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DELINQUENT BORROWERS IN AN ACADEMIC LIBRARY

BY

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THESIS

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I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY LE MOYNE W. ANDERSON

ENTITLED *DELINQUENT BORROWERS IN AN ACADEMIC LIBRARY*

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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D512

THE PREFACE

In a post seminar discussion at the University of Illinois one day in 1967, the question turned to the availability of resources for users of American academic libraries. The insatiable needs of the patrons in all college and university libraries were generally acknowledged. The capability of satisfying these wanton appetites was not so fully understood.

It was conceded, furthermore, that resources seemed destined to limitation on most campuses during the foreseeable future. In order for a library to make available its collections it was agreed, therefore, that it must require its patrons to share the materials. No library can be a repository of literary property for the exclusive use of one person or one group, it was concluded.

These principles have been recognized for decades in American academic librarianship. No seminar of scholars can add much to these historical facts. The successes or failures of the patrons* responses to this type of library service, however, are amazingly enough rarely known. Even if a library patron agrees philosophically that a collection is assembled for the use of all members of the community, there seems to be doubt that he actually practices what he knows is the rationale for the establishment of academic libraries.

The argument continues that all patrons do not or will not share resources with others for several reasons. The library is obliged, therefore, to establish regulations, punitive rules, and other measures to elicit return of borrowed materials. Libraries have also taken the position that they must further encourage the sharing of materials by providing reminders to stimulate patron responses. Substantial programs of service and great amounts of time, effort, and funds are expended annually toward this end, but with unknown results.

A further exploration of the literature and a consideration of expert opinion indicated that little information existed about the results of these attempts to encourage patrons to share materials by returning them promptly. It was at this point that serious consideration of a study began to germinate. Subsequent inquiries and discussions led to the experimental research described in this document.

Although the impetus for selecting the topic was rather simple as stated, the implementation and the execution and the analysis and the interpretation were much more complex in this assignment. These elements were included in an investigation that continued with varying degrees of intensity for nearly twenty-four months.

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CHAPTER I

THE BACKGROUND

The earliest centers of higher learning, dating back to the days of the University of Paris in the twelfth century, were associations of students and faculty who "... banded together for mutual protection and welfare."[1] It is a spurious historical notion, however, that these free republics of scholars managed their own affairs exclusively inasmuch as they did come under early ecclesiastical authority.[2] At the outset, these institutions were without property, but eventually there came the residences, the instructional complexes, and then the library - all of which were seen first at the English universities of Oxford and Cambridge. This pattern was preserved later by Harvard's founders in 1636 and continued in America for the next two hundred years.

The expansion of American institutions of higher education and the accompanying modification of the traditional approaches to academic libraries had their roots in the middle nineteenth century, however, and were related principally to two external factors. One was the private philanthropy from the coffers of the wealthy such as Cornell, Hopkins, and Rockefeller which provided "...not only for the construc-

universities..."[3] The other factor was the enactment of the Morrill Act of 1862 by which the land-grant college system was established, to wit:

> SEC. 4 (as amended Mar. 3, 1883). That all moneys derived from the sale of lands aforesaid by the States to which lands are apportioned, and from the sales of land scrip hereinbefore provided for, shall be invested in stocks of the United States or of the States, or some other safe stocks; or the same may be invested by the States having no State stocks in any other manner after the legislatures of such States shall have assented thereto and engaged that such funds shall yield not less than five per centum upon the amount so invested and that the principal thereof shall forever remain unimpaired: Provided, That the moneys so invested or loaned shall constitute a perpetual fund the capital of which shall remain forever undiminished (except so far as may be provided in section five of this act) and the interest of which shall be inviolably appropriated, by each State which may take and claim the benefit of this act, to the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.[4]

This latter development introduced the new elements of agriculture and engineering into the curriculum and also required the facilities and resources, including libraries, to accommodate them. The Act also committed the federal government to financial support of higher education, which promoted and expanded instructional programs, growing research

efforts, and consequently, an opportunity for more persons to pursue a college career.[5]

What has actually emerged over the decades, then, are several types of institutions. All of these are "a compromise between the early collegiate ideal with its stress on character, moral and religious development, and later fellowship and well-roundedness as well as intellectual achievement, and the university ideal, with its almost exclusive concern with the advancement and transmission of knowledge."[6] Although there is no simple pattern for the 1,739 four-year colleges and universities in this country, they all possess similar traits and features.[7]

The sixty-nine institutions which comprise the land-grant system seem to have even more in common, however, than any other type. From the characteristics which mark this type of institution, emerges a clear and unique pattern -- "a trilogy of American ingenuity. ...The three legs on which the tripod stands are instruction, research, and extension."[8] As the land-grant colleges grew, higher education came to be regarded as not so much a luxury as a national necessity. The assumption was that each person should be given the opportunity to develop his innate abilities to benefit himself and his nation. The land-grant college fostered this concept, and as a result became "an academic melting pot of all classes and kinds."[9]

The land-grant university library as we know it today in the United States is an outgrowth of these developments in higher education in the nineteenth and twentieth centuries. It was principally the activity at Harvard generated by Justin Winsor, librarian under President Elliott, however, which led to the present concept of an academic library. Winsor advanced the idea that the library was for the use of all students and not merely a vast depository of carefully-guarded publications accessible only to the privileged scholar or faculty member.[10]

Like its progenitors in other types of institutions, the library at the land-grant college resulted from "a pooling or sharing of resources on the part of individuals who constitute its clientele."[11] No matter how serious the principle of self-sufficiency was pursued, that is, that all materials needed be immediately at hand, it has always been apparent that no library "no matter how vast its resources can possess more than a fraction of what is produced."[12]

Such developments were in conflict, however, with certain early and even recent views, one of which contends that "the ideal objective of a research library is a complete record of human thought, emotion, and action. Its collections should be developed without distinction as to language, date, place, and form of publication. In short, it should have everything."[13] This has always been an

unrealizable goal if for no other reason than that the annual world production rates as estimated by the Library of Congress are in excess of "300,000 books, 70,000 periodicals, 30,000 newspapers, and 17,000 maps."[14]

Discarding the principle of self-sufficiency leads inevitably to the idea of sharing resources. If everything produced cannot be at hand, then the alternate approach must rest upon another principle, that is, the sharing between libraries and the sharing among patrons within the library. Nowhere has this principle been followed more closely than at a land-grant university library. This type of library is faced with several vexing problems some of which are common to all libraries, but many of which are particularly unique. Especially prominent are the demands to provide the adequate library resources from an exploding output of literature to a growing land-grant university community in order to support the many expanding and diversifying programs of teaching, research, and extension.

Observation suggests that these needs will only be met within a milieu where sharing library materials with one another is the rule. In other words, no library can provide resources for the exclusive use of a few patrons. If this premise is acceptable, then the means and methods of fostering such a climate are vital. The forces, furthermore,

which a land-grant library can generate towards stimulating the patron to share with others become major concerns.

The Problem

A number of developments in higher education today bear importantly upon a critical problem which academic librarians face. It is based partially upon the fact that students at this point in time are more advanced academically than they were in the past; they are more physically mature; they are often married; an increasing number attend college; and a far larger proportion continue into graduate school - all of which leads to greater numbers making greater uses of library resources. As the numbers of patrons increase and as the utilization of resources rises correspondingly, the heavy demands upon collections in the future suggest levels of an overwhelming magnitude.

Although a consciousness of the patrons' great needs for access to limited resources prevails, their habits in using them are not well known. We face a paucity of information upon which to base decisions involving the provision of library services and resources in land-grant university libraries, particularly.

One critical element in determining the needs of the patron for material rests firmly upon his behavior. By philosophical implication, at least, librarians suggest that

collections of books and other materials are provided for the use of all patrons, and therefore a responsibility to share resources on an equal basis exists. The practical results, however, seem to contest this assumption to a considerable degree. It is not known, moreover, what the reasons are for the behavior of patrons in many situations involving the use of resources.

If the responsibility for a person to share borrowed library resources by returning them promptly is fundamental in the classical relation of purveyor and patron, then why does the latter often fail to uphold his original agreement? The reasons for this failure are almost unknown, and, therefore, dealing with the problem is difficult, if not impossible.

Libraries must have an understanding of the human beings they serve in order to provide adequately the resources which are required. The present research project focuses on this problem by gathering and analyzing selected facts about the delinquent borrower's habits of sharing resources as well as his response to efforts at stimulating his behavior.

The Related Research

Several studies have been conducted during the past thirty years on such related topics as the kinds of reading,

the habits of reading, the methods of studying readers, and the uses of types of reading material. Limited previous research has been recorded on the book-sharing habits of the library's readers, however. There are only a few recorded studies, for example, concerning the responsibilities of book borrowers, the numbers of delinquent borrowers, and the costs of reminding patrons to share books.

Among the former studies, Waples and Tyler assert that "the character of adult reading is a matter of far greater social importance than the much discussed question of illiteracy. If this be granted, the importance of developing some reliable basis for selecting reading of most worth should be obvious...(it) remains to determine and evaluate what adults want to read. When such interests are known, it becomes possible to describe the kinds of reading that people want and that pertain to socially important problems."[15] The authors continue by noting that facts concerning the reading of adults are important not only to librarians, but to students of society. "The curiosities, problems, and prejudices of any typical group of adults find expression in what they want to read about. Hence, studies of reading interests are a contribution to problems of social organization and social change."[16]

There have been, over the years, important investigations describing the reading habits of patrons. A

monumental effort in this area of research is that of Strang, who explored the structure of reading audiences, and described the variety of reading habits.[17] Among the many conclusions, she states, "People's reading is influenced by environmental factors such as availability of books and magazines, geographical locations, vocational demands, competing leisure activities, and interests arising out of other environmental stimuli. Interacting with these environmental factors are the individual's predispositions, reading rate and comprehension, age, sex, and that quality of response called intelligence. Those and many other factors enter into the reading patterns of adolescents and adults."[18] Strang suggests, furthermore, that the scholar is interested in reading as it operates in daily living because it may be an important source of personal satisfaction and social usefulness, and it may be a decisive factor in social progress.

In more recent years, Ennis has studied extensively the reading patterns of library users. He has outlined in elaborate and lucid detail his views toward how to study use of print by the distinction between general audiences for books and specialized audiences for particular types of recorded information.[19] He suggests that "the conceptual separation of the two types of audience invites a different kind of question, each of which in turn relates to a different and basic sociological problem."[20]

As far as the library borrower, per se, is concerned, there have been research forays into the responses of patrons to certain punitive measures applied to their book-sharing activities. Kozumplik has reported on an analysis of circulation statistics at a land-grant college library in which he points out the low incidence of borrowed material returned beyond the date due.[21] He infers that, because the expenses of administering this program are greater than the fines collected, it may not be worthwhile. He suggests that "it seems feasible to place greater confidence in the student's high sense of responsibility...and to relegate fining and the sending of overdue notices to their properly minor roles."[22]

Some investigators have looked into the practice of reminding delinquent borrowers, but largely for purposes of analyzing costs of the operation rather than to determine the effect of such an activity. Kilgour describes the use of marginal punched charge card forms at the Yale University Medical Library and the resultant simplification of sending overdue notices.[23] He suggests that such a system reduces the time involved, and, therefore, the cost of mailing notices. He also concludes that this method increases the availability of books and periodicals and results in an increased circulation rate.

Another investigation which sheds light upon the experience of various libraries in the assessment of the sharing of library materials is the one directed by George Fry & Associates for the American Library Association and the Council on Library Resources.[24] The purpose of this effort was to gather facts and figures which could apply toward determining the type of system most effective for a particular library. The results showed that overdues in academic libraries varied from 0.1 - 0.8% of the total circulation at one library to 14.9 - 15.6% at another library, with the average range falling between 9.3 - 10.0%.[25] The investigators reported, furthermore, that the most common reason given for sending overdue notices "...was to remind the borrowers on the premise that they lose track of items after too long a period."[26] They recommended, nonetheless, "...that special library loan periods be indefinite. For libraries that feel the need to send some form of overdue or reminder notice, a slip with appropriate wording can be sent three to six months after charging."[27]

Whereas there has been little recent specific research recorded, the philosophical position of the library regarding the sharing of resources has received considerable attention and documentation. Included in Public Library Service..., for example, is the statement:

> The library is a group means for people to gain access to resources. The conditions of use should be liberal and flexible so that persons of varied habits and responsibilities can use them conveniently. At the same time, conditions of circulation for home use must be established which protect the majority from monopolization by individuals and which get the maximum return from public funds.[28]

The nature of certain problems created by those who do not share the materials they have borrowed has also been expressed in celebrated punitive actions. In some instances, recalcitrant patrons were summoned to court for their refusal to return borrowed material.[29] A city ordinance in East Orange, New Jersey, states that it is illegal to hold a library book beyond a certain period. After three initial notices plus a final certified mail notice are forwarded by the Library, the Court sends a notice in lieu of a summons for violation of an ordinance, followed by a formal complaint if necessary. The court next converts complaints into warrants which are then handled by police who serve them. If the delinquent borrower fails to answer the summons, he is held in contempt and bail is set; or, if no bail, the patron is jailed. The newspaper articles a few years ago, which described and commented upon several arrests, projected the case of the delinquent borrower into an international cause célèbre.

The publicity which such an incident received in the nation's press gave the American Library Association cause to issue a statement by the Executive Director as follows:

> It is a rare library that does not have some trouble in getting borrowers to return books. The principal sufferer in these instances is the borrower's neighbors; his failure to return books impose a hardship on others who wish to read and use the books. Fairness to other readers requires the return of borrowed books within a reasonable time.[30]

Another relative point involves a fundamental question upon which little evidence has been unearthed. Once having loaned materials, it can be asked whether a library has a continuing responsibility to seek the prompt return of the items. The procedure which seems to be favored by most libraries is to try motivating patrons to share materials by some common method such as sending notices.[31] There are librarians who claim that their responsibility includes keeping close check on materials, but how far they must go in retrieving books which borrowers have failed to return is an unsettled question. A survey by Trainor and Eckardt of sixty libraries concluded that despite the fact that all of these agencies send notices to delinquent borrowers, the value of such "a courtesy gesture to the public" was questionable because of cost.[32] No evidence was offered, however, by the investigators regarding the effectiveness of such a procedure.

There are academic libraries which suggest that once having actually made a book available, further responsibility adheres to the patron to return items for all others to use with no further stimulus from the library deemed necessary. The premise that "...frequent overdue notices are necessary in order to have books returned soon after they are overdue so that others may use them, appears to be logically incorrect," Howell has asserted.[33] "The patron, not...library, is responsible for the return of material. Actually, we only manage to compound the problem when we, at considerable expense, vainly try to assume this responsibility for him."[34] To extend this point-of-view, Howell studied the effects of the practice at the State College of Iowa to reduce the overdue notices to twice each semester. He observed that the reduction in staff time was considerable. He concluded, furthermore, that students accepted this change in re-focusing responsibility on themselves, judging from the fact that the number of books returned did not decrease from the time when more notices were sent.

Another consideration is the magnitude of the practice of reminding patrons to share materials by the various libraries. The efforts to direct the students' attention toward their obligations to return overdue materials is widespread throughout the academic library world.[35] At the largest land-grant university library, sending overdue notices is a traditional practice of deep entrenchment in

the procedures of the circulation system.[36] In no instance, including the experience at the University of Illinois, however, could the effect of the practice of notifying patrons that they must return materials in their possession for others to share be supported by any evidence - merely testimony. The questions of Trainor and Eckardt seem relevant to this issue when they ask: "Does the end justify the means? Does it pay to go to all the trouble and expense of sending out overdue notices? Why try to retrieve anything? Would it not be better to forego all notices and write the materials off as lost at the end of the year?"[37] Although the procedure, then, is widespread, few, if any, libraries know the results of their efforts to encourage the return of borrowed material.

In this context of sharing resources, no consideration is given to the punitive measures such as fines which are often imposed to prevent the occurrence of overdue material in the first place. This type of effort creates quite a different situation from the application of treatments to borrowers which tend to encourage them to return materials which are already overdue.

In discussing the sharing of resources, one final point to be considered is the fact that heavy use by patrons in academic libraries is concentrated among a comparatively small proportion of the titles in the collection. The

importance of this principle was illustrated in such research studies as those conducted by Fussler and Simon in which they conclude that the use of collections is uneven and that a prediction of "probable future use of groups of books with defined characteristics" can be made.[38]

In a later study at Northwestern University by Trueswell on the characteristics of circulation, it was determined that "a very small proportion of the library's holdings is accounting for a large fraction of the daily circulation."[39] He suggests, furthermore, that well under 50% of the holdings of a library will satisfy 99% of user circulation requirements. On the basis of the summaries of these two studies alone, it is evident that exceedingly high demands for relatively few books necessitate a greater urgency for patrons to utilize and return the material immediately in order to make it available for others to use.

The Pilot Study

One element of this vast problem of sharing library resources, which continually re-emerges in a sea of study and speculation and where there is little evidence upon which to form any conclusions, is the habit of borrowers to return materials late and the reasons for their actions. In order to probe into this question, a small study was undertaken at the University of Illinois in May, 1967.

Ten students were selected at random among fifty who had borrowed materials but failed to return them on time. These students were interviewed and were asked several questions regarding their borrowing habits. An attempt was made to determine whether they were aware that they had charged out materials which were due. It was also the purpose of the study to solicit reactions to a stimulus such as an overdue notice received from the University of Illinois Library. The study went one step further in trying to ascertain the reaction to other types of proposed reminders and the degree to which they would provide assistance in stimulating the return of overdue materials (see Appendix A).

In this abbreviated pilot project, the patron emphasized overwhelmingly that the chief reason for failing to share materials by not returning books on time was that he forgot. Human memory is not infallible, of course, which indicates that some type of notification is in order to remind the forgetful patron. The response to the suggestion that the type of reminder might have some relation to the action taken by a patron was scattered and inconclusive. It seemed quite possible, nonetheless, that for a certain segment of the borrowers with past due materials, a more direct stimulus provided by a library authority would move them to respond even more promptly.

The data from this small study suggest an hypothesis, that is: that an undergraduate borrower who fails to share library materials by returning them at the time the loan period expires is a person who has forgotten and, unless he is reminded of his responsibility, he will take limited action toward fulfilling it. The nature of the reminder, furthermore, is important and tends to stimulate a more prompt response, the more direct it is.

It was inferred on the basis of this sample study, therefore, that the typical borrower keeps materials out of the library beyond the date due because he loses track of them. Once he has been reminded of his obligation to share the materials, however, he responds affirmatively. The speed of his response, furthermore, seems to be related directly to the level of concern evoked by one reminder method over another.

In view of related studies of the library patron and his problems of using and sharing materials as well as the results of the brief pilot study, it is contended that all other things being equal, the greater the stimulus to share resources provided by an academic library the greater will be the rate of returning materials by delinquent borrowers because they tend to forget the responsibility to share resources until reminded of it.

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CHAPTER II

THE DESCRIPTION

The previously cited studies, the opinions of experts, and the accumulated years of professional experience led ultimately to the design of this research project. The experimental method was selected in order to test the hypothesis that, all other things being equal, the greater the stimulus to share resources provided by an academic library, the greater will be the rate of returning materials by delinquent borrowers. It was postulated, furthermore, that delinquent borrowers tend to forget their responsibilities to share resources until reminded of them.

In this empirical test of an hypothesis, the primary objective was to apply and observe selected treatments in order to determine whether they produced an improvement in the frequency rate of returning library materials among delinquent undergraduate borrowers. At the outset, it was conjectured that if the hypothesis was generally true, it should apply to the undergraduate borrower at a medium-sized land-grant university library. The experiment tested, therefore, the logical consequence of the general statement: that given a selected group of delinquent undergraduate borrowers at a medium-sized land-grant university library who receive varying forms of stimuli regarding the

responsibility of sharing borrowed materials, the borrowers who receive the more direct stimulus will return materials at a significantly faster rate than will those who receive a less direct stimulus, all other things being equal, because the delinquent borrower forgets his responsibility to share resources until reminded of it.

It was anticipated, furthermore, that if the postulated causal element was operating, the difference in the promptness of returning materials would be related to the particular method of notifying delinquent borrowers. The stimulus of a telephone call, for example, would elicit a more prompt response than a letter, or a postal card. It also seemed logical to expect that in instances where no type of stimulus was provided, the rate of return would be even lower.

The Assumptions and Definitions

In this experiment, certain assumptions were made. Libraries do not provide material in their collections for the exclusive use of one patron, but they assemble all resources to be shared mutually by everyone. It was assumed that this concept was understood by delinquent borrowers because of previous knowledge or experience with libraries as institutions of society.

It was also assumed that at a particular academic library, the specific policy governing the return of materials

was a matter of record. This information could be found readily within the borrowed item itself, within public guides and handbooks, and within normal exchange of information among librarians, faculty, and the undergraduate.

