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Man-environment interaction : an academic department moves into a new building.

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DEPOSITORY**

MAN-ENVIRONMENT INTERACTION:

AN ACADEMIC DEPARTMENT MOVES INTO A NEW BUILDING

A dissertation Presented

By

Toni M. H. Farrenkopf

Submitted to the Graduate School of the
University of Massachusetts in
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AN ACADEMIC DEPARTMENT MOVES INTO A NEW BUILDING

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February 1974

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Man-Environment Interaction: An Academic Department Moves Into
A New Building (February 1974)

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This project investigated the move of an academic department into a newly constructed building, with the aim of exploring research methodologies and problem areas in the building-user interaction.

Interviews with parties involved in the design of a new Psychology building and examination of design documents indicated four problems in the building design process: (1) the difficulty of long-term planning, due to changing needs, (2) a cumbersome bureaucratic process which does not seem to be future-geared, (3) inadequate consideration for human values, (4) a communication gap between users and designers. Design flexibility and user involvement were recommended.

User attitudes were assessed before and after the move into the new building. Major environmental aspects for users were consistent with other studies: (1) space, other people, esthetics, (2) temperature, lighting, ventilation, privacy and quiet, (3) facilities and windows/views. Users' priorities seem to differ as a function of (1) assessment techniques, (2) user population, (3) environmental setting. The value of employing multiple assessment instruments was demonstrated. User satisfaction was shown to depend on administrative and social aspects and actual physical use, in addition to architectural variables.

Implications for design and planning were developed through study-

ing the use of the building environment. The relative effects of physical and social variables on social interactions among academicians were investigated and the study was replicated in another department. Professional and private homogeneity emerged as better predictors for interactional parameters; physical proximity primarily affected the frequency of interaction. Relocation had no effect, and it was concluded that the ecology of social interaction was social-organizational rather than physical.

The study's main findings were: (1) User satisfaction, employment of the physical structure, and everyday use are very much dependent on the user population itself. Users are responsible for placement of resources, esthetics, furniture and social variables mediating environmental response. Establishment of administrative channels within the social structure of building users was recommended in order to survey user requirements before and after building design and to monitor user-building interaction longitudinally. Recognition in the academic reward structure and training of personnel would be needed.

(2) People's social environment constitutes a pervasive aspect of their overall physical environment. Yet, consideration for social variables is neglected in the design of university buildings and in environmental research itself. Assessment instruments geared to the physical environment seldom entail social variables, thereby violating the need to view environments in their ecological totality.

(3) A four-step model for fitting of building environments to user needs was demonstrated: (a) post-occupancy evaluation of building

use, employing behavioral observations, interviews and questionnaires, (b) surveys of user needs and attitudes, employing interviews and questionnaires, (c) environmental modifications based on these data and desired goals, (d) behavioral and attitudinal evaluation of the modifications.

The strengths of this study were its total ecological approach, its longitudinal nature, consideration for all sizable user populations, use of multiple cross-validating methods and beginning of comparative studies. It remains a case study with limited generalizability, and more comparative research and more longitudinal assessments are called for.

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C H A P T E R I

INTRODUCTION

Environment Makes Behavior

Psychology and the social sciences in general are striving to achieve an increasingly useful and sufficient (Kuhn, 1970) understanding of human behavior. Human behavior -- on the level of the individual as well as the species -- has been variously attributed to three factors: (1) hereditary-evolutionary genetic endowment, (2) past experiences, conceived of as the individual's or group's learning history, and (3) the parameters of the situation, that is, the environment in which the given behavior occurs. Psychologists have traditionally studied the first two of these factors and for the most part have neglected the third.

Recently, however, environmental awareness has intensified as a result of pressing environmental problems, such as global pollution, population density and population increase, depletion of finite global resources and technological "accelerative thrust" (Toffler, 1970). The increasing awareness has been reflected in the sciences and in popular concerns. Psychology has experienced a shift from dominantly intrapersonal emphasis to the investigation of interpersonal and environmental settings, such as the family, the milieu, the community, the culture and the physical surroundings. Most recently we have experienced the emergence of two new disci-

plines, "community psychology" and "environmental psychology". In Kenneth Craik's words (Craik, 1970), the trend toward environmental research ". . . represents an unusually clear instance of psychology's responsiveness to exogenous influences."

The Built Environment

A natural first focus for environmental research may be that part of the environment which we invent and build. Buildings encompass an increasingly overwhelming amount of our living space. In the words of James Fitch (Sommer, 1969), "Americans have become an 'indoor' people". Winston Churchill's quote "We shape our buildings and later they shape us" has been echoed a lot, though with seemingly little impact. Buildings determine where and how we move around, where and how we sit, meet, converse and work. A building also has impact on more subtle behaviors and attitudes, such as social interaction, satisfaction and work performance. Yet, there is hardly any systematic knowledge in this area (Griffin et al., 1974). There is a discrepancy between the billions of dollars and millions of people employed in designing and building our environments and the few isolated investigators who have only recently come to study these environments (Craik, 1970). Even the research that has been done in this area has dealt mostly with isolated variables in experimental settings (Griffin et al., 1974).

In a natural setting, architects seldom receive feedback concerning the "success" of their creations, or the goodness-of-fit between a building and its occupants (Manning, 1966; Craik, 1970; Brookes, 1972; Sommer, 1972). Instead, planning decisions continue to be guided by "implicit unchecked behavioral assumptions" (Craik, 1970). Furthermore, designers seem to be out of touch with the actual users of planned buildings. Architects' clients are usually intermediaries in the form of governmental or municipal agencies, while building users remain unidentified (Craik, 1970). Unfortunate outcomes of these practices are the appearance of maladaptive behaviors among building occupants and the enormous amount of waste of resources, such as finances, man-power, time, energy and raw materials. The disaster experience with the Pruitt-Igoe housing development in St. Louis has been a shocking example (Newman, 1972).

Environmental Research

Barker (1965) has called for environmental researchers to become "transducers" of natural events into data, rather than being "operators" in the manufacturing of data in the laboratory. By their very nature, environments and man-environment interactions entail a host of tangible and intangible variables which are interrelated, and little generalizable knowledge may be gained from studying them in isolation. Investigators repeatedly find that the total situational set-

ting exerts a greater influence upon behavior than isolated segments (Barker, 1965; Proshansky et al., 1970), or that the interactional effect between person and situation yields more information than either component alone (Raush et al., 1960; Pervin, 1968; Cronbach, 1957). Pervin (1968) proposes that we see behavior as a transaction between reciprocating variables within a total system.

A few studies have begun the comprehensive assessment of the environments of offices and office buildings (Sloan, 1972; Brookes, 1972; Manning, 1966; Davis, 1972). These were naturalistic investigations of ongoing events and were geared to generating guidelines for future design. Both Sommer (1972) and Craik (1970) propose that such study of people's attitudes toward existing buildings is preferable to studying what is expected from future buildings.

The Problem

In 1972 the opportunity arose to study a naturally occurring environmental event at the University of Massachusetts in Amherst. The Psychology Department was moving from three separate buildings into one large and newly constructed building, Tobin Hall. There is no literature which deals directly with the impact of such a move (Beck et al., 1973). Beck et al. (1973) generate some questions in connection with an academic department's relocation at Clark University and they call for the collaborative efforts of geographically dis-

persed investigators and interdisciplinary research units in assembling standardized case studies of given environmental contexts, such as moves and relocations. Their own study, as well as the present project, should be helpful in suggesting problem areas worthy of such intensified future endeavors.

The present project is a case study of a particular population in a particular environmental context. An effort was made to embrace this situation in its totality, and the purpose was to discover relevant problem areas and hypotheses and to explore methodologies dealing with building design and human behavior. Findings of more general applicability with implications for building design and planning would, we hoped, emerge. Several foci for investigation evolved during the work: (1) problems in the building design process (Chapter II); (2) user attitudes regarding their general and specific building environments (Chapter III); (3) the way people use and interact with their building environment (Chapter IV); and (4) the influence of physical and social variables on social interactions (Chapter V). Chapters III and IV address themselves directly to what Kenneth Craik (1970) considers the initial contribution of environmental psychology: ". . . to describe what goes on in designed environments and how people comprehend them."

Method

The target of investigation was the Psychology Department and its building environments, with particular focus on the relocation and the new building, Tobin Hall. Participants in the assessments were drawn from the Department and from those groups and persons connected with Tobin Hall either as users or as design and planning participants. The Psychology Department members were sampled to represent relevant sub-populations, including secretarial staff. Each chapter specifies the sources of data for that particular chapter and how the data were collected.

Typically, studies aiming at user satisfaction and the perception of office environments or building environments have employed (1) interviews and questionnaires entailing specific as well as open-ended questions, (2) environmental scales and quantitative questionnaires, and (3) behavioral observations (Manning, 1966; Davis, 1972; Sloan, 1972; Brookes, 1972; Moleski and Goodrich, 1972; Gerst and Moos, 1972; Craik, 1968, 1971). The present project follows this format, employing interviews, open-ended and quantitative questionnaires and scaling instruments for assessing attitudes and behaviors, augmenting the assessment of behaviors with direct observations. In addition to using validated scales (Brookes, 1972), two quantitative instruments were developed specifically for this study. Multiple methods and assessment instruments were employed to cross-validate find-

ings.¹

Apart from several assessments that were conducted on a continuing basis or that were not contingent on a time table, there were three distinct assessment phases for many of the instruments: the Spring of 1972, when the Psychology Department was still housed in its old quarters, the Winter of 1972/73, shortly after the Department's relocation into Tobin Hall, and the Spring of 1973, one full year after the pre-move assessment phase and one half year after occupying the new building. This design was geared to eliminate or detect a possible "honeymoon effect" (Craik, personal communication), which may be especially important in research dealing with relocations and occupancy of new buildings.

In dealing with the Psychology Department's response to its building environment or with the interaction between the user population and Tobin Hall, we are essentially working with an N of 1, treating the social unit as a whole. Differences among subgroups or the absence of such differences are noted at appropriate points, but the major aim is not a survey of population differences. The meticulous assessment of such differences is certainly a necessary future research step (Wells, 1967).

¹In many cases we are not dealing with hard data (Barker, 1965) and we are restricting our interpretations to sizable trends, thereby preferring Type II errors of not finding relations where there are any to Type I errors of finding relations where there are none.

During the evolution of this research endeavor, two phenomena were noted. (1) We experienced an increasing sharpening of foci for investigation, as the incoming data suggested its organization. This process continued into the writing stage. (2) It soon became obvious that an ecological study of the present scope was unmanageable for one investigator, and the increasing crystallization of foci brought a corresponding and growing army of interdisciplinary collaborators onto the scene. Some fifteen undergraduate psychology students collected data, advanced undergraduate and graduate students in design and in regional planning developed branch projects, and manpower for a follow-up study was offered. Advising collaborators came from clinical and environmental psychology, landscape architecture, design, statistics and computer science.

C H A P T E R I I

SOME PROBLEMS IN THE BUILDING DESIGN PROCESS

The effect of architectural design on human behavior and attitudes is rapidly becoming a new major direction in psychology as well as in planning and design. One focal concern is the design process itself. It should be clear that the very process and context of doing something -- in this case, designing a building -- must affect the finished product (Sommer, 1972; Craik, 1970; Appley and Boulter, 1960). Kenneth Craik (1970) speaks of the predicament of the designer in grappling with at least four problem areas: (1) the rate of change, (2) inadequate feedback regarding design creations, (3) design intricacies and design problems, and (4) "implicit unchecked behavioral assumptions". The present chapter discusses four main problem areas which were suggested by an examination of the design process for Tobin Hall: (1) long-term planning, (2) length of the design process, red tape and hard cash, (3) consideration for human values, and (4) communication with the architect. The architects, University planning officials and most of the Psychology Department members involved in this design history were interviewed and design documents and memoranda were examined. This kind of data collection method poses the problem of incongruous information from different sources. We have generally re-

stricted our inferences to information that was validated by consensus among the various sources.

Long-term Planning

Appley and Boulter (1969) note (1) the speed in which design decisions have to be made, (2) that funds are frozen much in advance, and (3) that planning for a distant future is extremely difficult. When planning their Behavioral Sciences Building at York University in Toronto, they were asked in 1963 to project the Psychology Department's needs for 1980. There is, of course, no question about the necessity for long-term planning. Without such projections we may find ourselves the victims of what Toffler (1970) fittingly labeled "future shock". The real question is: is such planning possible? Let us look at some of the problems encountered during Tobin Hall's design history in regard to the need for long-term planning.

There were only nine faculty members in the Psychology Department (around 1962), when the Department was projecting its future space needs and when the planning history of Tobin Hall began. Their projection of the Department's growth to 30 to 40 faculty members must be seen as a radical proposal for that time. The University administration was hostile to such claims. Among administrators some were opposed to the idea of the Department getting its own building. Early

documents speak of a "Liberal Arts Classroom and Laboratory Building" which was to be shared by Psychology and other departments. The emergence of the name "Psychology Building" in 1964 may be an indication of an attitudinal shift.

In 1967, there were 22 faculty members in the Department. Besides being housed in Bartlett Hall, the Department expanded into Berkshire House and Middlesex House. A change in philosophy, probably due to a change of the Department leadership, was also made around that time: rather than planning to achieve a reputation of excellence in a few selected specialties of psychology, the Department was now aiming for overall quality, which entailed expansion in quantity. In part, accelerated expansion was a response to the fact that Psychology (and academia in general) gained momentum as a field of study and research. During the years 1968-1972 the University increased its undergraduate enrollment by 1000 every year, and the enrollment increases in psychology were estimated to be 30% higher than at the University in general. Newsweek magazine (May 21, 1973) states that nationwide graduate enrollment in psychology has increased by 114% in five years, and Albee (1973) speculates a 50% increase in doctoral level first-year students since 1970.

In 1968 -- five to six years after the new building was first designed -- we see the first accurate prediction of the Psychology Department's size for 1972 (when the building was completed): 60 faculty members and 150 graduate students.

The projection was for a mere four years into the future, based on a trend of expansion occurring at that time.

When the Psychology Department moved into Tobin Hall late in 1972, the building was too small to house the entire Department. It was necessary to retain considerable office and laboratory space in Bartlett Hall and in Middlesex House. It was originally planned to house two graduate students per office; by 1967 this idea had been dropped: the present Mean number of occupants per graduate office in Tobin Hall is 3.2, the Mode being three and four students per office.

In addition to the amount of space, another need in relation to space changed while the building design process was going on, namely the kinds of space. For example, a large physiological lab-classroom was designed for the purpose of teaching laboratory techniques to medium sized undergraduate classes. Today's laboratory teaching is conducted on a more individual basis, calling for real labs rather than large lab-classrooms. As a result, the designed classroom was non-functional by the time it was built. Similarly, under the original design the "data processing rooms" were meant to house electronic desk calculators and similar equipment. Quite a different spatial layout is required for the remote computer terminals and other sophisticated hardware used now.

In summary, changing needs may be a function of technological, educational and population variables, as well as a function of the specific individuals involved in the design

process. Changing enrollment figures and technological advances such as computers and lab techniques are examples of the former, the philosophy of the Department Head or the construction of dog-runs or a very expensive and space-consuming anechoic chamber (no present Department member requires or uses these facilities) are examples of the latter.

It has been recognized (Simmons and Johnson, 1971; Appley and Boulter, 1969) that the difficulties of long-term planning and the shifting of population needs call for flexibility in building design and in the design process. An example of inflexibility in the design process of Tobin Hall was the early establishment of a project cost ceiling, which made later adaptation in the face of inflation impossible. An example of design inflexibility has to do with the expansion of Tobin Hall. When increasing space needs made expansion desirable, the possibility for vertical expansion was excluded by the design of mechanical space on the roof of the building (as is common practice for six-story buildings). Horizontal expansion under the Greek columns of the 2nd and 3rd floors had allegedly been planned as a future possibility, but was rejected later during the design process stage. Another design inflexibility is the University rule against demountable partitions, based on initial cost considerations.

Length of the Design Process, Red Tape and Hard Cash

Tobin Hall's ten year history. It took ten years to create the six-story, 118,000 sq. ft. building. Under normal circumstances a structure of this size should require about five to seven years to complete. Let us examine why a normally lengthy process spanned a whole decade.

(1) The first step in planning a new structure is to obtain the design funds from the State, three quarters of which pays the architect's design fee. It would take the architect about two years to complete the design. The design funds in 1962 for the Psychology building were roughly 300,000 dollars.

(2) Since it takes about a year to receive appropriations from the State, the building funds are requested from the State Bureau of Building Construction (BBC) in Boston one year before they are needed. These funds amounted to roughly five million dollars and were requested around 1963. In the process, the project cost ceiling was fixed, with only 5% depreciation allowed for inflation.

(3) No sooner was the maximum cost determined, than the inflation curve in the construction business steepened drastically in 1964. In other words, the appropriated money would not be enough to build the designed facility. Two courses of action were open to the University administration: either the whole appropriations process would be restarted, which would cause a delay of one or one-and-a-half years dur-

ing which the architect would stop working and during which inflation would continue to devalue the funds, or cuts would be taken in the project and funds would be sought elsewhere. The Psychology Department and the University chose the latter course. A flurry for funds ensued. A request for a Title I grant from the Department of Education, claiming that 80% of the building would be used for teaching purposes (undergraduate, extension and continuing education), was subsequently denied.² Next, the equipment fund for the building, roughly one million dollars, was shaved by one quarter. This was risky, since the State's approval and appropriations had to make the completed building "operational", and it would be hard to obtain additional funds for equipment later.

We should note at this time that the whole struggle for approval and appropriations involved an intricate web of political activity. The Psychology Department, the University Planning Office and the University executive structure were negotiating with each other. All of these in turn dealt with the Bureau of Building Construction (BBC). The architect conferred mainly with the BBC and also with the University forces. BBC communicated with the Governor who, in turn, was responsible to the State Legislature. And each request and each piece of information flowed back and forth between these various agencies. In the end, and despite serious cuts, the

²With the explanation that the various psychology subdivisions were not sufficiently integrated in the Department.

construction budget still fell short by about 700,000 dollars, mainly due to rapidly progressing inflation.

