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WINDOWS, VIEWS, AND HEALTH STATUS IN HOSPITAL THERAPEUTIC ENVIRONMENTS

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The architecture of health care facilities has been the focus of a number of studies of environment-behavior transactions. The issue of windowlessness in hospitals has been the focus of a small subset of this research. It has been generally assumed that an absence of meaningful contact with the outside environment has a negative effect on building occupants. In hospitals, further, it has been held that patients likely respond more negatively than staff. In response, a study was conducted to compare staff and inpatient response to windows, views, and associated factors in hospitals. It was hypothesized that inpatients and staff experience the same environment in quite different ways, and that patients are more susceptible to lessened health status and general well-being, compared to staff persons with respect to the windows, view and associated factors in one's hospital. The research was conducted in the Physical Medicine Rehabilitation Units (PMR) of six hospitals in Chicago. Staff respondents numbered 137, and inpatient respondents numbered 100. Independent variables consisted of background characteristics and assessments of one's contact with windows via six person- window constructs. Dependent variables consisted of staff self-report appraisals of well being and occupational outlook through the use of 11 verbal response items, and patient dependent variables consisted of staff reports of a patient's well-being and health status through the use of nineteen verbal response items. These variables were subsequently transformed into a single

measure for staff, and a single measure for patients. Data were gathered through the use of drawings, photographs, behavioral observation, and a two- phase questionnaire. Regression analyses were performed on these data to explore environment-behavior patterns relative to well-being and health status. Patients, as predicted, were found to be more negatively impacted by poorly windowed rooms, compared to staff persons. Paralyzed, immobile, visually impaired patients, and non-white patients were susceptible, particularly with respect to being more than ten feet from the window(s) for relatively long periods each day, and those persons in rooms low in view information content, with screens obstructing part or all of the view. Staff persons who work more than 40 hours per week, those who work in occupational and physical therapy, or who commute to work were associated with lessened well-being relative to the person-window constructs. It was concluded that an appropriate perceptual involvement with windows and views contributes in helping the patient fuse a satisfactory perceptual and cognitive link with the external environment, and is perhaps a potential adjunct to the therapeutic treatment process. Compensatory measures are suggested for patients confronted with the deficiencies inherent in poorly windowed rooms. Design strategies, policy implications, limitations of the study, and priorities for further work are discussed.

INTRODUCTION

A window is a break in a wall, which symbolizes contact with life and the world beyond the hospital. Rooms with few or no windows often do not allow for direct contact with the outside and a sense of involvement with the flow of life (Collins, 1975; Lavy, 1978; Keep, 1980). In hospitals it is a type of sensory deprivation being recognized as a growing problem (Wilson, 1972; Taylor, 1979; Vaisrub, 1979). Thomas Markus (1967) described the compositional elements of good and poor views and their effects on office workers in a number of buildings. More recently Ulrich (1984) found that patient recovery rates were greater for those in rooms with a view of a natural setting. These patients had shorter post-operative stays, received fewer negative evaluative comments, and required less medication than 23 matched patients in similar rooms with windows facing a nearby brick wall. Verderber (1982; 1986) comparatively explored staff and patient responses in and across six hospital settings, identified an array of cognitive dimensions of person-window transactions, and a set of design recommendations for windows and related elements in health care settings. Below, a portion of that investigation is reported, which specifically addresses the effects of window and view attributes.

In this research, hospital-based rehabilitation therapy settings were selected for study. A setting was desired where access to users would be allowed and where the architectural features under investigation were thought to be of potential therapeutic benefit to the users. Programs in Physical Medicine and Rehabilitation (PMR) exist for victims of accidents and other traumatic experiences which have left them physically and perceptually disabled. The rehabilitation process begins near the end of the acute phase of hospitalization. The philosophy of PMR is to retrain the individual to re- enter the mainstream of society as fully as possible. It centers on restorative care: therapeutic treatment programs are developed on an individual basis with the needs of each patient in mind. Inpatients in PMR include paraplegics, quadriplegics, chronic arthritics, stroke victims, amputees, head trauma victims, and muscular dystrophy victims.