At one time or another, therefore, it was assumed that the typical undergraduate on a university campus would know generally and/or specifically about his responsibilities for sharing resources by returning borrowed books to the library.

Delinquent borrowers at a multi-purpose university include several levels of student patrons as well as the faculty, the staff, and the non-institutional borrower. For the purposes of this experiment, however, the delinquent borrower was defined as an undergraduate patron who has been loaned materials at his request by an academic library for off-premises use. According to this definition, he has failed, furthermore, to return them by the maximum time limit allowed in terms of the loan period.

The Treatments

The different procedures applied in this experiment whose effects are to be measured and compared are described under the general term, treatments. The object of using the specific treatments in this experiment was to determine which was the most effective, if indeed it made any difference in the behavior of the treated subjects which treatments were applied. It was apparent that the treatments

chosen had to be of such characteristics that they could be tested readily in practice. Some types were considered initially which it was later determined had little chance of being administered meaningfully or whose responses could supply substantive information.

It was early in the design stage of the experiment that consideration was given to the use of six different treatments. It was thought possible, originally, to use a conspicuous label in each borrowed volume as a reminder for borrowers to share materials by returning them promptly. It was also considered initially to post public notices at the points where a loan transaction was made in order to call attention indiscriminately to all borrowers when an item was due. It was also suggested to print regularly in a student newspaper an advertisement reminder that library books were due on a certain date.

All of these types of treatments were rejected ultimately. It was concluded that they would have been difficult to identify and impossible to calculate accurately the responses which might have been generated. On the grounds of extreme cost and impractical methods of application, it was also decided to reject an early proposal to study the behavior of borrowers personally visited by a library messenger who would remind them of their delinquency.

It remained, then, to follow the treatments which were the most desirable and feasible and which had some previous acceptance in libraries generally. The first treatment selected, consequently, was the postal message, prepared and dispatched by the authority of a library (see Appendix B). It was the intent to inform the delinquent borrower that his loan was past due. It was also the objective to remind the student of his obligation to share materials with other students. The notice was sent together with a photocopy of the loan transaction document to the campus address of the undergraduate borrower (see Appendix B).

The second treatment chosen was the less widely used and more expensive method, the personal telephone call. The delinquent borrower was contacted by the investigator as a representative of the library and reminded that he had a specific title past due. The caller followed a pre-designed script which, after verifying the identification of the borrower, proceeded to relate a message similar to the mailed notice (see Appendix B).

The third treatment was a "control" in which the delinquent borrower was treated with neither a mail notice nor a telephone call. The behavior of the student in this group would supply important information to the experiment, it was surmised, even though a specific treatment was not applied.

The aim of selecting these treatments was to utilize meaningful and practical stimuli in order to determine whether receiving a telephone call would prompt a borrower to return books faster than one who received a written message. The object of the treatments was to see, furthermore, whether the telephone call or the mail message would elicit a different response from no stimulus at all.

The Conditions

As Cochran and Cox have stated, "The specification of the treatments may raise difficult questions about the conditions under which the treatments are to be compared."[1] In this regard, one objective was to maintain similar conditions for each treated group throughout an experimental period. Each test was conducted on the same day of every week during an academic quarter. A given treatment was applied to all of the borrowers in the group at the same time. It was a condition of the experiment, furthermore, that borrowers were grouped according to the severity of their delinquencies. The borrower who had material one day overdue was not treated together with a patron who had materials seven days past the due date, for example.

No treatment was considered completed until assurance had been received by the investigator that either a telephone call had been received or the postal message had been delivered. In order to confirm the fact that the subject

had actually been treated, the non-delivery of all mail items, for example, was reconciled with the loan record, which was subsequently withdrawn from the experiment. In the case of telephone calls, the investigator always spoke directly with the delinquent borrower. No messages were left asking the borrower to return a previous call, for example. If the patron was not contacted personally, the subject was not considered to have been treated.

Further efforts were made to minimize the experimental error. The subjects were all treated at the same time, that is, within a twenty-four hour period. Every effort was made to limit the introduction of extenuating circumstances. These could arise over longer periods of experimentation influencing behavior and thereby causing a response variance within a group, not necessarily due to the treatment. The time of the day, the time of the week, and the time of the year were held constant and never varied in conducting each experiment. It was assumed, of course, that the subject treated either listened to the message of the telephone call, or read the mail notice he had received.

The Controls

It was necessary to include a control group in the experiment in order to compare the effectiveness of the other treatments. It was also desirable to investigate the pronouncement in some quarters that delinquent borrowers will

respond when they are "good and ready" and no stimulus is going to alter these rates appreciably. Inasmuch as it was not initially known which of the treatments would be the more effective, or the degree of effectiveness represented, it was thought that a control group would provide these comparisons.

The control group became an integral part of the experiment which allowed the results to be directly comparable with those of other treatments. Other uses of the control group were considered at one time, but were rejected ultimately. Since the treatments were tested on the same campus at the same time with human subjects, the return rate of library materials before the treatments were introduced, for example, was not considered a satisfactory control. The return rate of materials on another campus, or at another time on the same campus, where delinquent borrowers were receiving similar treatments, was not acceptable as a good control either.

In these cases, observed effects of new treatments may have been due to differences in the severity of the delinquency. It may also have been due to the type of subject or to other aspects of library conditions in two separate time periods, or on two different campuses. In this experiment, it was essential to regard the telephone call and the mail

notice on an equal basis, and to use randomization in assigning the treatments to the delinquent borrowers.

The Replications

A difficult problem confronting the investigator in this experiment was to maintain accuracy and precision. It is known that the results of some experiments are affected by extraneous variations as well as by the action of the treatments themselves.[2] These experimental errors affecting any treatment tend to cancel out as the experiment is repeated. Replication of an experiment decreases the error associated with the average results of treatments used in an experiment, provided, of course, "that precautions (such as randomization) have been taken to ensure that one treatment is no more likely to be favored in any replicate than another..."[3]

In order to increase the precision and to obtain a close estimate of error, each experiment was executed on a Wednesday for eleven consecutive weeks. Other considerations in determining this pattern included the fact that experimental units could be formed, treatments could be applied, and observations could be recorded most conveniently at these intervals. Replications were conducted at one place during one academic term. This plan was favored over the type of experiment which differs in time and location.

The Techniques

The principal objective in developing the techniques of the experiment was to secure uniformity in the ways in which the treatments were applied. In delivering a telephone message, for example, the same amount and kind of information had to be supplied to each subject. The script was composed, therefore, which served as a guide for each conversation (see Appendix B).

An effort was made to develop a uniform pattern. Several versions of scripts were written subsequently. These were evaluated ultimately through role-playing sessions of the investigator and assistants and by stop-repeat-listen use of the tape recordings made of the trial calls. In addition, scores of live telephone calls were placed previous to the experiment in order to polish the relaying of messages and to test the responses of borrowers. Careful evaluations of all these methods were made during critiques which preceded the experimental period and after which the final pattern was established.

A similar review of the development of the mail notice was followed. Several versions were composed and tested before the final model was selected (see Appendix B). An investigation of the delivery system was undertaken and tested so that the handling of notices could be evaluated and incorporated into the experimental plan.

During the tests, it was necessary to exercise certain controls over external influences. A concentrated effort was made to allow every treatment in the experiment to produce its effects under desirable and comparable conditions. Telephone calls were made, for example, at a time when the subject was most likely to be awake and available to talk. Mail was dispatched so that it would be delivered at the same time as most other communications would ordinarily be received by the subject.

In order to eliminate any traces of the halo effect in the experiment, no public or private announcements were made about the study. All telephone calls and mail notices were sent under the aegis of the library authority, and no reference was made to the research project. The subjects knew little or nothing of their inclusion in this experiment. In fact, the library staff members were not told the nature of the plan, only that a special project was underway. This practice, it was thought, would prevent any biases in the subjects' responses as well as in the staff's record-keeping practices.

Close supervision was maintained and constant revision undertaken of the work of all assistants to control gross errors. A careful scrutiny of all data gathered by others in the experiment was conducted by the investigator routinely and personally. In order to prevent measurements which

were biased and thus increase experimental errors, additional safeguards were initiated. These included the regular issuances of instructions, written and oral, as well as conferences and meetings of all staff members participating in the experiment.

Attempts were made to keep the technique simple, knowing that the likelihood of accuracy would be increased. Complicated techniques were eliminated whenever possible, particularly in those areas of tabulating the results of the treatments, and especially if they revealed no more information than simple approaches. There were several library assistants involved in the various phases of the experiment. The risk of error was greater, therefore, unless the techniques could be kept uniform, understandable, and uncomplicated -- which was the constant effort of the investigator.

The Experimental Unit

The choice of the experimental unit was of primary importance. In planning the project it was decided to concentrate upon the undergraduate delinquent library borrower at a land-grant university. These students were easily identifiable and were used as subjects to which the treatments were applied. No further selection was made regarding the composition of the experimental unit beyond the random choices which were necessary for the particular subjects of a specific treatment group.

In view of the fact that the responses to a treatment involved human beings some selectivity of subjects could not be avoided. If the subject did not cooperate, for example, by hanging up the phone before completing the conversation, then he could not be included in the experiment. The success of the project, therefore, depended to a degree upon the investigator's ability to persuade participation.

The Experimental Site

The site at which the experiment was conducted was Colorado State University at Fort Collins. The fundamental consideration was a place where the investigator had immediate access to an academic library and where he could obtain maximum accuracy for a reasonable expenditure of time and labor.

This field study library was located at a university which offered an instructional program typical of the other states in the country where the land-grant institution and the state university are separate entities. The twenty states where this type of institution existed included: Washington, Oregon, Utah, Montana, Colorado, Kansas, Oklahoma, North Dakota, South Dakota, North Carolina, Iowa, Michigan, Indiana, South Carolina, Mississippi, New Mexico, Alabama, Virginia, Massachusetts, and Texas.[4]

In addition, the library facilities for undergraduate patrons at Colorado State University were similar to those at the other land-grant institutions. The reference and circulation services were closely rated in concept to those at the other libraries, also.

The Colorado State University was established at Fort Collins nearly one hundred years ago in 1870 by the Council and the House of Representatives of the Colorado Territory. In 1879, it opened its doors to the first students, and was designated as Colorado's land-grant college under the terms of the federal land-grant act. The school was well-known throughout most of its history as the "Colorado Agricultural and Mechanical College" until 1957 when the Colorado General Assembly re-designated it "Colorado State University".[5]

The University grew slowly until the end of World War II when registration suddenly began increasing sharply. By 1961 student enrollment was up to 6,529. By fall quarter of 1968, the enrollment had more than doubled to over 15,000 students.[6] To keep pace with the explosive student enrollment growth of the 1960's, the University embarked upon an accelerated capital building program. The University now has more than 100 buildings with eighty-nine of them on the main campus. Twenty-five of these buildings are less than five years old, and nearly all buildings have undergone

recent remodeling or enlargement. Enrollments have continued to exceed the growth of academic space, however.

The University is accredited by numerous associations, councils, and societies. It is located on three campuses, the principal one of which is at Fort Collins. This is a city of approximately 40,000 situated at the foot of the Rocky Mountains, sixty-five miles north of Denver, and forty-five miles south of Cheyenne, Wyoming. A wide range of local and campus activities together with the excellent climate and mountain surroundings add to the setting for undergraduate students.

Much of the student life revolves around the William E. Morgan Library, completed in 1965. It is a functional modern building, housing more than a half-million volumes, and a vast array of periodicals, journals, newspapers, manuscripts, films, phonodiscs, and other items. The library provides seats for over 2,000 readers.

The objectives of the Colorado State University Libraries are based upon the objectives of the University itself. These include the support of the instructional program by providing resources, teaching students the effective and efficient use of library materials, and encouraging them to develop the habit of self-education. The library system is primarily a teaching instrument. "The professional staff, administrative organization, and the physical facilities are

so planned to implement teaching, learning, and research by the use of all library materials. The professional staff is composed, therefore, of educators who teach, not necessarily in the classroom, but by mobilizing the resources of the libraries according to a well-defined program."[7]

The Groupings

Many factors were considered in the design as the basis for grouping. Inasmuch as knowledge regarding the best criteria for grouping in the line of research contemplated was not available, it was necessary to conduct a series of uniformity trials. These tests were structured so as to execute them during the winter quarter of 1968, which was well in advance of the planned period for the actual experiment. Uniformity, in this case, refers to uniformity of treatments. The mail notices were sent and the telephone calls were made to the randomly selected delinquent borrowers. The techniques were representative of the type contemplated for the actual experiment.

For the first trial, a sample was drawn from among the undergraduate delinquent borrowers identified during the regular weekly exercise of sending overdue notices at the field study library. Among the ninety borrowers identified, thirty were selected. After arranging alphabetically the borrowers' cards by last name, each was assigned a number from one to ninety. Successive two-digit groups in a random

number table were read and when it constituted a number between 01 and ninety that number determined a borrower for inclusion in the sample. Any two-digit group not between 01 and ninety was ignored. By taking successive groups in this way until thirty numbers were chosen, the sample was determined.

By lot the sample was divided into three sub-groups: A, B, and C. The C group charge cards were returned to the file immediately; the B group cards were prepared for reminder notices; and the A cards were held for the telephone calls in the trial.

In the calling process of the trial, the investigator was assisted by two library staff members. In conducting the preliminary calls, one side of the conversation was tape recorded in order to gain information of the telephone manner as well as the inflections and the timbre of the caller's voice. Some role-playing was conducted over intercommunication telephone lines in order to gain impressions of possible dialog that might ensue in a genuine call.

The first call was placed and the delinquent borrower answered the telephone. The message was relayed and the conversation terminated. The subsequent calls were uneven in the response. Two of the calls were to patrons who were unavailable and would not return until a late hour. These subjects were rejected, therefore, from the sample. Another

caller indicated he had returned the material, and it was suggested that he make further inquiries at the library's loan desk. The third borrower received the message and thanked the caller for reminding him. A variety of these responses were noted and the aforementioned were typical.

It was concluded ultimately that the trial was profitable for the following reasons: (1) it gave the caller an opportunity to develop a telephone technique; (2) it gave the investigator a chance to revise a script suggested for the telephone conversations; (3) it added information to the type of responses that might be received from a delinquent borrower; (4) it showed the necessity for a sub-group as a necessary back-up for the possible non-responses and non-telephone numbers that might occur in sample groups; and, (5) it afforded the investigator a chance to review in retrospect the conversations of the caller and make suggestions subsequently based upon an evaluation of the audiotape.

A second trial for the telephone call treatment was conducted a week later. In this case, out of the thirty delinquent borrowers randomly selected in the same manner as previously described, eighteen were actually contacted by telephone. All of the caller's side of the conversations were tape recorded so that the principal investigator could review the presentation in order to evaluate further the techniques and procedures followed.

The trial also included a review and sampling of the various types of mail notices to be sent. Reaction was obtained from patrons regarding the physical appearance, the message, and the possible affect it might have on a subject so treated. This information was also helpful in determining the final copy.

Although it was not the primary purpose of this investigation to determine costs of the treatments applied during the experiment, an effort was made to establish a rough bench mark. On the basis of some elementary time and motion studies which included only the components of labor and supplies, a unit price of 35¢ for each telephone call and 26¢ for each mail notice was established. It must be emphasized, however, that these estimates are not based upon rigorous cost analyses and, therefore, are not defensible as precise figures.

Based upon the results of these trials, several groupings were formed. It was known previously that the experiments which are executed close together tend to be more similar in their results than those spaced far apart.[8] These experiments were conducted, therefore, within seven days of each other. This spacing followed the knowledge that results vary less from week to week than from one part of the year or from one year to another year. The experiment was also confined to one academic quarter.

Characteristics of the students tend to change slightly from one term to another; approaches to library material, therefore, often may be affected by the varying demands and distractions of one term over the next.

A plan to complete all treatments on the same day was also followed. In this manner, responses that occur from day to day did not influence any comparisons made among the treatments. The alternative was to apply all of one treatment during one week, another treatment the second week, and so forth. This grouping was rejected as an invitation to bias since the treatment effects could be influenced by these shifts in application.

The Summary

The purpose of this research project was to study the delinquent borrower's habits of sharing resources. In the experiment the selected treatments were applied to delinquent borrowers in order to determine whether the frequency rates of material returned would change in the indicated direction. In conducting such an experiment, the two treatments of telephone calls and mail notices were selected because they were the most desirable and feasible to several alternatives.

It was pointed out, also, that similar conditions of time of day, week, and year would be maintained in order to

minimize the risk of response variances not caused by treatments. A control group was an integral part of the experiment and was included in order to provide comparisons. The need for a high level of accuracy and precision was recognized which included the plan to use eleven replications. Simple techniques were employed to secure uniformity in application of treatments.

Composition of the experimental unit was the undergraduate delinquent borrower of library books. The experimental site was selected on the basis of its accessibility to the investigator -- a place where maximum accuracy for a reasonable expenditure of time could be expected. Based upon the evidence of several trials, the groupings were formed which provided that all experiments would be executed close together which suggested that the results would more likely be similar, thereby reducing the likelihood of bias.

The Footnotes

1. William G. Cochran and Gertrude M. Cox, Experimental Designs (New York: John Wiley, 1957), p. 11.

2. Ibid., p. 17.

3. Ibid.

4. American Association of Land-grant Colleges and State Universities, Centennial Fact Book (Washington, D.C.: The Association, 1961), pp. 35-36.

5. Colorado State University, General Catalog, 1968-69 (Fort Collins, 1967), p. 11.

6. Ibid., p. 12.

7. Colorado State University Libraries. Personnel Organization and Procedure Manual, (Fort Collins, 1965), p. 1 of Per:100-65 (rev.).

8. Cochran, op. cit., p. 43.

CHAPTER III

THE METHODOLOGY

The initial design of the experiment included a plan for the selection of subjects, the application of treatments, and the collection and tabulation of the resultant data. A primary consideration underlying these elements of design involved uniform definitions.

Of principal interest was the meaning of the term: delinquent borrower. For purposes of this study, the delinquent borrower was defined as an undergraduate patron, that is, one pursuing a bachelor's degree, who has been loaned books (not periodicals or other fugitive materials) by the library for off-premises use. He has failed, however, to return them within the regular two-week period after the date on which he originally borrowed them.

Facing such a definition, the first task of the investigator was to establish a procedure by which the delinquent borrower could be readily identified. In order to explain the method, however, it is first necessary to describe the circulation procedures at the field-study library.

The Circulation System

A generalized version of the procedure followed by a library patron to borrow and return books is represented by a flowchart (see Figure 1). In designing this chart, as with all others in this report, the conventional shapes to symbolize parts of the procedure are used. The drawings are based specifically on the symbols of the IBM Flowchart Template, Form X20-8020.

The diamond box has been used for "yes-no" decisions or questions, the answers to which determine the subsequent direction of activity, as indicated by the arrows. The squares represent operations performed. The hexagon indicates a group of operations not detailed in the flowchart. Although the chart is a simple and accurate representation of the procedures, almost every library patron or library assistant will produce some variation on the general pattern.

A charge card file system is used involving borrower participation. In this case, the patron's involvement in the transaction process necessitates supplying the information required on a 3-1/4" x 3-3/4" card (see Appendix C).