(4) The University finally had to go back through the legislature appropriations process in order to close this deficit. This normally lengthy process was further drawn out by the fact that the proposed University library had meanwhile gained higher priority than the Psychology building.³ Furthermore, previous cut-backs taken to save the budget could not be reinstituted in the new budget request.

(5) After the necessary construction moneys were finally obtained, the building was advertised for bids, with contracts and subcontracts to be awarded about three months later.

(6) Contractors started construction, which ran the normal cycle of about two-and-a-half to three years (Fall 1969 - Fall 1972).

(7) In October 1972, somewhat over ten years after the original planning, Tobin Hall's classrooms were available for use. The heating-ventilating-airconditioning system (HVAC) ran wildly out of control, windows had no blinds (some classroom windows were taped over with cardboard panels so that movies could be viewed), electrical outlets were unfinished, and the contractor's door locks had to be replaced by University locks -- an activity eliciting conflicting comments from

³The library, incidentally, was caught in a similar dilemma, with a deficit amounting to roughly two million dollars.

the parties involved in the design process --, and there was no office furniture. With the arrival of the first waves of furniture, Department members started to move into their Tobin Hall offices in mid-November 1972. For a full year, the HVAC system continued to pose problems due to alleged design mistakes and frequent breakdowns. Responsibility for this failure has not been assigned, and as of this writing Tobin Hall has not been officially accepted by the State (BBC) or by the University.

A similar cumbersome political process as with Tobin Hall in toto was experienced in 1973, after an unexplained fire on Tobin Hall's fifth floor caused 70,000 dollars damage to the building and 84,000 dollars in equipment loss. Lengthy negotiations to obtain the necessary repair funds advanced through administrative channels from the Psychology Department to the University Planning Office to the University Financial Office to the University President and to the State Governor. At the end of five months, 70,000 dollars were allocated from the Governor's emergency fund to the University repair fund. Meanwhile, however, the fiscal year expired and the unused funds were forfeited. The new Governor's emergency fund was minimal and was excluded as a further source for support. At present, one year after the fire, a bill is in preparation to obtain the total cost of the fire damage from the State Legislature.

How changing needs cause delay, and the risk of delay.

The original plans for Tobin Hall included an anechoic chamber, a large soundproof and shockproof room in which sound reverberations are filtered out and which is used for research in auditory perception. Several years before the building construction was begun, personnel changes, changes in research orientations and space needs made retention of this expensive facility undesirable. In order to remove the chamber from the blueprints, however, the architect would have had to make a new design, necessitating additional design fees and approval from BBC. The whole appropriations and approval process would have had to be restarted, which in turn would have cancelled the project's building priority (as it did, in the end) and which would have caused a long waiting period during which no work would have been done. This delay itself would have been so very costly, due to inflation, that the savings from the anechoic chamber would have been dissipated. The University of Massachusetts Psychology Department now features an anechoic chamber.

Many other modifications of the building which were suggested as needs changed were considered "changes in scope" which required "unlikely" approval from BBC (quote from planning office memo, Oct. 16, 1967). Among them were Dean Appleby's attempts to reinforce the top floor in order to allow future vertical expansion and/or replace the exterior terrace and Greek columns surrounding the 2nd and 3rd floors with interior office and lab space. All these modification proposals

were started around 1967 when it was foreseen that Tobin Hall, as designed, would not be able to accomodate the entire Department and that further expansion would be necessary.

Among the first victims in the process of shaving funds and scrambling for money and space are human values, such as comfort, satisfaction and esthetics.

Consideration for Human Values

No knowledge. It is, indeed, astonishing to realize that we have no systematic knowledge about human values and people's requirements in regard to building design (Craik, 1970). Most of our daily lives are spent within buildings. We may accuse builders of not thinking of people's needs, but builders may also justify accusing social scientists of neglecting a vast and important area of human activity. Robert Sommer (1972) notes that there exist some specialized programming firms which research user requirements. He also calls for postoccupancy evaluation and client consultation. In regard to office environments there are examples of studies investigating behavioral requirements, satisfaction, territoriality (Moleski and Goodrich, 1972; Brookes, 1972; Sloan, 1972; Manning, 1966). Sloan (1972) and others (Wells, 1970; Manning, 1966) note that different populations require different work environments. Sommer (1972) proposes establishing centralized data banks that accumulate and categorize

such information and are available to the design professions.

Little emphasis. Documents and correspondence pertaining to Tobin Hall and interviews with the people involved show little emphasis on human values.⁴ In this respect, the original building design was mostly concerned with traffic and acoustics, as well as with lighting. Most recommendations and modifications from 1964 on dealt with physical factors: positions of doors, one-way mirrors, moving walls, shelves, counters, sinks, sound proofing, electrical shielding, blackboards, microphones. The one continuing consideration for human factors dealt with traffic patterns: walls were moved and doors installed or locked in order to restrict undesirable traffic to the main areas and keep it out of research areas. Nowhere did we find a concern for esthetics.

A refreshing exception to this pattern is the influence of Mortimer Appley between the years 1967 - 1969. Appley had had direct experience in the design and subsequent occupancy of the York University Behavioral Sciences Building in Toronto and later came to head the Psychology Department at the University of Massachusetts. He showed concern for colors,

⁴An example of such emphasis is supplied by the architects Grant, Copeland and Chervenak in their 1968 program for a Psychology Building at Central Washington State College. Their first "general features" point is: "Psychology sets great store in serendipity, innovation, creativity, invention, and wit. The psychology building must reflect these characteristics. Therefore, we strongly encourage the adventurous use of new ideas, materials, and spatial arrangements at every opportunity."

lounge areas for studying and socializing, privacy of the clinic waiting room, carpeting and the troublesome airconditioning problem. Appley as well as Simmons et al. (1971) advise wide use of carpeting throughout buildings for sound control as well as psychological effects, especially in offices and human research areas. Appley's argument that carpeting is financially "within the range of better acoustic floor tile" and constitutes "50% less maintenance cost" did apparently not persuade the BBC responsible for rejecting carpets for Tobin Hall, at a time when immediate costs may have been regarded as more important than long-term expenditures.

Appley requested that windows, at least in the office areas, be able to be opened. He stated: "Our experience with these non-opening windows has been highly negative. People don't like them -- get quite worked up about them in fact -- and the insidious thing about balance is that everyone gets the same treatment. Individual likes and dislikes with respect to temperature (and fresh air) are important morale considerations." (letter from Dean Appley to Dean Wagner, July 19, 1967). In their article on "dos, don'ts, and druthers" in designing Psychology Buildings, based on a survey of recent experiences, Simmons and Johnson (1971) make the identical point: "Air conditioning. Don't be persuaded that fresh air ventilation will be adequate. Having fingertip control of the environment is critical to the well-being

of animals and the quality of research", and they conclude their article with: "Windows. Have some that are functional in case the air conditioning fails . . ." From an engineering point of view, sealed windows make heating, ventilating and airconditioning cheaper and supposedly provide for better balance by eliminating "local adjustment". Tobin Hall is a sealed building and this fact has given its inhabitants trouble ever since occupancy due to failures of the HVAC system. Could it be that this latest trend in engineering may not be worth the price of prolonged human discomfort?

For financial reasons, the architect's contract with the State of Massachusetts (via BBC) did not include interior finishings, such as drapes and furniture or concern with esthetics. Responsibility for these aspects rested with the University administration and with the Psychology Department. Architects reportedly are distressed about this practice because the resulting finishings are often in discord with the architectural design. We will see in the next chapter that a major dissatisfaction of Tobin Hall users was the interior esthetics.

The use of "bright colors at least as accents to set off the long corridors . . . which would be extremely dull if done in institutional monotonies" was one of the changes proposed by Appley. This recommendation was partly implemented, although Appley had thought of interrupting selected stretches of the corridors with accent colors, rather than painting the

very long walls in a single color as the architect had understood. Other corridors, classrooms and offices were planned in a neutral off-white which was turned into a neutral grey by a painting mistake. The rationale was not to offend building users. User surveys and user involvement in color selection could have helped to remedy the problem. The corridor colors for Tobin Hall were selected exclusively by the architect. The only peripheral input from the Psychology Department came in the form of a senior staff member's outrage over the bright yellow on her floor. The problem was dealt with by switching colors from one floor to another.

User involvement. Craik (1970) comments on the great distance between designers and users; architects' clients are often intermediaries in the form of administrative agencies. In Tobin Hall's case the client was the State Bureau of Building Construction, located in a different part of the State. Robert Sommer (1972), a foremost advocate of democracy in building design, proposes that "the influence of each group upon a structure should be proportionate to its effects on their lives".

Tobin Hall has a great effect upon the members of the Psychology Department who, on the average, spend about 43 hours per week on campus, including evenings and weekends. There are about 30 staff members (secretarial, shop, animal care), 50 faculty members and 120 graduate students in Tobin Hall. In addition a large number of undergraduate students,

while occupying no offices there, constantly use the building in classrooms, in experiments as researchers or as subjects, on work/study assignments and during office visits. About 300 undergraduate students occupy the nine classrooms at almost any given daytime moment during a schoolweek. There are also a score of maintenance workers located on the first floor in addition to numerous janitors whose work is directly involved with the physical structure itself. And finally, there are the clients of the Psychological Services Center on the first floor, who use the building on a less extensive and more short-term basis, but whose needs and sensitivities must be considered.

In terms of involvement in the planning and design of the building, there was a distinct graded system. The graduation was not based on population size or on length of stay. Some twelve faculty members were closely associated at one time or another with the creation of Tobin Hall in terms of specifying the Department's needs in the original design, space layouts, and architectural changes. Only one member of the administrative staff was peripherally involved in this process. As far as the architectural design itself was concerned, user involvement stopped here.

There are, however, other ways of shaping one's environment. Most faculty members were involved either as respondents or as information gatherers and planners in the planning for space and equipment. Many faculty members had some choice

in the location of their offices and labs. Very few secretarial staff members had this choice. Faculty and staff all generally had a hand in selecting their office furniture.

Graduate students -- who have offices and mailboxes in the Department and who are long-term (three to five years) and extensive building users -- were conspicuously omitted from this whole process. Seventy-five percent of the interviewed sample had no involvement whatsoever. Some others were able to choose among offices and office mates. Very few served on committees dealing with space considerations; only one respondent out of 43 sampled had a choice of lab location and furniture. In retrospect, many graduate students expressed that they would have liked to have had more input. Conspicuous in their total absence from any kind of involvement is the sizable undergraduate population.⁵

Communication with the Architect

Who is the client? That the architect (residing near Boston) was directly responsible to a State board in Boston (BBC), while at the same time negotiating with architects from the University Planning Office in Amherst and attempting to fulfill all the wishes of the Psychology Department at the

⁵I myself am guilty of omitting the shop personnel, the animal caretakers, the janitors and the clinic clients from my survey.

University at Amherst -- invited a host of problems. Any friction, incongruence or inconvenience in this multichannelled communication network was most likely at the expense of the building users, the Psychology Department. We may guess that the architect ultimately strove to fulfill his primary responsibility to his contracted client, the Bureau of Building Construction. The extent to which he accommodated the Psychology Department may have been a function of his good will. This potential pitfall of the user being left at the mercy of favors rather than commitments has been recognized by Psychology Department chairmen who have experienced the building of new facilities. Simmons and Johnson (1971), who surveyed about two dozen such chairmen, give the following advice: "Make payment for the services of the architect, the builders, the suppliers, and others contingent on approval of their work by the department (their italics)."

Unstable Department representation. Not only was there confusion as to the primary client and the balance of responsibility, but confusion was compounded by an ever changing group of departmental representatives. In his efforts to accommodate the Psychology Department, the architect was confronted with new faces and new philosophies at almost every meeting. Those members of the Psychology Department serving on the "building committee", spent an immense amount of time and effort in endless meetings, collecting and synthesizing information and attempting to familiarize themselves with a

job that was alien to them. Since such activities were not recognized in the academic reward structure, all of this work was done during the members' private time. It is not surprising that such a process took its toll by exhausting the faculty members involved. Consequently there was continual turnover, with new members bringing new ideas for changes and discarding previous agreements. To make matters worse, in the ten year Tobin Hall history, the architect had to negotiate with no less than four different Department Heads. And, understandably, the Heads injected their own philosophies into the Department and into the creation of their future home.

According to the architect there were three distinct design stages ("schematics", "preliminaries" and working drawings), each stage followed by a review period allowing changes and culminating in the approval of the involved parties (BBC, Psychology Department, University Planning Office). Any changes that were requested by the Psychology Department after the building contract was awarded were costly and time consuming to the architect who did not obtain additional design fees. While the relations between the Department and the architect were said to have been "congenial" in the beginning, later representatives claim to have had hardly any contact with him. It is quite understandable that the architect, after conducting lengthy meetings with ever changing people, listening to endless proposals for modifications and remodifications, may have sacrificed the whims of the Psycho-

logy Department in favor of fulfilling his basic responsibilities to the Bureau of Building Construction, who must have given him much less trouble.⁶

Language barrier. A further problem, also observed by Davis (1972), was the language barrier between users and designers. Appley and Boulter (1969) relate: "It was our experience that in dealing with architects, one should refrain from making hypothetical statements that could be mistaken for concrete specifications . . ." and they advise exercising "care in the use of what may be read as semitechnical language . . ., especially if time is important, which it always is. Trying to change a major parameter later becomes next to impossible". Appley certainly was to receive ample experience of this latter statement during his involvement with Tobin Hall.

As an example of the communication gap Appley et al. (1969) point out that architects have a different understanding of the term "office" than the academic user population. Academic psychologists require more bookshelves in their offices than is true for the "normal" office. If the architect

⁶Some of the design victims of this unhappy communication problem include: the non-installment of connecting doors between area heads, senior faculty and their secretaries, small observation mirrors where large ones were requested, wrong size computer cables that needed replacement, elaborate oak framing and one-way observation mirrors in animal labs where they are not needed, small sinks instead of large sinks, inadequate facilities for animal caretakers, and undesirable carpeting in numerous laboratories.

builds "normal offices" or even slightly larger than normal ones, the later installment of sufficient shelving may transform previously adequate space into cramped space that inhibits comfortable movement. Late during the design phase, Tobin Hall offices were cut by the Planning Office from 200 sq. ft. to 160 sq. ft. each, with the argument that smaller offices would prevent undesired double occupancy for faculty members under future space shortage.

Linguistic rapprochement between architects and user representatives must be facilitated from both sides. User representatives have to learn what they want from design and how to translate such requirements into design specifications. The architects involved in Tobin Hall report the common experience that user representatives are of little help to them because of the former's main concern for trivia. Architects, on their part, should receive training and develop their skills in the social sciences relevant to environmental engineering. At the same time all of us must find out what the building environment does to man in general and to specific behaviors and attitudes of specific populations.

Recommendations

We have reviewed the design process of a building, in particular the problem areas of that process. The review suggested that need for long-term planning, length of the design

process and its concomitant bureaucratic entanglement, lack of consideration for human values and the inadequate communication between users and architect, all adversely affected the building. The following general recommendations emerge:

(1) Efforts at determining the developments and needs of the future should be intensified.

(2) More effort should be spent on designing flexibility into building structures.

(3) User needs must be surveyed carefully before designing a building.

(4) Architects and builders should be committed by contract more directly to the actual user population of the planned structure.

(5) User representatives and social scientist-consultants involved in the design process should be familiar with at least the most basic architectural skills (Craik, 1968).

(6) An appropriate reward structure should be established recognizing the activities of user representatives, especially academicians, who aid architects in the design process.

CHAPTER III

USER ATTITUDES

User attitudes have been ignored in the area of building design (Sommer, 1969, 1972; Craik, 1970; Manning, 1966; Harries, 1971; Kaplan and Brookes, 1971). Although this oversight is beginning to be remedied, design decisions will for some time to come continue to be based on the designer's "unchecked behavioral assumptions" (Craik, 1970), or in Manning's (1966) words: "on personal prejudice, rather than knowledge". It is surprising to the layman to realize that the "success" of buildings seems to have been defined by architectural circles and art critics, rather than by the users. The process of design seems to end with the completion of the building, whereupon the architect turns away to his/her next enterprise.⁷

The present chapter examines the values and attitudes of a group of building users. The purpose of this endeavor is three-fold: to explore a methodology for assessing user satisfaction; to provide feedback regarding one specific

⁷The blame for this neglect of feedback should not rest with the designers alone. Available communication avenues are often ignored by users (Langdon, 1966). In addition, appropriate feedback channels within the social structure of building occupants are often nonexistent, as unsuccessful inquiries concerning several nonfunctioning water fountains in Tobin Hall seem to indicate.

building, Tobin Hall, as model for other studies; and to search for consistencies in user attitudes which may be generally applicable. Employing diverse open-ended as well as quantitative assessment techniques, we examined which environmental aspects are important to building occupants; we assessed the environmental satisfactions and dissatisfactions of the members of the Psychology Department before and after the move into Tobin Hall, with a subsequent follow-up study; and we surveyed the attitudes of undergraduate students using Tobin Hall.

Method

Instruments. The information contained in this chapter was derived from multiple investigative methods: interviews and questionnaires, two quantitative scales and various observations. When I henceforth speak of the "three assessment instruments", I am referring to the questionnaire, the Environmental Satisfaction Scale (ESS) and the Environmental Descriptors. The questionnaires were preceded by structured interviews, in order to test the items. Dealing with user attitudes were items 10-12, 15, 17-20 on the Spring 1972 questionnaire (Appendix A), item 1 on the Winter 1972/73 questionnaire (Appendix B) and items 4-8 on the Spring 1973 questionnaire (Appendix C).