A functionalist-evolutionary theory of environmental psychology (Kaplan, 1972, Kaplan and Kaplan, 1982) guided the theoretical development and design of the study. This perspective postulates that humans are biologically predisposed to crave visual information about one's environmental surroundings. As such, this drive compels one to continuously seek the challenge of effectively processing incoming stimuli in order to make sense of -- and retain control of -- one's immediate surrounds and place in the environment.

This process involves pattern recognition, information processing, the prediction of what is to come, and effective decision-making. This perspective was extended to the architectural environment to determine through correlational analyses if the window and associated factors afford amenity as facilitators of information processing requirements in people, and if in this context windowlessness is tantamount to decreased well-being. Further, insufficiently windowed rooms may in fact be counter-therapeutic to the rehabilitation treatment process. Two hypotheses were tested: (a) inpatients, due to their weakened physical and perceptual state compared to staff, are more adversely affected by minimally windowed and windowless conditions, and (b) patients who lack freedom of choice to derive the benefits of person-window transactions experience lessened health status.

SETTINGS AND RESPONDENTS

Initially, 12 hospitals were visited in an attempt to obtain a representative cross-section of occupants and conditions, i.e., patient population, range of services, general philosophy, staff composition. In each hospital, rooms devoted to PMR services were classified in one of three environmental domains within the PMR unit: staff office domain, therapeutic treatment domain, and patient housing domain. Six hospitals were chosen for detailed study to best reflect a range of architectural, occupant, and health care characteristics. A cross-sectional design was adopted to allow for analysis on a hospital-by-hospital basis and also to allow for broader analyses across hospitals. Figures 1 and 2 contain axonometric drawings of portions of three of the six hospitals. The three domains are indicated. In hospital 5, for example, the physical therapy department was located in a windowless basement area, whereas in hospital 3 (Level 12) the physical therapy department was located in a generously windowed area. Photographs a-h in Figure 3 illustrate some of the actual conditions in the hospitals as experienced by building occupants on a day-to-day basis. The downtown lakefront location of one hospital and its views from the patient and therapeutic domains are shown in items a and b. Plants were frequently used to personalize spaces (c). Poor views, i.e., a concrete wall (d and f) and windowless basement areas were studied (e) where surrogates were used, as were windowless office and treatment areas (g and h).

Data were collected from 137 staff persons and 100 PMR inpatients. The six hospitals are in the Chicago metro area. Prior to this, a pretest was conducted in the Ann Arbor, Michigan, Veterans Administration Hospital. Male and female respondents were roughly equally represented. The majority of staff respondents worked in physical therapy, occupational therapy, or rehabilitation nursing. Generally, patients were reliant upon wheelchairs (58%), middle-aged to elderly (mean age, 62), quadriplegics or paraplegics (28%), stroke victims (25.8%), or post-acute orthopedic patients (14.6%). The average person had been "on" the unit as an inpatient for nearly two months (54.6) days. All were inpatients at the time of