After completing the initial process of filling out the card, the patron presents it together with the book to an assistant at the central loan desk. Upon identification of the borrower and a scrutiny of the information presented on

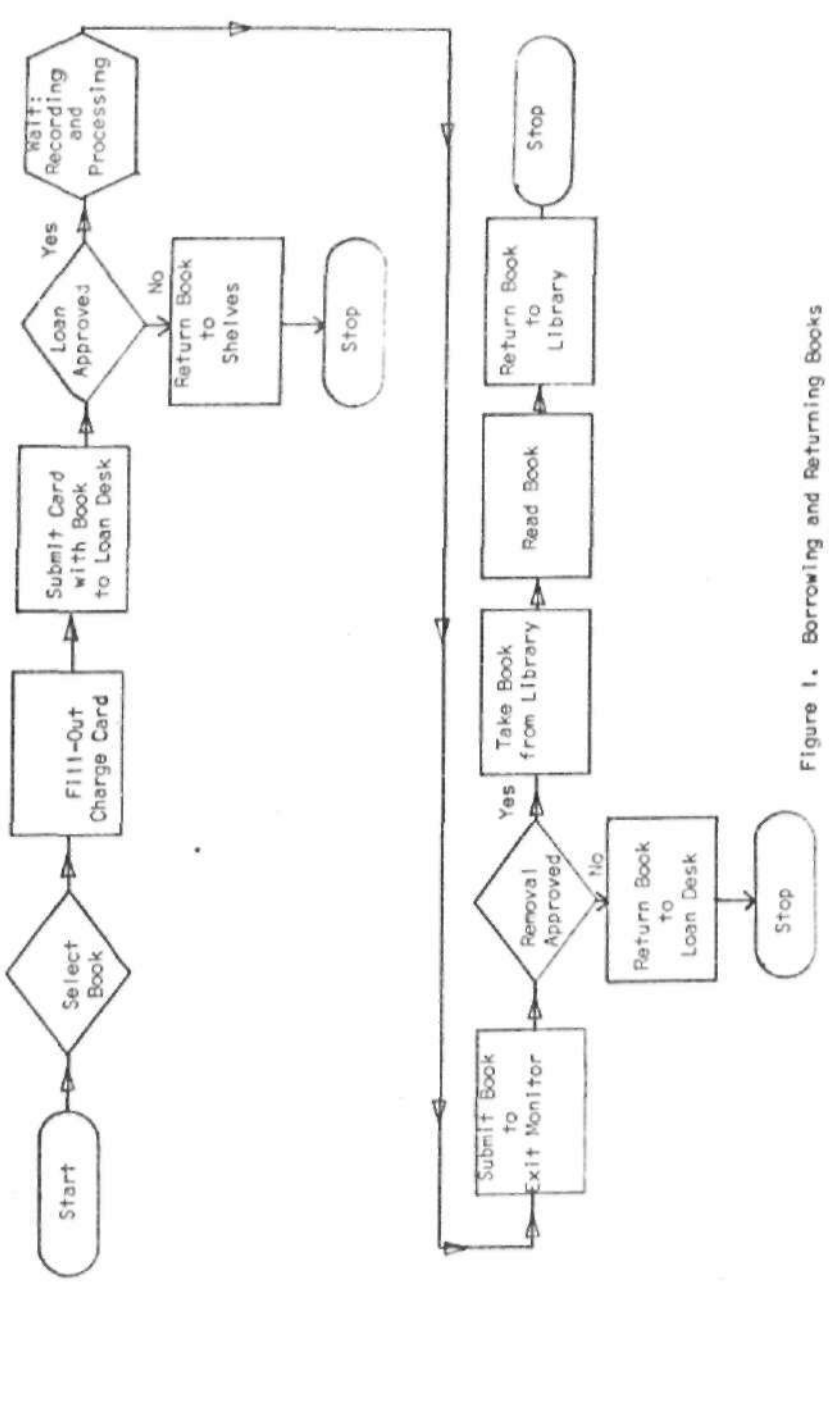


Figure 1. Borrowing and Returning Books

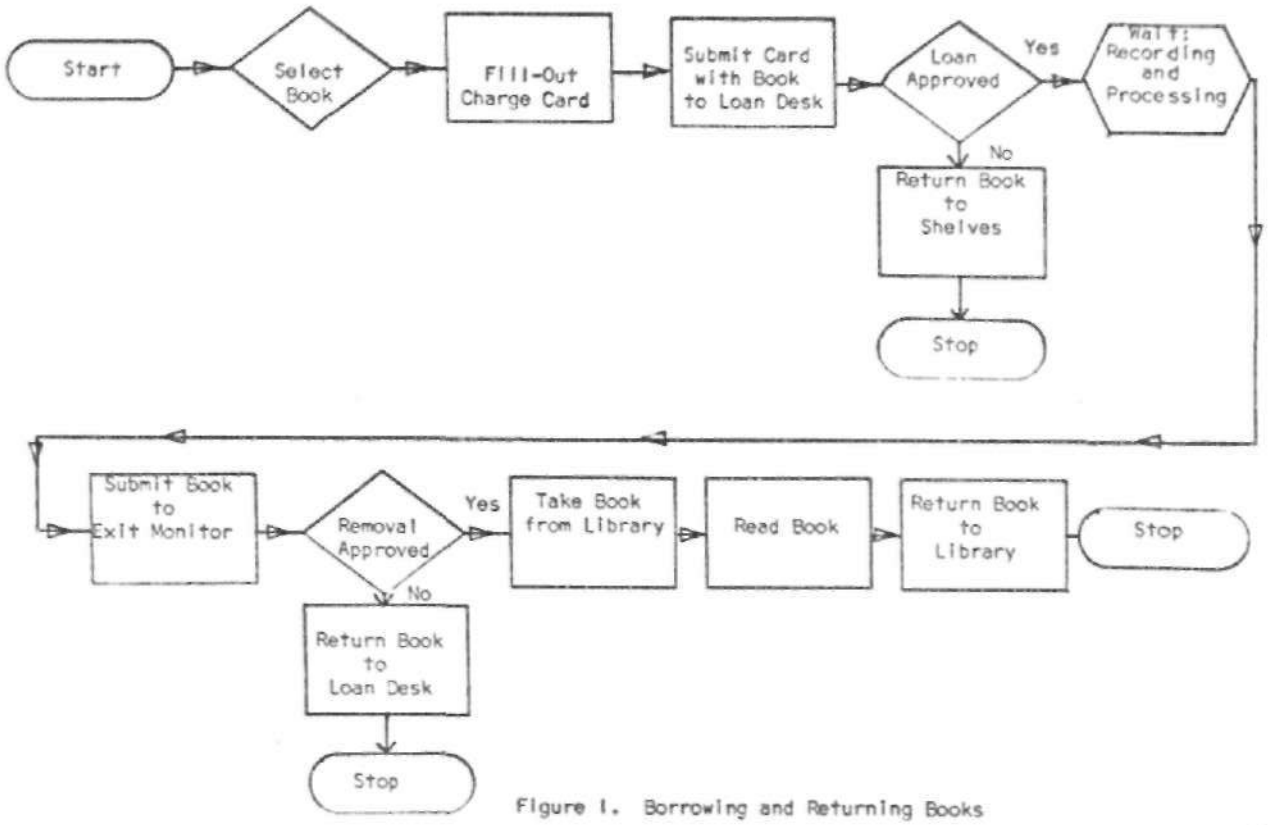


Figure 1. Borrowing and Returning Books

the charge card, the assistant approves or rejects the request to borrow. If the request is rejected, the material is ordinarily returned to the shelves. On the other hand, if it is approved, the card and the book are stamped with the date on which the patron is expected to return the material. In order to leave the building with the book, the patron must present the book to a monitor stationed at an exit. He establishes library ownership of the book. If it is not approved, the book is returned to the shelves. If it is appropriately processed for lending, he approves the removal from the building. To complete the loop, then, the patron returns the book to the library, thus making it available for someone else to borrow.

The marginal punched card utilized is a product of the Royal McBee Corporation. This instrument is commonly called a Keysort card and has marginally-notched holes. The outer holes in the card are coded from information contained on the card. The date due, for example, is recorded by notching that portion of the card between the hole and the edge. The notches allow the coded cards to be separated from un-notched cards when a sorting needle is inserted into one of a group of cards. Since the notched holes have nothing to support them on the needle, they fall from the group leaving the un-notched cards intact. Using various codes and positions on the cards, as well as various needling or sorting

patterns, the cards can be selected and sequenced in several types of arrangements (see Appendix C).

The Identification Process

Given such a system, which includes information about all borrowers, such as their status and the date on which the material is due, the task of identifying delinquent undergraduate borrowers was performed (see Figure 2). The specific procedure included the following steps:

(1) Once each week, all charge cards, representing loan transactions, were needled to sort the materials falling due during the previous seven days;

(2) Inasmuch as all overdue material regardless of the borrower's status fell out during the needling process, the cards of undergraduates had to be separated manually from those of all other classifications;

(3) In cases where a patron failed to check his status on the charge card, the name was verified in the various available directories and the status subsequently established;

(4) All cards bearing titles about which reports of lost items and so forth had been made were also pulled from the files;

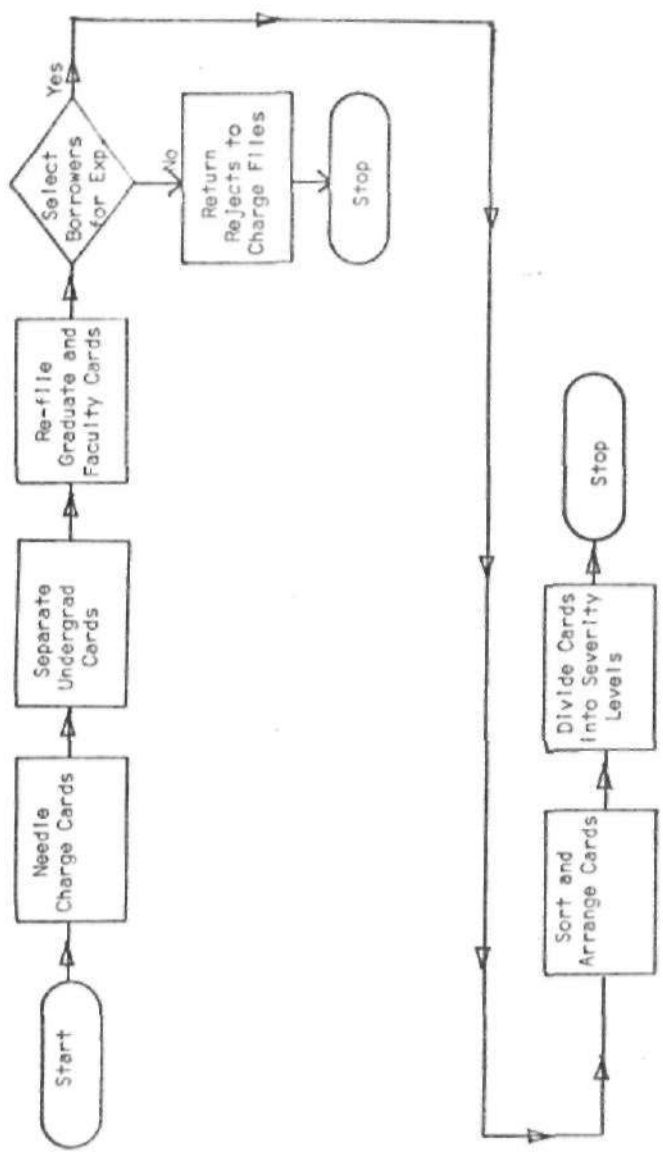


Figure 2. Identifying a Delinquent Borrower

(5) All charge cards were alphabetized, and multiple titles belonging to one borrower were assembled together;

(6) All remaining cards were re-filed into the library's master charge file, while the delinquent undergraduate borrower cards were further sub-divided into seven decks according to the degree of delinquency severity, that is, one day, two days, and up to seven days.

The Selections

The experimental units had to be selected from a finite population representing all undergraduate delinquent borrowers. On the basis of past loan transactions at the field-study library, it was calculated that there were 1,200 different undergraduate delinquent borrowers during the complete course of a typical academic quarter. Lack of data made it impossible, however, to determine the number of delinquent borrowers for any given week, except to infer from previous circulation statistics of approximately 60,000 transactions that they were fewest at the beginning of the period and most around mid-term.

It was also determined that a random sample of 400, approximately one-third of the expected delinquent borrowers, would be an adequate representation of the estimated

population of 1,200 in the study. Inasmuch as the experiment had to be executed on a weekly basis in order to identify and use subjects with comparable degrees of delinquency severity, a specific day was selected. It was decided to choose Wednesdays for each replicate, because of the fact that the library at Colorado State University regularly sent its overdue notices to all patrons on that day of the week, and the staff was geared to this procedure. It was agreed also that this particular experimental day would be less at variance with the other normal routines of the library's circulation department.

By needling all charge cards on this day, Wednesday, the delinquent borrowers representing delinquencies of the past one to seven days could be ascertained readily. If a Wednesday fell on May 14, for example, a pass through the files by needling would identify all materials that were still overdue as of May 13 (1 day), May 12 (2 days), May 11 (3 days), May 10 (4 days), May 9 (5 days), May 8 (6 days), and May 7 (7 days).

The study was ultimately conducted during the spring quarter of 1968. From the group of delinquent borrowers in the eleven replicates, three sub-groups were selected randomly each week to receive either one of the two treatments, or to serve as a control category (see Figure 3). The

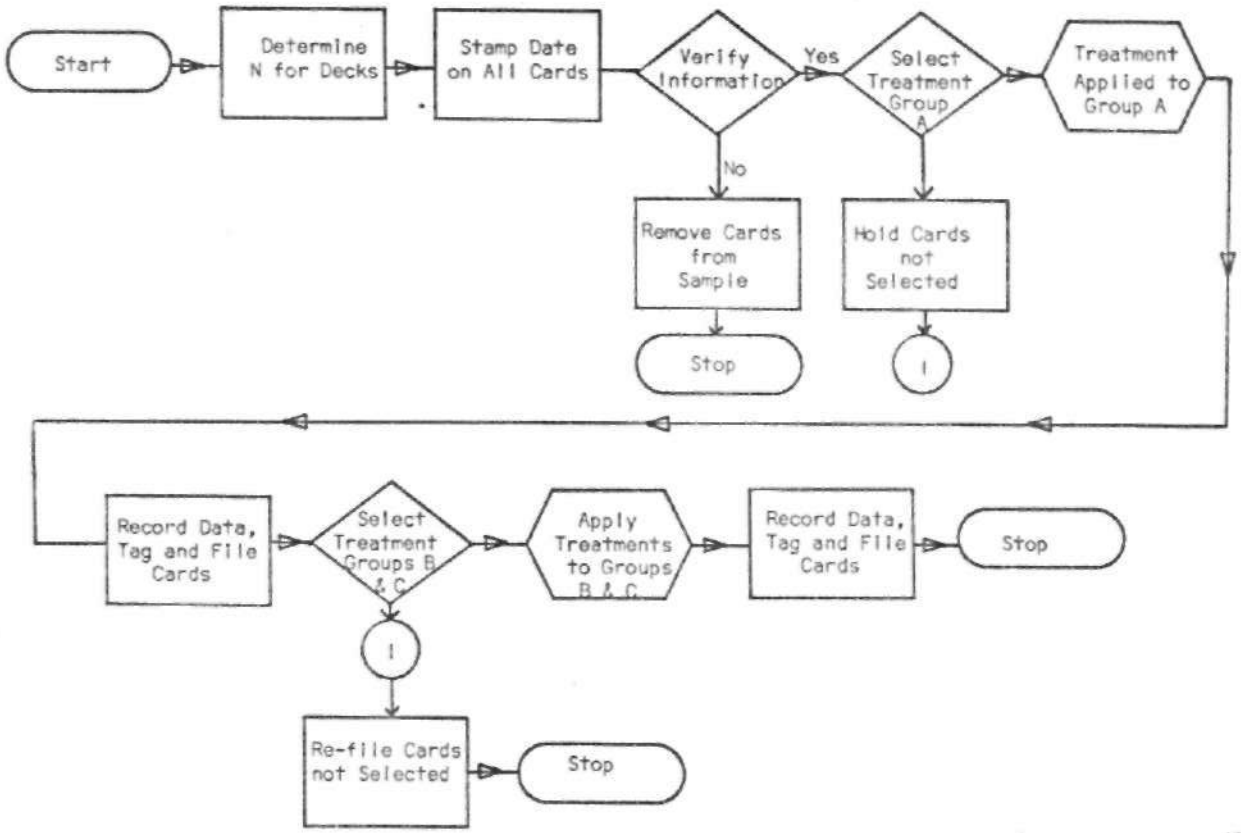


Figure 3. Selecting Experimental Units & Applying Treatments

procedure which was implemented in this regard included the following steps:

(1) An initial count of the subjects in each replicate was made and recorded from the seven severity decks of charge cards, together with the dates the material was due.

(2) Each charge card was stamped on the verso with the current date, indicating the time of treatment.

(3) All telephone numbers and names were checked for legibility and when in doubt, they were verified through the aid of official directories.

(4) All names were also checked against the master cumulative alphabetical list of all borrowers which was maintained throughout the experimental period to guard against duplication of subjects.

(5) All borrowers not verified, or already in a replicate, were removed from the experimental unit and the tally figures were adjusted accordingly.

(6) After the final N was determined, one-third of the charge cards from each severity deck, which was arranged haphazardly in a container, were drawn by lot for Treatment-A (telephone

calls). The treatment was subsequently applied.

(7) The final N for this experimental unit was next entered on a tally sheet (see Appendix B). Each card was identified finally with a black tag.

(8) After Treatment-A had been applied to one-third of the subjects of each severity deck, the remaining two-thirds of the cards of each of the seven severity decks were mixed in a container and one-half of them were drawn by lot for the Treatment-B sub-group (mail notices). The remaining cards were designated for the control sub-group. After verifying the names against the master cumulative list of subjects in the experiment, each card in the former sub-group was identified with a light blue tag and in the latter with a white tag.

(9) All charge cards of the subjects in the Treatment-B sub-group were photocopied on a Coronostat machine after which they were each affixed with a stamp stating: OVERDUE. Together with the reminder notice, they were next inserted into a window envelope (see Appendix B) and mailed.

(10) The total N's for the Groups B and C were recorded finally on the appropriate tally sheets.

(11) All of the original charge cards, now tagged, were ultimately returned to the master files of the library.

The Applications and Responses

The charge cards in Group A of each severity category represented the delinquent borrowers to whom telephone calls were made. Each call included the same message, delivered by the same investigator, which reminded the borrower of his delinquency. It was called to his attention, furthermore, that the basic purpose of returning overdue items was to share with others (see Appendix B).

The charge cards in Group B of each severity category represented the delinquent borrowers to whom notices were sent by mail. Each notice included the same message which reminded the borrower of his delinquency and also called his attention to the fact that the purpose of returning overdue items was to share them with others (see Appendix B).

In variance from application of these two treatments were the charge cards in Group C of each severity category. They represented delinquent borrowers to whom no treatment was applied.

Upon the return to the library of each overdue book in the experiment, the charge card containing the previously recorded information was ultimately pulled from the charge-out files by a loan desk assistant. The current date was subsequently recorded on the face of each card (see Figure 4).

Upon completion of the library's normal discharging and billing processes, each flagged card representing a delinquent borrower was filed separately according to delinquency severity categories and treatment groups. After accounting for all delinquent borrowers in the experiment, the tallies were made showing the rates of return (see Appendix B).

The Tabulations

In each of the eleven replicates, the data regarding every delinquent borrower in each treatment sub-group were reviewed three times. They were transferred subsequently to a final summary tabulation sheet for each complete experiment. All percentage rates of response to the treatments were calculated, then, for each group.

Given a treatment group in an experiment with an N of 100, for example, and twenty-five affirmative responses to the treatment on the same day it was applied, this would be 25% response at the fastest possible rate (see Figure 5). It should be emphasized again that the responses on the same

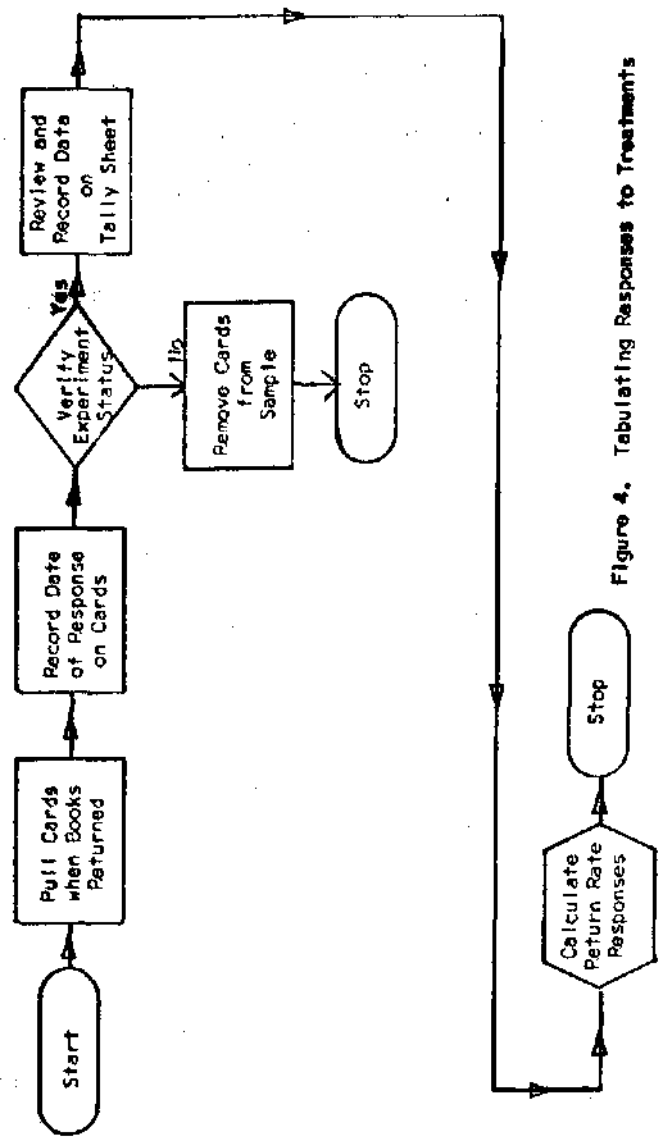


Figure 4. Tabulating Responses to Treatments

day of treatment are indeed after the treatment and not before as might be questioned. The controls included a verification procedure which assured the investigator that a book had not been returned. If the subject so indicated, he was rejected from the sample.