A seven-point Environmental Satisfaction Scale (Appen-

dix D) was devised for the present purpose, assessing the respondents' degree of satisfaction with various physical aspects of their building environment. In search of a more widely accepted scaling instrument with proven reliability and validity, Brookes (1972) unipolar list of environmental descriptors was used.⁸ This instrument allows the description of a given environment, as well as the measurement of discrepancies between the described environment and the respondents' ideal environment -- thereby also yielding a measure of satisfaction. With Malcolm Brookes' help (personal communication), several items were deleted and the dimension warm-cold was converted back to a bipolar scale, repeating the descriptors twice: once for a dimension of emotional atmosphere and once for temperature. We also expanded the scale from five points to seven points in order to increase the potential variance of responses. The instrument, as it was adapted for this study, is shown in Appendix E.⁹

Participants and procedures. A main sample of 79 members (about half of the population) from the Psychology Department was selected in the beginning research phase. Par-

⁸Kasmar's Lexicon of Environmental Descriptors (Kasmar, 1970) was rejected. There is a question if Kasmar's bipolar adjectives (e.g. drafty-stuffy) really constitute one single dimension as they are intended to, or if we are dealing with two different dimensions which should be scaled separately.

⁹When presenting the instrument, the order of "present environment" and "ideal environment" was not counterbalanced.

ticipants were selected to yield proportionate representation from all relevant subgroups in the Department. Thus, the total sample contained proportionate numbers of students, faculty and staff, men and women, the seven psychology specialty areas contained in the Department, academic rank of faculty, year level of students, and the three psychology buildings (before moving). After the move into Tobin Hall, the three office floors were also equally represented. A slightly larger sample was used for the quantitative scales. The sample remained constant over all three assessment phases, while the numbers of returned and usable instruments varied. The numbers for Tobin Hall were generally lower, since not all of the initial sample members moved into Tobin Hall.

Respondents were approached in person and were given the questionnaire and the two quantitative scales, to be filled out at their leisure but within a specified time. Each instrument was explained verbally, in addition to the printed directions that they contained. Respondents were asked to record their numerical answers to the scales directly onto attached computer opscan sheets, which allowed automated key-punching. Completed materials were deposited in a mailbox in the Department or collected in person. Rapport with the participants was invariably excellent -- which may explain the very high return rate. Faulty answer sheets to the scaling instruments were dropped from analysis.

A survey of undergraduate students' attitudes toward Tobin Hall was also carried out during the Fall of 1972 and Spring of 1973 semesters by students from Introductory Psychology classes under my supervision. The survey entailed 225 respondents from six undergraduate classes from three Tobin Hall classrooms.

What Environmental Aspects are Important to People?

The Spring 1972 open-ended questionnaire (N = 79) included the question: "What things are important to you in your working environment?" Answers were tallied and grouped in categories suggested by the data. Apart from an assortment of idiosyncratic items, the categories embraced 90% of all responses. A highly consistent pattern regarding these "important aspects" emerged throughout all assessment phases of the study. Questions repeatedly yielded the same basic categories of responses, even though such questions appeared in diverse and seemingly unconnected forms and were asked over considerable intervals in time. The categories were rank ordered for each of twelve relevant questions and overall averages were computed (Table 1). The analysis of high and low scores on the environmental descriptor scales of people's "ideal" working environment yielded similar categories with the addition of adaptability, security, and efficiency. Changes in ideals over the three assessment phases

TABLE 1. ENVIRONMENTAL ASPECTS CONSIDERED IMPORTANT
BY RESPONDENTS IN THE PRESENT STUDY, COMPARED TO OTHER STUDIES

Present Study ¹⁰ (Psychology Department)	Brookes (1972) (Business Office)	Six Factor analytic studies (Collins and Seaton, 1970)
1. Space	1. Space	1. Esthetics
2. Access to people (and facilities)	2. Temperature, light- ing	2. Security
3. Esthetics	3. Privacy, quiet	3. Space (two factors)
4. Temperature, light- ing, ventilation	4. Esthetics	4. Temperature
5. Privacy, quiet	5. People	5. Lighting
6. Windows, view	6. Facilities	6. Windows, view
7. Facilities, equip- ment, furniture	7. Windows	

¹⁰Categories are ranked in order of importance, with 1 as highest.

were negligible or nonexistent as shown by analyses of variance.

The present findings are not only strikingly consistent within this study, but they also resonate strongly with results achieved by other researchers. Brookes (1972), in his study of office employees' satisfaction with their working environment, asked open-ended questions regarding likes and dislikes, both in a conventional office and after moving into a landscaped office. The same environmental categories emerge (Table 1). The major difference in rank order is that the academic population in the present study attributes more importance to other people than do Brookes' office workers. Contact with colleagues is probably more part of the academic psychologist's daily work (as we will document in Chapters IV and V), than is the case with desk-bound employees. Collins and Seaton (1970), comparing factor analytic studies of six researchers of environmental descriptors, find agreement on the first three most salient factors regarding architectural dimensions: esthetics, security and space (physical and phenomenological size). Collins (1970) and Vielhauer (1965) agree on two further factors: temperature and lighting. Collins (1970) adds another separate factor of windows/view (Table 1).¹¹

¹¹In a different environmental context, the survey of 600 dormitory students at the University of Massachusetts, conducted by Ganz and Farrenkopf in 1973, the list of important environmental aspects differed somewhat: overwhelming

Some of the differences in the rank order of items in Table 1 may be attributed to methodological differences: lists of environmental descriptors place no emphasis on social aspects; moreover, they are biased in favor of esthetic responses and they deal with more subtle environmental aspects, such as security, that are not elicited by open-ended questions. Other rank order differences may be due to population differences, as pointed out. The present study showed two consistent population differences: faculty, more than students and staff, expressed consistent and great concern for spatial aspects; and the graduate students, more than others, showed great concern for their social surroundings. Concern for facilities also differentiated these groups: faculty members mentioned items essential to their research activities, whereas students showed concern for items which were insufficiently available, such as telephones, bookshelves, duplicating facilities, lounges. Dividing the Psychology Department by psychology specialty areas yielded one major population difference: members of the biopsychology area furnished markedly fewer responses dealing with "other people".

Based on the present findings and the comparative studies, environmental designers may regard the listed environmental aspects as essential in the eyes of building users.¹²

concern was shown for social aspects, space concerns appeared lower on the list, and temperature and lighting were not mentioned.

If economic or other constraints force designers to favor certain aspects over others, the survey of user values and population differences seems mandatory.

Attitudes Toward the Old Environment

In the Spring of 1972 the Psychology Department occupied Berkshire House, Middlesex House and parts of Bartlett Hall (Figure 1). Berkshire and Middlesex Houses -- two identical former married-student dormitories, 100 ft. apart -- are 18,000 sq. ft., rectangular, grey, three-story buildings. Each floor consists of a long and dark corridor with office doors on both sides. Bartlett Hall is a 111,000 sq. ft. four-story building with two wings, housing several academic departments. Corridors are wide, double-loaded with offices and many classrooms. The Psychology Department's administrative offices and mailboxes were located in the basement of Bartlett Hall -- a 700-foot distance from the other two buildings (Figure 2 shows the Department's layout). A representative sample of 79 Department members were asked the questions "What aspects bother you most in your present work-

¹²The present research project also showed that these "important environmental aspects" were not merely restricted to attitudes, but were directly reflected in the behaviors of building users, such as the planning and modification of their offices, the pattern of movement in the building and use of facilities, such as lounges or lobbies.

Figure 1. The Psychology Department's previous environment.

Bartlett Hall North view (a) and South facade (b),
Berkshire House (identical to Middlesex House) aerial
view (c) and East facade (d)



Figure 2. Psychology buildings; Tobin Hall (a),
Bartlett Hall (b), Middlesex House (c)
and Berkshire House (d)



ing environment?" and "What aspects please you most in your present working environment?". Eighty-nine members filled out the Environmental Satisfaction Scale (ESS) and 80 members correctly completed the rating of environmental descriptors both for their present and their ideal working environment. The three buildings were roughly represented according to their populations.

The open-ended questions yielded 206 responses under "dislike" and 136 responses under "like". This is roughly a ratio of three to two.¹³ The major complaints were noise, traffic, distractions and the lack of privacy; inadequate space; lighting, temperature and ventilation (temperature most prominent); esthetics; and access to things and people. Lack of windows and inadequate facilities and equipment were also mentioned. In contrast, respondents were overwhelmingly pleased with their social environment, i.e. "other people". This high response rate is especially significant since the survey and questionnaire may have had a physical-environmental bias. The second and only other sizable high-like aspect was the access to various facilities and support personnel (phone, coffee, copying machines, secretaries, refrigerator, books). Windows (light, air, view), privacy, lounges, ability to decorate the offices, large desks and space were also

¹³Differences were not due to effects of the order of the questions, as shown by a later test.

mentioned. Thus, four of the seven important environmental aspects -- space, privacy and quiet, esthetics, temperature and lighting -- were regarded as unsatisfactory, whereas only one appeared as clearly positive (other people).

On the Environmental Satisfaction Scale (Appendix F), the Mean values generally fell around "neutral", averaging 2.7 (between "neutral" and "a little negative"). Satisfaction ("a little positive") was generally expressed with the location of things (labs, office, building). Temperature regulation scored lowest: between "negative" and "a little negative". Esthetic variables, such as contrast and variation inside buildings or appearance of hallways, floors, offices, rest rooms fell around "a little negative". A one-way analysis of variance of the environmental descriptors showed significant differences in ratings of present and ideal working environments for 37 of the 41 items (Appendix G). The largest present-ideal differences involved the categories of space, esthetics, quiet and light.

There are no contradictions among the three instruments. Apart from the high liking for the social environment obtained only in the open-ended questionnaire, all other items are corroborated by at least two of the three instruments. There was a general negative attitude on the part of the members of the Psychology Department toward their previous working environment. While "other people" and the distance to certain facilities were seen positively, respondents were dissatisfied

with esthetic variables, noise and lack of privacy, lack of space, temperature regulation and lighting.¹⁴ In comparing students, faculty and staff members, few meaningful differences in responses emerged. The attitudes of secretarial staff members were the most negative, with almost twice as many complaints as praises on the open-ended questionnaire (they were also more enthusiastic than others about moving into Tobin Hall). Staff members contributed little to the high number of dissatisfactions regarding noise and space, but paid more attention to temperature and esthetics. The greater variance of responses to ESS questions dealing with offices was partly due to student-faculty differences: students were generally less satisfied with office size, number of occupants per office and traffic and noise within offices. Differences among the three buildings were minor, and were related to differences in usage. Greater variance of responses was observed for questions on the ESS dealing with laboratories and offices than with other questions, and these variances were at least partly due to building differences. Satisfaction scores for laboratories were higher in Middlesex House than in the other buildings; for offices, scores were lower in Bartlett Hall. Middlesex House, which was occupied by biopsychologists and contained animal laboratories,

¹⁴The possible hypothesis that this negative attitude may have been intensified by expectations from the pending move into the new building cannot be disconfirmed, since we did not conduct an earlier pre-test that would have been further removed in time from the relocation.

was liked for its isolation and privacy, whereas Berkshire House, an identical structure which housed social and clinical psychologists, was disliked for these same reasons. Whether architectural features are viewed positively or negatively thus depends in part on the use created by the users.

Attitudes Toward Tobin Hall

Likes and dislikes. Tobin Hall (Figures 3 and 4) is a long, rectangular, six-story building with straight lines, concrete terraces and concrete columns outside, the upper three office floors consisting of rows of windows set back in 4-foot concrete niches. The inside is characterized by long outer corridors, single-loaded by some fifteen office doors and an inner "core" with a wide hall separating experimental cubicles. The building is set against a slope on the Western edge of the campus and provides a view of the Pioneer Valley in the West.

This present section is based again on three data-collection instruments: open-ended questionnaire (N = 74), Environmental Satisfaction Scale (N = 61) and Environmental Descriptors for present and ideal environments (N = 49). Data were collected at two phases: between mid-December 1972 -- one month after moving into Tobin Hall -- and the end of January 1973, and in the Spring of 1973 (April). The Winter 1972/73 quantitative scales and the Spring 1973 open-ended questionnaire data are presented here.¹⁵

Figure 3. Tobin Hall South aerial view

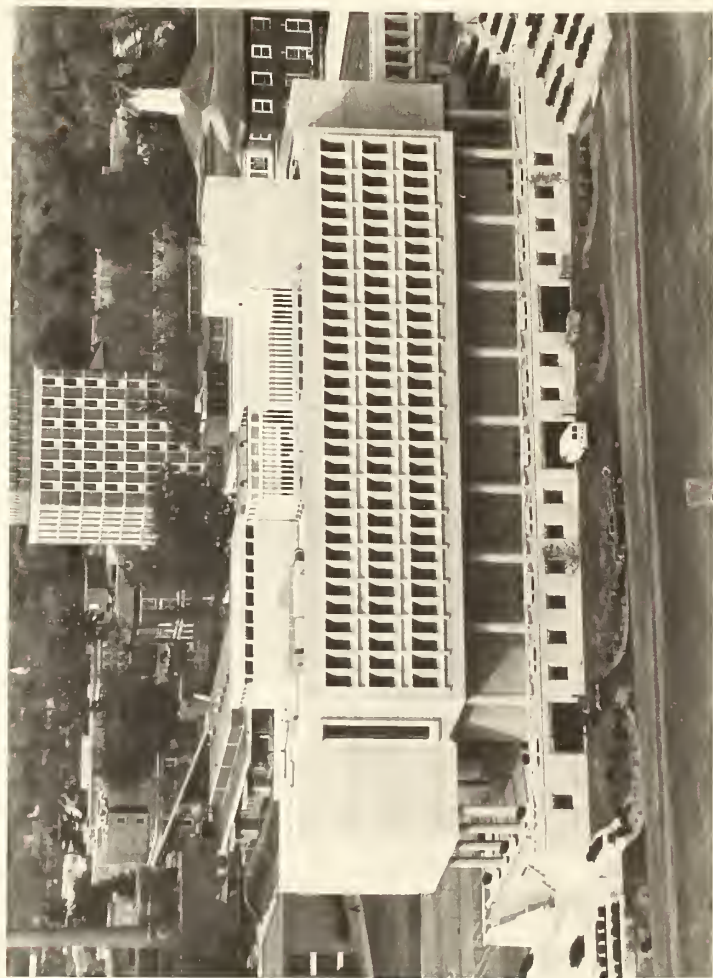
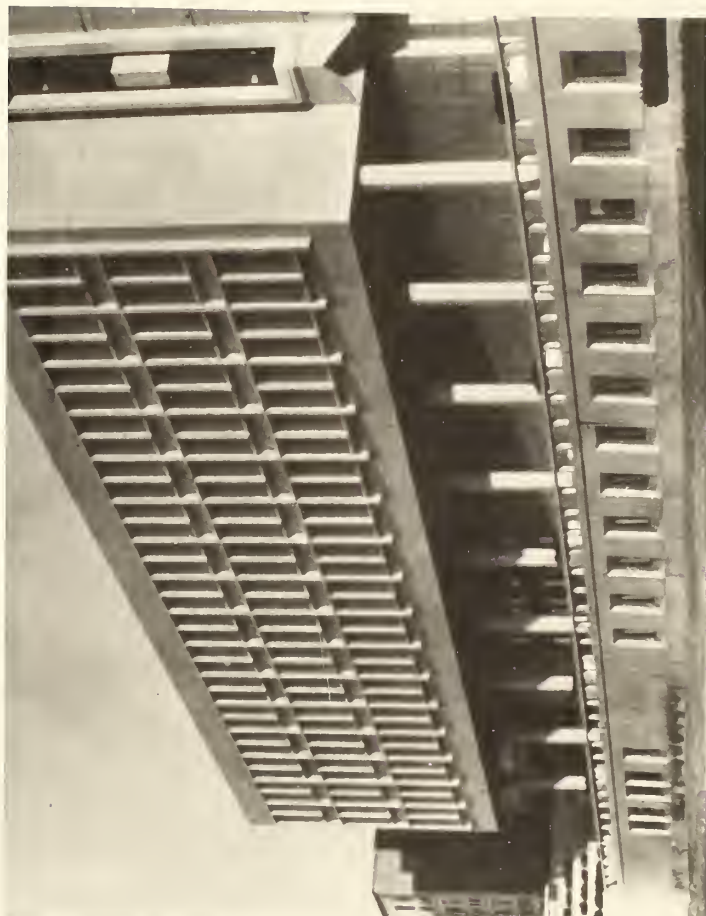


Figure 4. Tobin Hall North facade



The open-ended questionnaire yielded a total of 350 responses, 162 "likes" and 188 "dislikes". Thus, there was a roughly even ratio of likes to dislikes. The major features of praise were: nearness of other people; space; windows and view; newness and looks; privacy; and access to facilities. On the other hand respondents complained about: temperature control; sterility, "sameness" and cold atmosphere of interior; the Department being "spread out"; and "windows cannot be opened". Space and privacy were satisfactory, whereas temperature control was clearly unsatisfactory; access to people and facilities, esthetics and windows were mixed.

The Mean values for items on the Environmental Satisfaction Scale (Appendix F) generally fell above neutral toward "a little positive". Satisfaction was expressed regarding the location of things, such as the building, floor levels, restrooms, offices (except for the distance to laboratories), esthetics (with great variance, however), traffic and noise, and windows/view. The only negative items were temperature and ventilation ("a little negative" to "negative"). Environmental Descriptors rated for Tobin Hall and for the ideal working environment (Appendix G) showed significantly smaller Mean absolute differences per item (one-way analysis of variance) than before the move. The highest dissatisfaction was

¹⁵ Although there were no qualitative differences between the Winter 1972/73 and Spring 1973 open-ended responses, the Spring survey yielded more extensive data (N = 74, versus Winter N = 54).

expressed in regard to temperature. This item was not included in the statistical analysis, since many respondents simultaneously rated both extreme values of 0 (= very cold) and 6 (= very warm), due to the extreme fluctuations of the HVAC system from day to day and from one area in the building to another.¹⁶ Other pronounced discrepancies regarded the angularity (rectangular, square, hard, not curved, not rounded) of the building; conventionality; space; and esthetics.

