared to the original relationship between library skills and library use, if the potential antecedent variable is a true antecedent variable. In the cases of both sex and intelligence as defined in the pesent study, no significant difference was found between the relationship of library use and the potential antecedent variable when controlled for by library skills and the original relationship between library skills and library use. Therefore,

sex and intelligence are not considered to function as antecedent variables in this regard.

Conditional Variables

While the number of cases in certain cells becomes less than desirable when more than one additional variable is introduced into the analysis, in view of the nature and strengths of the relationship at the bivariate level, the possible simultaneous effects of two conditional variables were considered, but without significant results.

Replicative Patterns

In addition to the preceding analyses, a split-sample approach was utilized to consider indicators of a replicative nature. The Cooke County College sample and the Grayson County College sample were accordingly separately analyzed using fixed point analysis procedures and repeating the tests for possible extraneous, intervening, and conditional variables. The comparisons thus made yielded results that were highly replicative between the two samples, as well as with the test population as a whole. As previously noted, a similar highly replicative pattern was manifested between the findings of the pilot study and the present study.

Functional Relationship

While limitations of the data collected for the present study are recognized, it was deemed of possible interest to envision the kind of functional relationship that might be inferred if the data actually collected had been more extensive and of higher quality. A simple graphic analysis was performed accordingly for this purpose, which suggested that a simple linear relationship might obtain whereby, for the range of values considered, increments in library skills might be associated with approximately corresponding increments in library use.

Explanatory Model

As a final stage in the analysis of data, it was also deemed to be of interest to consider the nature of a limited explanatory model, although recognizing at the same time the limitations of the data thus utilized. Accordingly, Spearman correlations for those variables evidencing a correlation of greater than 0.10 with library use (tested library skills, hours worked, age and self-perceived library skills) were "promoted" and utilized as input in multiple regression analysis suggested that roughly some eighty-seven per cent of the variation in library use could possibly be accounted for by the four variables mentioned above. Further, the results of the multiple regression

analysis suggested that tested library skills might be re-
garded as having the strongest influence upon library use,
followed in order of relative strength by hours worked,
age, and self-perceived library skills. It was also sug-
gested that tested library skills might influence library
use primarily directly, and secondarily as mediated by
self-perceived library skills. Hours worked and age were
also seen as possible independent variables influencing li-
brary use directly and in a negative manner.

Summary of Findings

In overall summary, the principal findings of the
present study may be stated as follows.

1. Library skills were found to correlate with libra-
ry use at a relatively low level (0.127), when both library
skills and library use were considered as global measure.

2. Through the refinement of the global values of li-
brary skills and library use by fixed point analysis, a
relatively high level of correlation (0.774) was found be-
tween the refined indicators of library skills and library
use.

3. The relationship thus identified between library
skills and library use was found not to be spurious when
testing for selected potential extraneous variables.

4. The self-perception of library skills was found to function to some extent as a possible intervening variable in the relationship between library skills and library use, but no antecedent or conditional variables were identified.

5. While the data collected were not deemed to be sufficiently extensive or of a quality to warrant any specific assertion about the functional nature of the relationship between library skills and library use, it was noted that a simple graphic analysis is suggestive of a simple linear function which might obtain between these two variables.

6. It was also noted that when the data collected for the present study were analyzed utilizing multiple linear regression procedures, roughly some eighty-seven per cent of the variance in the level of library use was possibly to be explained by the variables of tested library skills, hours worked, age, and self-perceived library skills. The respective beta weights for these variables in a general multiple regression equation were obtained as follows:

$$Y = 6.10 + 0.77X_1 - 0.44X_2 - 0.25X_3 + 0.13X_4$$

A graphic model developed on the preceding data suggested that library skills might act primarily upon library use directly, and secondarily as mediated by self-perceived library skills, while hours worked and age might be

independent variables acting directly and negatively upon
library use. These interpretations are necessarily con-
jectural, however, in view of the extent and quality of the
data actually collected.