Number of days	Same Day	One	Two	Three	etc.	N
Number of subjects	25	15	10	5	45	100
Per cent of subjects	25%	15%	10%	5%	45%	100%

Figure 5. Typical Rate of Response to Treatment

The next step was to assign a numerical value which depicted the return-rate-response to all treatment groups. Inasmuch as the principal concern was to collect data on the return-rate-responses in increments of twenty-four hour periods, a continuum from zero to twelve or more days was constructed. The sequences of numbers were then reversed for weighting purposes. A same-day-response to a treatment, for example, was assigned the weight of thirteen; the first-day-after-treatment-response received a weight of twelve; up through twelve days or more after treatment, received a weight of only one on the scale.

Each weight was subsequently multiplied by the percentage rate for each response cell. The arithmetical product was the ultimate numerical value of the response. The sum

of each of the return-rate-response cells for every treatment group was calculated finally. This amount resulted in the total numerical value of the experimental response to the treatment (see Appendix B).

This procedure was followed for each of the three subgroups in all replicates. The resultant critical data determined the ordering among the treatment effects for each experiment. This information was of prime importance in allowing a test of the relationships of the treatments as suggested in the basic hypothesis of the study.

The Statistical Analysis

At the outset of this experiment, the background evidence suggested an ordering among the treatment effects. In order to recognize such implicit hypotheses in an analysis of variance, the ranking statistic "L" was used. This is a test of a relationship among the treatment sub-groups in the two-way analysis of variance.[1]

The definition of the statistic "L" for m rank is:

$$L = \sum^{n} (Yj \sum^{m} Xij).$$

In this definition, Y is the hypothetical ranking of the jth column which was predicted from the prior considerations described earlier. The $\sum^{m} Xij$ equals the sum of the ranks observed in the jth column. Expressed in words, the statistic "L" may be defined as "...the sum of products of each

column's predicted ranking times its column sum of observed ranks."[2]

In support of this significance test for linear ranks, Page states: "L is related to the test of the linear component of the treatment sum of squares in the parametric randomized-block design, to the product-moment correlation and regression, to the normal deviate test of Leyerly's average rho, and to Friedman's chi-square ranks. Where either L or the Friedman test may be used, L is often more accurate and appropriate, and it has some advantages over other tests of trend and monoticity."[3]

Several considerations were necessary in the use of the "L" as a test in this particular study. First of all, in accordance with the hypothesis, an ordering of the results was predicted upon the basis of logical reasoning, upon the experience of the investigator, and upon some empirical evidence from the pilot study.

In this context the null hypothesis amounts to the assumption that the treatments have made no difference in the deliquent borrowers' rate of returning materials. If the treatments have made a difference, the sets of observations should belong to different populations and the null hypothesis can be rejected.

In the examination of the evidence obtained in the experiment it was also decided that the relationships within the alternate hypotheses would be analyzed by applications of the Friedman chi-square test. "The chi-square is a simple and direct test of significance. It is suitable for most cases in which the observations can be classified into discrete categories and treated as frequencies."[4]

The level of significance, or the alpha level, refers to a cut-off point as a basis for inferring the operation of non-chance factors in an experiment. When an event occurs a certain percentage of the time or less by chance, the investigator agrees to assert that the results are due to non-chance factors.

It was decided that the level of significance at which the null hypothesis (that there is no agreement of experimental results with the hypotheses) would be rejected in the experimental phase of this investigation would be .01. This meant that when a given result occurred it would happen by chance alone only 1% of the time or less. This conservatism indicated a willingness on the part of the investigator to make an error in the direction of failing to claim a result rather than to make an error in the direction of claiming a result when wrong. In other words, it was decided to risk the error of accepting the null hypothesis when it was false

(Type II error) rather than to reject the null hypothesis when it was true (Type I error).

The Causal Elements

Among the first points in this investigation to be considered after the observance of changes in the response of subjects to experimental treatments was to ask the question, "Why?" A quest for an explanation was foremost in the list of priorities in completing an analysis of data gathered through the research method. The causal why asks really for a "...nexus of dependence or interdependence between a phenomenon and a scheme of things already in some measure known."[5]

The method of analysis of the data was important in order to determine not only how things were, but also how they work, ultimately enabling a cause and effect relationship to be understood. It was decided that if the hypothesis was supported by the results of the experiment, a final consideration would be to determine whether the postulated causal element had been operating. This procedure involved the gathering of additional data directly from the delinquent borrowers in the experiment.

The causal element of the hypothesis was based upon implications from the literature, current observations at other academic libraries, and personal experiences of the

investigator that despite the multifarious efforts by librarians to inculate a sense of sharing among undergraduate patrons, a considerable number do not respond affirmatively because they forget. It was postulated, therefore, that a more effective response would come from the direct effort by a library to remind the undergraduate that he had in his possession borrowed materials which should be returned in order that others may use them, too. It was supposed, furthermore, that the rate of returning delinquent loans would depend upon the degree of direct solicitation made upon the borrower by the library. One treatment in the experiment would employ a more direct contact (a telephone call), therefore, than another treatment (a mail notice). On the other hand, it was suggested that no contact by the library would produce an even slower return of past due library materials than in the case of a mail notice. In summation, it was predicted that A>B>C in treatment sums.

It was supposed, also, that the delinquent borrower was not a person of malicious intent. His delinquency did not refer to a defiance of principles and regulations, or acts against the establishment. He did not refuse to share materials by deliberately depriving his fellow students. It was suggested, too, that the delinquency of most undergraduate borrowers was not because the borrowing privileges prevented him from having an adequate period in which to consult the material loaned to him. This unlikelihood was

especially apparent in view of the generous renewal privileges afforded to those borrowers in such a predicament.

The hypothesis, then, predicted that the cause for a delinquent borrower to respond affirmatively and quickly to a direct stimulus from the library was that he had forgotten his obligation and when reminded of it, he was willing to fulfill it promptly. In order to test this prediction, a specific pattern of data collection was established. The simplest design suggested that the delinquent borrower himself should be queried in order to ascertain his reasons for responding as he did to the treatment which he received. A survey was necessary, then, and took the form of a mail questionnaire.

It was the purpose of the survey to determine the reasons for a delinquent patron to have overdue material. It was essential to find out what reminded him of his delinquency and whether the reminder actually prompted him to return it. It was also thought desirable to determine after he had been reminded if the patron appreciated this action, or whether he had suggestions of other ways by which an academic library could remind him.

In the event that additional descriptions of the borrower such as his major field of study and his classification might prove useful, they were obtained, also. It was thought that the mean scores and distributions could be

calculated subsequently based upon these data. It was also anticipated that the sample data would make possible future cross-analyses such as comparisons of responses by class levels, correlations with subject majors, and other statistical studies.

The principal objective of an analysis of the survey data, then, was to identify causation by the technique of directly confronting the delinquent borrower. It was predicted that the causes would involve the human memory and the influence of personal contacts upon the promptness of responses to experimental treatments.

It has been said that "...there are only three methods of obtaining data in social research: one can ask people questions; one can observe the behavior of persons, groups, or organizations, and their products or outcomes; or one can utilize existing records of data already gathered for purposes other than one's own research."[6] In the original experiment, the initial concern was with the behavior of subjects in response to specific treatments applied. The concern with causality, however, would also require that questions be asked of the subjects treated. It was thought essential to obtain data regarding the delinquent borrowers' own experiences. Attitudes and perceptions sought in this phase of the study seemingly were available only through a direct communication.

In order to gather the reactions of persons in the experiment, a systematic method had to be derived. Festinger and Katz have stated: "The adequacy of a technique for collecting data is ordinarily judged in terms of criteria of reliability and validity..."[7] They continue by adding: "Reliability requires that repeated measurements use results which are identical or fall within narrow and predictable limits of variability. The criterion of validity demands that the measurements be meaningfully related to the research objectives: that is, that it may measure what it purports to measure."[8]

It was decided subsequently that a solicitation of answers to questions by mail would be the initial method by which students in the sample were to be contacted. This approach necessitated the development of an instrument. A preliminary questionnaire was constructed which attempted to accomplish the following: (1) authenticate the borrower's status; (2) verify the fact that the borrower did return materials past the due date; (3) establish reasons why the delinquent borrower failed to return the materials; (4) determine the attitude of the borrowers toward the treatments applied; (5) find out the promptness of a delinquent borrower's reaction to a treatment; (6) ascertain the perception of borrowers toward other stimuli a library might provide; and, (7) determine the borrower's classification and his major field of study.

This type of information could not be obtained from external sources or observations. It was available, however, through personal inquiry and only capable of being isolated by way of personal communication. The other choices of methods would involve risky processes of deduction and inference which this phase of the experiment did not propose to include.

All of the support for the technique utilized is not to say that the questionnaire and interview have no limitations. There was the ever-present likelihood of biases. The respondent may withhold information, he may distort it, indeed, he may not possess the information sought; or, he may have forgotten, rendering it impossible for him to reply accurately. Despite these considerable limitations, it seemed that an interview through a questionnaire was the only method available by which the delinquent borrower's attitudes and perceptions could be elicited.

The design of the questionnaire began by attempting to create an interest on the part of the respondent to the problem. This tactic was manifest in the testing phases through the covering letter (see Appendix C). An appeal was made to the borrower's possible sense of providing assistance. It was also the purpose of the initial covering letter to refer to a problem of concern to all students, that is, effective library service. Another effort was to

emphasize in the inquiry not only the importance of the response, but also the brevity of the demands made upon the respondent. It was pointed out, finally, that his anonymity would be maintained and that the frankness of his response would in no way be held against him.

An attempt was also made to structure the questions in such a way as to translate the research objectives into specific queries. The answers, it was predicted, would test the postulated causal element of the hypothesis. The assumption was made, for example, that only through a direct inquiry could it be determined whether the delinquent borrower failed to share library materials because he forgot that he had them in his possession. All questions were contrived to force a response which accurately described the subject's position on the matter.

At this point in the description of the methodology, it should be emphasized that after the data were collected it was discovered that question number two was perhaps leading in nature and might have suggested a conclusion (see Appendix C). Although more than eighty per cent of the replies by the respondents were positive, nonetheless, twenty per cent of the subjects did not say "yes". The fact that this latter number of non-directed responses was found in such a great variety of answers tends to weaken the argument regarding the leading question. It should also be mentioned

that subsequent items in the questionnaire afforded the respondent several alternatives in assessing his own causes for delinquency.

The primary purpose, then, was to ask the delinquent borrower why he did not return materials to the library on time. It was a secondary objective to find out if the delinquent borrower was influenced, in his eventual action to share materials by returning them, through the reminders provided in the experimental treatment. In order to obtain data for possible cross analyses, it was planned finally to gather information regarding the respondents' university status, major field, and the type of material borrowed. The behavior, then, was to be studied in order to determine the relationship to the presence or absence of the treatments.

It was also the purpose of the questionnaire to create conditions to which the subject responded. An attempt was made to choose language easily within the interviewee's vocabulary. It was the intent to form a sequence in the questions through which the respondent could discern some logic. If the subject could see the relationship of his answers to the objectives of the research study, it was thought that he would respond more willingly. An effort was made to avoid placing the respondent in the position of not possessing an answer which would somehow and in someway demean him.

Guarding against getting a response was attempted, on the

other hand, wherein the delinquent borrower was not sufficiently knowledgeable to offer an intelligent answer.

In the construction of the questionnaire, it was intended to gain definite answers rather than general notions which a more global question would elicit. It was also decided to use closed questions because the situations presented only limited forms of reference from which the respondent could answer, that is, there was a known range of responses.

The pre-test of the questionnaire for this study was undertaken to determine whether the questions provoked responses which were able to fulfill the research objectives. It was also the purpose to find out whether the questions were easily understood, and whether there was a free response from the subject. A pre-test sample of twenty cards was drawn from each of three treatment sub-groups of 100 delinquent borrowers in the manner previously described in Chapter II. An explanatory letter was sent over the signature of an assistant rather than the investigator, and under the heading of her home address. It was thought that biases would be reduced if an official of the university did not solicit responses to the questions. By disguising the inquiry in this manner, it was also thought that a greater motivation might be generated in the respondent. The questionnaires were subsequently mailed (see Appendix C).

The final responses to the sixty inquiries averaged 70%. Of the returns received from the borrowers treated by telephone calls, 91% indicated that they had forgotten that they had overdue materials; two-thirds indicated that the treatment reminded them of their delinquency and also prompted them to return borrowed material. Of the pre-test sample from the mail notice treatment sub-group, 86% said they had forgotten that they had materials from the library; 58% in this group stated that they were reminded of their delinquency by the treatment; while 42% replied that they were actually prompted to act by the reminder. In the pre-test control sub-group, 86% stated that they, too, had forgotten that their library books were overdue, and 67% replied that various reminders called their attention to a delinquency. The same percentage was prompted to return the borrowed materials as in the mail notice sample, that is approximately 42%.

The respondents in the pre-test answered unanimously and affirmatively the question about whether they had ever borrowed material, thus confirming their status as borrowers. It was also readily determined from the responses that the borrower had known the length of the loan period as well as the fact that he had materials in his possession which were overdue. The questions regarding his reasons for delinquency were answered forthrightly and consistently as were the queries about the treatment he received and his response

to it. The trial questionnaire seemed to meet the research objectives of identifying causes.

The delinquent borrower replied freely about other matters concerning his appreciation of the reminder. He also offered suggestions regarding other ways and means by which an academic library could encourage borrowers to share materials. The questionnaire seemed to meet adequately the criterion of establishing rapport with the respondent.

On the basis of these pre-test results, several revisions were made in the actual experimental questionnaire. In the first place, the covering letter included a more complete statement about the purposes of the investigation (see Appendix C). The method by which the borrower was chosen was also explained more fully. The sponsor conducting the research was also identified, although it was decided to retain the mask of the investigator by substituting the name of one of the research assistants. By also promising to preserve the anonymity of the respondent and, thereby, insuring the confidential nature of a response, the establishment of rapport seemed likely to be achieved.

In the revised questionnaire, it was decided, first of all, to eliminate the question on establishing the respondent's status as a borrower (see Appendix C). It was considered desirable, however, to continue the verification of the subject's delinquency. In the revision, the response

possibilities were left open to give the respondent with an uncertain reply a chance to answer. The objectives were: (1) to identify the reason for the borrower being a delinquent, and (2) to obtain his reaction to the stimulus toward changing this condition. The queries regarding characteristics were also retained inasmuch as they were reliable and would probably provide useful data for future analyses. The patron was also given an opportunity to receive a summary of the results of this research as a token of gratitude from the investigator for his participation in the project.

In the examination of the evidence obtained in the survey, it was decided that the relationships among the subgroups would be analyzed by applications of the Friedman chi-square test. It was agreed, furthermore, that the level of significance at which the null hypothesis would be rejected would be .05. It was understood that when the .05 level of significance was employed, approximately 5% of the time we would be wrong when the null hypothesis was rejected and the alternative asserted. The fact that the rejection level is set at .05 attests to a less conservative point-of-view where the investigator is not so willing to make an error in the direction of failing to claim a result.

In order to conduct the survey in search of the causality data, a sample was drawn. The size was directly related to the number of subjects in the experiment. Inasmuch as it

had been established at the beginning of the experimental period that 400 would be an ample number from the anticipated 1,200 delinquent borrowers during an academic quarter, then one-third or approximately 135 patrons was thought to be an adequate number for the causality survey.

It was impossible, however, to expect to contact several of these subjects during each replicate inasmuch as toward the end of the academic quarter, the borrowers would leave the campus. It was decided, therefore, to draw this sample among only the first five replicates. The affirmative and complete responses of the 135 patrons in the sample were difficult to anticipate, also. In order to assure a full response of 135, this number was increased by over one-half and 210 cards were ultimately drawn. From the treatment sub-groups in each of the five replicates arranged in haphazard order, a systematic selection of every other charge card was conducted in an un-weighted cross-section.

The Summary

In this chapter, the initial design of the experiment was presented. The definitions were delineated and the system of the field-study library was described. A procedure was presented whereby the delinquent borrowers could be readily identified. The plans for the selection of subjects, the applications and responses of treatments, and the tabulation and calculations of the data were also outlined.

Inasmuch as the background evidence suggested an ordering among treatment effects, the choice of the ranking statistic "L" was explained. This test of relationship among the treatment sub-groups in a two-way analysis of variance was subsequently described. It was advanced that this particular significance test for linear ranks would be more accurate and have more advantages than other tests.

It was emphasized finally that the determination of the postulated causal element was of critical importance in the experiment. The procedure of directly involving the delinquent borrower was delineated including the methods for constructing the questionnaires which were the principal data gathering instruments for personal mail interviews. In searching for these causality data, the primary objectives were to identify the reasons for delinquency and to obtain reactions to the various stimuli applied to change the behavior patterns. The use of the Friedman chi-square test in the statistical analysis of the survey evidence was also described.

The Footnotes

1. Ellis B. Page, "Ordered Hypotheses for Multiple Treatments," American Statistical Association Journal, LVIII (March, 1963), pp. 216-230.

2. Ibid., p. 219.

3. Ibid., p. 216.

4. Celeste McCollough and Loche Van Atta, Statistical Concepts (New York: McGraw-Hill, 1963), p. 85.

5. R. M. MacIver, Social Causation (Boston: Ginn, 1942), p. 11.

6. Leon Festinger and Daniel Katz, Research Methods in Behavioral Sciences (New York: Holt, Rinehart, and Winston, 1953), p. 241.

7. Ibid., p. 327.

8. Ibid., p. 328.

CHAPTER IV

THE FINDINGS: EFFECTS

Basic to the analysis of the results of the experiment is an ordering among the effects of the treatments applied. The hypothesis states that the rate of returning loans depends upon the degree of contact made upon the delinquent borrower by the library. In this particular investigation, Group-A employed the most direct contact (telephone notice), Group-B the next most direct (mail notice), and Group-C (control) had the least, or no contact. In the hypothesis, it was predicted, therefore, that A>B>C in treatment sums.

The Significance of Differences

In the experiment at hand, 500 subjects were chosen at random from an estimated population of 1,200 different delinquent borrowers. They were matched on the basis of the particular week in which they were chosen, each of which formed one of the eleven replicates. The replications I, II,...XI, for example, correspond with the rows in Table 1. The subjects in each replication, having been assigned randomly within the rows to Treatments A, B, or C, are represented by the columns. Each cell stands for the accumulated rank of all of the subjects based upon the frequency of response to the treatment applied compared with other subjects

TABLE 1

THE RANKING MATRIX FOR THE DELINQUENT BORROWER EXPERIMENT

($L = \sum_{j}^{n}(Yj\sum_{i}^{m}Xij)$ or, the sum of products of each column predicted ranking (Y) times its column sum of observed ranks.

	$\overset{n}{\text{Treatments}}$			
m Replications	A	B	C	
	1	2	3	= Y
I	1	2	3	
II	1	2	3	
III	1	3	2	
IV	2	1	3	
V	2	1	3	
VI	1	3	2	SUMS
VII	1	2	3	
VIII	1	2	3	
IX	1	2	3	
X	1	2	3	
XI	1	3	2	
$\sum_{i}^{m}Xij$ =	13	23	30	$66 = \sum_{i}^{nm}Xij$
$Yj\sum_{i}^{m}Xij$ =	13	46	90	$149 = \sum_{j}^{n}(Yj\sum_{i}^{m}Xij) = L$

Notes: n = treatments, or stimuli, applied to the population of student delinquent borrowers;

m = replications of delinquent borrowers experiment

across the row. The m rows in the table, then, represent the set of m independent replications.

In this experiment, the predicted rank Yj appears at the top of each column in Table 1, that is: 1, 2, and 3. The actual sums of the observed ranks: 13, 23, and 30, appear in the next to the bottom row. The products of each Yj multiplied by its sums appear in the bottom row as 13, 46, and 90. In the lower right side of the table, the sum of each product is found. In this instance $\sum\sum Xij$ is 66. The quantity of 149 as expressed by $\sum(Yj\sum Xij)$ is the discovered value of "L" for the experiment.

The next step in the statistical analysis was to locate on a table of critical values the cells associated with the correct m and n (see Appendix D). Upon entering such a table, the first step is to find the cell for m, which in this experiment equals 11. The next step is to find the cell for n, which is 3. Upon locating the cell appropriate to this experiment, it is discovered that the higher number, which is 147, is the value of "L" at or beyond which one may reject the null hypothesis at the .001 level. The middle number (144) is the corresponding critical value for the .01 level of confidence. The lower number, that is 141, relates finally to the .05 level.

Inasmuch as the point of rejection for the investigation was initially established at the .01 confidence level,

the middle figure on the "L" table is the selected value. It is important to consider that if the experimentally discovered "L" either equals or exceeds the selected value in a table of critical values, then "L" is significant at that level.