The three instruments were, again, very consistent. Satisfaction with the variable "traffic, noise, privacy" and dissatisfaction with the temperature control showed strongly on all three instruments; other findings were supported by at least two out of the three. In sum, we arrive at the following picture regarding Tobin Hall: the members of the Psychology Department had an overall neutral to positive attitude and were most satisfied with the degree of noise, traffic

¹⁶ The bad luck experienced with the HVAC system over the course of one year included: miscalculated pressure for steamvalves, replacement of valves, insufficient fan motors and fresh air intake windows, failure to winterize the cooling tower on the roof and subsequent repair (cost: 20,000 dollars), breakage and repair of cooling coil and chiller unit, leaking water and HVAC shutdown due to energy shortage. As a result of these shortcomings and mishaps, the building was sometimes too cold (45 degrees in the morning to 68 degrees in the evening), at other times too hot (80 to 93 degrees), temperature differences from one part of the building to another were observed to range 27 degrees (66 to 93 degrees), fresh air circulation was at times insufficient or nonexistent. In an attempt to adapt to these conditions, office occupants frequently covered air vents to prevent the flow of hot or cold air, installed individual space heaters or fans, and refrained from using essential research computers that threatened to overheat.

and privacy. They felt generally good about the available space, but had a desire or need for more. The nearness of colleagues and facilities was mostly enjoyed; however, there was a feeling that the distances between things within the building were greater than optimal and that the Department was spread out. From an esthetic point of view, the newness and cleanliness and the impressive outside facade were appreciated, while the same architectural features, especially inside, aroused negative impressions of sterility, sameness, harsh angularity and a cold, concrete and institutional atmosphere¹⁷ (Figures 5, 8(b) and 9(c)). People liked their windows and views from high up, but resented the fact that the windows could not be opened¹⁸ -- a feeling that was intensified by the continuous failures of the HVAC system. The latter -- inadequate temperature and ventilation control -- was an overwhelming complaint.

Population differences tended to be weak and a matter of varying emphasis placed on the same variables. Graduate students located near the elevators furnished more of the complaints regarding noise, traffic and disruptions, they complained about inadequate telephone service, and they were

¹⁷Davis (1972) found that office workers did not want to work in a place that was "smooth, shiny, cold, mechanical".

¹⁸A negative correlation between sealed windows in an office building and job performance was found by Langdon (1964).

Figure 5. Tobin Hall "sterility"; outside (a)
and inside (b), (c)

(a)



(b)



(c)



more pleased than other groups with their windows. Secretarial staff members had proportionately more complaints than other groups about the distance to various facilities in the building.

Comparison with the old environment. The change for the better should be highlighted by the circumstance that a full one-third of the Tobin Hall complaints were about a single item: temperature control. Two of the previous complaints were not remedied by Tobin Hall: temperature and ventilation control, and the Department being spread out. Two previously positive features remained positive for Tobin Hall: access to people and other social aspects, and access to facilities. Esthetic concerns, which were clearly negative before, were divided in Tobin Hall into likes for the newness and modern and impressive appearance and dislikes for the cold concrete sterility. Two previous complaints were turned into positive aspects in Tobin Hall: privacy/noise level and space. One complaint emerged in regard to Tobin Hall that had been absent (positive) before: sealed windows. Thus, the open-ended questionnaires show a marked improvement of Tobin Hall over the previous environment; two major complaints were remedied, one additional complaint was diluted. Two unique dislikes regarding Tobin Hall should be taken seriously: the sterile atmosphere and the sealed windows.

The Environmental Satisfaction Scale (Appendix F) shows 41 out of the 56 relevant items significantly more positive

in Tobin Hall than before the move. Thirty of these were significantly different at the .001 level of confidence. The variables concerned with appearance, space, traffic/noise and windows/view moved in the direction of greater satisfaction. Some aspects dealing with Tobin Hall stairways and lounges did not follow this general pattern of improvement, and Tobin Hall residents were significantly more dissatisfied than before with the temperature regulation and with the distance to their laboratories.

The Environmental Descriptors show an identical trend (Appendix G). The Mean present-ideal discrepancy per item moved from 1.74 scale values for the previous environment to 1.19 for Tobin Hall. An analysis of variance on these Means and on the sums of discrepancies showed significant differences at the .001 level of confidence. The changes for the better were due to changes in the described present environment. The ideal environmental descriptors did not change meaningfully, an observation also made by Brookes (1972) in his study.

Table 2 offers a summary of positive and negative attitude changes from the old environment to Tobin Hall, comparing all three assessment instruments. We see an overall marked improvement in Tobin Hall, especially in privacy and noise level and lighting. Some improvement -- while still short of the ideal -- was achieved in space, esthetics and windows/view. Remaining esthetic complaints concerned Tobin Hall's

TABLE 2. ATTITUDE CHANGES FROM THE OLD
ENVIRONMENT TO TOBIN HALL

Environmental Aspects	Open-ended Questionnaire	Environmental Satisfaction Scale	Descriptors and Present-Ideal Discrepancies
Privacy/noise	more positive	more positive	more positive
Space	more positive	more positive	less negative
Lighting	--	--	more positive
Windows/view	more positive; more negative (sealed windows)	more positive	--
Esthetics	more positive (new); more negative (sterile)	more positive	less negative; more negative (angularity)
Access to people	remained positive	--	--
Access to facilities	remained positive	--	--
Department spread out	remained negative	more negative (distance to labs)	--
Temperature regulation	remained negative	more negative	more negative
Overall	better ratio "like" to "dislike" for Tobin Hall	75% of items significantly more satisfactory	present-ideal discrepancies decreased significantly

sterility; and the fact that windows were sealed was a new complaint. Inadequate temperature control was the one drastic and consistent shift toward the negative in Tobin Hall. Consistent with these trends for the better -- although attributable to other factors as well -- the average amount of time spent on campus per week per Department member increased by three hours from before the move (except for secretaries who remained constant), time spent in the office increased by an average of four hours. Office decorations undertaken by Tobin Hall residents were abundant considering the short time of occupancy, and they showed greater care and concern (Figure 6).

The survey of undergraduate users. An academic group that is often neglected in decision making processes is the undergraduate population. Tobin Hall contains nine classrooms, and at any typical day over 300 undergraduate students use the building for classroom instruction, office visits, laboratory experimentation and participation in experiments. Although each of these students does not spend as many daily hours in Tobin Hall as the average member of the Psychology Department, or "possesses" any part of the building, this population nevertheless comprises the "largest single category of users" (Robert Sommer, personal communication).

Two research teams from Fall 1972 and Spring 1973 Introductory Psychology courses conducted a survey of undergraduate classes that were meeting in Tobin Hall classrooms.

Figure 6. Office decorations of one student, while in Berkshire House (a) and after moving into Tobin Hall (b)

(a)



(b)



The responses from 225 students were received, equally distributed over the two semesters, six classes, three classrooms and roughly equal numbers of females and males. Data were collected during the first classmeeting and during the latter part of the respective semester. During each assessment period respondents were given five minutes to write down (1) their "impressions of Tobin Hall", (2) their "impressions of this classroom", (3) their sex, and (4) their familiarity with the building.

The undergraduate student survey was highly consistent with the Psychology Department findings presented earlier. Undergraduate students responded to the same environmental aspects, although esthetics became their outstanding main concern. This makes sense considering that these students were mostly visitors and reacted strongly to appearance, whereas residents showed more concern for spatial variables and the distribution of colleagues and resources, with esthetics ranking third in priorities. The undergraduates' positive attitudes regarding lighting and efficiency and their negative attitudes regarding temperature and ventilation were identical to those for Department members. The nature and distribution of the esthetic responses mirrored those of the Department, with a strong reaction to the cold and impersonal atmosphere of the interior design. Overall attitudes of undergraduate students fell around the neutral point. This may mean that they felt slightly less positive toward

Tobin Hall -- due to their greater concern for esthetics -- than did the members of the Psychology Department.

Changes over time. The three assessment instruments yielded highly consistent results over the Winter 1972/73 and Spring 1973 assessment periods in Tobin Hall. The open-ended questionnaires furnished the same response categories in similar proportions, except for a growing concern about the sealed windows. This makes sense in that during the Winter assessment phase, shortly after moving into Tobin Hall, the heating system was not working properly and the building was very cold, whereas the Spring assessments were conducted after and during a period of overheating. The heat and lack of fresh air circulation highlighted the sealed windows. Only three of the 56 relevant items on the Environmental Satisfaction Scale (Spring N = 66) changed significantly over the two assessment periods. Two of these items concerned the ventilation, which was rated significantly more negatively than before. Traffic and noise, while still above average in the positive direction, also decreased significantly in satisfaction. The overall Means for all items remained identical (3.7 vs 3.6). The Environmental Descriptors (Spring N = 62) also showed little change over the two time periods. A one-way analysis of variance on the Means as well as the sums of the discrepancies for the two time periods showed no significant difference. We are left with the conclusion that the overall attitudes toward Tobin Hall have changed little from

initial occupancy until five months later. Documented attitudinal changes may be attributed to actual environmental changes (HVAC system, seasons).

Conclusions

(1) The "success" of a building means different things to the architect, the legislator, the taxpayer, the official concerned with services and maintenance, and the user. In the present project we deal only with the user's definition of success. This definition entails attitudes -- examined in the present chapter -- and the way people actually use the building. The next chapter will be devoted to the latter problem.

Users of Tobin Hall felt slightly positive about the new building. Three environmental aspects that are important to people were seen in mostly positive terms: lighting, space and privacy/quiet. That the size of the Psychology Department required a large building in the attempt to contain the whole Department, was seen as a mixed blessing. People were divided over their satisfaction about being in a single building versus their dissatisfaction with the distances to other people and facilities within that building. Another difference concerned esthetics. Although the newness, tidiness and appearance were appreciated, the long hallways, straight lines, naked concrete and the lack of color and decor were perceived as sterile and institutional. Windows

and views were enjoyed, but the fact that windows could not be opened became an increasing nuisance, especially in conjunction with HVAC failures. This failure in temperature and ventilation control was the major complaint on the part of the building users. On the whole users saw Tobin Hall as an improvement over the Psychology Department's previous quarters. Lighting, space, privacy and noise level, comfort, windows and the distribution of the Department were experienced with relatively greater satisfaction.

(2) Some of the variables discussed above are not strictly architectural variables for which the building designer is responsible, but are mediated by the actual physical use of the environment and by administrative and social aspects. Attitudes toward spatial layout and the distribution of people and resources are at least in part affected by the way the social unit occupies and arranges itself in the building. Interior esthetics in the form of decoration and furniture are also to a large part the responsibility of the Department and of each individual. The density and distribution of people and resources, the specific and actual use of each room are largely administrative decisions. These, in turn, affect traffic flow, noise and privacy, supervision by superiors and adequacy of space. The placement and use of lounges, for example, may affect the atmosphere of the social organization. In addition, we have seen examples that social interactions and individuals' attitudes toward other people

may mediate their satisfaction with the total environment as well as with specific environmental aspects, such as privacy and noise and the distribution of people.

A recommendation emerging from the studies is the need for channels for continued evaluation and readjustment of a building environment. Large aspects of such an environment are created in the daily use by occupants, and the responsibility for the detection and remedy of inadequacies seems to lie nowhere. Such channels must be publicly known and they should command adequate resources in the form of knowledgeable manpower, allocated time and funding. This endeavor is a logical continuation of the pre-design assessment of user requirements suggested in Chapter II. If resources are limited for a longitudinal responsibility, the immediate post-occupancy evaluation of a building environment, followed by appropriate adjustments, is a must.

(3) The data on user attitudes suggest several implications for environmental design and planning: (a) the use of sealed windows in conjunction with precarious heating-ventilating-airconditioning systems should be re-evaluated, especially since total dependence on such a system may prove uneconomical or even unfeasible in view of the shortage of energy. (b) When using concrete as a building material, finishings and esthetic beautification should receive particular attention. (c) Scheduling interior windowless rooms for office spaces may guarantee user dissatisfaction (Figure 7).

Figure 7. Windowless interior student offices in Bartlett Hall; occupied by one student (a), three students (b) and four students (c)

(a)



(b)



(c)



(d) In addition to Mean values of user attitudes, the variance of such attitudes should be considered. Differences in variance may suggest differential design for different subgroups.

(4) We found the employment of multiple research methods and instruments highly desirable. The use of one assessment instrument poses the grave problem of validity, the use of two instruments presents the dilemma of conflicting results. By employing three instruments in the present study, we confidently reported findings that were substantiated by at least two of them.

CHAPTER IV

THE USE OF THE BUILDING ENVIRONMENT

The way in which a building is used is a function of at least two parameters: the habits and characteristics of the user population and the environmental specifics of the building. Together these form what is usually called an "interaction", sometimes referred to as the "person-environment fit" (Wells, 1967; Sloan, 1972; Davis, 1972; Moleski and Goodrich, 1972; Pervin, 1968; Sanford, 1962; Stern, 1970; Barker, 1965). The "success" of a building is defined by how functional it is, how adequately it can be and actually is used. This chapter examines some environmental parameters of an academic population and the use of selected building facilities. Neither of these are pure and polar dimensions; they both deal with the interaction between people's needs and habits and the available building parameters. To provide a central focus, we shall concentrate on Tobin Hall. Findings from before the move into Tobin Hall are also presented, further illuminating the environmental habits of the population and highlighting the possible effects of the relocation and environmental change itself.

Method

The data for this chapter were derived from interviews

and questionnaires administered to the sample of Psychology Department members over the three assessment periods (Appendix A, B, and C), and from observations conducted throughout the research project -- before and after the move into Tobin Hall. Some observations, e.g. office decorations, entailed the classification and counting of the static observed phenomena, whereas observations dealing with the dynamic use of certain building aspects, e.g. use of entrances, employed a time sampling method. In the case of entrances, elevators and stairs, the number of individuals using the respective facility per specified time period (e.g. five minutes) were counted, distributing the observation periods equally over times of the day, days of the week and time of the semester. In the case of lounges and lobbies, the same sampling of observation times was employed, and the number of occupants of the respective facility at that given time were counted. Additional interviews with specific user groups were conducted and will be noted under the respective sections. The observational data were collected by myself and by seven students from my Introductory Psychology classes and from the Design Department, University of Massachusetts.

Population Parameters and Use of Facilities

Time spent at work. In the Spring of 1973, a sample of 74 Psychology Department members responded to the questions:

how many hours per week do you spend at work on campus? in your office? evenings in Tobin Hall? and weekends in Tobin Hall? Table 3 presents the results for Spring 1972 (before the move) and Spring 1973 (Tobin Hall), categorized by sub-groups. In terms of population differences, faculty members clearly exceeded graduate students in number of hours spent on campus, in their offices and in the building on evenings. Both groups showed great individual variations on every question.¹⁹ In contrast, the staff members showed a steady pattern. While they reported little work during evenings and essentially none on weekends, they spent more time than any other group in their offices, which amounted to 88% of their working time.

The comparison between Spring 1972 and Spring 1973 surveys yields a clear difference, except for the staff members who showed an identical pattern throughout. The other groups increased their on-campus working time by a Mean of three hours per week over the two assessment periods, and they spent a Mean of four hours per week more in their Tobin Hall offices than in their previous offices. In light of the findings reported in the previous chapter, we may speculate that the Department members' greater satisfaction with their Tobin Hall working environment may have motivated them to spend

¹⁹Time spent by graduate students in their offices showed a bimodal pattern. In addition, students showed male-female differences: female graduate students reported a Mean of five hours per week more on campus and a Mean of three hours per week more in their offices than male students.

TABLE 3. TIME SPENT AT WORK (EXCLUDING OFF-CAMPUS WORK)

BY PSYCHOLOGY DEPARTMENT MEMBERS BEFORE AND AFTER THE MOVE INTO TOBIN HALL

Working hrs/week	Before (N = 79)				After (N = 74)			
	Total	Faculty	Students	Staff	Total	Faculty	Students	Staff
On campus								
Mean	41	45	37	40	43	48	40	40
Range		21-73	18-72	37-45		7-70	8-65	37-43
In office								
Mean	25	27	18	34	28	30	23	35
%	61%	60%	49%	85%	65%	63%	58%	88%
Range		17-40	1-60	22-42		7-50	2-50	33-40
Weekends in bldg.	3	3 0-9	3 0-12	none	2-3	2-3 0-10	2-3 0-20	none
Evenings in bldg.		no data			5-6	8 0-40	6 0-20	little

more time at work. This speculation is tentative, however, since there are many uncontrolled variables.

Collaboration with colleagues. We have learned in the previous chapter that academic psychologists consider their social environment as of the utmost importance. When asked during the before-the-move assessment phase, to what degree they collaborate with others in their professional work, the overwhelming majority of Department members (excluding secretarial staff) reported "moderate" collaboration (38 responses) or "quite a bit" (21). Only ten people professed little or no collaboration. Half of those who did collaborate, did so across psychology specialty areas or across Department lines. Some psychology specialty areas (educational psychology, cognitive processes) had more across-area ties than others.²⁰

Locus of interaction. In the context of a detailed study of Department members' interactions with colleagues (Chapter V), faculty members and graduate students were asked to indicate the most usual location of interacting with each of their listed interactional partners. As might be expected, most interactions take place in offices (57%). Perhaps less expected are the high proportion of interactions in hallways (28%) and the low proportion of interactions in

²⁰In contrast to reporting a substantial amount of collaboration, respondents generally believed that little collaboration was carried out by others. This discrepancy between reported and perceived activity suggests inadequate communication.

lounge areas (4%).²¹

57% -- in offices; equally often "own office"
or "others' offices"

28% -- in hallways

6% -- in labs, clinic, class

4% -- in mailroom and lounges

4% -- at home and outside the University

Movement within the building. The questionnaires show a high level of movement of Department members in Tobin Hall. Seventeen respondents reported moving around more than ten times a day, 22 between five to ten times a day, another 16 reported moving less than five times a day, and only four said they moved on a weekly rather than daily basis. People moved primarily to get to and from various places of work (labs, class, clinic, shop, meetings, supplies, duplicating) and to interact with other people, and then (in decreasing order) to pick up mail, for administrative errands, and for rest and recreation. In contrast to faculty and students, most of staff members' movements concerned errands, duplicating, getting supplies. Most of the traffic went toward central Departmental areas: the mailroom with lunch services on the fifth floor and the administrative offices on the fourth floor.²² As noted above, respondents reported spending only

²¹A survey of the Chemistry Department members by John Wargo, a graduate student in regional planning, yielded roughly similar results, with the exception that some of what might otherwise be office interactions were carried out in labs.