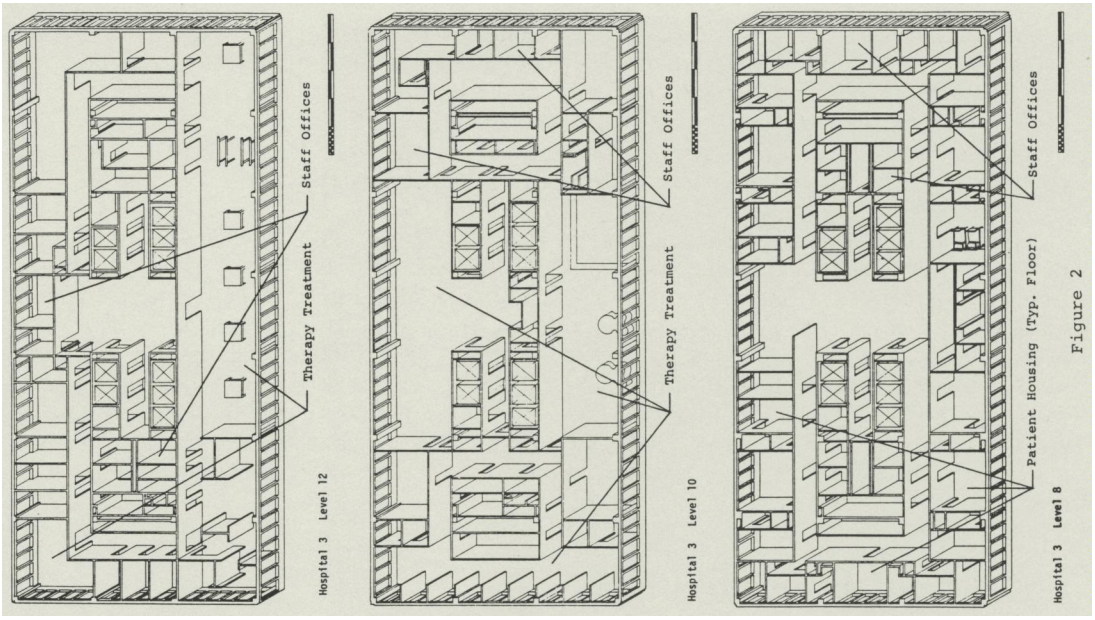

Figure 2

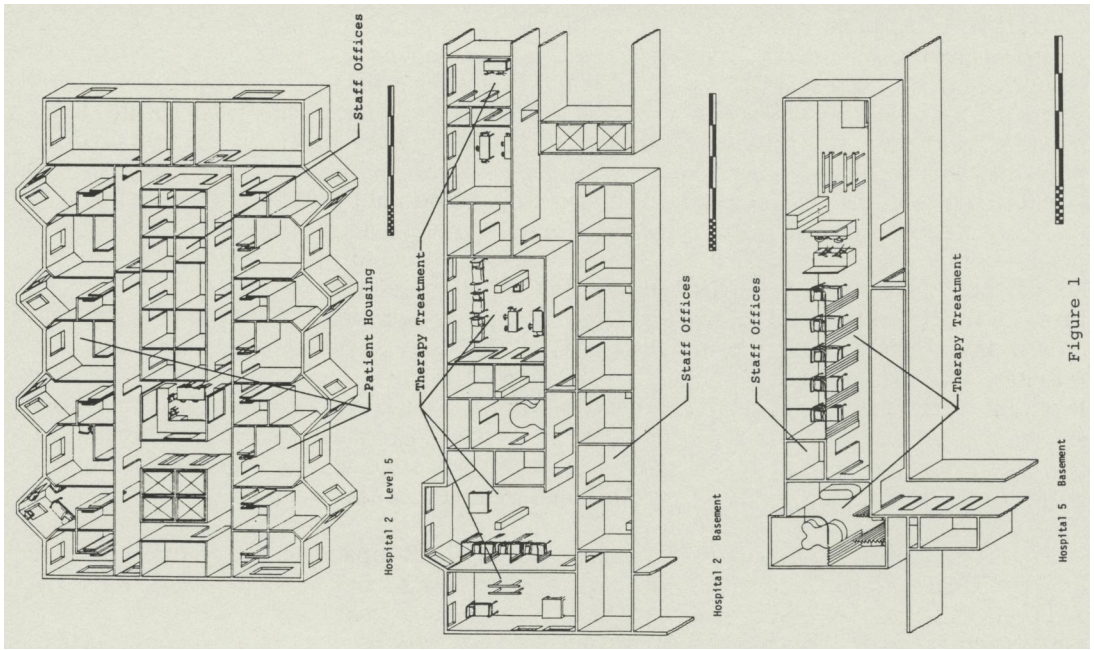

Figure 1

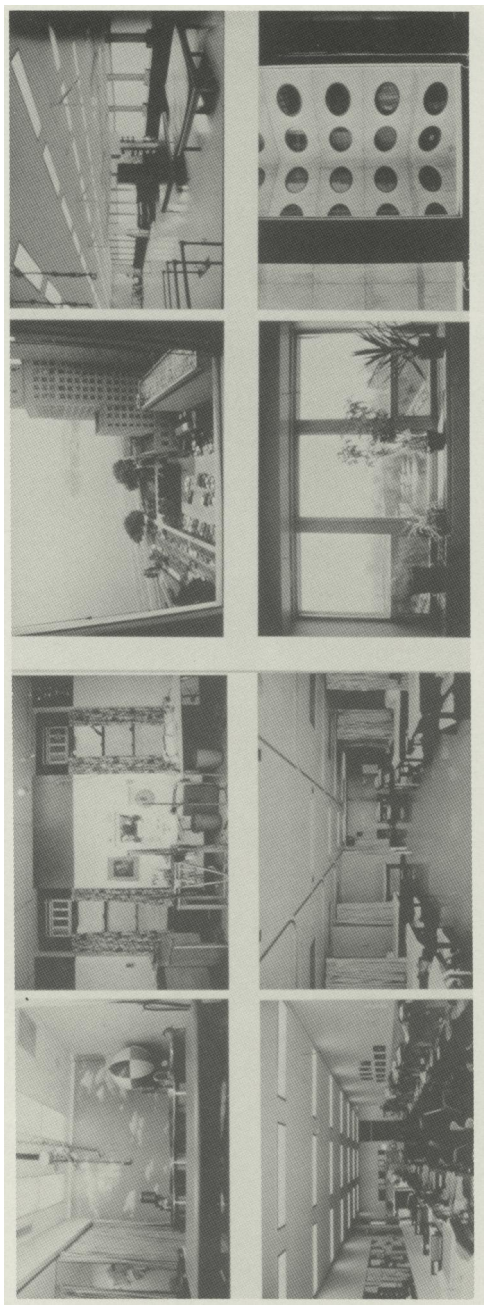

Figure 3.

the study. The point where each person was within his or her program differed, as did the severity of condition, prognosis for a full recovery, and general outlook on life. Most participants appeared eager to participate in the project.

INSTRUMENTATION

The bulk of data collected from respondents was by two means: a questionnaire, and through a comprehensive survey of the actual length of time occupants were in various rooms within their PMR unit. The questionnaire was completed by staff persons. Two types of information were obtained: staff self-report information on one's occupational outlook and overall level of job satisfaction, and information provided by staff on patient health status and well-being. The actual patterns of use within the PMR settings were ascertained through interviews with staff and through direct observation of patients and staff at regular intervals between the hours of 7:30 a.m. and 5:00 p.m. during a seven day period (Monday through Sunday). Hence, this task required six weeks. Throughout the data collecting process the identity of each respondent remained confidential; tasks were operationalized in an unobstrusive manner. The questionnaire-interview and patterns of use tasks occurred concurrently in each hospital.

Independent Variables

The design of the research reported in this paper is shown in Figure 4. Variables are grouped together and arranged from left to right, corresponding to the sequence of steps. Reading the headings across the top of Figure 4, from left to right, the first category consists of the six hospital settings. The total number of beds in each institution is shown relative to the number of PMR inpatient beds. To the right is a profile of the number of respondents in each hospital.

Three groupings of independent variables were defined. Staff and patient background data were elicited using a questionnaire, one for each subgroup. Self-report background data (items 1-11) were collected from each staff member (age, gender, length and nature of rehabilitation work experience, occupational factors, work schedules, place of residence within the metro area, and demographic factors). For each patient, the staff member(s) most knowledgeable about a given patient rated him or her on each of the following: specific type and nature of disability, eyesight, mobility, condition, length of hospitalization, age, gender, and place of residence (11 items).