In this study, then, the experimental value of "L" is 149 and exceeds the selected value of 144. The null hypothesis may be rejected, therefore, at the .01 level in favor of the ordered alternative. Based upon this analysis, it is discovered that there exists a significant amount of agreement between the predicted ranking of the treatments and the experimental rankings in the various replications. The data generally agree with the predictions.

The General Effects of Treatments

One of the expectations underlying the principle from which the hypothesis was derived was that the personal concern evinced by the library toward the delinquent borrower would more often than not elicit a positive and quick response, thus supporting the practice of reminding patrons to share materials borrowed by returning them promptly. A review of the relationship between the two major variables of the treatments applied to delinquent borrowers and the responses as measured by the frequency rates of materials returned, therefore, is a primary consideration at this point.

Out of the sample of 500 subjects distributed among eleven replications of the experiment, 160 were treated by A (telephone calls), 170 by B (mail notices), and 170 by C (control), or approximately 32%, 34%, and 34% respectively (see Table 2). In the total sample, 136 (27%) returned the library material on the same day that the treatment was applied. Of the 136 same-day-returnees, seventy (51%) were treated by A, thirty-four (25%) by B, and thirty-two (24%) were in the control group. There were an additional eighty-seven delinquent borrowers who returned the materials between twelve and twenty-four hours after the treatment, or 17% of the total sample. Thirty-five of these eighty-seven borrowers (40%) were A-treated, thirty (35%) were B-treated, and twenty-two (25%) were control.

Within twenty-four hours, which is the highest possible frequency response rate of the same-day or the first-day-following-treatment, 223 (44%) of the 500 delinquent borrowers in all replications of the experiment had returned the overdue library materials. Of this number of 223, 105 (47%) had been exposed to Treatment-A, sixty-four (29%) to Treatment-B, and fifty-four (24%) were in the Treatment-C group.

The frequency return rate of the subjects in the experiments from two days through eleven days included 179 borrowers, or 36%. Of these delinquents, thirty-six were

TABLE 2

A COMPOSITE OF THE NUMBER OF RESPONSES
TO TREATMENTS BY FREQUENCY RATE
OF MATERIALS RETURNED IN
ELEVEN REPLICATIONS

Treatments	Rate of Response in Days													
	0	1	2	3	4	5	6	7	8	9	10	11	12+	Totals
A	70 (44)	35 (22)	10 (6)	5 (3)	4 (2)	6 (4)	1 (1)	2 (1)	5 (3)	2 (1)	0 (0)	1 (1)	19 (12)	160 (100)
B	34 (20)	30 (18)	12 (7)	16 (9)	20 (12)	9 (5)	8 (5)	6 (3)	1 (1)	0 (0)	0 (0)	2 (1)	32 (19)	170 (100)
C	32 (19)	22 (13)	14 (8)	4 (2)	8 (5)	18 (10)	11 (7)	3 (2)	4 (2)	4 (2)	0 (0)	3 (2)	47 (28)	170 (100)
Totals	136 (27)	87 (17)	36 (7)	25 (5)	32 (7)	33 (7)	20 (4)	11 (2)	10 (2)	6 (1)	0 (0)	6 (1)	98 (20)	500 (100)

Note: Percentages shown within parentheses.

treated by A, seventy-four by B, and the remaining sixty-nine were C.

The subjects who had the lowest frequency response rate of twelve or more days after a treatment amounted to ninety-eight in number, or 20%. Of the ninety-eight subjects, nineteen (19%) had been treated by A, thirty-two (33%) by B, and forty-seven (48%) were in the control group.

These data suggest that the telephone call reminder elicits the quickest rates of frequency from delinquent undergraduate borrowers with 44% of the sample returning materials on the same day as treated. The mail notices, on the other hand, showed a 20% rate of return after treatment on the same day, whereas the control group showed a slightly lower 19% return rate.

The inverse results are apparent in the subjects' slowest rates of return. In these instances, one sees that where no treatment is applied to a group of delinquent borrowers, more patrons will take longer to return material than in instances where treatments are used. In the composite of the experimental replications, it seems evident that the control subjects receiving no treatment were more derelict in returning overdues with 28% waiting until twelve or more days had passed after the library materials were due (see Table 2). In the case of the treated subject, however, the more direct stimulus, the telephone calls, failed to

elicit return of materials by the twelfth day from the due day in only 12% of the sample. On the same basis of comparison, the less direct treatment of a mailed-reminder-notices shows only 19% of the borrowers in the sample failing to return materials.

Interrelationships of Treatments

The analysis of the data and the tests for significance tend to show at this point that the direct treatment of delinquent borrowers precipitates quick responses. The interrelationships of the various treatments, however, suggest further analysis which could support the original contentions of the hypothesis if found statistically significant.

The differences between the high response rate of subjects treated by telephone calls and those not treated are markedly pronounced. The data indicate that there is a 33% greater response during the first twenty-four hours after treatment by borrowers treated by telephone calls than those not treated with anything. One can infer that sixty-six out of 100 borrowers will return materials if called and reminded, whereas about half that number (32%) of those not treated will so respond (see Table 3).

At the other extreme of the continuum, only twelve out of 100 of those borrowers contacted by telephone do not respond, whereas twenty-eight out of 100 who had no treatment

TABLE 3

A COMPOSITE OF THE PERCENTAGES OF THE RATIO OF RESPONSE RATES OF TELEPHONE TREATED TO UNTREATED DELINQUENT BORROWERS

	Rates of Response		
Treatments	High (0-1 Days)	Middle (2-11 Days)	Low (12+ Days)
	%	%	%
A	66	22	12
C	32	40	28
Difference	34	-18	-16

reacted in this manner. The difference between the treated and untreated groups in the middle category is a -18, showing that 22% of the former and 40% of the latter group will return materials between two and eleven days after treatment.

In order to determine whether the difference is significant, or whether chance alone accounts for it, the Friedman chi-square test was applied to the data. By consulting Table 4, it is noticed that the resultant chi-square is 38.50. This figure is great enough to reject the null hypothesis inasmuch as the value needed for significant X^2 at the .01 level with two degrees of freedom is 9.21. The test tends to support the hypothesis that delinquent borrowers treated by telephone calls will return materials at a significantly more rapid rate than those patrons who had received no treatment.

Differences are also seen upon comparing the frequency response rates of the borrowers treated by telephone and those by mail notices. The data in Table 5 indicate that there is a 28% greater response during the first period after treatment by borrowers called by telephone than by those who received mail messages. These figures show that 66% of the patrons who received telephone calls returned materials within twenty-four hours, whereas only thirty-eight out of 100 who received mail notices returned items so quickly.

TABLE 4

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN THE RESPONSE RATES OF THE TELEPHONE TREATED TO UNTREATED DELINQUENT BORROWERS BY X^2

Treatments	High (0-1 Days)		Middle (2-11 Days)		Low (12+ Days)		Totals
	O	E	O	E	O	E	
A	105	76.9	36	50.9	19	32.2	160
C	54	82.1	69	54.1	47	33.8	170
Totals	159		105		66		330

$$\frac{10.26}{9.61} \quad \frac{4.16}{3.91} \quad \frac{5.41}{5.15}$$

$$19.87 + 8.07 + 10.56 = 38.50 = X^2$$

Value *needed for significant* X^2 at .01 level with 2 df is 9.21.

O - Observed Frequency

E - Expected Frequency

TABLE 5

A COMPOSITE OF THE PERCENTAGES OF THE RATIO OF RESPONSE RATES OF TELEPHONE TREATED TO MAIL TREATED DELINQUENT BORROWERS

	Rates of Response		
Treatments	High (0-1 Days)	Middle (2-11 Days)	Low (12+ Days)
	%	%	%
A	66	22	12
B	38	43	19
Difference	28	-21	- 7

The differences in the middle response category, on the other hand, show a -21. The lowest rate difference is a -7 for those returning materials twelve or more days after treatment.

In order to establish the statistical significance of this difference, the chi-square test was utilized. The calculations indicate a X^2 of 25.61 with two degrees of freedom (see Table 6). This experimental value is greater than the selected value of 9.21 at the .01 level. The null hypothesis can be rejected, therefore, and the significance of the difference between the two treatments is further reinforced.

A somewhat less pronounced difference is seen upon examining the frequency return rates of the borrowers treated by mail notices and those untreated (see Table 7). The highest rate of 0-1 was found in thirty-eight out of 100 cases, whereas thirty-two returned materials who had had no treatment, resulting in a difference of only 6%. At the other extreme, nineteen out of 100 delinquent borrowers failed to return items before the twelfth day, while 28% of the untreated did not return materials, or a difference of -9%.

On the basis of these data, one observes that the differences are slight between the high frequency rate of borrowers treated by mail notices and the untreated subjects. In the non-return category, however, there are 9% fewer who

TABLE 6

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN THE RESPONSE RATES OF THE TELEPHONE TO MAIL TREATED DELINQUENT BORROWERS BY X^2

Treatments	High (0-1 Days)		Middle (2-11 Days)		Low (12+ Days)		Totals
	O	E	O	E	O	E	
A	105	81.92	36	53.28	19	24.8	160
B	64	87.08	74	56.72	32	26.2	170
Totals	169		110		51		330

$$\frac{6.01}{6.11} \quad \frac{5.60}{5.26} \quad \frac{1.35}{1.28}$$

$$12.12 + 10.86 + 2.63 = 25.61 = X^2$$

Value needed for significant X^2 at .01 level with 2 df is 9.21.

O - Observed Frequency

E - Expected Frequency

TABLE 7

A COMPOSITE OF THE PERCENTAGES OF THE RATIO OF RESPONSE RATES OF NOTICE TREATED TO UNTREATED DELINQUENT BORROWERS

	Rates of Response		
Treatments	High (0-1 Days)	Middle (2-11 Days)	Low (12+ Days)
	%	%	%
B	38	43	19
C	32	40	28
Difference	6	3	- 9

do not return materials before twelve or more days past the due date have elapsed among the untreated than among the patrons receiving mail notices. In the broad category between two-day-after-treatment through eleven days, there is a 3% more favorable return rate among the B-treated than the untreated group.

The slight differences in the responses of the mail-treated patron and the untreated did not suggest positive significance in the high group. The direction of the differences between the response and the non-response categories, however, indicated that this result might be due to more than chance alone would produce.

Friedman's chi-square was again applied to the data (see Table 8). In this application, the value needed for a significant X^2 at the .01 level with one degree of freedom is 6.64. The experimental figure, a chi-square of 4.77, falls short of reaching the expected value.

These results tend to show that the differences between rates of return of those treated by mail notice and those untreated are evident but not significant at a confidence level that has been acceptable in this experiment. It is apparent, furthermore, that at the highest return rate, that is within twenty-four hours after treatment, there is only a slight difference which is probably not significant.

TABLE 8

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN THE RESPONSE RATES OF THE MAIL TREATED TO UNTREATED DELINQUENT BORROWERS BY X^2

Treatments	High		Low		Totals
	O	E	O	E	
B	138	128	32	40	170
C	123	133	47	39	170
Totals	261		79		340

.78 1.60
.75 1.64

$1.53 + 3.24 = 4.77 = X^2$

Value needed for significant X^2 at .01 level with 1 df is 6.64.

O - Observed Frequency

E - Expected Frequency

The Proximity of Treatments

As explained previously, of the thirteen discrete frequency rates utilized in the tabulation, 27% of the responses to treatments were in the zero category (see Table 2). It should be noted, furthermore, that in these arrays, the lowest number reflects the highest rate of return: zero being a response on the same day as the treatment was applied; one being on the first day thereafter; two on the second day, etc.

The data suggest that the first-day-after-treatment also has a high rate of return for all replications and treatments of this experiment reaching a level of 17%. The incidence of book return declines appreciably on the second-day-after-treatment to 7%, however, and continues generally downward to 5% on the third, up to 7% on the fourth, 7% on the fifth, 4% on the sixth, 2% on the seventh, 2% on the eighth, 1% on the ninth, 0% on the tenth, and 1% on the eleventh. The thirteenth category has the lowest rate of response, but includes 20% of all subjects in the several replications.

It appears that the more direct the treatment is, the more quickly the borrower will act to remove his delinquency. It was found, for example, that 66% of all subjects called by telephone returned materials by the end of the first day after the loans were due. By the second day, an additional

6%, or a total of 72%, had returned materials (see Table 9). The next three days (third through fifth) accounted for only 9% of the returns, whereas in the sixth through eighth days 5% had returned books, and by the ninth through eleventh days, only 2% had returned borrowed items. For this group, the accumulation of all other responses of twelve days and beyond amounted to 12%.

The next most direct treatment, the mail notice, also seemed to elicit the greatest response immediately after treatment, but not quite so large a surge nor so quickly as the telephone call. For this unit, 44% of the subjects had the materials returned by the end of the second-day-after-treatment. There was a 27% return during the second three-day span, followed by 9% return on the sixth through eighth day, and only 1% returned on the ninth through the eleventh day. A greater number (19%) of borrowers treated by mail notices made no response to the treatment than the group treated by the telephone call.

It is evident that a large share of the patrons who received no reminder of their delinquency returned borrowed materials soon after the due date. In this experiment, 40% had returned materials by the end of the second-day-after-treatment compared to 44% who had received a reminder in the mail, and 72% who had been reminded by a telephone call (see Table 9). Returns were generally slower in the control

TABLE 9

A COMPOSITE OF THE RATES OF DELINQUENT BORROWERS RETURNS BY RETURN CATEGORIES

Treatments	Rates of Returns in Days					
	0-2	3-5	6-8	9-11	12+	Totals
A	115(72%)	15(9%)	8(5%)	3(2%)	19(12%)	160(100%)
B	76(44%)	45(27%)	15(9%)	2(1%)	32(19%)	170(100%)
C	68(40%)	30(18%)	18(10%)	7(4%)	47(28%)	170(100%)

group, however, with 18% realized in the three through five slot, 10% in the six-through-eighth-day-return category, and nine through eleven days after the date due showed 4%. This leaves the largest single category of returns, however, to come from the twelve day and after group, or 28%.

It is apparent that large numbers of delinquent borrowers return materials soon after being treated no matter what type of stimulus is applied. The evidence suggests, nonetheless, that a significantly greater number return materials even more quickly if called by telephone or sent mail notices than if no action is taken in trying to elicit a response. Even if one accepted the conclusion that most books checked out by undergraduate book borrowers are returned within a day or two after the due date, no matter what is done to stimulate the students, ninety-eight out of 500, or nearly 20%, are still not moved to respond in any manner for at least twelve days after treatment, if at all.

One-half of all delinquent borrowers returned materials by the second day after treatment (see Table 10). Over 75% of these borrowers returned materials by the first week, and 80% by the twelfth day after treatment. By the first week after treatment, 82% of the A-books are back, 76% of the B-materials have been returned, and 64% which have had no treatment have been re-deposited. Only 6% more borrowers returned books between seven and twelve days after receiving

TABLE 10

CUMULATIVE RESPONSES TO TREATMENTS BY FREQUENCY RATE OF MATERIALS RETURNED IN ELEVEN REPLICATIONS

	Rate of Response in Days												
Treatments	0	1	2	3	4	5	6	7	8	9	10	11	12+
A	70 (44)	105 (66)	115 (72)	120 (75)	124 (77)	130 (81)	131 (82)	133 (83)	138 (86)	140 (87)	140 (87)	141 (88)	160 (100)
B	34 (20)	64 (38)	76 (45)	92 (54)	112 (66)	121 (71)	129 (76)	135 (79)	136 (80)	136 (80)	136 (80)	138 (81)	170 (100)
C	32 (19)	54 (32)	68 (40)	72 (42)	80 (47)	98 (57)	109 (64)	112 (66)	116 (68)	120 (70)	120 (70)	123 (72)	170 (100)
Totals	136 (27)	233 (44)	259 (51)	284 (56)	316 (63)	349 (70)	369 (74)	380 (76)	390 (78)	396 (74)	396 (79)	402 (80)	500 (100)

Note: Percentages shown within parentheses.

Treatment A, 5% more after Treatment-B, and 8% more after Treatment-C.

There are institutional constraints available to academic libraries against delinquent borrowers which assure eventual return of all materials. They include discontinuing borrowing privileges, encumbering academic records, and prohibiting future matriculation. Unless the material is lost or stolen, therefore, it is safe to say that all borrowed books will be returned eventually.

As shown in Table 11, the maximum number of days overdue books were held by delinquent borrowers amounted to 7% of all subjects in the experiment. There were two out of 160 borrowers (1%) who were treated by telephone calls; twelve out of 170 borrowers (7%) who were treated by mail notices; and twenty-five out of 170 borrowers (15%) who were untreated.

The evidence indicates that there are relatively fewer numbers of borrowers who wait beyond three weeks after the due date to return materials than those who return items more promptly. It is seemingly evident, therefore, that the more proximal the subject is to the day of treatment, the greater the incidence of overdue materials returned.

TABLE 11

INCIDENCE OF DAYS OVERDUE AMONG TREATMENT GROUPS: A COMPOSITE

Treatments	Days Overdue					
	Low (1-4)	Low/Middle (5-8)	Middle (9-14)	Middle/High (15-20)	High (20-90)	Totals
A	99 (62%)	37 (23%)	17 (11%)	5 (3%)	2 (1%)	160 (100%)
B	88 (52%)	42 (25%)	19 (11%)	9 (5%)	12 (7%)	170 (100%)
C	63 (37%)	44 (26%)	16 (9%)	22 (13%)	25 (15%)	170 (100%)
Totals	250 (50%)	123 (24%)	52 (14%)	26 (5%)	39 (7%)	500 (100%)

The Point-in-Time of Treatments

Do undergraduate library patrons respond differently during selected periods of a typical academic term than during other times? It has been suggested that a greater response will be seen toward the end of a quarter when the student is nearing completion of his studies and no longer has a need for keeping library materials. If this is true, then, the effect of contacting delinquent borrowers at certain times of the year may warrant an evaluation and review.

In order to investigate the relationship of this question to the performances of the treated borrowers, an analysis of the responses in each replication was undertaken. A recapitulation of all replications regarding percentage of *response to treatments by frequency of overdue materials returned* was constructed (see Table 12).

In examining these data, it is important to recognize that the first experiment was conducted during the beginning of the academic quarter at Colorado State University. All of the ten replications followed at seven-day intervals through the last week of the term.

There does not appear to be a discernible pattern of consistency in the high rates of response to treatments as related to a particular point-in-time during an academic term. The first and eighth weeks show the only common result

TABLE 12

A COMPOSITE OF THE RATES OF RESPONSE BY HIGH, MIDDLE, AND LOW FREQUENCY TREATMENT GROUPINGS AS RELATED TO POINT-IN-TIME

	Rates of Response								
	High (0-1 Days)			Middle (2-11 Days)			Low (12+ Days)		
Replications	A	B	C	A	B	C	A	B	C
	%	%	%	%	%	%	%	%	%
1	75	56	33	17	33	40	8	11	27
2	67	63	25	33	12	50	0	25	25
3	100	25	0	0	50	100	0	25	0
4	55	46	27	27	54	45	18	0	28
5	70	45	22	0	55	11	30	0	67
6	75	12	37	19	65	42	6	23	21
7	59	25	27	23	50	42	18	25	31
8	70	59	30	30	27	52	0	14	18
9	65	34	13	23	35	52	12	31	35
10	54	52	42	34	24	37	12	24	21
11	71	27	54	7	53	31	22	20	15
M =	69	40	28	19	42	46	11	18	26
Med =	70	46	27	23	50	42	12	23	25

among the replications above the average response to all treatments occurring during those periods. The opposite result holds true for the seventh and ninth replications which are the only ones below the average response that are common to all treatments.

No single week of the term is common to all treatments wherein an identical response rank is noted (see Table 13). The closest common relationship is found during the sixth week of the term when response of Treatment-A and the control group show the rank of three as well as during the fourth week when Treatment-B and the control group are ranked together at the sixth level.

The evidence does not seem to support any direct positive relationship of the delinquent borrowers' response to treatment and a particular point-in-time during the spring quarter. The borrower appears to return materials during the first week as readily as the last part of the quarter. The high volume of academic work which seems to produce varying degrees of intensity of library use does not appear to affect the sharing of materials with others as evidenced by a quick response to a given treatment. There does not seem to be evidence in the data gathered from this experiment, therefore, to support a position that treatments are more or less effective during one particular point-in-time during an academic term than at another.

TABLE 13

THE RANKING OF THE HIGHEST RESPONSE RATES AS RELATED TO THE TREATMENTS AND THE POINT-IN-TIME OF THE ACADEMIC TERM

	Treatments		
	A	B	C
Rank of Response		(week of term)	
I	3	2	11
II	1	8	10
III	6	1	6
IV	8	10	1
V	11	5	8
VI	5	4	4
VII	2	9	7
VIII	9	11	2
IX	7	3	5
X	4	7	9
XI	10	6	3

Rank - an ordering of response rates by weeks from the fastest (I) to the slowest (XI).