65% of their on-campus time in their offices. Supported by similar findings obtained before the move into Tobin Hall, we conclude that academic psychologists seem to be quite a mobile population.²³

Lounges. Data have repeatedly suggested that social interactions with colleagues are an important aspect of the academic psychologist's daily work. Lounges are generally designed to allow for informal and ample social contact. Yet, as we have seen above, only 4% of Department members' contact occurred in lounges. Questionnaires, interviews and time sampling observations all confirm the very limited use of the lounge areas in Tobin Hall. Questionnaires indicate that over one-third of the sampled Department members used no lounges. Nine Department executives and area heads were interviewed independently and asked which Tobin Hall lounges they knew of. Out of the five existing lounges, they knew an

²²The sixth floor, although it housed about one-third of the Department members, offered no general services and was visited relatively rarely by non-residents -- about as frequently as the third floor, which contained no academic offices.

²³Observational studies suggest that for movement between floors, stairways were used as frequently as elevators. On the questionnaire, 51% of the sampled Department members reported using mostly the stairs for movement between office floors, while only 13% reported the predominant use of elevators. Respondents noted the unattractiveness and barrenness of the stairways (Figure 8). In the case of the stairways, it seems that there was a discrepancy between planned intended usage -- for emergencies -- and actual usage -- for ordinary traffic.

Figure 8. Stairways in Bartlett Hall (a)
and Tobin Hall (b)

(a)



(b)



average of only two. They mostly knew about the lounge on their own floor and about the mail room lounge. The term "lounge" created some ambiguity, since many of the rooms that may be labeled as "lounges" were also used for classes, meetings, "brown bag" meetings, and were conceptualized as "conference room", "mail room". This confusion seemed to accurately reflect the actual pattern of use of these rooms.

Apart from the mail room lounge, lounges seemed to be used by local residents and on a less-than-daily basis. Only one room, the clinic conference room, fulfilled a lounge function to the satisfaction of its users.²⁴ Many people remarked that lounges were territorialized quickly and that outsiders seemed unwelcomed. For example, one lounge was perceived to be "taken over" by faculty members of a single psychology specialty area during the lunch hours and by meetings during other times. Staff members complained bitterly about not having a secretarial lounge. It was reportedly a pattern that they would spend half of their lunch break searching for an available lounge, and that they would then be interrupted constantly by other users and passers-by with work requests. Time sampling observations strongly supported the questionnaire findings.

One might interpret the above data as indicating that Department members felt little need for or interest in

²⁴Second in use to the mailroom lounge.

lounges. Countering such interpretation were the data from before the move into Tobin Hall, which show ample lounge use, and the frequent complaints that Tobin Hall lounges were inadequate and were not fulfilling a social function. There were a number of reasons why the lounges may have failed in their function. First, there was confusion as to what rooms were and were not lounges. As noted, even those faculty who presumably were best informed about arrangements, were unable to identify Departmental lounges. Indeed, there was some doubt in the administration as to whether any rooms had been planned to serve as lounges. Moreover, very soon after the move the rooms became identified with other functions -- as mail room, conference room, seminar rooms. Esthetically, also, the rooms were criticized by respondents; one was too large (24 by 32 feet) to serve for informal social contact; others were criticized for their plastic and uncomfortable furnishings; the mail room was both uncomfortable and cramped with partially useless furniture and equipment (Figure 9). No lounge, except the mail room and clinic conference room, had facilities for refreshments such as coffee or soft drinks and no room had machines for sandwiches or snacks.

Lobbies. When the placement and adequacy of the Tobin Hall lounges was discussed prior to the Psychology Department's move into the new building, the Department administration argued that there were abundant lobbies that could and would be used for lounge purposes. The reference was to the

Figure 9. Tobin Hall lounge areas; "mail room" (a),
"conference room" (b), lounge and seminar room
(termed "plastic") (c) and "clinic conference room" (d)



rectangular open spaces connecting hallways, stairs or elevators at each end of the building on each floor. On the fourth, fifth and sixth office floors these areas -- henceforth called "lobbies" -- were equipped with two or three cushioned chairs and an end table. The same areas on the second and third classroom and laboratory floors were left bare.

Time sampling observations of the use of these lobbies were conducted during the beginning of the Spring 1973 semester.²⁵ The observations showed unequivocally that the use of lobbies was minimal. Subsequent interviews with lobby users indicated that they were exclusively undergraduate students waiting for classes, experiments or friends. Department members did not use the lobbies to any extent, nor did the undergraduate population feel free to "trespass" into the aforementioned "lounges". Asked about their likes and dislikes, the interviewed students generally liked the comfort of the cushioned chairs, and they liked the large windows and view of the third floor West lobby. Users disliked the hot temperature, the fact that windows were sealed, the noise level, poor lighting, broken clocks, lack of furniture and esthetics. Lobbies were described as "cold, concrete, institutional, lacking color, hospital-like and bland". These responses, again, were consistent with the array of user atti-

²⁵With the help of Susan Weller, an advanced student in interior design.

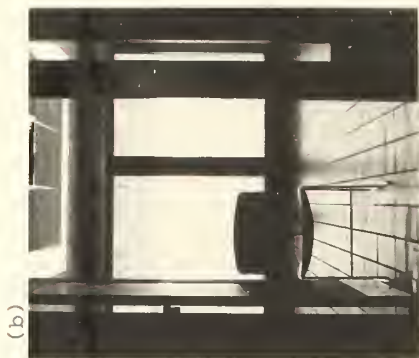
tudes surveyed and reported in Chapter III. When asked how the lobbies could be improved, respondents offered: comfort and sense of being "lived in", more furniture, more privacy, rugs, pictures, bulletin boards, coke machines, color and an artistic quality.

We now went about renovating one of these lobbies. The third floor West lobby was selected as ideal for various reasons: one of its walls consisted of a window with view over parking lot and mountain range; it provided privacy since it was not situated on a route of traffic flow; students from the third floor classrooms had frequented this space even though there was no furniture -- indeed they had repeatedly pulled one or two chairs out of the classrooms. Permission and cooperation from the Department administration was procured, along with two available couches, some lounge chairs and a colorful rug. Students made collages for the walls, and the University physical plant -- through informal channels -- provided two tropical plants along with a caretaker (Figure 10). The response was immediate. A second survey of lobby use during April, after the renovation of the third floor lobby, tripled the use of that lobby, making it by far the most used lobby in the building. Post-renovation interviews and observations also established that this lobby was now used not only for waiting, but also for studying, resting and socializing.

Figure 10. Third floor West lobby; originally empty

(a) (b), after renovation (c), and after theft

of rug and couch (d)



Following this success in environmental change, a second lobby (second floor West) was selected for replication.²⁶ This space offered privacy and windows with view, but was not used at all. Some pieces of used furniture were installed. A third observational survey in the Fall of 1973 showed that this lobby skyrocketed from no use to the second most used lobby in the building.

Some problems and difficulties became apparent in the process of environmental modification. Again, there was evidence of lack of foresight concerning user requirements and absence of appropriate administrative channels for dealing with the evaluation and adjustment of the building environment. Much of the present project was carried out by volunteers and for the purpose of this investigation, rather than being initiated and followed through by a designated component of the social organization. It is unfortunate that the arrangement and beautification of a public building has to reckon with one additional dimension: theft. We had to abstain from decorating the third floor West lobby with student paintings for that reason. During the writing of this chapter, one of the couches in that successful lobby disappeared, a few days later the rug. We are left with a sense of despair, and are somewhat shaken in our conviction that building users want and deserve a fully functional and esthetic environ-

²⁶Dr. Charles Clifton, the Associate Department Head, deserves the credit.

ment. On the other hand we may need to adapt to the circumstance that equipment and furnishings may be stolen from public areas. This may require pre-occupancy planning of fixed features.

The above section suggests how the fitting of a building environment to user needs may be approached: (1) post-occupancy evaluation of building use, (2) survey of user needs and attitudes, (3) appropriate modifications based on the collected data and on the desired goals. A fourth step involves evaluation of the modifications. Robert Sommer states: "No design should exist without evaluation, and no evaluation without redesign" (1972). The above noted results indicate the efficacy of these procedures.

Aspects Surrounding the Move into Tobin Hall

Attitudes about moving and the move itself. In the Spring of 1972 the 79 sampled Department members were asked how they felt about moving. Two-thirds of the respondents felt good about moving into Tobin Hall and were looking forward to it; about one-third expressed some hesitancy or ambivalence regarding the total new environment or regarding specific aspects of it. Included among this one-third were a number who felt negative, mostly for reasons of expected inadequate space; some faculty and students were, indeed, not moving into Tobin Hall, because of such space considerations.

Some respondents did not care. Some predicted that the physical act of moving would be a nuisance. Secretarial staff members, who were -- as a group -- most dissatisfied with their previous environment, expressed the greatest enthusiasm about moving. These comments were consistent with the attitudes discussed in Chapter III.

The schedule for moving into Tobin Hall seemed like a continuation of the problematic design and construction timetable, as discussed in Chapter II. The first serious plan scheduled the Department's move for the Summer of 1972, then for the early Fall, and then the dates were postponed on a week-by-week basis. The building was opened and classrooms were used in October. The Department itself finally moved between November 8 and November 20, 1972. Faculty and staff members packed their possessions into boxes and file cabinets, which were then moved into their new Tobin Hall offices by University personnel. The graduate students were responsible for moving their things themselves. Most chairs, bookshelves and student desks had not arrived yet or were slowly coming in. The post-move survey shows that graduate students, who were somewhat annoyed about the differential treatment given to them, found it easy to move and generally felt good about it, whereas faculty members were more negative and found it hard and difficult to move.

Perceived impact of the move on the Department. During the Spring of 1972, sample members were asked about the ex-

pected impact of the move into Tobin Hall on the Psychology Department. Most responses were positive (77); there were 28 negative and 15 neutral responses and 15 respondents thought that there would be no change. By far the most frequently mentioned item concerned relations and interactions among Department members: 50 respondents thought interactions would increase, 18 thought they would decrease. Morale and pride were expected by 17 people to increase. Another frequent response was the expectation of many months of annoyances and confusions. Almost every change that was mentioned had its advocates as well as adversaries -- although fewer of the latter.

One year later, while in Tobin Hall, sample members answered the question: "What has changed in the Department since we moved into Tobin Hall?" Again, almost all responses dealt with social aspects and again, there was a consistent preoccupation with social interactions. Almost one-third of the sample (23) reported little or no change. Sixteen respondents thought that interactions had increased in general, while another 20 felt that interactions had merely shifted and that they now interacted less with some people and more with others. Thus, there was some correspondence between expected and perceived changes in the Department in that most responses were focused on the amount of social interaction. However, strikingly fewer people observed changes in the number of interactions than had expected them, and more people

than had expected it saw no impact of the move whatsoever. Chapter V documents that the actual number and pattern of interactions did not change as a result of the move.

Discussion

Summary of environmental characteristics. Academic psychologists spend more than a forty-hour week working at the University. In addition, substantial amounts of work are undertaken elsewhere, especially at home. The building which houses psychologists seems to be used at almost all times, including evenings and weekends. The work habits of the present group show extreme individual variation.

Social interaction seems to be a major ingredient of the academic psychologist's work. There seems to be a fair amount of professional collaboration; interacting with other people was cited as the main reason for movement throughout the building; and we saw in the preceding chapter that the social environment was considered to be of the utmost importance, rivaling spatial concerns. Most interpersonal contact takes place in people's offices, another substantial portion in hallways while in transit.

The academic psychologist's office is an important part of his/her life space. Observational surveys reflected this. The offices were abundantly personalized with decorations and books; most social interactions took place there; occupants

spent time there during evenings and weekends; and offices were the most frequent place for eating lunch. Proximity and availability seemed to govern the use of various services and facilities, such as lounges, restrooms, coffee machines or hot water, and various vending machines. The facilities closest to the working area on the same floor were generally used.

The population seemed to be fairly mobile. A great amount of moving around was reported, especially within the building; one-third of on-campus working time was spent in various other locations outside the office. Most of such movement was to and from the Department's ecological centers, the mailroom and administrative offices. The noon hours presented a greatly increased traffic flow, especially with the presence of undergraduate students in the building. For movement between two or three floors, building residents tended to prefer stairs over elevators.

Group differences. Various investigators (Wells, 1967; Sloan, 1972; Manning, 1966) have pointed to the importance of group differences in analyzing the man-environment characteristics of a population. Although a detailed statistical analysis of group differences (age, sex, status, length of stay, et cetera) exceeds the scope of the present study, some consistent sub-population differences emerge from the data.

As might be expected, the pattern of environmental habits of graduate students, as compared to faculty members,

seemed to indicate less "belonging" or "rootedness" within the Department and its environment. Graduate students spent markedly less time on campus and in their offices, they reported less moving around, they made less use of the available coffee machines, and their lunch eating habits were more irregular and on a less-than-daily basis. Corresponding to this status was the absence of graduate student input into the building design process. In rating environmental aspects, students showed the strongest concern for their social environment, whereas faculty members paid more attention to spatial variables. There were some suggestions of sex differences among students (and possibly faculty) with respect to such characteristics as time spent at work or the use of lounges. Secretarial staff showed a very different pattern from either faculty or graduate students. The study gave consistent indications that the difference in occupation was translated directly into different environmental characteristics. Staff members had a different time-at-work pattern with little variance, they were more stationary in their offices, they had different reasons for moving around and their concerns centered around (often administrative) aspects that were specific to this sub-population.

The "success" of Tobin Hall. Despite the move into Tobin Hall many environmental habits of the user population remained constant. There were no changes from before the move in the amount and pattern of social interactions and in the

amount and pattern of movement within the Department; those groups which made little or no use of lounges remained identical. Many respondents perceived no change in the Department after moving into Tobin Hall. The major change was that time spent at work and in offices increased after the move, possibly suggesting increased user satisfaction. As was the case with user attitudes, there are more than architectural variables involved in the way a building is used. A building encompasses both architectural and organizational considerations. Among the more clearly architectural design inadequacies was the unattractive and barren appearance of the stairways in view of these stairways being a major mode of passage by building residents (Figure 8). Inadequacies in administrative and organizational planning appeared in the wastefulness of lobby space -- an easy matter to correct -- and in that lounges were not fulfilling their presumed function.

Implications for design and planning. A number of suggestions emerge from these studies. Architectural design and organizational planning need to recognize the importance and plan in terms of social interaction as a major aspect of an academic social sciences department. Hallways can be designed to be more conducive and accomodating to the abundant social contact which is carried out in them. This might be accomplished by niches or alcoves featuring seats, windows or plants. Whether or not one wants to promote or inhibit a

lively social life in the halls, carpeting and acoustical engineering are indicated in order to keep disrupting noise from infiltrating the numerous offices. The heavy movement of great numbers of people in an academic building should be facilitated by ample room in the hallways, elevators, stairways, and these connective areas should be rendered esthetically pleasing. Careful predesign evaluation of the probable use of building entrances should be conducted. What seems like a most intuitive pattern of traffic flow on the building site may not always be substantiated by post-occupancy user preferences. Observational data clearly show that Tobin Hall's impressive and costly West entrances receive inordinately less traffic than the East entrances. Facilities and services (restrooms, coffee, vending machines) should be placed strategically throughout the building, considering that they may serve only users in the immediate proximity. It should be kept in mind that some facilities with stronger attraction, such as the mailboxes, will affect traffic patterns throughout the building. The placement of the Department's ecological center -- comprised of mailboxes, administrative offices and potentially a general and fully functioning lounge -- should be considered carefully, since it will permanently affect movement, congregation, noise, privacy and the relative isolation of other areas throughout the building.

Academic offices should be recognized for what they are:

social and personal life spaces for their occupants. Academicians usually require libraries of their own books close at hand, and the necessary bookshelves substantially reduce the size of their offices (Appley and Boulter, 1969). The reduction of Tobin Hall offices from 200 sq. ft. to 160 sq. ft. by the University Planning Office during the design process -- as reported in Chapter II -- should have been considered much more carefully than it seemed to be. As architects Grant, Copeland and Chervenak (1968) note in their program for a psychology building at Central Washington State College:

A . . . major function of the building will be that of providing office space for the faculty and staff of the department. The design, layout and location of the various offices within the department constitutes a major problem and deserves thorough analysis. The office design must recognize that a great portion of the occupant's life is spent within its confines. It is reasonable to expect, therefore, that such habitation can be successful only if contracted on the most accomodating terms.

Lounges and lobbies should be set up with care and for their specific social and recreational functions. If such areas are frequently used for other functions, such as classrooms, conferences or seminars, they loose their identity and cease to fulfill their social function properly. Appropriate

furnishings and equipment for coffee, soft drinks, snacks and sandwiches would facilitate their use for informal social meeting. A diversity of such areas would promote their use by a diversity of populations, thereby making the building an open and fully used system in the campus ecology. An appropriate number of such areas would accomodate to the user tendency for territorialization, without such territorialization depriving other users.

The findings consistently suggest that person and environment do not constitute wholly independent dimensions. There is a flow and interaction between persons and environments. Environments, as we have seen, can affect and alter the behavior of people. But, as we have also seen, people modify and effect changes in their environments so as to meet their specific needs.