Generalization of Findings

With regard to the results of the present investiga-
tion, no formal descriptive generalizations can be made
beyond the two institutions studied, since no formal random
or systematic samples were drawn from a broader population.
Restrictions are also posed in this regard by the limited
size ofthe sample actually studied, including the earlier
pilot study as reported in Appendix B of the present study,
although a highly replicative pattern was manifested be-
tween the pilot study and the present study and between the
two principal subgroups of the present study. Descriptive
generalization is envisioned accordingly, as feasable only
to the extent to which the student population of Cooke
County College and Grayson County College might be regarded
as typical of other such non-urban community colleges, as
discussed in Chapter II of the present study. However,
these two community colleges would appear to resemble many
such institutions with regard to key characteristics such
as type of program, size and nature of faculty, and size
and type of area served.

Relation of Findings to Other Studies

That a relationship exists between library skills and library use has been widely assumed, but little attention has apparently been devoted to this relationship beyond limited or incidental observations in studies focusing primarily on other questions. Harvard-Williams (4) for example, in his study of instruction in library skills argues that improved instruction in library skills is needed in order that students may use the library more effectively, but no data were collected or analyzed concerning library skills considered as an independent variable and library use considered as a dependent variable. Similarly, Riley (6), in her study of library skills as related to the academic performance of freshmen students at Tuskegee Institute mentions library use only incidentally, and Clark (2), in an extensive study of the relationship between the type of library instruction and the devleopment of library skills of 1,995 students at Wright Junior College focuses almost entirely on these two variables, and does not go on to consider the relationship between library skills and library use in a like manner. Further examples may be noted in this regard in the summary of library use by nineteen cooperating libraries as reported by the Association of Research Libraries in 1976 (1). Most of these libraries did not inquire into the level of library skills of the

respondents to their library use questionnaires; a few did ask whether or not the respondent had received a formal course of instruction in library skills, but no effort was made to relate levels of library skills to levels of library use.

As reviewed in Chapter I of the present study, other investigators have, however, considered or suggested the importance to library use of a number of variables, such as major course of study, sex, age, and marital status. The present study would appear to confirm that age is significant factor, and it also identifies hours worked as another possibly significant factor. However, sex, major course of study, and marital status were found to show little if any relationship with library use. A possible contribution of the present study may be noted in this regard not only in indicating library skills and self-perceptions of these skills as potentially significant variables, but also in suggesting the relative importance of these variables in comparison to hours worked and age.

Recommendations for Further Study

As noted at different points in the present study, a number of questions were identified which would appear to warrant further investigation. It is hoped that the present study may help to fucus upon and to clarify needs in

this regard relative to library skills and library use. These questions and needs for further study may be summarized as follows.

1. The component parts of library skills need to be more clearly identified, as do the component parts of library use. The literature in this area is surprisingly sparse. Hopefully, the present study has added to the few useful items to be found in this area.

2. The role played by self-perception in the relationship between library skills and library use could well be tested further by collecting data relevant to the degree of self-perception of library skills of a selected group and determining the relationship of different levels of self-perception of library skills to different levels of library use.

3. Further studies could also be undertaken in efforts to replicate the findings of the present study with random samples of similar populations.

4. Replication efforts could similarly be made with samples from populations of differing natures in order to determine the parameters and conditions under which the relationship between library skills and library use might prove significant.

5. Additional studies might concentrate on efforts to extend the causal chain through the investigation of

antecedent variables. A random sample of a group for which a large body of information is available with regard to antecedent variables such as socio-economic status, overall intelligence, attendance at secondary school, etc., might be tested in this regard to identify possible antecedent variables in the causal chain relative to library skills and library use.

6. Replications of the present study might be attempted using differing research designs and including particularly designs of experimental and quasi-experimental formats. The latter would appear to be especially feasible in settings where courses of instruction in library skills are already offered.

7. It is to be hoped finally that further and more extensive explanatory of causal modeling in this area might be pursued with elaboration as appropriate to consider a larger number of variables, and especially possible sequential chains reflecting significant antecedent and intervening variables. Newer path-analytic approaches would appear to be especially indicated for this purpose.

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APPENDIX A

QUESTIONNAIRE UTILIZED IN THE PRESENT STUDY

CIRCLE THE ANSWER TO EACH QUESTION THAT APPLIES TO YOU.