As with the distribution of data in the high rates of response to treatments, there is no consistent pattern seen in the low rate response group either (see Table 14). The seventh week was the only period in which the experiment had the same response rate in more than two treatments (A and B) at fourth rank. All rankings show a haphazard scattering among the weeks of the experiment for all other treatment categories.

On the basis of these data, it appears that the delinquent borrowers' slow response to any kind of treatment, if indeed a stimulus has been applied, has only a chance relationship to any particular point-in-time during an academic quarter. As with the delinquent borrower who responds to a stimulus on the same day he is treated, the patron who makes little or no response, judging from his delay of twelve days or more, is rarely noticeably affected by the time of the quarter in which the treatment is applied.

The Severity of Delinquencies

One of the questions frequently posed during the study related to the severity of delinquency. It was desirable to determine whether those undergraduate borrowers who had in their possession library materials which were overdue only one day responded differently to various treatments from those students who were two, three,...or seven days in arrears. It was conjectured that if this variable shows no

TABLE 14

THE RANKING OF THE LOWEST RESPONSE RATES AS RELATED TO THE TREATMENTS AND THE POINT-IN-TIME OF THE ACADEMIC TERM

	Treatments		
	A	B	C
Rank of Response		(week of term)	
I	5	9	5
II	11	2	9
III	4	3	7
IV	7	7	4
V	9	10	1
VI	10	6	2
VII	1	11	6
VIII	6	8	10
IX	2	1	8
X	3	4	11
XI	8	5	3

Rank - an ordering of response rates by weeks from the fastest (I) to the slowest (XI).

relationship to the responses, the credibility of the main hypothesis would be strengthened.

The information resulting from such an analysis could add to the sparse information available regarding ways and means of contacting the various classes of delinquent borrowers. Such an analysis would parallel those observations of patients in hospitals who have been treated with experimental drugs according to the severity of their illness.

On the basis of the various rates of response to treatments by delinquent borrowers as related to severity levels, a composite chart of the frequency rates of response by severity level was constructed. The high range includes rates of response from the same day through the first day after treatment, the middle range is the second day through the eleventh day, and the low range is the twelfth or more days. The composite data were cast into a two-way table by severity levels and rates of responses to the treatments (see Table 15).

A response within twenty-four hours to a telephone call reminder was observed most frequently in borrowers who had had materials out four days already when treated as was also the case in the responses to a mail notice. The high response from the control group was among those delinquent borrowers who had had materials out two days at the point of experimentation. In the middle response class, that is from

TABLE 15

A COMPOSITE OF THE RATES OF RETURN BY HIGH, MIDDLE, & LOW FREQUENCY TREATMENT GROUPINGS AS RELATED TO SEVERITY LEVEL

	Rates of Return								
	High (0-1 Days)			Middle (2-11 Days)			Low (12+ Days)		
Severity Levels	A	B	C	A	B	C	A	B	C
	%	%	%	%	%	%	%	%	%
1	65	54	34	23	40	48	12	6	18
2	72	46	44	19	36	38	9	18	18
3	64	30	18	28	30	47	8	40	35
4	100	63	29	0	25	43	0	12	28
5	86	8	0	0	76	25	14	16	75
6	58	12	25	42	59	42	0	29	33
7	50	19	30	36	63	30	14	18	40
M =	71	33	26	21	47	39	8	20	35
Med =	65	30	29	23	40	42	9	16	33

two through eleven days after treatment, the A group response was found most frequently in the sixth day, the B group in the seventh day, and the C group in the first day. The lowest response of twelve or more days past treatment was found most frequently in students treated by A stimuli who had had materials out five days already, the B group in the third level of severity, and the control group in the fifth day.

A reference to Table 16 shows that the patterns of borrowers' responses to treatments as related to the severity of the delinquency are haphazard and scattered. There is only one instance where the responses are consistent among the various treatments. That example is for those delinquent borrowers who returned overdue materials from two through eleven days after treatment (Middle) and who had had the materials for two days past the due date. In this case, the A, B, and C groups were each the fifth most frequent responses among the possible seven.

On the basis of these data, no consistent pattern of responses to treatments as related to severity levels is discernible. It makes little difference to the patrons having a book overdue one day, two days or even seven days whether they respond more or less quickly to experimental efforts to stimulate them to return materials in order to share them with other students. There appears to be,

TABLE 16

A COMPOSITE OF THE RANKING OF RETURN RATES
BY FREQUENCY TREATMENT GROUPINGS AS
RELATED TO SEVERITY LEVEL

	Rates of Return								
	High (0-1 Days)			Middle (2-11 Days)			Low (12+ Days)		
Severity Levels	A	B	C	A	B	C	A	B	C
I	4	2	2	4	4	1	3	7	6
II	3	3	1	5	5	5	4	5	7
III	5	4	6	3	6	2	5	1	3
IV	1	1	4	6	7	3	6	6	5
V	2	7	7	7	1	7	1	4	1
VI	6	6	5	1	3	4	7	2	4
VII	7	5	3	2	2	6	2	3	2

therefore, little relationship between the number of days a borrower has had a book out when he is contacted and the resultant rate of response to a particular treatment.

The Subjects of Borrowed Material

It has been suggested that undergraduates who borrow materials in the sciences and technologies are better disciplined and more sensitive to the need of sharing materials than students who use books in the humanities and social sciences. If it could be established that a university library has more or fewer recalcitrant patrons who borrow one type of book rather than another, valuable information could be gained for applying toward the servicing of collections. Eventual application of such study to this treatment of students by groups rather than individually might be feasible as a result. On the other hand, as with other alternate hypotheses, if no relationship of the subjects borrowed to the treatment responses is discerned, the general hypothesis of the experiment would gain additional strength.

In order to probe into this question, each transaction card in the experiment was examined and analyzed according to the subject content of the books borrowed. As previously explained, the delinquent borrowers were selected randomly to be treated by telephone message, mail notice, or assigned to the control group. In studying the subjects of borrowed materials, only a few borrowers were rejected inasmuch as

their material was of a general nature and could not be classified conveniently into the categories of humanities, social sciences, or science-technology.

The records of 496 delinquent borrowers were subsequently inspected to determine patterns as related to the subject of the material borrowed. In order to place the data of the eleven replications into a meaningful form, a composite table was constructed. The results of all borrowers' responses viewed together reveal a few patterns not so readily observed unilaterally (see Table 17).

A computation of the valid records of 496 delinquent borrowers shows that 120 (24%) had used science and technology materials, 154 (31%) had checked out humanities titles, and 229 (45%) had borrowed social science books. The differences in the rates of response to treatments show various patterns.

There appears to be only slight differences among the rates of response to treatment as related to the subject of the books, ergo, the type of borrower. It is noted in Table 18 that there are few large differences in response rates among the three subject categories.

There is a slightly greater high response to treatment among borrowers who check out science and technology materials than those who borrow social science books. There is

TABLE 17

RETURNS AFTER TREATMENTS AS RELATED TO SUBJECTS OF BORROWED MATERIALS IN ALL REPLICATIONS

Return Rates	SCIENCE & TECHNOLOGY				HUMANITIES				SOCIAL SCIENCES				
(Days)	A	B	C	Total	A	B	C	Total	A	B	C	Total	Totals
0	17	16	5	38	15	15	14	44	37	19	13	69	151
1	8	8	7	23	9	9	6	24	16	13	10	39	86
2	4	3	1	8	3	6	5	14	6	2	7	15	37
3	0	3	0	3	2	3	3	8	1	5	1	7	18
4	1	6	4	11	2	6	2	10	1	8	3	12	33
5	0	2	8	10	1	3	5	9	4	2	6	12	31
6	0	3	1	4	0	4	1	5	1	4	7	12	21
7	0	1	0	1	0	4	0	4	2	2	2	6	11
8	2	0	1	3	1	1	2	4	2	0	3	5	12
9	1	0	1	2	0	0	1	1	1	0	4	5	8
10	0	0	0	0	0	0	0	0	0	0	1	1	1
11	0	0	1	1	0	0	2	2	0	1	1	2	5
12	4	4	8	16	6	8	15	29	7	12	18	37	82
Totals	37	46	37	120	39	59	56	154	78	68	76	222	496

TABLE 18

RETURN RATES OF DELINQUENT BORROWERS AS RELATED TO FREQUENCY RANGES AND SUBJECT CATEGORIES IN ALL REPLICATIONS

Return Ranges	Science & Technology	Humanities	Social Sciences
	%	%	%
High (0-1 Days)	50	44	49
Middle (2-11 Days)	36	37	34
Low (12+ Days)	14	19	17

even a greater high-response among science and technology borrowers and those who select humanities materials and a slightly greater high-response in social sciences over humanities. It follows, then, that the highest low-response category is in the humanities (19%), trailed by the social sciences (17%), a difference of 2%, and then science and technology (14%), a difference of 3%.

In order to test the significant differences of the return rates among science and technology, humanities, and social sciences groupings, the chi-square test was applied to the data. As can be seen in Table 19, the null hypothesis that there is no difference between any two groups which cannot be accounted for by sampling variability because they have been drawn from the same population is upheld. In the case of the comparison of the science and technology group to the humanities, the chi-square equals 3.01. The value needed for significant X^2 at the .01 level with two degrees of freedom is 9.21.

The comparison of the social sciences to the science technology group shows approximately the same results. The chi-square in this instance equals 1.05. With two degrees of freedom, the value required for a significant X^2 at the .01 level is 9.21.

TABLE 19

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN *RETURN RATES OF DELINQUENT BORROWERS USING* SCIENCE & TECHNOLOGY MATERIALS AND HUMANITIES AND SOCIAL SCIENCES BOOKS BY X^2

A

	High (0-1 Days)		Middle (2-11 Days)		Low (12+ Days)		Totals
	O	E	O	E	O	E	
Science & Technology	61		43		16		120
Group		56		43		21	
Humanities	68		57		29		154
Group		73		57		24	
Totals	129		100		45		274

.44 .00 1.19
.34 .00 1.04

.78 + .00 + 2.23 = 3.01 = X^2

Value needed for significant X^2 at .01 level with 2 df is 9.21.

B

	High (0-1 Days)		Middle (2-11 Days)		Low (12+ Days)		Totals
	O	E	O	E	O	E	
Science & Technology	61		43		16		120
Group		59		42		19	
Social Sciences	108		77		37		222
Group		110		78		34	
Totals	169		120		53		342

.06 .02 .47
.03 .01 .26

.09 + .03 + .93 = 1.05 = X^2

Value needed for significant X^2 at .01 level with 2 df is 9.21.

The Summary

The foregoing analysis indicates that there is a statistically significant relationship among the various treatments applied to these delinquent borrowers and their rates of returns. The results show that when a library patron had overdue materials in his possession and was reminded of this fact, he returned materials most quickly if called by telephone, less rapidly if sent a written notice, and least promptly if not treated in any manner.

There appears to be the most immediate return, regardless of type of treatment, on the same day or the day-after-treatment. The middle range return rate category includes fewer borrowers than in the extreme no-return category. All delinquent borrowers, in other words, follow a surge of returning materials immediately after treatment. This is extended by a more even rate-spread over the following week. The tag-end return rate, then, builds up over a period of at least twelve days.

The interrelationships for all categories indicate that even though the same and first-day-after-treatment exhibits the most rapid rate of returns, the most direct treatment elicited an even greater return, followed by the next most direct, and finally the least direct treatment. The return rates in the extreme categories show that the control group has the greatest percentage of returnees in the lowest rate classification.

There are fewer relationships between the return rates and the experimental treatments and other variables which were analyzed, however. A review of the return rates and treatments as related to a particular point-of-time during an academic term reveals no positive or negative relationship, for example. The variations in intensity of work loads during a quarter do not appear to affect the return rates of delinquent borrowers.

On the basis of the experimental data, furthermore, no consistent patterns of return rates and treatments as related to the severity of the delinquency is discernible. It does not seem to make any difference in the return rates of a borrower and a treatment whether he has had the library material out for one day, two days, or up through seven days past the due date.

An inspection of the experimental results also shows that the delinquent borrowers check out the most materials in social science, less in humanities, and least in the sciences. One notices, in addition, that there are slightly quicker rates of return after treatments by those patrons holding science and technology books than those with social science and humanities materials. These differences are not statistically significant, however, and more than likely they are chance relationships due to sampling variability.

CHAPTER V

THE FINDINGS: CAUSES

Since the hypothesis was supported by the results of the experiment, the final consideration was to determine whether the postulated causal element had been operating. This study of the delinquent borrower devolves consequently into an analysis of the findings regarding the hypothesized causal factors. It is intended that by examining the reasons which cause a borrower to become a delinquent, a clearer understanding may develop regarding the relationship found in the foregoing analyses.

In this context, the definition of causation is synonymous with causal nexus, or that linkage of events which Galileo described as a firm and constant connection. "If it is true that an effect has a single primary cause, and that between the cause and the effect there be a firm and constant connection, then it necessarily follows that whenever a firm and constant alteration is perceived in the effect, there be a firm and constant alteration in the cause."[1]

The proposition had been submitted that undergraduates become delinquents because they forget to return borrowed library materials. It was postulated, furthermore, that effective responses to appeals for sharing books with others

would come from the direct effort by a library to notify the patrons. It was also suggested that the rate of returning delinquent loans would depend upon the degree of personal contact made by the library.

The Survey

The primary purpose during this phase of the investigation was to ascertain the reasons why the delinquent borrower failed to return materials on time. The secondary objective was to determine how the delinquent borrower was influenced in his action either by the treatment provided in the experiment or by other stimuli.

A survey of the patron's accountability of his actions and attitudes during the experiment was subsequently conducted. In order to gather these data, the subjects were contacted by letter and sent a questionnaire. This personal communication was a method of obtaining information about the borrowers' behavior which was more manageable than by external sources or observations.

As previously explained in Chapter III, a sample of 135 borrowers was accepted as adequate for the causality survey. In order to assure a response reasonably close to this number, 210 subjects were ultimately selected at random from among the first five replicates.

Representativeness of this sample was a serious consideration. Indications were that the subjects in the first five weeks of the term were no different in their characteristics and behavior patterns than those selected during the last six weeks. This inference seemed to be reinforced by the results of the study in which point-of-time had no significant influence. It was also found that the distribution of males and females in the causality sample coincided with that of the experimental sample, or 55% male and 45% female borrowers in the former and 56% and 44% respectively in the latter.

Out of this survey, questionnaires were returned by 150 persons, of whom 129 submitted sufficient and complete information which could be validated. This rate of return represents 71% of the subjects contacted. The final usable data are from only 61% of the 210 subjects contacted, however. This amount of response, in turn, is 26% of the total 500 delinquent borrowers in the experiment, which seemed sufficiently adequate and representative.

Of the 129 subjects, forty-nine (38%) had been treated by telephone calls; forty-three (34%) by mail notices; and thirty-seven (28%) were untreated. Seventy-one of the undergraduates (55%) were men and fifty-eight (45%) were women. Among the disciplines which could be identified as majors, thirty-one (24%) were in science-technology; forty (31%) in

the humanities; and fifty-five (43%) in the social sciences; and three (2%) were unclassified. Of the borrowers replying, thirty-five (27%) were freshmen; thirty-one (24%) were sophomores; thirty-two (25%) were juniors; and thirty-one (24%) were seniors (see Table 20).

The Causes

After establishing the validity of the borrower's delinquency, the first question posed to him elicited his reason for returning borrowed materials past the due date (see Appendix C). Out of 129 respondents, 104 (80%) said that they simply forgot that they had in their possession a library book which was overdue (see Table 21).

There were twenty-five borrowers (20%) who had other reasons, however. The accounts of this minority group ranged widely. The fact that the patron was not finished reading the book represented the reason for five subjects (4%). The situation wherein a secondary loan was made to a fellow student was cited by five additional patrons (4%) as the explanation for delay. The causes of ignorance of fines, of oversleeping, of illness, and of temporary loss of books were offered singly by each of four borrowers (3%) as reasons for failing to return materials.

The in-between causes for delinquency, according to the subjects of the sample, included procrastination (2), confusing due dates (2), unable to get to the library (3),

TABLE 20

RESPONSES OF DELINQUENT BORROWERS
AS RELATED TO SEX AND
SUBJECT MAJOR

	SEX			MAJOR				
Treat-ment	Male	Female	Total	S-T	H	SS	Uncl.	Total
A	23	26	49	8	12	27	2	49
B	22	21	43	12	13	18	0	43
C	26	12	37	11	15	10	1	37
Totals	71 (55%)	59 (45%)	129 (100%)	31 (24%)	40 (31%)	55 (43%)	3 (2%)	129 (100%)

TABLE 21

RESPONSES OF DELINQUENT BORROWERS AS RELATED TO CAUSAL FACTORS

Treatment	Forget		Other		Total	
A	37	(77%)	12	(23%)	49	(100%)
B	37	(86%)	6	(14%)	43	(100%)
C	30	(81%)	7	(19%)	37	(100%)
Totals	104	(80%)	25	(20%)	129	(100%)

misplacing a book (2), and being out-of-town (2), or a total response of eleven persons (9%). In no case did anyone indicate that he was openly defying the system by a flagrant violation of library rules. In only one instance did a subject say that he was ignorant of the rules regarding the lending of materials and, actually, that example related more specifically to fines than to the length of a loan period.

In every case, it was evident that the borrower was, indeed, a delinquent by his own admission, thereby corroborating the records of the field-study library. The severity of the habitual delinquency, however, could not be determined precisely from the data. There seemed to be indications, nonetheless, that the subject's behavior was not confined to one experience. He more than likely had had other books overdue in the past, although the evidence found was inconclusive in this regard.

There was nothing in the data either to suggest that the borrower was a person of malicious intent who defied the regulations without purpose. There was no evidence, furthermore, to indicate that the delinquent borrower was refusing to share materials through a deliberate attempt to deprive his fellow students. Nothing was revealed in the analysis of the data which suggested that the condition of

delinquency was caused by the lack of a sufficient length of loan periods.

There was no information obtained, moreover, from which one could infer that it made any difference whether the delinquent borrower was a man or a woman as related to the reasons for failing to return library materials. No relationships could be found either between the cause for delinquency and the classification of the student. Delinquency causes, that is, showed no discernible differences among freshmen, sophomores, juniors, or seniors. One class was as well represented in the survey as another. It should be stated finally that the major fields of the patrons in the study had little or no relationship with the stated causes of delinquency.

Separate tests for significance were run in order to evaluate the following proposition: (1) men and women; (2) freshmen, sophomores, juniors, or seniors; and (3) majors in science-technology, humanities, or social sciences, all tend to respond to stimuli equally. It was conjectured that if the null hypotheses were supported by the tests of significance, additional credence would be lent to the postulated causal elements of the experimental hypothesis.

It can be seen in Table 22 that there is no significant difference in the causes for delinquency between male and female undergraduates. A chi-square of 1.16 with one degree

TABLE 22

THE STATISTICAL DIFFERENCES BETWEEN MALE AND FEMALE BORROWERS AS RELATED TO CAUSES OF DELINQUENCY:A COMPOSITE BY X^2

	Forgetfulness		Other		Total
	O	E	O	E	
Male	59	57	12	14	71
Female	45	47	13	11	58
Totals	104		25		129

.16 .61
.09 .30

.25 + .91 = 1.16 X^2

Value needed for significant X^2 at .05 level with 1 df is 3.84.

O - Observed Frequency

E - Expected Frequency

of freedom is not significant where the value of the significant X^2 at the .05 level is 3.84.

A referral to Table 23 shows that the comparisons among freshmen, sophomores, juniors, and seniors exhibit little difference with a chi-square of .81. At three degrees of freedom, this experimental figure is well below the selected value of the significant X^2 at the .05 level which is 7.82.

The relationship among the undergraduate borrower who majors in humanities, social sciences, or science-technology is not a difference of significance either. According to Table 24, the experimental value is .90. The value of the significant X^2 at the .05 level with two degrees of freedom is 5.99.

According to these analyses, it does not seem to make any difference in the rates of returning materials whether a delinquent borrower is a man or woman; a freshman, sophomore, junior, or senior; nor whether his major is in the area of science-technology, humanities, or social sciences. The data suggest that whoever he is, the delinquent fails to return on time the materials which he has borrowed from the library because he forgets.