C H A P T E R V
SOCIAL INTERACTIONS IN AN ACADEMIC DEPARTMENT
AS A FUNCTION OF PHYSICAL AND SOCIAL VARIABLES

Introduction

The preceding chapters have repeatedly shown that social interactions and contact constitute an important aspect of people's total environment. Responses to physical surroundings may be mediated by attitudes toward the social environment. In his study of the Westgate student housing development, Festinger (1951) found that residents, 90% of whom were satisfied with their social relationships, displayed a general satisfaction with the development in spite of "many physical inadequacies of the houses". In contrast is Festinger's 1947 study of a housing development for lower-class shipyard workers, where people were very dissatisfied with the other residents, and hence, with the development as a whole. In a study of dormitory life at the University of Massachusetts Ganz and Farrenkopf (1973) found that students liked their dormitories mostly because of other people and the social atmosphere, in spite of abundant complaints about physical aspects. The Tobin Hall undergraduate student surveys showed differences in student attitudes toward the same classroom, due to different classes and instructors. The present chap-

ter examines the relative influences of physical and social variables on social interaction.

Some investigators claim that human interactions are explained to a great extent by physical proximity and accessibility, while others maintain that social variables are better predictors of who interacts with whom and how much. Festinger (1951) and Festinger, Schachter and Back (1950) were early proponents of the notion that architectural design may have a profound affect on social interactions. Friendship patterns in two student housing projects were explained in terms of (1) distance between apartment doors in the same building, (2) location of stairways and mailboxes, (3) distance between houses, and (4) the direction in which the houses faced. Consistent with the Festinger findings, White (1957) explained the visiting patterns and social interactions in another housing development by proximity and groupings of the houses. And in yet another suburban study, Athanasiou and Yoshioka (1973) documented the number of high intensity friends to decrease with growing distance. On a smaller scale, within an office environment, friendship choices have been attributed to the distance between employees (Wells, 1965; Gullahorn, 1952). Changing the functional distance in an academic environment by providing a spatial link between faculty offices and student lounges was found to change student-faculty interactions (Porteus, 1971).

Probably the best known study casting doubt on the over-

riding importance of physical proximity is Gans' (1961) investigation of suburban housing. He argues that proximity by itself only influences the initiation of contact and the maintenance of low-level "neighborly" relations. For extended and more intensive interaction the homogeneity of people (sharing of values and interests, child rearing practices, leisure time activities, cultural preferences and temperaments) was found to be more important than proximity.

Athanasίου et al. (1973) document that "variables . . . dealing with the life-cycle stage of the S (such as age, marital status, number of children, and so on), are related to friendship choices regardless (their italics) of distance to friends' homes . . .". Socio-economic status has been correlated with the physical dimensions of friendship patterns in that lower class groups tend to draw more heavily upon the immediate neighborhood for their friendships than do middle and upper class groups (Smith et al., 1960; Rosow, 1961; Athanasίου et al., 1973). Length of residence has frequently been found to increase the importance of social variables and to decrease the effect of proximity (Rosow, 1961; Gans, 1961; Priest et al., 1967). The importance of social factors was shown at small distances within a college dormitory (Priest and Sawyer, 1967). Interactions on the same floor were mostly a function of class level, called "peership" by the authors. "Among floormates, in fact, the prediction of peership is so much superior that adding proximity (even though this is es-

entially independent of peership) raises the correlation with attraction little if any over that of peership alone" (Priest et al., 1967). The role of proximity is explained in terms of balance theory: high attraction at close distance, as well as low attraction over far distances provide balanced and stable relationships. In order for high attraction to occur over further distance (which means high costs in terms of time and effort), social rewards, as in the form of homogeneity, have to be greater (Thibaut and Kelley, 1959). Possibly comparable to class level among dormitory students, academic rank of faculty has been shown by Estabrook and Sommer (1972) to correlate highly with being known and knowing others in an academic building.

The present study compares the effect of selected social and physical dimensions on the interactions occurring in the Psychology Department and assesses the effect of a change in physical environment (moving into Tobin Hall) on such interactions.

Method

Participants. A sample of 72 faculty members and graduate students of the Psychology Department participated in the Spring 1972 assessment phase. As noted, participants were selected on the basis of yielding proportionate representation from all relevant sub-populations of the Department

and from the three psychology buildings. The sample constituted close to one half of the on-campus Psychology Department students and faculty members. Fifty-seven members of the original sample were assessed again in the Spring of 1973. The reduced number is due mostly to the decision to assess only those members from the original sample who had moved into Tobin Hall; there were also some others, however, who had left the Department.

Instruments. Seven five-point scales were devised for the present study (Appendix H). Three scales assessed the usual nature (frequency, subject matter,²⁷ duration) of the interaction between the respondent and the named interactional partner, three other scales assessed the degree of "homogeneity" or functional overlap (similarity of professional work, administrative work, private interests and contact) between respondent and interactional partner, and one last scale determined the distance between respondent's and partner's office or laboratory.

Procedure. Appointments were scheduled with all participants, and the interviews took place in their offices. Rapport with the respondents was invariably excellent. Participants were presented a typed sheet with the following instructions, which were then clarified verbally.

²⁷ The ordinal nature of the scale "usual subject matter of interaction" has been questioned. Respondents were instructed to regard this scale as a dimension of increasing intensity.

First, I will give you a list of all members of the Psychology Department. Pick out the names of those persons with whom you have interacted at work during the past week. To count as an interaction for our purposes, ignore those persons whom you merely greet in passing. Also ignore interactions that occur during scheduled or formal meetings such as classes or committees. Then we will rate each of these persons on seven scales. Three scales deal with the usual nature of the interaction itself. Three other scales pertain to the similarity of interests that you share with the particular person. One last scale assesses the distance between the other person's working place and your own.

Summary of criteria for an interaction to be counted:

- in person
- at work
- during past week
- apart from classes, assemblies
- more than just "Hello"

The respondent then looked at a list of names of all faculty, graduate students and secretarial staff of the Department, separated by psychology specialty area. Respondents picked out those names which met the mentioned criteria. With the scaling instrument in front of them, respondents then rated each name, except for the staff names, on the

seven scales. This procedure took between 20 and 40 minutes.

Analyses. The major analysis consisted of a series of eight stepwise regressions (Dixon, 1973). The dependent variables in the separate sub-problems were: (1) frequency of interaction, (2) modal subject matter, (3) modal duration of interaction, and (4) an overall measure of intensity of interaction, derived from the Means of these three variables. The first four regression analyses predicted each of the dependent variables from the following independent variables: (1) similarity of professional work, (2) similarity of administrative work, (3) private interests and contact, and (4) proximity of work area. The regression analysis was repeated for each of the same dependent variables but using the following independent variables as predictors: (1) a measure called "Mean similarity", derived from the Means of similarity of professional work, similarity of administrative work and private interests and contact, and (2) proximity of work area.

The stepwise regression attempts to predict the respective dependent variable from the respective independent variables. In the first step, the independent variable with the highest predictive power is selected; from its values the values of the dependent variable are predicted; and lastly, the predicted and the actual values of the dependent variable are correlated, yielding a measure of the predictive power of the selected independent variable. In the subsequent steps,

the remaining independent variables are taken in the order of their predictive power and added to the previous variable(s) and the prediction equation.

Another analysis dealt with the list of names of interactional partners generated by each respondent. By combining the responses from members of each psychology specialty area, the amount of interaction carried out within each area and between areas was obtained. Since the psychology specialty areas were spatially separated and had definable spatial relationships to each other, and since these spatial relationships changed after the move into Tobin Hall, the amount of interaction between areas could be examined in relation to spatial influence.

Results

Regression analyses. Table 4 reports the correlation matrices for all dependent and independent variables before and after the move into Tobin Hall. In general there were few changes, except for the increased correlation between similarity of professional work and the interaction dimensions after the move. Highest correlations with the interaction dimensions were achieved by the Mean of the homogeneity variables (professional work similarity, administrative work similarity, private interests and contact), with two of these variables (similarity of professional work and private

TABLE 4. CORRELATION MATRICES FOR ALL DEPENDENT AND
INDEPENDENT VARIABLES BEFORE AND AFTER THE MOVE
INTO TOBIN HALL

<u>Spring 1972, before the move</u>								
	2	3	4	5	6	7	8	9
1 Frequency inter- action	.42	.42	.38	.26	.49	.51	.76	.57
2 Subject matter interaction	-	.58	.42	.14	.39	.17	.84	.50
3 Duration		-	.34	.16	.40	.11	.82	.47
4 Simil. prof. work			-	.18	.15	.40	.47	.73
5 Simil. admin. work				-	.18	.18	.23	.59
6 Private contact					-	.18	.53	.68
7 Phys. proximity						-	.33	.40
8 Mean of 1, 2, 3							-	.64
9 Mean of 4, 5, 6								-
<u>Spring 1973, after the move</u>								
	2	3	4	5	6	7	8	9
1 Frequency inter- action	.41	.49	.42	.20	.48	.46	.78	.57
2 Subject matter interaction	-	.60	.49	.12	.39	.18	.82	.53
3 Duration		-	.43	.16	.42	.14	.85	.53
4 Simil. prof. work			-	.16	.22	.27	.55	.76
5 Simil. admin. work				-	.16	.10	.19	.54
6 Private contact					-	.18	.53	.69
7 Phys. proximity						-	.31	.29
8 Mean of 1, 2, 3							-	.66
9 Mean of 4, 5, 6								-

interests and contact) correlating highly with the interaction variables, except for frequency of interaction. Similarity of administrative work always correlated low with the dependent variables. While the independent variables correlated slightly with each other, correlations between the dependent variables (interaction dimensions) were high.

Table 5 and 6 summarize the stepwise regressions predicting the overall intensity of people's social interactions at work (Mean of frequency, subject matter and duration of interaction) from the listed independent variables. The similarity of interactional partners, specifically the degree of private interests and contact and of professional similarity, accounted for much of the variance in interactions, with the degree of physical proximity contributing little additional information. Information added by the degree of similarity of administrative work was negligible. The pattern was essentially the same, before and after the move.

When predicting the usual subject matter of interaction (ranging from superficial to personal) and the duration of interaction, professional work similarity and the sharing of private interests consistently emerged as the best predictors, with physical proximity and administrative work similarity adding little or no information. Physical proximity, however, was a strong predictor of the frequency of interaction. In one case, before the move into Tobin Hall and when competing with the similarity dimensions individually rather than with

TABLE 5. STEPWISE REGRESSION SUMMARY TABLES.

DEPENDENT VARIABLES: THE MEAN OF ALL THREE INTERACTION
VARIABLES. INDEPENDENT VARIABLES: SIMILARITY OF
PROFESSIONAL WORK, PRIVATE CONTACT, SIMILARITY OF
ADMINISTRATIVE WORK, AND PHYSICAL PROXIMITY

<u>Spring, 1972, before the move</u>					
Variables	Multiple R	R ²	Incr. in R ²	F	Signif. level
Private contact	.5306	.2815	.2815	673.4349	<.001
Simil. prof. work	.6633	.4399	.1584	485.9207	<.001
Phys. proximity	.6693	.4480	.0080	25.0282	<.001
Simil. admin. work	.6721	.4518	.0038	11.9856	<.001

<u>Spring, 1973, after the move</u>					
Variables	Multiple R	R ²	Incr. in R ²	F	Signif. level
Simil. prof. work	.5468	.2990	.2990	578.7585	<.001
Private contact	.6881	.4735	.1745	449.5069	<.001
Phys. proximity	.6983	.4876	.0141	37.3865	<.001
Simil. admin. work	.6999	.4898	.0022	5.8372	.02

Notes. R = Cumulative correlation between predicted and actual values of the dependent variable.

R² = Cumulative percent of variance of the dependent variable accounted for by the independent variable(s).

Increase in R² = Percent of variance of the dependent variable accounted for by the best predicting independent variable and cumulatively added by each subsequent independent variable.

TABLE 6. STEPWISE REGRESSION SUMMARY TABLES.

DEPENDENT VARIABLE: MEAN OF INTERACTION VARIABLES.

INDEPENDENT VARIABLES: MEAN OF SIMILARITY VARIABLES
AND PHYSICAL PROXIMITYSpring 1972, before the move

Variables	Multiple R R ²		Incr. in R ²	F	Signif. level
Mean similarity	.6366	.4053	.4053	1171.4949	<.001
Phys. proximity	.6422	.4125	.0072	20.9730	<.001

Spring 1973, after the move

Variables	Multiple R R ²		Incr. in R ²	F	Signif. level
Mean similarity	.6612	.4372	.4372	1054.0667	<.001
Phys. proximity	.6734	.4535	.0163	40.4973	<.001

their Mean, physical proximity was the single best predictor of the frequency of people's interactions.

Comparing the interactions in Tobin Hall with the previous environment, physical proximity lost some of its predictive power in Tobin Hall, whereas similarity of professional work gained in predictive power.

Overall numbers of interactions. Before the move into Tobin Hall, respondents reported a Mean of 24 different interactional partners (at work, face-to-face, outside of classes or assemblies, more than mere "Hello") for a given past week. Respondents listed more interactional partners from their own psychology specialty area ($M = 15$), than from all other areas ($M = 9$). After the move, with all respondents housed in the new building, the results were identical. A Mean of 24 interactional partners per respondent were listed for a given week, 15 from the same specialty area, 9 from other areas. In both cases, there were no differences in this pattern due to sex or status (student-faculty).

Distance between interactional partners. Before the move there were roughly equal numbers of interactional partners in each physical distance category, except for "same room or next door". Of course, there simply are not as many people located in the same office or next door. After the move this pattern was identical (Table 7), except that the number of interactional partners from different buildings had dropped considerably, and had shifted to the category "differ-

TABLE 7. PHYSICAL DISTANCE BETWEEN RESPONDENTS
AND THEIR INTERACTIONAL PARTNERS BEFORE AND AFTER
THE MOVE INTO TOBIN HALL

	Before the move	After the move
Same room/next door	10.3%	11.3%
Within 5 doors	21.5%	24.3%
6 doors or more	24.8%	25.8%
Different floor	21.4%	29.2%
Different building	22.0%	9.4%

ent floor". This means that some of the interactional partners from different (other than the respondent's) psychology specialty areas, who were previously housed in the other buildings, were now located on the other floors in Tobin Hall. There is no evidence that the selection of interactional partners followed a spatial pattern, i.e., that the number of partners decreased with increasing distance.

Between-area interactions. The Mean numbers of interactions coming from and going to other psychology specialty areas were computed for members of each specialty area. The absolute as well as the relative number of interactions carried out by members of each area was the same before and after the move into Tobin Hall ($t_{67} = 1.14$; nonsignificant). Computing the Mean number of interactions between each specialty area and each other individual area, yields similar absolute numbers and a similar rank order of area diads before and after the move ($\rho = .62$, $N = 21$, $p < .01$), despite drastic changes in the spatial relationships between these areas.

Replication study. A replication of the present study was conducted during the Spring of 1973 in the Chemistry Department at the University of Massachusetts, employing the same assessment instrument and procedure.²⁸ The composition of the Chemistry Department was strikingly similar to the

²⁸With the help of John Wargo, a graduate student in regional planning.

Psychology Department. It was a large department, about three-quarters of the size of the Psychology Department, and it was divided into five specialty areas ("divisions"). In contrast to the Psychology Department, the Chemistry Department was housed in one single building (the Goessmann Chemistry Laboratory Building) and the subdivisions were not spatially segregated to a great extent, but were mingled in the building. This was reflected in the absence of a correlation between physical proximity and similarity of professional work.

Although the predictive powers of the independent variables were lower for the Chemistry Department, the data were strikingly similar to findings for the Psychology Department. The correlations and predictors were in the same direction and of the same relative magnitude. Similarity of professional work and the degree of private interests and contact were better predictors for the overall measure of interactions and for the subject matter and duration of interactions. Physical proximity was the best single predictor of the frequency of interactions, both when competing with the similarity dimensions individually and with the measure of Mean similarity. The replication of the Psychology Department findings encourages confidence in the results and suggests that the conclusions may generalize to academic settings of similar structure (large University departments with subdivisions, located on a large campus).

Discussion

Social versus physical variables. Overall -- and based on a variety of data analysis methods -- the interactions of University academicians at work seem to be more a function of social than physical variables. The similarity of professional work between Department members (research and teaching activities) and the extent of shared private interests and contact outside of the University consistently emerged as better predictors of interactions than physical proximity within the Department. The private dimension was especially important regarding the usual duration of interactions. It is easily conceivable that we would have accounted for even more variance in interactions, had we included other relevant social variables, especially "interpersonal attraction".

Psychologists interacted more with persons from the same professional specialty area than with members from other areas. Examining the amount of between-area interactions yields the same conclusions: there was little evidence that such interactions were determined by spatial distances, whereas there were ample indications that interactions followed bonds of research collaboration and professional activities and interests. Those subareas of psychology (cognitive processes, educational and developmental psychology) that consistently interacted with each other more than other areas were the ones that had close professional ties, with

members of one area being active in the research field of the other area (as evidenced by the independent questionnaire items regarding collaboration in the Psychology Department). The only interactional dimension influenced by physical proximity was frequency of interaction.

This is not to say that proximity is irrelevant to interaction. The effects of proximity may be expected to relate to distance (Priest and Sawyer, 1967; Thibaut and Kelley, 1959). Before the move into Tobin Hall we found less across-building interaction with the general Departmental staff in Bartlett Hall. Interactions between secretarial staff members within one building tended to be a function of homogeneity, but homogeneity did not bridge the distance to different buildings. Further evidence that proximity may play a greater role at greater distances comes from the regression analyses. We find that the dimension of "professional work similarity" gained in importance whereas physical proximity lost in importance after the move into Tobin Hall.²⁹ When the Psychology Department was spread out over three buildings

²⁹ In Tobin Hall the variance in interactions accounted for by the variables "professional work similarity" and "private contact" increased by three to six percent. At the same time there was a five percent loss in predictive power regarding the frequency of interactions, indicating that the predictive power of proximity had decreased. There was less of a range on the proximity scale after most Department members and all sample members had moved into the single building, thereby reducing the possibility for higher correlation.

the effect of physical distance on the frequencies of interactions was greater than when most of the Department was compacted into one building. The effect of proximity was also greater when we were dealing with a loose social organization within a single building (the Chemistry Department).