A. 1. Male   B. 1. Freshman
    2. Female   2. Sophomore

C. 1. Married   D. 1. U.S. Citizen
    2. Single   2. Not U.S. Citizen

E. Where did you obtain most of the library skills that
    you now have?

    1. In an English class in high school
    2. In an English class in college
    3. In a social studies class in high school
    4. In a social studies class in college
    5. In a class in library use
    6. Informally, by going to the library and finding
        what I need.
    7. Other (Please name) _____

F. From whom did you obtain most of the library skills that
    you now have?

    1. A librarian
    2. A teacher
    3. Follow students
    4. On my own
    5. Other (Please name) _____

G. How frequently do you use the library?

    1. Less than once every two months
    2. Once every two months
    3. Once a month
    4. Twice a month
    5. Three times a month
    6. Once a week
    7. Twice a week
    8. Three times a week
    9. Four times a week
   10. Once a day
   11. More than once a day

H. What length of time do you usually spend in the library each time you go?

    1. Less than 1/2 hour
    2. 1/2 hour
    3. 1 hour
    4. 2 hours
    5. 3 hours
    6. 4 hours
    7. More than 4 hours

I. When you go to the library, what percentage of the time do you spend using library materials, as compared to using materials that you have brought with you, talking, socializing, etc?

    1. 0%
    2. 25%
    3. 50%
    4. 75%
    5. 100%

J. Which of these statements best describes your reasons for going to the library?

    1. I never have a reason to go to the library, to use library materials.
    2. I go to the library only when required to by class assignments and there is no other source of information available.
    3. I go to the library only when required to by class assignments and the library happens to be the most convenient source of information.
    4. I go to the library only when required to by class assignments and as a first choice of information sources.
    5. I go to the library as a first choice of information sources and for recreational reading.
    6. I go to the library as a first choice of information sources, for recreational reading, and because I had rather be in the library than most other places on campus.

PLEASE FILL IN THE BLANK IN RESPONSE TO THE FOLLOWING QUESTIONS

K. Your age: _____   L. Major field of study:

M. Hours worked per week at a job: _____

N. Number of books you CURRENTLY have checked out of the
    library: _____

O. Number of books you checked out of the library last
    semester for home use: _____

P. Number of reserve books or other reserve items you
    checked out last semester: _____

Q. Number of reference questions you asked last semester:

    _____

R. Number of periodicals you used last semester: _____

S. Number of times you have used the card catalog last
    semester: _____

INDICATE YOUR RESPONSE BY CHECKING ONE BLOCK ON THE SCALE
FOR EACH QUESTION.

T. When I go to the library my feelings are:

Great uneasiness and   Complete ease
lack of confidence   and confidence

⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

U. I find the terms and abbreviations used on catalog
    cards, in books, and in periodical indexes:

Very unclear and   Very clear and easy
hard to understand   to understand

⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

V. When I need to use the reference books in the library
    to locate information:

                                        I usually locate the
I do not know   desired information
which books to use   without difficulty

⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

W. I find using the card catalog:

Very difficult   Very easy

⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

X. I find using periodical indexes, such as the <u>Readers'</u>
    <u>Guide</u>:

Very difficult   Very easy

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APPENDIX B

PILOT STUDY DATA

The data represented in these tables were collected in
the latter portion of the Fall Semester, during the period
from November 27, 1978 to December 19, 1978 at Cooke County
College and Grayson County College. The data were collect-
ed to form the basis for a pilot study and to clarify the
questions and procedures used in the present study. The
results are also presented here to provide a replicative
dimension for the present study. The following tables may
be directly compared with the tables presented in the main
body of the present study, as they have been constructed in
parallel fashion to facilitate comparison.

A total of two hundred forty-three respondents are in-
cluded in the data presented in the following tables. One
hundred forty-eight of the respondents were from Cooke
County College. Ninety-five respondents were from Grayson
County College. The conditions relevant to the obtaining
and handling of the data were the same for those for the
data utilized in the present study.

The results of the Spearman correlation coefficients
calculated for the data in this appendix closely parallel

the results of the Spearman correlation coefficients calculated for the data utilized in the present study. Utilizing the same indicators of library use as in the present study, the data in this appendix yielded a Spearman correlation coefficient of 0.7826.

TABLE XXXII

LIBRARY USE WITH LIBRARY SKILLS

Coefficient	0.7826
Per cent	100.0
Cases	243

As in the present study, the data in this appendix revealed no extraneous variables among those tested, which were school attending, intelligence, as measured by the American College Test, English Section, age, sex, marital status, major course of study, and hours worked other than attending school.