The Responses

The secondary objective of the survey was to determine how the treatments applied in the experiment stimulated

TABLE 23

THE STATISTICAL DIFFERENCES AMONG FRESHMAN, SOPHOMORE, JUNIOR, AND SENIOR DELINQUENT BORROWERS AS RELATED TO CAUSES OF DELINQUENCY: A COMPOSITE BY X^2

	Forgetfulness		Other		Total
	O	E	O	E	
Freshman	27	28	8	7	35
Sophomore	26	25	5	6	31
Junior	25	26	7	6	32
Senior	26	25	5	6	31
Totals	104		25		129

.04 .14
.04 .17
.04 .17
.04 .17

.16 + .65 = .81 = X^2

Value needed for significant X^2 at .05 level with 3 df is 7.82.

O - Observed Frequency

E - Expected Frequency

TABLE 24

THE STATISTICAL DIFFERENCE AMONG HUMANITIES, SOCIAL SCIENCES, AND SCIENCE-TECHNOLOGY MAJOR DELINQUENT BORROWERS AS RELATED TO CAUSES OF DELINQUENCY: A COMPOSITE BY X^2

	Forgetfulness		Other		Total
	O	E	O	E	
Humanities	34	32	6	8	40
Social Sciences	42	44	13	11	55
Science-Technology	26	26	5	5	31
Totals	102		24		126*

*3 Unclassified delinquent borrowers not included in the test.

.13	.50
.09	.18
.00	.00

$.22 + .68 = .90 = X^2$

Value needed for significant X^2 at .05 level with 2 df is 5.99.

O - Observed Frequency

E - Expected Frequency

responses from the borrowers. For whatever reason the library patrons fail to return overdue materials, how do they react to telephone calls or mail notices which are intended to remind and to prompt? How does this response compare to the patrons who receive no treatment? It was thought that answers to these questions, which were self-imposed during the analysis of the data, would satisfy substantially the secondary purpose of the survey.

Out of the ninety-two subjects treated with telephone or mail notices, fifty (55%) said that the stimuli received had positively reminded them of their delinquency (see Table 25). Forty-two of the subjects (45%) replied negatively or that they were uncertain. In the case of those subjects treated by telephone, most subjects (67%) said they were actually reminded, whereas among those treated by mail notice, there were only seventeen (40%) of the forty-three patrons who were quite so positive.

It is difficult to establish the reason for a greater evidence of reminding via a telephone message than by a mail notice. Unless the student already knew before the receipt of the notice, it would appear that no matter what form a message takes, he would be reminded ipso facto. There seems to be something about a telephone call, however, which denotes urgency and, therefore, the likelihood of quick response is more possible. It could be, of course, that this

TABLE 25

RESPONSES OF DELINQUENT BORROWERS AS RELATED TO INFLUENCES OF TREATMENTS

A

REMINDER

Treatment	Yes		No		Total	
A	33	(67%)	16	(33%)	49	(100%)
B	17	(40%)	26	(60%)	43	(100%)
C	21	(56%)	16	(44%)	37	(100%)
Totals	71	(55%)	58	(45%)	129	(100%)

B

PROMPTER

Treatment	Yes		No		Total	
A	35	(71%)	14	(29%)	49	(100%)
B	26	(60%)	17	(40%)	43	(100%)
C	21	(56%)	16	(44%)	37	(100%)
Totals	82	(63%)	47	(37%)	129	(100%)

particular sample of B-treated patrons who were sent mail notices had remembered the delinquency immediately prior to receiving notification. This possibility seems rather remote, however, in view of the large numbers in this category who said that the reason for being delinquent in the first place was attributed to their forgetfulness (see Table 21).

It was difficult to determine precisely from the subjects in the control group which circumstances reminded them of their delinquency. Twenty-one of the thirty-seven (56%) responded that they were reminded in some way. These replies suggested all types of situations such as: discovering the book while housecleaning; shelving it among personal books; noticing the date due slip; or realizing while visiting the library that books checked out previously might be overdue.

There has to be something, surely, which eventually reminds people of an obligation. It is difficult for most persons to identify this reminder, however, especially when it is so elusive and when the events of the past have to be reconstructed in the process. There was less of a problem for the subjects to identify a reminder, on the other hand, when they had been treated by the library in some positive and tangible manner, such as receiving a telephone call or a mail notice.

Although 80% of the treated subjects indicated that the cause for their delinquency was forgetfulness, only 55% were positive that the stimulus received actually caused them to remember (see Table 25). Something else, then, obviously must have reminded them. This possibility is reinforced by the results of the control group where 56% of the subjects indicated that they were reminded of their forgetfulness by one circumstance or another, even though not provided directly by the library. The survey was not always successful in eliciting a positive identification by a patron of how he was reminded.

If the greatest number of delinquencies in the sample is caused by forgetfulness (80%) and if the response of reminding them of their forgetfulness is positive for the greatest number (55%), then one logical extension of this analysis is to determine the numbers who are prompted into doing something about it. In this context, prompting means a change in behavior patterns from passiveness to action which is presumably caused by a stimulus.

In the experiment, 71% of the subjects who were reached by telephone were prompted to return the material (see Table 25). Out of the group which was sent mail notices, 60% indicated that the treatment had a prompting effect. Among those who were not treated, 56% opined that various

combinations of circumstances prompted them to return materials which were overdue.

The treatment applied seems to have a slightly greater likelihood of prompting people to return material than it did of reminding them. It can be inferred that even though reminded of a delinquency, which 54% of the subjects said they had been, a precise stimulus received will actually prompt 66% to return the items.

In order to test the significance of differences of the secondary objective as related to the reminding and prompting which leads to behavioral changes, the Friedman chi-square test was applied. In the first place, the significant differences were ascertained between the reminder effect as reported by the borrowers treated by telephone and by those treated by mail notices.

In Table 26, it is noted that the resultant X^2 is 6.35. This experimental figure is greater than the value needed for significant X^2 at the .05 level with one degree of freedom, which is 3.84.

It was also part of the secondary objective of the survey to ascertain the degree of prompting which a treatment may have precipitated. The subsequent application of the chi-square test in this regard is summarized in Table 27. In this instance, the two variables of the experiment when compared showed no significant difference in the effects of

TABLE 26

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN RESPONSIVE AND UNRESPONSIVE DELINQUENT BORROWERS AS REMINDED BY TREATMENTS A AND B BY X^2

	Responsive		Unresponsive		Total
	O	E	O	E	
Treatment-A	33	27	16	22	49
Treatment-B	17	23	26	20	43
Totals	50		42		92

1.36 1.63
1.56 1.80

$2.92 + 3.43 = 6.35 = X^2$

Value needed for significant X^2 at .05 level with 1 df is 3.84.

O = Observed Frequency

E = Expected Frequency

TABLE 27

THE STATISTICAL SIGNIFICANCE OF DIFFERENCES BETWEEN RESPONSIVE AND UNRESPONSIVE DELINQUENT BORROWERS AS PROMPTED BY TREATMENTS A AND B BY X^2

	Responsive		Unresponsive		Total
	O	E	O	E	
Treatment-A	35	32	14	17	49
Treatment-B	26	29	17	14	43
Totals	61		31		92

.38 .53
.31 .64

.69 + 1.17 = 1.86 = X^2

Value needed for significant X^2 at .05 level with 1 df is 3.84.

O - Observed Frequency

E - Expected Frequency

prompting delinquent borrowers. It is seen that X^2 equals 1.86. The value needed for significant X^2 at the .05 level with one degree of freedom is 3.84.

Although one type of treatment (telephone calls) seems to remind a significantly greater number of borrowers of their delinquency than another treatment (mail notices), the prompting into action does not show any significant difference between the two treatments as based upon the responses in the survey.

The attitudes of the patrons in the survey toward the treatments applied by the library were also investigated. The respondent was asked, therefore, if he had, or would have, appreciated receiving a notice regarding the overdue materials. Among the patrons contacted, ninety-six (74%) replied affirmatively, fifteen (12%) negatively, and seventeen (14%) uncertainly (see Table 28).

The subjects in the survey who received telephone calls were in favor of this practice by a large majority (76%) over those who were unfavorable (10%) or uncertain (14%). The patron queried who received a mail notice was less appreciative, but, nonetheless, twenty-seven of the forty-three, or 63%, were positive whereas seven (16%) were negative, and nine (21%) were uncertain.

TABLE 28

THE ATTITUDES OF BORROWERS
TOWARD TREATMENTS:
A COMPOSITE

Treatments	Favorable		Unfavorable		Uncertain		Total	
A	37	(76%)	7	(10%)	5	(14%)	49	(100%)
B	27	(63%)	7	(16%)	9	(21%)	43	(100%)
C	32	(87%)	1	(1%)	4	(12%)	37	(100%)
Totals	96	(74%)	15	(12%)	17	(14%)	129	(100%)

It was the patrons surveyed from the control group, however, who indicated overwhelmingly (87%) that they would have appreciated a notice, while only one (1%) said he was not interested and four (12%) were uncertain. Out of these thirty-two affirmative respondents, nineteen (59%) preferred the mail notice whereas thirteen (41%) wished to receive a telephone call, if they had a choice of methods.

The Summary

By eliciting the personal responses of a sample of experimental subjects, an attempt was made to present information on the nature of the relationships between the borrower and the forces which determine his delinquency. In ascertaining the reasons for a delinquent patron's failure to return borrowed material on time, the evidence of the survey shows that the primary cause is forgetfulness. Although there are a miscellany of other reasons for failure to share material, according to the respondents, they amount to less than 20% of the total number of patrons queried. These data tend to support the prediction of the causal factor in the hypothesis, that is, that undergraduates fail to share borrowed materials by returning them on time because they forget.

There was no evidence found to substantiate any probabilities that borrowers are delinquents because they defy library regulations, or that they refuse to share materials

with fellow students, or that the length of the loan period is insufficient. There was no information uncovered in the survey, moreover, which suggested response differences because of the undergraduate's sex, his major field of study, or his university classification.

More difficult to isolate was the information necessary to determine how the treatment applied in the experiment stimulated responses from borrowers. The respondents who indicated that they had been reminded of their delinquency by virtue of a telephone call received were quite positive, whereas those borrowers receiving mail notices tended to be more negative and uncertain in their response. The patron apparently considers a telephone call to be urgent and, therefore, it more likely jars him into remembering more than any other stimulus. The other means by which patrons are reminded of an obligation were scattered in the evidence and the responses tend to be uncertain.

It is one thing to be reminded of an obligation such as the need to return an overdue book for others to share. It is quite another thing to be prompted into action upon receiving notification. Most of the respondents tended to think that the treatment prompted them into action. The survey evidence shows, indeed, that more patrons were prompted than reminded by treatments received. The two variables in the experiment did not show a statistical

difference, however, in their respective effects to prompt patrons. It was also difficult to obtain information from the untreated experimental patron. His responses were based upon a reconstruction of circumstances which are ordinarily elusive and very hard to identify.

Although the patrons in the survey responded variously, the vast majority said that they liked to get a notice regarding an overdue book. Those who actually received a telephone call favored this method in greater percentage than those who received mail notices. It was the group which was not treated, however, which wanted some kind of notice sent as seen in the great proportion of affirmative replies.

The Footnotes

1. Galilei Galileo, Opere, Vol. VII cited by Mario Bunge, Causality (Cambridge: Harvard University Press, 1959), p. 4.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The purpose of this study has been to gather and examine data on the relationship between the treatments applied to delinquent undergraduate borrowers and the effectiveness of the responses as well as to obtain empirical information on the operation of other variables in the delinquency situation. The method used was a series of experiments in which eleven replicates of delinquent undergraduate borrowers in a medium-size land-grant university library were treated by either a telephone call or a mail notice, or they were untreated. All of the responses were carefully observed, tabulated, and analyzed. The subjects of each replicate were similar regarding such characteristics as university classification and severity of delinquency. The groupings were arranged for treatment during the same time of the year, the week, and the day.

The data collected were used in testing the study hypothesis that the greater the stimulus to share resources provided by an academic library, the greater will be the rate of returning materials by delinquent borrowers. In addition, several other variables which were thought to be operative were subsequently analyzed and subjected to a statistical test.

In accordance with the hypothesis, an ordering of the results was predicted upon the bases of logical reasoning, upon the experience of the investigator, and upon the empirical evidence from the pilot study. In order to recognize such implicit hypotheses in an analysis of variance, the ranking statistic "L" was used as a primary test of the relationship among the treatment groups. The Friedman chi-square test was also applied to determine the significance of differences in several other comparisons.

In the following sections of this chapter, the findings of the study are summarized, after which are presented a delineation of the limitations and assumptions of the results. An attempt to draw conclusions from the investigation is then outlined. A discussion of some practical implications of the summary and conclusions ultimately is presented after which several directions for further research are finally offered.

The Findings

The findings of the study were determined in the two important categories of effects and causes as follows:

1. There is a statistically significant relationship among the treatments applied to a delinquent borrower and the rate of materials returned being highest when called by telephone, next high when sent a mail notice, and lowest when not treated.

2. There is a surge of materials returned among delinquent borrowers instantaneously after treatment regardless of type, extended by a more even and modest rate throughout the next week and ultimately building up to a late and greater rate of return again by twelve or more days after the treatment was applied.
3. There is an interrelationship of responses that indicates an even greater return rate, the more direct the treatment, showing the control group of borrowers with the greatest number of respondents in the lowest rate of return classification.
4. There is neither a positive nor a negative relationship of patrons' rates of return during any particular time whether an early, middle, or late segment of an academic term.
5. There is no apparent difference in the rates of return after treatments as related to delinquency severity, that is whether the library material has been overdue for one day, two days, or up through seven days.
6. There is no statistical difference in the rates of return after treatments displayed by patrons borrowing science-technology books from those borrowers using social science or humanities material,

even though fewer books are checked out by the former group than by the latter two categories.

7. There is evidence to support the postulated causal element for delinquency as the common human characteristic of forgetfulness, thereby reducing the other attributable causes such as procrastination, lending charged books to friends, misplacing the material, and similar reasons to an aggregate element amounting to 20% of the undergraduates.
8. There is no information to substantiate any probabilities that borrowers become delinquent because they tend to defy library regulations, or refuse to share materials, or that the loan period is too short.
9. There are no data to support the conjecture that delinquency can be correlated positively with an undergraduate's sex, major field of study, or university classification.
10. There is evidence indicating that those borrowers who were treated more directly were actually reminded of their delinquency in significantly greater numbers than borrowers who were treated by other stimuli, or not treated at all.
11. There is sufficient information available to suggest that the more direct the treatment, the

greater the likelihood of prompting a delinquent borrower into positive action.

The Limitations and Assumptions

All conclusions and generalizations based on these findings should be drawn only after limitations and assumptions implicit in the design and method of this study have been made explicit. Those which are important to this report are listed as follows:

1. The undergraduate delinquent had borrowed materials from a land-grant university library. The findings would be applicable to borrowers at other types of libraries only to the extent that their lending situations are similar to those of the library at Colorado State University.
2. The delinquent student was studied at a medium-size university borrowing situation. No borrowers at small nor very large academic libraries were considered.
3. The undergraduate was the only type of delinquent studied. The applicability of these results to the graduate student, the faculty or staff patron, or the non-university borrower cannot be made with certainty.
4. The attempt to select randomly the subjects of the experiment was uncompromising and the effort to

include representative delinquents of a wide population was unfailing. A larger number of cases, nonetheless, might have strengthened the results.

5. Several of the questions asked in the survey demanded the reconstruction of a series of elusive events by the delinquents which was sometimes difficult, if not impossible, to accomplish. It was discovered beyond the point of no return that one of the questions posed in the questionnaire regarding causes of delinquency was leading in nature and might have suggested a conclusion by the respondent. Although several alternatives were offered in the instrument which allowed for non-directed answers, these facts, nonetheless, may cast a shadow of doubt upon the credence of some of the responses.
6. The generalizations from the responses of 500 participants to treatments applied by the library rests upon the assumption that the education and experience in library use and the obligation to share materials is recognized among all those in the study. In the selection process, an effort was made to obtain respondents with similarities. In addition, the borrowers in the sample represented a cross-section of undergraduates at the institution where the study was conducted.

The Conclusions

Based upon the findings in the investigation and within the limitations of the experiment, several conclusions are drawn as follows:

1. The effort put forth by university libraries in using telephone and mail messages to encourage sharing of resources is effective. The length of overdue periods would likely be longer without this stimulus provided by a library. The materials are returned more quickly, the more direct the message is, which suggests that a sense of urgency and concern is created in the minds of delinquent borrowers when they receive notices, and subsequently stimulates them to respond positively and promptly.
2. With fewer resources per capita available to a rising population of students, the need to gain a broader circulation base is critical and thus the immediate return is very important. The contention by some librarians, therefore, that the time and effort expended on contacting students about past due materials is wasted has little support in this study. The practice of sending such notices seems worthwhile in view of the results of this experiment.
3. The patron tends to react to stimuli more responsively either immediately after treatment or

otherwise he waits for several days. A follow-up contact with these borrowers would more than likely reach a group which fails to react immediately with the high probability of achieving positive results.

4. The library should notify students of their delinquency at the same level of intensity during all times of an academic year. The pronouncements frequently cited that sending one notice each semester is as effective as frequent and regular stimuli have little basis of support in this study.
5. There does not seem to be much point in treating borrowers differently according to the severity of their delinquency. It means nothing more or less to a patron whether he has had a book one day overdue or seven days; he reacts the same to the stimuli applied.
6. There is little support in this experiment for the position that the student who checks out material in science-technology is more or less responsible than those borrowing humanities or social sciences books. All students tend to respond about equally to library treatments no matter what kind of books they use.
7. There is small doubt that a student's forgetfulness leads him unwarily to the status of delinquency.

All efforts by a library to overcome or delimit this condition seem to be worthwhile.

8. Contrary to popular contentions about an undergraduate's behavior, there is little foundation for the claim that he becomes a delinquent borrower through his defiance of regulations or that he is basically selfish and refuses to share materials. It makes little difference, either, on the matter of habitual delinquency or even the length of loan periods as far as responses are concerned. The consideration of these matters in handling the problems seems unimportant for the library.
9. This study tends to refute the girl-is-more dependable or the upperclassman-is-more-considerate syndromes. They really make a small difference and libraries might disregard the sex and status of delinquents as meaningful indicators of behavior in the delinquency situation.
10. It is also apparent that the notice from the library which directs a delinquent borrower to return materials is, in fact, the reminder as well as the prompter of action. The tangible evidence of receiving something seems to get far greater positive responses than if left solely to chance.

In the classic relationship between the purveyors of books in academic libraries and the borrowers, the burden of

responsibility for sharing the materials by returning them according to a contractual agreement has always revealed sufficient deviation to impede the continuous transfer of information. Although a small percentage of the undergraduate borrowers become delinquents, there are still enough instances annually to accumulate into several thousand cases on a college campus.

For each patron who neglects to return a book on time, there is another one who may be denied use of that material. It is particularly important at a library with inadequate collections to provide the widest range of circulation. The delinquent borrowers create a situation, often unknowingly, whereby full utilization of the university's book resources fails to reach its potential. An apparently insignificant problem, therefore, often becomes one of great import particularly as the population increases and the collection growth fails to expand commensurately.

It is necessary, consequently, to know more about our library users. This study has given us an insight into their behavior patterns under specific controlled conditions. As a result, we do know more fully how students respond to given stimuli. We grasp more accurately the reasons for their delinquency status. We better comprehend the relationship of the user's background and the ways he reacts to given situations. We understand more about his attitudes toward an academic library and its services and resources.

We submit that the results of this investigation have added to the knowledge about a perennial problem which confronts libraries. The delinquency situation is a substantive phenomenon which threatens a fundamental philosophical tenet of library service -- sharing. Inherent in the rationale for the organization of the modern academic library is this concept of sharing. When it falters, the repercussions throughout the network ordinarily follow. Whenever the privileges to share are placed in jeopardy and are acknowledged, steps to correct the imbalances are in order.

The Future Research

Inasmuch as this study is the first known large-scale investigation of the delinquent borrower in an academic library, it should be considered exploratory and preliminary. In order for the findings and conclusions to be accepted with even greater confidence, other similar investigations might be undertaken. A future effort to validate, to supplement, or to refute the results of this experiment might be worthwhile.

Certain refinements in future studies over the present experiment are needed. A better control of the variables is one consideration. The experiences of the subjects may have included treatments similar to the experiment and thus influenced their response. Without more data on each subject

in advance, however, this type of control is impossible to achieve.

It could be that other variables might be introduced as treatments. The effect of stimuli ranging from personal messengers to special markings in each book might be worthwhile exploring. Attention to more variables would involve a larger group of subjects than is found in the present study, however.

It may be that the experiment should be conducted for the entire academic year rather than during only one quarter. Students are known to change in their behavior and attitudes and perhaps these factors should be studied in the future.

The experiment could also be broadened to include other libraries. One readily can conceive developing the experiment at a similar institution to the field library. The same kind of study in a large library with a vast collection spread over many buildings could produce quite different results. It could even be conducted at a public or school library with information of importance resulting. The delinquency situation is no less severe in public, school, and special libraries than on the campuses.