Impact of environmental change. There was little change in interactions after the Psychology Department's move into Tobin Hall. Respondents listed the same numbers of total interactional partners per week, the same numbers of partners from their own specialty areas and the same numbers of partners from other areas before and after the move. The Mean number of between-area interactions for members of each area were the same both times, and the areas had a similar rank order in relative amount of interaction. This latter point is especially significant in view of the circumstance that spatial relationships and distances between areas were very different after the move to Tobin Hall.

The results suggest that interactions are very much a function of social-organizational variables. Little has changed in the Psychology Department regarding its social organization. A social conglomerate formerly spread over a wider area was compacted into a smaller area. The functions did not change although the environmental scale was different. Again, the results suggest that the ecology of social interactions is social-organizational rather than physical.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Summary

In this project we have investigated the move of an academic department into a newly constructed building. There has been little exploratory research dealing with the totality of building environments and no systematic research focusing on the relocations of social units. Our aims were to discover problem areas and hypotheses about building environments and human behavior and to explore methodologies and implications for design and planning.

Chapter II discussed the design history of Tobin Hall, the newly constructed building for the Psychology Department at the University of Massachusetts. The architects, University planning officials and Psychology Department members involved in this design history were interviewed and design documents and memoranda were examined. We noted and discussed four problems in the building design process, some of which had been noted by other investigators (Craig, 1970; Appley and Boulter, 1969; Simmons and Johnson, 1971): (1) the difficulty of long-term planning, due to changing needs and design inflexibility; (2) a cumbersome and inflexible bureaucratic process, which does not seem to be future-gearred; (3) inadequate consideration for human values, as evidenced by

the absence of knowledge, effort, imagination and user involvement; (4) the communication gap between users and designers, due to (a) lack of contractual ties between these two parties, (b) inadequate user representation, and (c) a language barrier. We discussed the need for future-minded planning and for flexibility built into design. We pointed to the need for user representation as an inherent element of the design process. User requirements need to be assessed systematically and user representatives need to be provided with contractual ties to the designer, training, and an appropriate reward structure.

Attitudes of users toward their building environment, with special emphasis on Tobin Hall, were examined in Chapter III. A sample of 79 Psychology Department members was surveyed with multiple instruments over three time periods, before and after the move into Tobin Hall. Undergraduate student users of Tobin Hall were also studied though less intensively. The environmental aspects in order of ranked importance to users were consistently: (1) space, other people, esthetics, (2) temperature, lighting, ventilation, privacy and quiet, (3) facilities and windows/views. Some subgroup differences were discussed. Attitudes toward the building environment before and after the move were assessed, and significantly greater satisfaction was found with the new environment. These attitudes seemed to change little over five months of occupying Tobin Hall, which may indicate that the "honeymoon

effect" (Craik, personal communication) was either absent or that it lasts for a longer period than that of the study. The value of employing multiple assessment instruments was demonstrated. User satisfaction was shown to depend on more than architectural variables. The actual physical use of the environment and administrative and social aspects had great influence on user attitudes.

In Chapter IV we assessed the use of the building environment, especially of Tobin Hall, employing interviews, questionnaires and behavioral observations. A building housing academic psychologists was found to be in use most of the time, although with great variation among individuals. Social contact was recognized as a major component of the academic psychologist's professional activities. The academic office constituted a crucial life space for its occupants, which indicated the need for great care in the planning of offices. The use of a variety of services seemed to be contingent on their availability and proximity, except for the central Departmental areas -- mailboxes and administrative offices -- which drew heavy traffic from every part of the building. Because of the effect on use, satisfaction, traffic and noise, the strategic placement of such facilities and services is called for. There were differences among subpopulations in their use of the building environment; design and planning have to be addressed to such differences. We noted little impact of the relocation on the habits and activities of

building users, except for the possible effect of newness and greater satisfaction with Tobin Hall. Again, we noted that architectural variables were only partly responsible for the pattern of man-environment interaction, and that the users and their administration were responsible for many building aspects.

Chapter V investigated the effects of physical proximity and social "homogeneity" (Gans, 1961) on social interactions among faculty members and graduate students in the Psychology Department. Department members were surveyed before and after the relocation, employing a scaling instrument created for this purpose. Data analyses at two levels of sophistication and a replication study in another department yielded similar results. Professional and private homogeneity among interactional partners consistently emerged as a better predictor of the parameters of an interaction than did physical proximity. There was essentially no change in the pattern of interactions after the move into Tobin Hall, again attesting to the possible lesser importance of physical variables. Physical proximity had effect primarily on the frequency of interactions. We hypothesized that the influence of physical proximity may be greatest when dealing with a loose social organization or with greater distance.

Conclusions

(1) Whereas we originally set out to demonstrate the impact of architectural aspects on the behavior and attitudes of building users, we must now conclude that a major part of the building environment and of the user-building interaction is determined by the user population itself. User satisfaction and the behavior within a building environment are very much influenced by who the users are and what they do with the building. The users themselves are responsible for the placement of resources, the use made of various spaces, esthetics and furniture, as well as a variety of purely social variables. Post-occupancy evaluation and redesign by the architect (Manning, 1966; Craik, 1970; Brookes, 1972) are important, but in addition, systematic and routine establishment of administrative channels is needed to survey user requirements and monitor user-building interaction on a continuing or at least periodic basis. It is important that such channels be part of the users' immediate social unit, which is not the case with the "building and grounds" office that traditionally is supposed to fulfill this function for a diversified University population and for a large number of dissimilar buildings. The establishment of such channels would call for an appropriate reward structure (e.g. release time from other duties) and a certain minimum of environmental training of personnel. In designing a new building, the

architect should be made partly responsible to the user population (Chapter II), and the administrative structure proposed here would serve well as user representation. The value -- for efficiency's sake -- of having the users themselves involved in the evaluation and redesign of their building environment has been recognized by Robert Sommer (1969, 1972).

(2) The present research project has consistently shown that the social environment constitutes a pervasive aspect of the physical environment, such as a building. Social aspects repeatedly emerged in the foreground of user satisfaction, use of the building environment and the determinants of social interaction. Yet, social considerations seem to be neglected in the design of university buildings and in environmental research itself. With respect to building design, Estabrook and Sommer (1972) observe that "the entire plan [the rectilinear arrangement and cubicle module form of university buildings], including the administrative edict against special coffee rooms and lounges, seem designed to separate the orbits of different individuals and reinforce the model of scholarly work as an individual pursuit." In the area of environmental research we find the absence of social variables in investigative studies and instruments geared to assess the human response to architecture (Collins et al., 1970; Craik, 1971). This seems counter to the need to view environments in their ecological totality (Barker, 1965).

(3) The strengths of the present research project in-

clude: (a) the large scope and total ecological approach; (b) the use of multiple methods and instruments which cross-validate the findings (Barker, 1965); (c) the longitudinal nature, spanning a time period of one and a half years, including assessments before and after the environmental relocation; (d) the consideration of all sizable user populations; (e) the beginning of comparative cross-validating studies; and (f) the presentation of a model for the recommended behavioral and attitudinal user surveys in building design and planning.

This project nevertheless remains a case study with limited generalizability; more comparative research is needed, and the longitudinal approach should be extended in both temporal directions: a further follow-up assessment should be conducted, and an earlier pretest -- further removed from the pending relocation -- would have been desirable.

(4) We presented a model for fitting of building environments to user needs. The model entails the following four steps: (1) Post-occupancy evaluation of building use, employing behavioral observations and questionnaires; (2) surveys of user needs and attitudes, employing interviews and questionnaires (such assessments require little training of personnel and should be conducted by the user population itself); (3) modifications of the building environment based on the collected data and on the desired goals; (4) behavioral and attitudinal evaluation of the modifications.

(5) Apart from the presented data and foci, a number of

researchable problems emerged:

(a) The relationship between building size and the organizational and social integration of occupants. We found consistently that the Psychology Department members felt the same lack of integration in the six-story building of Tobin Hall that they had felt when they were spread over three separate buildings.

(b) People may exhibit a negative response bias when answering questions concerning environmental satisfaction. How pervasive is this bias -- if it exists -- and can we develop a useful concept of "relative satisfaction" or "preference"?

(c) We expect the rank order of important environmental aspects to differ between populations and behavior settings. Data suggest, for example, that academic psychologists may be more concerned with their social environment than are employees in a commercial firm, and that university students show more concern for this variable in their dormitories as compared to classrooms.

(d) The perception of the relative importance of environmental variables may be affected by shortcomings in the respondents' environment. Graduate students, for example, showed great concern for certain facilities which were not readily available to them, such as telephones, bookshelves, duplicating services.

(d) In the absence of appropriate channels, building users may find it easier to adjust to inadequate conditions

by changing their attitudes and environmental habits, rather than by attempting to affect the appropriate changes in their environment. This may be consistent with the principles of cognitive dissonance reduction (Festinger, 1957; Zajonc, 1960).

(f) What are the information cues responsible for the expectations from a future building environment? The present study showed a striking match between expectations expressed seven months before occupying a new building, and attitudes expressed five months after occupancy.

(g) Are longitudinal changes in environmental attitudes more dependent on actual environmental changes or due to cognitive changes and adaptations? The present study uncovered evidence for the former explanation.

BIBLIOGRAPHY

- Albee, G. The uncertain future of psychology. APA Monitor, June 1973, 4, 6.
- Appley M. and Boulter, L. Planning and building a psychology facility: The York University Behavioral Sciences Building. Revision of a paper presented at an Education and Training Board Symposium on Academic Facilities, APA, Washington, D.C., August 31, 1969.
- Athanasiou, R. and Yoshioka, G. The spatial character of friendship formation. Environment and Behavior, 1973, Vol. 5, 1.
- Barker, R. Explorations in ecological psychology. American Psychologist, 1965, 20.
- Bennett, E., Degan, J. and Spiegel, J. Human factors in technology. McGraw Hill Company, 1963.
- Beck, R., Cohen, S., Craik, K., Dwyer, M., McCleary, G. and Wapner, S. Studying environmental moves and relocations. A research note. Environment and Behavior, 1973, 5, 3.
- Brookes, M. Changes in employee attitudes and work practices in an office landscape. In W. Mitchell (Ed.), Environmental design: Research and practice, proceedings of the edra 3 / ar 8 conference, U.C.L.A., January 1972.
- _____, personal communication.
- Bruner, J. and Goddman, C. Value and need as organizing factors in perception. Journal of Abnormal and Social Psychology, 1947, 42.

- Canter, D. An intergroup comparison of connotative dimensions in architecture, Environment and Behavior, 1969, Vol. 1, 2.
- Collins, J. Perceptual dimensions of architectural space validated against behavioral criteria, Man-Environment Systems, 1970, S-24.
- _____ and Seaton, R. Semantic dimensions as architectural discriminators, paper read at the Western Psychological Association, San Francisco, 1970.
- Craik, K. The comprehension of the everyday physical environment, Journal of the American Institute of Planners, 1968, 34, 1.
- _____. Environmental psychology. In Craik et al. New directions in psychology, Vol. 4, New York: Holt, Rinehart and Winston, 1970.
- _____. The assessment of places. In McReynolds. Advances in psychological assessment, Vol. 2. Palo Alto: Science and Behavior Books, 1971.
- _____, personal communication.
- Cronbach, L. The two disciplines of scientific psychology. American Psychologist, 1957, 12.
- Davis, G. Using interviews of present office workers in planning new offices. In W. Mitchell (Ed.) Environmental design: Research and practice, proceedings of the edra 3/ar 8 conference, UCLA, January, 1972.
- Dixon, W. (Ed.) Biomedical computer programs. University of

- California Press, 1973.
- Estabrook, M. and Sommer, R. Social rank and acquaintanceship in two academic buildings. In W. Graham and K. Roberts (Eds.) Comparative studies in organizational behavior. New York: Holt, Rinehart and Winston, 1972.
- Farrenkopf, T., Boisclair, M., Duncan, T., Lorentz, K., Sims, S., Thrasher, J. and Wright, R. Building design and user satisfaction, unpublished manuscript, 1973.
- Festinger, L. Architecture and group membership. Journal of Social Issues. 1951, Vol. 7, 1.
- _____. Theory of cognitive dissonance. Evanston: Row, Peterson, 1957.
- _____, Schachter, S. and Back, K. Social pressures in informal groups. New York: Harper and Bros., 1950.
- Friedman, A., Pile, J. and Wilson, F. Interior design. New York: American Elsevier Publishing Company, 1973.
- _____, personal communication.
- Gans, H. Planning and social life: Friendship and neighbor relations in suburban communities. Journal of the American Institute of Planners. 1961, 27.
- Ganz, S. and Farrenkopf, T. An environmental study of dorm life at the University of Massachusetts, Amherst. Unpublished manuscript, 1973.
- Gerst, M. and Moos, R. The psychological environment of university student residences. In W. Mitchell (Ed.) Environmental design: Research and practice, proceedings of the

- edra 3/ar 8 conference, U.C.L.A., January, 1972.
- Grant, Copeland and Chervenak. Proposal for a psychology building at Central Washington State College. Ellensburg, Wash., 1968.
- Griffin, W., Mauritzen, J. and Kasmar, J. The psychological aspects of the architectural environment: A review. In R. Moos and P. Insel (Eds.), Issues in social ecology. Palo Alto, National Press Books, 1974.
- Gullahorn, J. Distance and friendship as factors in the gross interaction matrix. Sociometry, 1952, 15.
- Hall, E. The hidden dimension. Garden City: Doubleday and Company, 1966.
- Harries, M. Architectural practice and the feedback of performance information from site to design. Industrialization Forum, 1971, 2.3.
- Hebb, D. O. A textbook of psychology. Philadelphia: W. B. Saunders, 1966.
- Hollahan, C. Seating patterns and patient behavior in an experimental dayroom. Doctoral dissertation, University of Massachusetts, 1971.
- Jacobs, J. The death and life of great American cities. New York: Vintage Books, 1961.
- Jones, E. and Gerard, H. The impact of value and attitude on perceiving and remembering. In Jones and Gerard (Eds.), Foundations of social psychology. New York: John Wiley and Sons, Inc., 1967.

- Kaplan, A. and Brookes, M. The availability and utility of human factors data for office designers. DMG Newsletter, 1971, Vol. 5, Nos. 10, 11.
- Kasmar, J. The development of a usable lexicon of environmental descriptors. Environment and Behavior, 1970, 2, 2.
- Kuhn, T. The structure of scientific revolutions. Chicago: The University of Chicago Press, 1970.
- Langdon, F. User research in office design. Architect's Journal, 1964, 139.
- _____. Modern offices: A user survey. National Building Studies, Research paper #41. London: Her Majesty's Stationary Office, 1966.
- Lipman, A. The architectural belief system and social behavior. British Journal of Sociology, 1969, 20.
- Lowenthal, D. Research in environmental perception and behavior: Perspectives on current problems. Environment and Behavior, 1972, Vol. 4, 3.
- Manning, P. Office design: A study of environment, Pilkington Research Unit, Department of Building Science, University of Liverpool, 1966.
- McCormick, E. J. Human factors engineering. New York: McGraw Hill Book Company, 1970.
- Moleski, W. and Goodrich, R. The analysis of behavioral requirements in office settings. In W. Mitchell (Ed.), Environmental design: Research and practice, proceedings

- of the edra 3/ar 8 conference, U.C.L.A., January, 1972.
- Moos, R. Systems for the assessment and classification of human environments: An overview. American Psychologist, August, 1973.
- Myers, J. Fundamentals of experimental design. Boston: Allyn and Bacon, 1969.
- Neutra, R. Survival through design. New York: Oxford University Press, 1969.
- Newman, O. Architectural design for crime prevention. Washington: U.S. Government Printing Office, 1971.
- _____. Defensible space. New York: McMillan, 1972.
- editorial, Psychology: Hot course on campus. Newsweek, May 21, 1973.
- Pervin, L. Performance and satisfaction as a function of individual-environment fit. Psychological Bulletin, 1968, 69, 1.
- Porteus, J. Design with people: The quality of the urban environment. Environment and Behavior, 1971, Vol. 3, 2.
- Priest, R. and Sawyer, J. Proximity and peership: Bases of balance in interpersonal attraction. American Journal of Sociology, 1967, 72, 6.
- Proshansky, H., Ittelson, W. and Rivlin, L. The influence of the physical environment on behaviors: Some basic assumptions. In Proshansky, Ittelson, Rivlin (Eds.), Environmental psychology: Man and his physical setting. New York: Holt, Rinehart and Winston, 1970.

- Pyron, B. Form and diversity in human habitats. Environment and Behavior, 1972, Vol. 4, 1.
- Raush, H., Farbman, I. and Llewellyn, L. Person, setting, and change in social interaction. II: A normal-control study. Human Relations, 1960, 13.
- Rosow, I. The social effects of the physical environment. Journal of the American Institute of Planners, 1961, 27.
- Sanford, N. (Ed.) The American college: A psychological and social interpretation of higher learning. New York: John Wiley and Sons, Inc., 1962.
- Simmons, W. and Johnson, M. Building a psychology building. Professional Psychology, 1971 (Summer).
- Skinner, B. F. Science and human behavior. New York: The Free Press, 1953.
- _____. Beyond freedom and dignity. New York: Alfred Knopf, 1971.
- Sloan, S. Translating psycho-social criteria into design determinants. In W. Mitchell (Ed.), Environmental design: Research and practice, proceedings of the edra 3/ar 8 conference, U.C.L.A., January, 1972.
- Smith, J., Form, W. and Stone, G. Local intimacy in a middle sized city. American Journal of Sociology, 1954, 60.
- Sommer, R. Personal space. Englewood Cliffs: Prentice Hall, 1969.
- _____. Design awareness. San Francisco: Rinehart Press, 1972.
- _____, personal communication.