TABLE XXXIII

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR SCHOOL ATTENDED

| | School Attended | |
	Cooke County College	Grayson County College
Correlation	0.781	0.783
Per Cent	61.0	39.0
Cases	148	95

TABLE XXXIV

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR AGE

| | Age | |
	20 and below	21 and above
Correlation	0.769	0.774
Per Cent	76.1	23.9
Cases	185	58

TABLE XXXV

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR SEX

	Sex	
	Male	Female
Correlation	0.760	0.798
Per Cent	51.8	48.2
Cases	126	117

TABLE XXXVI

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR MARITAL STATUS

	Marital Status	
	Married	Single
Correlation	0.774	0.792
Per Cent	10.7	89.3
Cases	22	221

TABLE XXXVII

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR SCORES ON THE AMERICAN
COLLEGE TEST: ENGLISH SECTION

	ACT Scores	
	13 and below	14 and above
Correlation	0.7684	0.7799
Per Cent	35.2	64.8
Cases	52	96

TABLE XXXVIII

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR MAJOR COURSE OF STUDY

	Major course of study	
	Science	Non-science
Correlation	0.788	0.776
Per Cent	49.8	50.2
Cases	121	122

TABLE XXXIX

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE, CONTROLLING
FOR HOURS WORKED OTHER THAN ATTENDING SCHOOL

| | Hours worked other than attending school | | |
	Zero	Part time 1 to 39	Full time 40 and above
Correlation	0.7713	0.7692	0.7745
Per Cent	35.0	47.3	17.7
Cases	83	115	45

TABLE XL

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR MARITAL STATUS

| | Marital Status | |
	Married	Single
Correlation	0.7736	0.7920
Per Cent	10.7	89.3
Cases	22	221

TABLE XLI

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR MAJOR COURSE OF STUDY

| | Major course of study | |
	Science	Non-science
Correlation	0.7879	0.7763
Per Cent	49.8	50.2
Cases	121	122

TABLE XLII

CORRELATION OF LIBRARY SKILLS WITH LIBRARY USE,
CONTROLLING FOR SELF-PERCEIVED LIBRARY SKILLS

	Self-perceived library skills	
	Low 0-48	High 49-96
Correlation	0.257	0.318
Per Cent	40.3	59.7
Cases	98	145

Self-perceived library skills were found to function in part as an intervening variable. The partial causal chain may be illustrated in the following manner:

Library Skills ⟶ Self-perceived Library Skills ⟶ Library Use
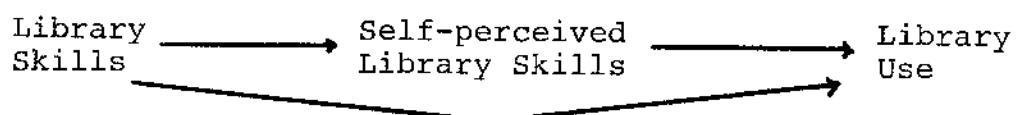
In testing for the potential antecedent variables of sex and intelligence as indicated by the American College Test: English Section, the results were the same for the data in this appendix as for the present study. Namely, that sex and intelligence as indicated by the American College Test: English Section are not antecedent variables.

TABLE XLIII

LIBRARY USE WITH LIBRARY SKILLS, CONTROLLING FOR SEX AND MARITAL STATUS

	Sex			
	Male		Female	
	Marital Status		Marital Status	
	Married	Single	Married	Single
Coefficient	0.7723	0.7991	0.8046	0.8130
Per Cent	5.8	46.1	3.3	44.8
Cases	14	112	8	109

TABLE XLIV

LIBRARY USE WITH SEX, CONTROLLING FOR
LIBRARY SKILLS

	Library skills	
	Low	High
Coefficient	0.7635	0.7928
Per Cent	49.0	51.0
Cases	119	124

TABLE XLV

LIBRARY USE WITH ACT*, CONTROLLING FOR
LIBRARY SKILLS

	Library skills	
	Low	High
Coefficient	0.7747	0.7819
Per Cent	41.2	58.8
Cases	61	87

*ACT scores are available for the Cooke County College
group only.