For the staff questionnaire and the inpatient questionnaire, each item was responded to on a 5-point scale ("not at all," "a little," "somewhat," "quite a bit," "very much"), and additional questions yielded longhand verbal responses, including data drawn from patient medical histories, family, PMR colleagues, and physicians. This format was preferable over standardized attitudinal scales because it was able to be tailored directly to the task at hand, and because a mixture of ratings and longhand data were needed (Verderber, 1982; 1986).

The third grouping shown under the heading Independent Variables (Figure 4) contained the six person-window constructs which measured patterns of use-involvement with window and view attributes in one's PMR unit. These are (1.) Proximity to Aperture (2.) View Content, (3.) Screen use, (4.) Window to Wall Area Ratio, (5.) Still Height Above Floor, and (6.)

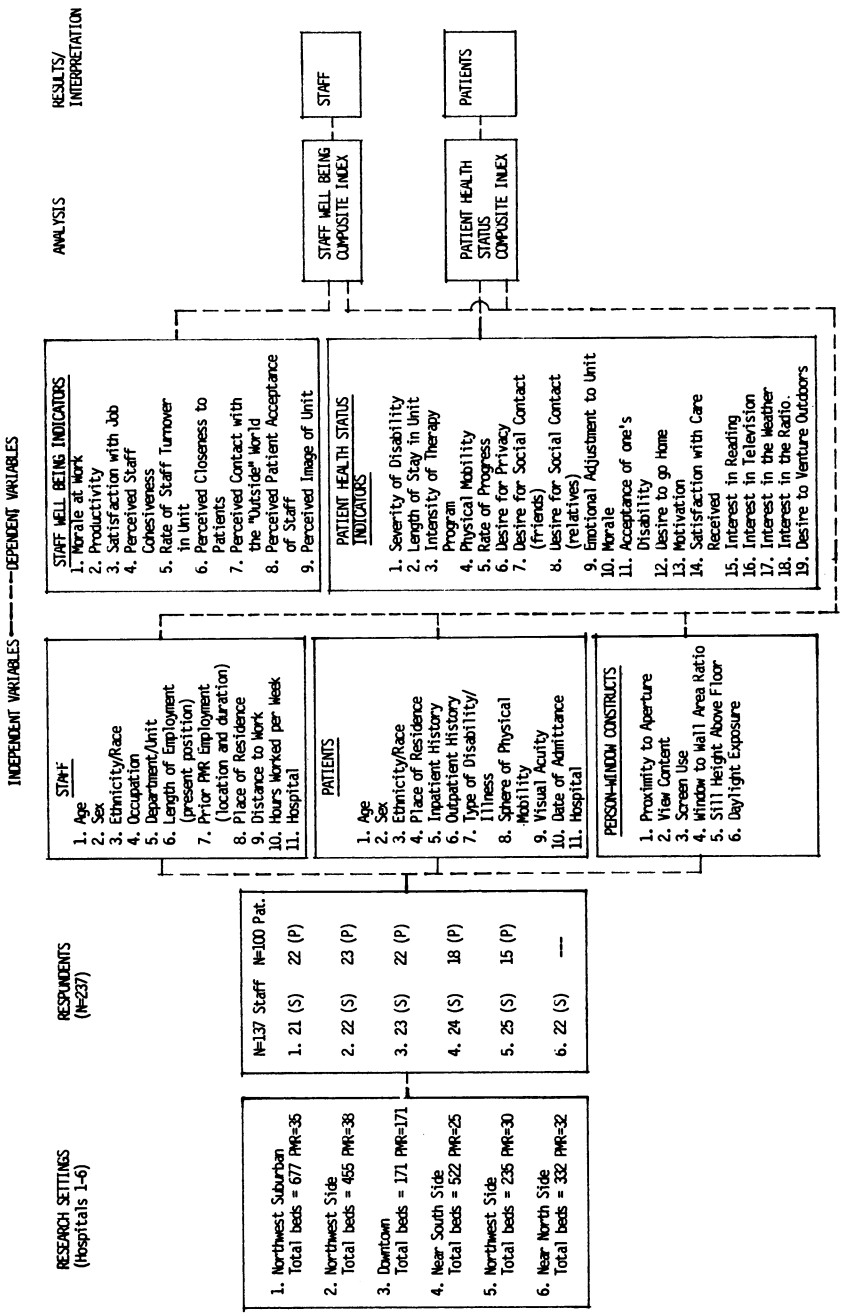

Figure 4. Research design.

Daylight Exposure. Of eleven architectural attributes of windows initially considered, these six were chosen due to their descriptiveness of how windows and views actually are experienced. Each respondent was scored on each construct based on a mean across the seven day observational period mentioned above.

Percentage of windowed area was measured from: a) 0% to 10%, b) 11% to 20%, and c) more than 20%. Windowsill height was of no more than 80 inches above the floor, b) 36 to 80 inches, and c) less than 36 inches above the floor. The composition of a view was subdivided into three layers: a) sky; b) inanimate urban; and c) the streetscape (rating of 1, 2, or 3 corresponded with the view from one's most frequent viewing angle). The amount of sunlight transmitted into each PMR space was rated low, medium, or high. Screen use was rated from never opened and closed to very frequently opened and closed. Physical proximity to windows: a) more than 15 feet; b) 5 to 15 feet; and c) less than 5 feet. Each construct was created at the ordinal level of measurement, measured in hours per day. Data were arrayed in magnitude, i.e., low to high in exposure (behavior) and low to high in terms of attribute (environment). (1)

For example, a stroke victim who spent a great deal of time in a generously daylit physical therapy treatment area was coded high in exposure (3) and in daylight (3). Correspondingly, a person spending a great deal of time in a windowless physical therapy room was coded 1 and 3 (high exposure). Each respondent thus had only a single rating on each construct, based on the array of rooms that person occupied.