- _____, and Becker, F. Room density and user satisfaction. Environment and Behavior, 1972, Vol. 3, 4.
- Sonnenfeld, J. Social interaction and environmental relationship. Environment and Behavior, 1972, Vol. 4, 3.
- Stern, G. People in context: Measuring person-environment congruence in education and industry. New York: John Wiley and Sons, Inc., 1970.
- Stinchcombe, A. Rebellion in a highschool. Chicago: Quadrangle Books, 1964.
- Thibaut, J. and Kelley, H. The social psychology of groups. New York: John Wiley and Sons, Inc., 1959.
- Toffler, A. Future shock. New York: Random House, 1970.
- Trickett, E. and Todd, D. Assessment of the high school culture: An ecological perspective. Theory Into Practice, 1972, Vol. 11, No. 7.
- Vielhauer, J. Development of a semantic scale for the description of the physical environment. Unpublished doctoral dissertation, Louisiana State University, 1965.
- Wagner, R. Faculty service load study, Fall 1972, University of Massachusetts, Amherst.
- _____, personal communication.
- Wapner, S., Kaplan, F. and Cohen, S. An organism-developmental perspective for understanding transactions of men in environments. Environment and Behavior, 1972, Vol. 4, 3.
- Webb, E., Campbell, D., Schwarz, R. and Sechrest, L. Unobtru-

- sive measures: Nonreactive research in the social sciences. Chicago: Rand McNally, 1966.
- Wells, B. The psycho-social influence of building environment: Sociometric findings in large and small office spaces. Building Science, 1965, 1.
- _____. Towards a definition of environmental studies. A psychologist's contribution. Architect's Journal, 1965.
- _____. Individual differences in environmental response. Arena, Architectural Association Journal, 1967, 82.
- White, W. The organization man. New York: Doubleday and Company, Inc., 1957.
- Willems, E. and Raush, H. Naturalistic viewpoints in psychological research. New York: Holt, Rinehart and Winston, 1969.
- Wohlwill, J. The emerging discipline of environmental psychology. American Psychologist, 1970, 25.
- Woodson, W. Human factors guide for equipment designers. University of California Press, Berkeley, 1957.
- Zajonc, R. The concepts of balance, congruity and dissonance. Public Opinion Quarterly, 1960, 24.

APPENDIX A

SPRING 1972 QUESTIONNAIRE BEFORE THE MOVE INTO TOBIN HALL

1. Your present work involves what kinds of activities? Which ones occupy most of your time?
2. How much time do you spend on campus in connection with your work? Where? How much time do you spend in your office/lab? Where else do you carry out your work and to what extent?
3. How much do you move around in your building? For what purposes? How much do you move around among buildings? For what purposes?
4. To what extent do you make use of the secretarial offices? Which one(s)? How?
5. The lounges? Which one(s)? How?
6. The rest rooms? Which one(s)?
7. Coffee machines? Where?
8. What other services are you using?
9. Where do you eat your lunch?
10. What things are important to you in your working environment?
11. What aspects bother you most in your present working environment?
12. What aspects please you most in your present working environment?
13. How much collaboration do you feel going on between department members? Across areas? Why? (Why not?)
14. Do you collaborate with other people concerning your primary work interest? How much? In which departmental area are those people? Where are they located?
15. (To faculty) What aspects did you consider when you chose your office furniture and thought about arranging your new office in Tobin Hall?

16. Were you involved in any way in planning our move? How? In planning Tobin Hall itself? How?
17. How do you feel about moving? About having to change? Are you looking forward to the move?
18. What have you already heard about Tobin Hall that strikes your fancy?
19. What do you expect to gain from our move? From Tobin Hall? What will you loose?
20. What do you think will change because of the move? (work efficiency/productivity/morale? relations? impact on the department as a whole?)
21. Can you think of anything in the framework of these questions that I forgot to ask or that you would like to add?

APPENDIX B

WINTER 1972/73 QUESTIONNAIRE AFTER THE MOVE
INTO TOBIN HALL

1. Observations/impressions/thoughts/et cetera regarding Tobin Hall:
2. Observations/etc./etc. regarding our move and/or the physical act of moving:

APPENDIX C

SPRING 1973 QUESTIONNAIRE FOR TOBIN HALL

1. Time spent at work:
hrs/week on campus:
hrs/week in the office:
hrs/week evenings in Tobin Hall:
hrs/week weekends in Tobin Hall:
2. Where do you move around in Tobin Hall?
Which floor(s)? Which side(s)?
How often (per day or week)?
For what purpose?
Via elevators or stairs (East or West)?
3. Do you use any lounges?
Which one(s)?
How often?
For what purpose?
Remarks:
4. What aspects of Tobin Hall do you like the most?
5. What aspects of Tobin Hall do you dislike the most?
6. Have you made any changes in Tobin since you moved in?
(physical modifications, rearrange office, change office
mates, location, block doors, et cetera):
7. What has changed in the Department since we moved into
Tobin Hall?
8. Were there any discrepancies (if yes, which ones?) between
your previous expectations of Tobin Hall and your present
observations or feelings?

Additional remarks:

APPENDIX D

ENVIRONMENTAL SATISFACTION SCALE

Please rate your attitude regarding the following variables on the following scale. Note that the scale is bi-polar, with 3 as the neutral point. 0 = very negative; 1 = negative; 2 = a little negative; 3 = neutral; 4 = a little positive; 5 = positive; and 6 = very positive.

- | | | |
|----------|------------------------|---|
| | 1. | overall attitude toward your work |
| | 2. | overall attitude toward your work environment |
| | 3. | physical layout of the department as a whole |
| building | 4. | <u>your building</u> , location on campus |
| | 5. | dimensions |
| | 6. | outside appearance |
| | 7. | inside layout |
| | 8. | possibility for movement inside |
| | 9. | contrast or variation inside |
| floor | 10. | <u>your floor</u> , location (level) |
| | 11. | layout |
| | 12. | appearance |
| | 13. | density of population |
| | 14. | traffic and noise |
| | 15. | possibility for movement |
| | 16. | possibility for change |
| 17. | contrast and variation | |
| con. | 18. | <u>entrances and exits</u> , location |
| | 19. | dimensions |
| | 20. | appearance |

connections	21.	<u>stairways</u> , location
	22.	dimensions
	23.	appearance
	24.	<u>elevators</u> , location
	25.	dimensions
	26.	appearance
	27.	<u>hallways</u> , dimensions
	28.	appearance
services	29.	<u>restrooms</u> , location
	30.	dimensions
	31.	appearance
	32.	<u>lounges</u> , location
	33.	dimensions
	34.	appearance
	35.	bulletin boards
office	36.	<u>your office</u> , location on floor, in building
	37.	dimensions
	38.	appearance
	39.	density of occupants
	40.	traffic and noise inside
	41.	window(s)
	42.	view
	43.	temperature regulation
	44.	ventilation
	45.	furniture
	46.	possibility for change

laboratory

47. your lab (or clinic space), location
48. distance from office
49. dimensions
50. appearance
51. density of occupants
52. traffic and noise
53. window(s)
54. temperature regulation
55. ventilation
56. furniture, equipment
57. possibility for change

APPENDIX E

ENVIRONMENTAL DESCRIPTORS

A. Please rate your present physical working environment on the following descriptors (i.e. to what extent do these adjectives describe your working environment?). Note that this is a one-dimensional scale (except for items 6 and 41). 0 = not at all; 1 = a little; 2 = somewhat; 3 = moderately; 4 = more than moderately; 5 = quite; 6 = very much.

- | | |
|--|---|
| 1. aggressive | 21. methodical |
| 2. adaptable | 22. noisy |
| 3. angular | 23. open |
| 4. calm | 24. orderly |
| 5. cheerful | 25. private |
| 6. cold-warm; physical temperature (cold = 0 . . . 6 = warm) | 26. progressive |
| 7. colorful | 27. quiet |
| 8. conventional | 28. rectangular |
| 9. conservative | 29. relaxing |
| 10. contrasting | 30. reliable |
| 11. curved | 31. reserved |
| 12. dark | 32. rounded |
| 13. economical | 33. secure |
| 14. efficient | 34. serious |
| 15. hard | 35. sociable |
| 16. hostile | 36. spacious |
| 17. independent | 37. square |
| 18. leisurely | 38. stable |
| 19. light | 39. triangular |
| 20. meaningful | 40. utilitarian |
| | 41. cold-warm; emotional atmosphere (cold = 0 . . . 6 = warm) |

B. Now do this again, please. Only this time, using the same descriptors in the same manner, rate your ideal working environment.

APPENDIX F

TABLE F. COMPARISON OF MEAN ENVIRONMENTAL SATISFACTION SCORES FOR THE PSYCHOLOGY DEPARTMENT BEFORE AND AFTER THE MOVE INTO TOBIN HALL ON A SEVEN-POINT BIPOLAR SCALE (0 = very negative, 3 = neutral, 6 = very positive), EMPLOYING A ONE-WAY ANALYSIS OF VARIANCE FOR EACH ITEM³⁰

Items	Before (N=89)	After (N=61)	F	Sign. Level
1. overall attitude toward work	4.85	4.80	.05	--
2. overall attitude toward the work environment	3.49	4.43	17.81	<.001
3. physical layout of the Department as a whole	1.92	3.72	80.83	<.001
<u>buildings:</u>				
4. location on campus	3.98	4.30	2.06	--
5. dimensions	2.92	3.82	16.92	<.001
6. outside appearance	2.34	4.08	51.21	<.001
7. inside layout	2.40	3.28	14.85	<.001
8. possibility for movement inside	2.94	3.57	8.32	<.005
9. contrast and variation inside	1.90	2.97	21.53	<.001
<u>floors:</u>				
10. location (level)	3.57	4.23	8.79	<.005
11. layout	2.84	3.38	6.27	<.05
12. appearance	1.96	3.72	87.91	<.001
13. density of population	2.85	4.11	28.84	<.001
14. traffic and noise	2.30	4.13	46.63	<.001
15. possibility for movement	3.13	3.85	12.42	<.001
16. possibility for change	2.53	3.00	4.08	<.05
17. contrast and variation	1.90	3.05	26.35	<.001

³⁰We did not employ a repeated measurements design, due to changes in N. Since significance is achieved easier with a repeated measurements design (= same subjects) the present analysis is a more conservative one.

TABLE F CONTINUED

Items	Before (N=89)	After (N=61)	F	Sign. Level
<u>entrances and exits:</u>				
18. location	3.39	3.23	.61	--
19. dimensions	3.24	3.75	8.70	<.005
20. appearance	2.55	3.59	31.67	<.001
<u>stairways:</u>				
21. location	3.28	3.54	2.05	--
22. dimensions	3.20	3.67	7.69	<.01
23. appearance	2.76	2.57	.72	--
<u>elevators:</u> ³¹				
24. location	2.97	2.66	2.03	--
25. dimensions	2.83	3.59	16.65	<.001
26. appearance	2.61	3.66	31.86	<.001
<u>hallways:</u>				
27. dimensions	2.99	3.49	5.69	<.05
28. appearance	1.87	3.13	38.79	<.001
<u>restrooms:</u>				
29. location	3.15	3.93	9.18	<.005
30. dimensions	3.04	3.54	4.27	<.05
31. appearance	2.11	4.03	86.34	<.001
<u>lounges:</u> ³¹				
32. location	3.15	2.80	1.71	--
33. dimensions	2.85	3.25	2.72	--
34. appearance	2.33	3.28	14.15	<.001
35. <u>bulletin boards:</u>	2.84	3.74	16.79	<.001
<u>offices:</u>				
36. location on floor, in building	3.80	4.25	2.88	--
37. dimensions	2.39	4.00	26.33	<.001
38. appearance	2.17	4.20	64.03	<.001
39. density of occupants	2.49	4.26	27.00	<.001
40. traffic and noise inside	2.64	4.18	24.64	<.001
41. window(s)	2.66	4.25	22.11	<.001
42. view	2.63	4.07	17.09	<.001
43. temperature regulation	1.74	1.11	5.86	<.05

³¹Before the move there were no elevators in Middlesex House and Berkshire House and there was no lounge in Middlesex House. Scale values of 3.00 ("neutral") were assigned to those cases.

TABLE F CONTINUED

Items	Before (N=89)	After (N=61)	F	Sign. Level
<u>offices: (continued)</u>				
44. ventilation	2.06	1.93	.16	--
45. furniture	2.01	3.72	33.38	.001
46. possibility for change	2.31	3.36	14.75	.001
<u>labs (or clinic space):</u>				
47. location	3.97	3.76	.36	--
48. distance from office	4.18	3.14	7.18	.01
49. dimensions	2.85	3.74	6.73	.05
50. appearance	2.43	3.93	20.80	.001
51. density of occupants	2.64	3.67	8.17	.005
52. traffic and noise	2.57	3.86	15.21	.001
53. window(s)	2.26	2.45	.31	--
54. temperature regulation	2.30	1.33	8.45	.005
55. ventilation	2.36	1.77	3.05	--
56. furniture, equipment	2.64	3.74	9.87	.005
57. possibility for change	2.23	3.33	14.23	.001
Overall Mean (except ques- tion #1):	2.7	3.7		

APPENDIX G

TABLE G. MEAN RATINGS OF ENVIRONMENTAL DESCRIPTORS FOR PRESENT AND IDEAL WORKING ENVIRONMENTS FOR THE PSYCHOLOGY DEPARTMENT BEFORE AND AFTER THE MOVE INTO TOBIN HALL, AND THE SIGNIFICANT DIFFERENCES IN PRESENT-IDEAL DISCREPANCIES,³² USING A ONE-WAY ANALYSIS OF VARIANCE

Unipolar Scale: 0 = not at all, 6 = very much

Descriptors	Before (N=80)		After (N=49)		Sign. Diff. Present- Ideal Discrepancies
	Present	Ideal	Present	Ideal	
1. aggressive	1.63	1.52	1.91	1.38	--
2. adaptable	2.59	5.07	2.72	5.08	--
3. angular	2.93	1.94	3.47	2.17	--
4. calm	1.87	3.99	2.85	4.09	<.01
5. cheerful	2.53	5.29	3.62	5.08	<.001
6. cold ³³	1.83	.41	--	--	
7. colorful	1.20	4.62	3.06	4.51	<.001
8. conventional	3.87	1.52	3.74	2.17	<.05
9. conservative	3.71	1.37	3.13	1.77	<.001
10. contrasting	1.26	3.73	2.19	3.75	<.05
11. curved	.57	2.74	.74	2.91	--
12. dark	2.31	.49	.75	.75	<.001
13. economical	2.92	2.92	2.98	2.74	<.05
14. efficient	2.52	4.58	3.30	4.09	<.005
15. hard	2.77	.92	3.38	1.09	--

³²All significant shifts in present-ideal discrepancies were in the direction of smaller discrepancies for Tobin Hall.

³³After the move into Tobin Hall, this item was: "cold-warm (temperature)".

TABLE G CONTINUED

Descriptors	Before (N=80)		After (N=49)		Sign. Diff. Present- Ideal Discrepancies
	Present	Ideal	Present	Ideal	
16. hostile	1.40	.23	1.64	.23	--
17. independent	2.99	4.20	3.32	3.81	--
18. leisurely	2.56	3.56	2.00	3.45	--
19. light	2.15	5.06	3.75	4.85	<.001
20. meaningful	2.85	5.16	3.11	4.98	--
21. methodical	2.56	2.74	3.17	2.43	--
22. noisy	3.81	.98	1.83	.98	<.001
23. open	2.94	4.17	2.74	3.57	--
24. orderly	2.30	3.77	3.25	3.57	<.05
25. private	1.64	3.92	2.68	3.85	<.005
26. progressive	1.99	4.64	2.60	4.53	<.005
27. quiet	1.38	3.95	2.83	4.04	<.001
28. rectangular	4.38	1.99	4.40	2.15	--
29. relaxing	1.94	4.02	2.34	3.87	<.05
30. reliable	3.10	4.50	3.30	4.49	--
31. reserved	2.26	1.69	2.55	2.19	--
32. rounded	.56	2.80	.77	2.92	--
33. secure	2.66	4.26	3.09	4.21	--
34. serious	3.45	3.60	3.70	3.62	<.005
35. sociable	3.42	4.40	3.04	4.23	--
36. spacious	1.24	5.06	2.96	4.89	<.005
37. square	3.38	1.80	4.17	2.25	--
38. stable	3.28	3.85	3.64	4.04	--
39. triangular	.77	1.31	.75	1.40	--
40. utilitarian	3.31	3.86	3.70	3.58	--
41. warm ³⁴	2.64	4.70	3.45	5.28	(not comparable)

³⁴After the move into Tobin Hall, this item was: "cold-warm (atmosphere)".

APPENDIX H

RATING SCALES FOR THE ASSESSMENT OF SOCIAL INTERACTIONS

1. Frequency of interaction

(0)	(1)	(2)	(3)	(4)
less than once a week	about once a week	2-3 times per week but not every day	about once a day	more than two times a day

2. Usual or most frequent subject matter of interaction

(0)	(1)	(2)	(3)	(4)
superfi- cial; small talk	business, e.g., ad- ministra- tive, secretarial	social- izing	profession- al work; the prob- lems you are working on	personal

3. Usual duration of interaction

(0)	(1)	(2)	(3)	(4)
less than one minute	1-5 minutes	5-10 minutes	about 15 minutes	more than 15 minutes

4. Similarity of professional work

(0)	(1)	(2)	(3)	(4)
unrelated	related work, dif- ferent 'area'	related work, same 'area'	work on same prob- lem(s), different 'area'	work on same prob- lem(s), same 'area'

5. Similarity of administrative/committee work

(0)	(1)	(2)	(3)	(4)
unrelated	related ad- ministra- tive con- cern, but no formal contact	share one committee	share 2 committees; or one of us is chair- ing our one committee	share many administra- tive res- ponsibili- ties; several committees

6. Private interests and contact

(0)	(1)	(2)	(3)	(4)
none	no contact outside of school, but share some interest	some contact outside of school	occasional visits	do things together privately

7. Proximity of the other to your working area (office, lab)

(0)	(1)	(2)	(3)	(4)
different building	different floor	6 doors or more but on same floor	within 5 doors	within same room or next door