APPENDIX C

AMPLIFICATION OF BASIC FIXED POINT ANALYSIS

Fixed point analysis has been explicated and advocated as a procedure by Earl R. Babbie, based on his own research experience and the experience of other researchers in both the social and natural sciences. The procedure evisions an alternative general research model which provides greater flexibility in the identification of variables and the testing of hypotheses than is afforded by more traditional and restricted perspectives. In view of the limited references to this procedure which are in <u>Psychological Abstracts</u> <u>ERIC, Social Science Citation Index</u>, <u>Sociological Abstracts,</u> <u>Library and Information</u> Sciences <u>Abstracts</u>, <u>Social Science</u> <u>Abstracts, Dissertation Abstracts</u>, and similar sources, the following basic summary is appended for convenience.

Babbie notes two basic problems or difficulties faced in envisioning research and the scientific method as essentially limited to a restricted set of serial steps leading uni-directionally from theory construction to derivation of hypotheses, operationalization of concepts, collection of empirical data, and empirical testing of hypotheses. These

two basic problems stem from the fact that theoretical concepts are at best only approximated by empirical indicators and that empirical associations are almost never perfect. As Babbie observes: "Ultimately, then, the scientist [must use] approximate indicators of theoretical concepts to discover [and test] partial associations." (2, p. 230). He remarks further that measurement and association are thus inevitably interrelated and must be dealt with simultaneously and logically. Accordingly, he offers the following summary: "Rather than moving through a fixed set of steps, the scientist moves back and forth through them endlessly. Often his theoretical constructions are built around the previously observed associations between empirical indicators. Partial theoretical constructions may suggest new empirical data to be examined, and so forth." (2, p. 231). A continuing interaction is thereby evisioned between measures and associations which are both progressively refined in the process of analysis.

This understanding is reflective, ultimately of the implications of the so-called "interchangeability of indexes" as described and discussed by Paul Lazarsfield, based on the recognition " . . . that there are several possible indicators for any concept." (2, p. 231). As Babbie notes, given a theoretical hypothesis in the form $Y = f(X)$, there

are always several possible indicators or measures of variable X (which may be written x_1, x_2, x_3, and so forth). Similarly, there are always several possible indicators of the variable Y, and, "while there may be reasons for believing that some of the possible indicators [of X and Y] are better than others, they are essentially interchangeable. Thus, the scientist faces the dilemma of which to use in the testing of the hypothesis." (2, p. 321). Fixed point analysis is a method for resolving this dilemma by proceeding from the initial use of all of the identified indicators for the theoretical variables.

When it is considered that there are several possible indicators of a dependent variable, X, written as x_1, x_2, x_3, x_4, etc., it may be seen that in the case of a two variable hypothesis, $Y = f(X)$, as well as more complex hypotheses, there are a number of possible tests. The definition and interpretation of these possible tests presents the researcher with a complex problem. Fixed point analysis provides a method of simplifying and resolving this problem, regardless of the level of the data, whereas other similar procedures, such as regression analysis, usually require more restrictive assumptions associated with interval level data.

In fixed point analysis, the researcher initially selects an indicator of Y, based on his best judgment, from

the possible indicators of Y. For example, y_1 may be chosen from the possible indicators of y_1, y_2, y_3, y_4, and fixed as the initial value of Y (Y = y_1). This is done with the knowledge that Y_1 may, or may not, be the best ultimate indicator of Y. Having the initial value of Y now fixed as Y_1, the researcher varies all possible combinations of X against this fixed point. For example, if the indicators of X are considered to be x_1, x_2, x_3, x_4, there are fifteen possible combinations of these indicators, resulting in fifteen measures of Y = f(X) with the value of Y fixed as y_1. The one combination of indicators of X of the fifteen evaluated above which proves to have the closest relationship with Y (such as the highest value among Spearman correlation coefficients) is now fixed as X. All possible combinations of the indicators of Y are now allowed to vary against the indicator of X just established in the first step of this level of fixed point analysis. This process can continue with as many levels as the researcher deems necessary.

It should be noted that the net result of this process is a better understanding of all the indicators of X and Y and a selection of particular indicators to be used. With the particular indicators of X and Y thus identified, the investigator may now proceed to investigate the relationship

between X and Y with a greater degree of precision. For additional readings on fixed point analysis and related background questions, the sources listed in the bibliography to this appendix are suggested.

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