Dependent Variables

In Figure 4, two groupings of dependent measures are shown, for staff well-being, and for patient health status. A five-point rating scale was provided next to each questionnaire item. For example, a patient evaluated by the physical therapist most knowledgeable about the patient's progress during hospitalization rated that patient from 1 to 5: (1.) "extremely below average," (2.) "below average," (3.) "average," (4.) "above average," and (5.) "extremely above average." Nineteen health status indicators were used to evaluate each patient in this manner. These addressed the nature and severity of one's disability, rate of progress and prognosis for recovery, psycho-emotional outlook, socialization behaviors, interest in the outside world, and interest in the outside world as exhibited through one's interest in media "connections."

Staff persons rated themselves in a similar fashion on each of nine well-being indicators. These addressed satisfaction with one's job, job performance, the perceived quality of care, the image of their PMR unit, and rate of staff turnover.

ANALYSIS

The next step, analysis, was guided by a series of multiple regressions (Kerlinger and Pedhazur, 1973) to explore respondent outcome as a function of the personal background characteristics and the six patterns of person-window transactions. In order to reduce the large number of dependent measures to fewer, or a single, group, the nine staff measures were reformatted into a single measurement of staff well-being, and for patients, the nineteen dependent measures were condensed to a single measurement of patient health status. This

was achieved by a weighted composite score method. Intercorrelation matrices, one for patients, one for staff were used to peruse these data. Positive loadings were subtracted from the composite. For example, if Variable 1 loaded positively within a well-being matrix, then an individual's score on Variable 1 was added toward a composite index. Conversely, the score was subtracted if the variable loaded negatively. This method yielded two composite indices (Figure 4). In all, 180 regressions were performed, sixty regressions (6x10x1) for staff and 120 (6x20x1) for patients. In each, the six constructs were consecutively considered with pertinent background data for each person, relative to outcome.