It also may be desirable to include graduate students and faculty as subjects in future research. Their needs for resources are different and their uses of materials are at

variance with undergraduates. There are similarities, too, and the data gathered in an experiment including those types of users would fill a gap in our present knowledge.

In addition to replicating the present study with refinements and improvements, other areas are in need of attention. If it is true that the delinquent borrower responds significantly more quickly when stimulated by a library, how can these facts be best put to use? Research into the techniques and procedures of notifying patrons needs to be done. Are certain types of notices more effective because of their novelty? Does the telephone call, for example, influence the listener because of the timbre of the caller's voice, or the persuasive tone of the reminder, or the authoritarian manner of the message? Is the written notice aesthetically pleasing which might stimulate action, or is it dull and drab? This suggests an investigation involving the contributions of psychologists, graphic artists, ard public relations experts.

Attention could be directed toward a borrower's history of delinquency. Does the fact that an undergraduate has had one overdue book mean he will have others? Does his experience with other regulatory agencies coincide with the library? Does his delinquency habit, for example, spill into the other student areas of involvement such as the campus police, the physical plant, the military science departments,

or the physical education complexes? What is the relationship of the delinquent borrower to his academic performance? Is it the better student who is also the more responsible borrower, or vice versa?

It may be of interest to determine the attitudes of all undergraduates about the sharing of resources. Why do some students unfailingly return materials on time? Is it their appreciation for sharing with classmates or do other factors force them into a behavior pattern which is non-deviating? On the other hand, why is it that some borrowers even after receiving reminders of delinquencies still fail to share materials by returning them promptly?

A related question is the matter of fines levied for books overdue. Is there better success in curbing the delinquency growth with high or low monetary fines? Is it possible to introduce other punitive measures which could effect a decline in the rate of delinquency such as the denial of borrowing privileges?

Carefully controlled experiments using different methods of education for undergraduates about their responsibilities could be conducted. The consideration of relevant research in other disciplines, such as behavioral psychology, may have application in the library delinquency situation. Motivation research has introduced new techniques which could be applied in this area, perhaps.

A cost study would also be important from a management point-of-view. The results of programs in most academic libraries necessarily are related to the costs. If circulating materials or making the greatest number of books available for the greatest number of patrons is of a low cost, then the program is more likely to be justified and continued. If the practice of notifying patrons of their delinquency is prohibitively expensive on the other hand, it may not be feasible no matter what the favorable results are.

Some persons have suggested that a notification to patrons prior to the date a book is due might reduce the total numbers accruing in a delinquency status. The task of contacting all borrowers rather than only delinquents may be possible with the aid of computers. An experiment along these lines should produce some informative results.

There is a need, finally, for a continual research program investigating the characteristics of the system which has evolved to provide selected resources on a shared basis to a large number of undergraduates who require intensive use during a relatively short period of each academic year. The limited findings of this study confirm the fact that the library patron in an academic library neglects to share in this classic relationship, not because he is opposed to it, but rather that he forgets about it. The results of this experiment have shown, furthermore, that when he is notified,

the borrower usually complies quickly and willingly. Conclusive as these results are, many of the components of the system are still unknown and unarticulated. Progressive and precise research in the future is certainly one requisite to understanding the library's role toward bringing more effective service to its users.

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APPENDIX A

PILOT STUDY INTERVIEW QUESTIONNAIRE

PILOT STUDY INTERVIEW QUESTIONNAIRE

The following record of queries and responses represents a summary of ten interviews conducted between the investigator and ten undergraduates at the University of Illinois, Urbana, May 17, 1937.

Questions and Responses

---Have you ever borrowed a book from the University Library?

Yes--10; No--0

---When you borrowed a book, were you aware that you could keep it for three weeks?

Yes--9; No--1

---Have you ever returned a book which you checked out from the University Library past the due date?

Yes--10; No--0

---When you kept the library book past the due date was it for a specific reason which you can recall?

Forgot--9; Not yet finished--1

---What was your reaction to the overdue notice which you received?

Reminded me of the book & I returned it immediately--9
Reminded me of the book, but I put off returning it anyway--1

---If you were to receive one of the following reminders or observe one of the notices, would you be likely or unlikely to return the material which you borrowed sooner?

Notice attached to the book itself: Likely--5; Unlikely--5

Notice displayed in the library: Likely--5; Unlikely--5

Notice in the Daily Illini: Likely--2; Unlikely--8

Notice on a postal card: Likely--7; Unlikely--3

Notice in a letter: Likely--8; Unlikely--2

Notice in a telephone message: Likely--9; Unlikely--1

Notice delivered by personal messenger: Likely--10; Unlikely--0

APPENDIX B

FORMS OF COMMUNICATION AND TABULATION

POSTAL MESSAGE

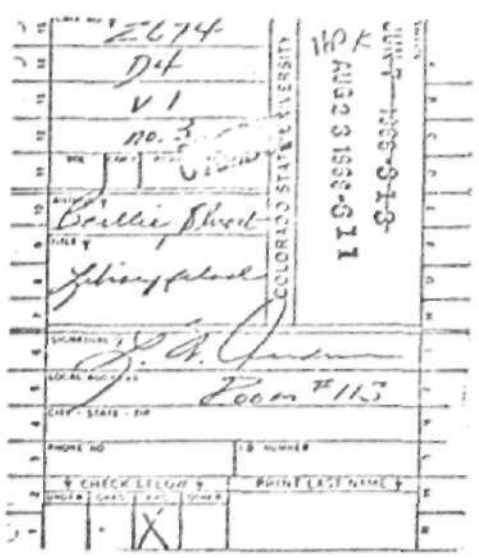
COLORADO STATE UNIVERSITY LIBRARIES

A Reminder

This loan is now past due. By returning the material, you will be sharing it with other students who also need it. If you have questions, please do not hesitate to contact us.

Circulation Department

PHOTOCOPY OF A COMPLETED LOAN
TRANSACTION DOCUMENT



TELEPHONE MESSAGE SCRIPT

Instruction for Telephone Callers

(1) Initiate the telephone call by dialing the number of a delinquent borrower;

(2) Upon the response to a call, begin the conversation as follows:

"I'm calling for the University Libraries. May I speak to _____?"

(3) If caller cannot locate the delinquent borrower, continue conversation as follows:

"Could you tell me when he is expected to return?" (listen to response and orally confirm.) "Thank you very much. Good-bye."

(4) If no answer, repeat the call at a later time;

(5) If the delinquent borrower answers (or if he is summoned to the phone, first repeat #2), then proceed as follows:

"I'd like to remind you that you have an overdue book."

It is _____ by _____.

PAUSE - (for response). PROCEED

"We would appreciate it if you would return it so other students could share it."

PAUSE: (If any response, please listen, note, and reply briefly if possible).

If extended conversation seems likely, then proceed as follows:

"I'd suggest that you take your question(s) about this material to the Loan Desk."

PAUSE

"Thank you very much. Good-bye."

TALLY SHEET

Experiment #_____ (_____ ___, 1968)

Severity of Delinquency (Check one)

___One Day _____Five Days

___Two Days _____Six Days

____Three Days _____Seven Days

____Four Days

RATES OF RETURN
(Days)

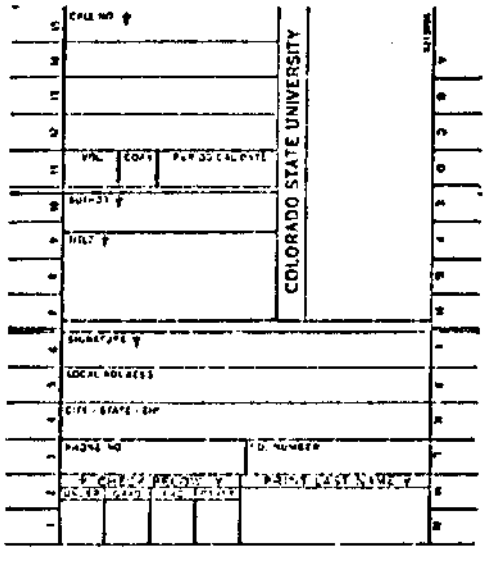
TREATMENTS	N	ZERO ( )	ONE ( )	TWO ( )	THREE ( )	FOUR ( )	FIVE ( )	SIX ( )	SEVEN ( )	EIGHT ( )	NINE ( )	TEN ( )	ELEVEN ( )	TWELVE ( )	REJECT
Group-A (Black)															
Group-B (Blue)															
Group-C (White)															
TOTALS															

A--Telephone
B--Mail
C--Control

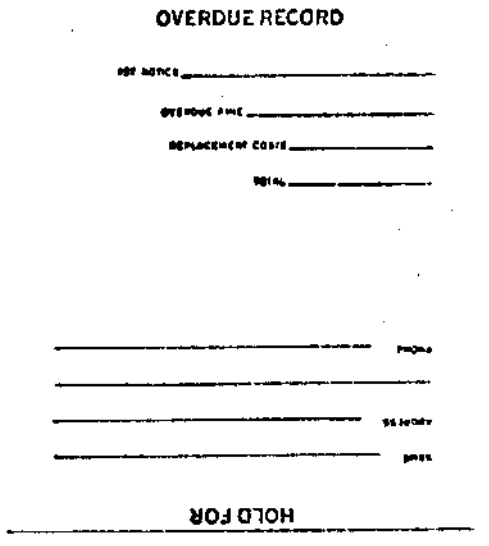
APPENDIX C

CIRCULATION FORMS AND QUESTIONNAIRES

McBEE CHARGE CARD



(Recto)



(Verso)

KEYSORT PROCESSES

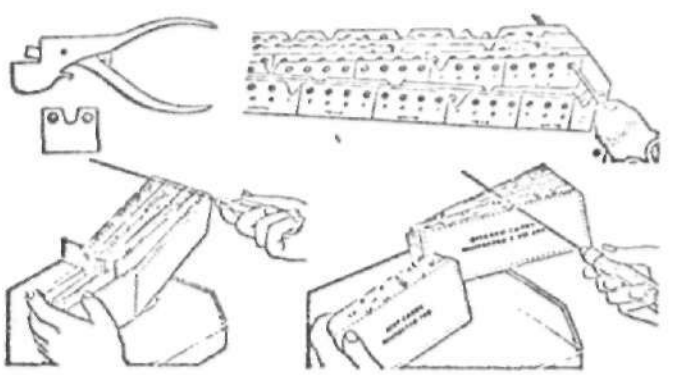


FIGURE 123. Keysort Processes. (Used by permission of Royal McBee Corporation)

PRE-TEST
LIBRARY QUESTIONNAIRE
(green)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPROPRIATE BOX:

1. Have you ever borrowed material from the Colorado State University Libraries?

   Yes ☐
   No ☐

IF YES, PLEASE CONTINUE.

2. If you have borrowed material, were you aware of how long you could keep it?

   Yes ☐
   No ☐

3. Have you ever had any overdue materials?

   Yes ☐
   No ☐

IF YES, PLEASE CONTINUE.

4. If you have had an overdue book, was it because you forgot when it was due?

   Yes ☐
   No ☐

5. If you did not forget when a book was due, did you return it late because you had not finished using it?

   Yes ☐
   No ☐

6. If you did not return the book for either of the above reasons, were there any other reasons?

   Yes ☐
   No ☐

If yes, please indicate: _____

7. If you have had an overdue book in your possession, was it a telephone call which you received which actually reminded you?

Yes ☐
No ☐

8. If you did receive a telephone call about an overdue book, did it prompt you to return the material?

Yes ☐
No ☐

9. If you received a telephone call about an overdue book, did you appreciate this reminder?

Yes ☐
No ☐

10. Do you prefer other ways by which a library staff could remind you of an overdue book?

Yes ☐
No ☐

If yes, please indicate: _____
_____
_____

***

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female
2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior
3. Major (please indicate) _____

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

PRE-TEST
LIBRARY QUESTIONNAIRE
(blue)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPROPRIATE BOX:

1. Have you ever borrowed material from the Colorado State University Libraries?

Yes ☐
No ☐

IF YES, PLEASE CONTINUE.

2. If you have borrowed material, were you aware of how long you could keep it?

Yes ☐
No ☐

3. Have you ever had any overdue materials?

Yes ☐
No ☐

IF YES, PLEASE CONTINUE.

4. If you have had an overdue book, was it because you forgot when it was due?

Yes ☐
No ☐

5. If you did not forget when a book was due, did you return it late because you had not finished using it?

Yes ☐
No ☐

6. If you did not return the book for either of the above reasons, were there any other reasons?

Yes ☐
No ☐

If yes, please indicate: _____

7. If you have had an overdue book in your possession, was it a notice which you received in the mail which actually reminded you?

Yes ☐
No ☐

8. If you did receive a notice about an overdue book, did it prompt you to return the material?

Yes ☐
No ☐

9. If you received a notice about an overdue book, did you appreciate this reminder?

Yes ☐
No ☐

10. Do you prefer other ways by which a library staff could remind you of an overdue book?

Yes ☐
No ☐

If yes, please indicate: _____

###

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female
2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior
3. Major (please indicate) _____

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

PRE-TEST
LIBRARY QUESTIONNAIRE
(white)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPPOPRIATE BOX:

1. Have you ever borrowed material from the Colorado State University Libraries?

   Yes ☐
   No ☐

IF YES, PLEASE CONTINUE.

2. If you have borrowed material, were you aware of how long you could keep it?

   Yes ☐
   No ☐

3. Have you ever had any overdue materials?

   Yes ☐
   No ☐

IF YES, PLEASE CONTINUE.

4. If you have had an overdue book, was it because you forgot when it was due?

   Yes ☐
   No ☐

5. If you did not forget when a book was due, did you return it late because you had not finished using it?

   Yes ☐
   No ☐

6. If you did not return the book for either of the above reasons, were there any other reasons?

   Yes ☐
   No ☐

   If yes, please indicate: _____

7. If you have had an overdue book in your possession, was there something that happened which reminded you?

Yes ☐

No ☐

If yes, please indicate: _____

_____

_____

8. If something did happen to remind you about an overdue book, did it also prompt you to return the material?

Yes ☐

No ☐

9. Would you have appreciated receiving a reminder from the library staff about this overdue?

Yes ☐

No ☐

If yes, please indicate your preference:

☐ telephone call ☐ mailed notice

☐ Other (indicate: _____

_____

***

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female

2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

3. Major (please indicate) _____

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

COVER LETTER FOR FINAL QUESTIONNAIRE

1308 Lory
Ft. Collins, Colorado
May 20, 1968

John Doe
Ellis Hall
Colorado State University

Dear Mr. Doe:

Your name has been drawn from a random sample of undergraduate library users at Colorado State University. The purpose of this letter is to ask you to provide data for a research project which is underway at the University of Illinois.

I am associated with a general study of the library borrowing patterns of college students. Your reaction to the current efforts by university librarians in encouraging students to share books is important.

You can help to determine the effectiveness of the present measures. All I need is your reply to the brief questionnaire enclosed. No signature or name is necessary. Your anonymity will be preserved.

Thanks very much for your cooperation.

Sincerely,

Ruth S. Weatherford

FINAL
LIBRARY QUESTIONNAIRE
(blue)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPROPRIATE BOX:

1. Have you ever borrowed material from the Colorado State University Libraries which you returned after the date it was due?

☐ Yes
☐ No
☐ Uncertain

IF YES, PLEASE CONTINUE

2. If you have had overdue material, was it because you forgot when it was due?

☐ Yes
☐ No
☐ Uncertain

3. If you did not forget when material was due, did you return it late for other reasons?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____
_____
_____
_____

4. Was it a notice which you received in the mail which actually reminded you that you had overdue material in your possession?

☐ Yes
☐ No
☐ Uncertain

5. Did the notice about overdue material prompt you to return it?

☐ Yes
☐ No
☐ Uncertain

6. When you received a notice about overdue material, did you appreciate this reminder?

☐ Yes
☐ No
☐ Uncertain

If yes, or no, please state your reasons: _____

_____

_____

7. Do you prefer other ways by which a library staff could remind you of overdue material?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____

_____

_____

***

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female

2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior

3. Major (please indicate)

_____

***

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

FINAL
LIBRARY QUESTIONNAIRE
(green)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPROPRIATE BOX?

1. Have you ever borrowed material from the Colorado State University Libraries which you returned after the date it was due?

☐ Yes
☐ no
☐ Uncertain

IF YES, PLEASE CONTINUE

2. If you have had overdue material, was it because you forgot when it was due?

☐ Yes
☐ No
☐ Uncertain

3. If you did not forgot when material was due, did you return it late for other reasons?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____

4. Was it the telephone call from the Libraries which you received which actually reminded you that you had overdue material in your possession?

☐ Yes
☐ No
☐ Uncertain

5. Did the telephone call about overdue material prompt you to return it?

☐ Yes
☐ No
☐ Uncertain

6. Since you received a telephone call about overdue material, have you appreciated this reminder?

☐ Yes
☐ No
☐ Uncertain

If yes, or no, please state your reasons: _____

_____

_____

7. Do you prefer other ways in which a library staff could remind you of overdue material?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____

_____

_____

***

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female
2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior
3. Major (please indicate) _____

***

I wish to receive a summary of the results of this research.

☐ Yes
☐ No

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

FINAL
LIBRARY QUESTIONNAIRE
(white)

PLEASE ANSWER THE QUESTIONS BELOW WHICH MOST NEARLY AGREE WITH YOUR VIEWS BY CHECKING THE APPROPRIATE BOX:

1. Have you ever borrowed material from the Colorado State University Libraries which you returned after the date it was due?

☐ Yes
☐ No
☐ Uncertain

IF YES, PLEASE CONTINUE

2. If you have had overdue material, was it because you forgot when it was due?

☐ Yes
☐ No
☐ Uncertain

3. If you did not forget when material was due, did you return it late for other reasons?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____

4. Was there something that actually happened which reminded you that you had overdue material in your possession?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate: _____

5. If something did happen to remind you about overdue material, did it also prompt you to return it?

☐ Yes
☐ No
☐ Uncertain

6. Would you have appreciated receiving a reminder from the library staff about this overdue material?

☐ Yes
☐ No
☐ Uncertain

If yes, please indicate your preferred method:

☐ telephone call ☐ mailed notice
☐ Other (indicate): _____

###

PLEASE CHECK APPROPRIATE BOX:

1. ☐ Male ☐ Female
2. ☐ Freshman ☐ Sophomore ☐ Junior ☐ Senior
3. Major (please indicate) _____

###

I wish to receive a summary of the results of this research.

☐ Yes
☐ No

PLEASE RETURN YOUR COMPLETED QUESTIONNAIRE IN THE ENCLOSED SELF-ADDRESSED STAMPED ENVELOPE.

THANKS AGAIN

APPENDIX D

CRITICAL VALUES OF L

For given m and n, numbers represent L values at or beyond which the null hypothesis may be rejected in favor of the ordered alternative. For the .001 level use the upper figure in each cell; for .01 the middle figure; for .05 the lower figure, all probabilities one-tailed. Those values enclosed within double lines are based upon exact distributions; those for larger m and n are based upon normal-deviate approximations.

m	n							
Number of rankings or replications	Number of treatments or objects ranked							
	3	4	5	6	7	8	9	10
	-	-	109	178	259	388	544	726
2	-	60	106	173	261	376	520	696
	28	58	103	166	252	362	500	670
	-	89	160	260	394	567	790	1056
3	42	87	155	252	382	549	761	1019
	41	84	150	244	370	532	736	987
	56							
4	55	ETC.						
	54							
	70							
5	68	ETC.						
	66							
	83							
6	81	ETC.						
	79							
	96							
7	93	ETC.						
	91							
	109							
8	106	ETC.						
	104							
	121							
9	119	ETC.						
	116							
	134							
10	131	ETC.						
	128							
	147							
11	144	ETC. to 50						
	141							

VITA

Le Moyne W. Anderson was born at Wheaton, Minnesota where he was also educated in the public schools. His subsequent attendance at Gustavus Adolphus College was interrupted by duty with the U.S. Army during World War II, serving in the United States, Africa, and Europe. In 1948, he attained the B.A. and the B.S.L.S. degrees at the University of Minnesota.

For the following two years he served as Serials Librarian at Iowa State University, after which he enrolled at the University of Illinois, receiving the M.S. degree in 1951. The author next served successively as Counselor Librarian, Serials Librarian, and Reference Librarian on the faculty of the University of Illinois at Chicago. In 1957, he became Director of Libraries at Colorado State University.

He has written many articles and monographs and has served on numerous professional committees including the Council of the American Library Association and the Executive Board of the Colorado Library Association. He is a past-president of the Bibliographical Center for Research, a past-chairman of the Colorado Council of Librarians, and is currently chairman of the Board of Trustees, Colorado Associated University Press. He has conducted surveys and has served as a building consultant and advisor on academic libraries for several colleges.

The author and his wife, the former Hollis Pearson, have two daughters, Kristine Marie and Victoria Annetta.