RESULTS

The results of the analyses are reported in Table 1. Columns 1 through 3 contain beta coefficients for three types of effects reported: person- window construct main effects in relation to outcome (Column 1), main effects of background characteristics in relation to outcome (Column 2), and the interactive effect of a particular person-window construct and a background characteristic as joint predictors of outcome (Column 3). Twenty-two significant relationships are reported. Certain individuals were negatively affected by a low, or moderate, degree of person-window involvement: (1.) patients requiring use of walking aids for mobility within the unit; (2.) patients with impaired vision; (3.) staff members who live more than two miles from the hospital; (4.) patients affected by a chronic disability or disease; (5.) therapists; (6.) patients with an upper extremity disability; (7.) female staff members; (8.) paralyzed patients; (9.) inner urban residents; and (10.) staff who work more than 40 hours per week. Those affected in a given way reflected a broad range of ratings and conditions. (2)

Patients

First, patients able to use gait assistance devices for mobility for substantial periods of time in rather close proximity to the windows were at advantage to patients confined to a bed or wheelchair further away from the windows (Pattern 1). The ability to stand and move about the room in order to "test" a variety of viewing stations may engender a greater degree of personal control. Second, and not surprisingly, patients with good to excellent vision in both eyes experienced greater well-being when close to windows (Pattern 2). However, an increase in closeness was found to be of benefit to even those with poorer vision. These persons are perhaps less successful at taking in and comprehending information due to the considerable barrier posed by glare, blurred images, waning colors, and the inability to discriminate among foreground-background subtleties within the view.

Third, patients with a chronic disability or illness and in a hospital with windowless spaces and windows with poor views experienced a decrease in health status compared to others (Pattern 4). In most cases, a chronic condition is more serious in nature and the physical and psychological consequences are indeed burdensome. These patients had been in the hospital longer than others, perhaps tuning in more to their isolation from the world beyond the hospital. Patients with a non-chronic disability or illness may have more hope for the future because their stay in the hospital may be of shorter duration, and, cognitively, they are able to reconcile this fact.

Patients with a chronic disability or illness, unable either by choice or by necessity to operate the window curtains or screens to look out the window experienced lower health status compared to others (Pattern 6). This may be partly explained as a learned helplessness behavior (Bell, et al., 1978). Patients may not wish to increase their dependency on the nurses to have them manipulate the screens which, in rooms oriented to the south, would require more careful monitoring to avoid glare and unwanted solar gain. As a result, one may just say it isn't worth the trouble, and leave the curtains closed for much of the day. At night, in particular, being seen by persons outside the hospital could cause loss of privacy, and it is understandable why the curtains would remain drawn. However, these results only represent daytime conditions and behaviors, and the perceived loss of privacy due to the patient's orientation to the window was not measured directly; one can only infer that closed curtains would perhaps denote this.

Lower patient health status was found to be a function of restricted upper extremity usage in relation to use of window screens and curtains (Pattern 7). Those with usage of both or one arm are at a distinct advantage -- possibly because one is able to manipulate the curtains and screens independently. For patients unable to use their arms, a remote bedside device or one affixed to a wheelchair could help in fostering greater independence. The finding that spinal cord injury patients in rooms with low to moderately windowed areas experienced lessened health status (Pattern 9) echoes Pattern 4 (above) and also Pattern 2 (above). Particularly, for paralyzed persons with a severely restricted sphere of mobility, the *size* of the window appears important. Poorly positioned windows or ones too small may make it too difficult for these persons to sustain a connection with the outside.

Finally, inner city patients were negatively impacted by rooms with window sills too high above the floor (more than 48"). This finding (Pattern 11) and the effect of one's race-ethnicity (Pattern 10) aren't very revealing in and of themselves, but make more sense when viewed in conjunction with the other patterns, and within the larger theoretical perspective of environmental cognition. A number of these patients, black or hispanic, lived in the densely built neighborhoods around two of the six hospitals. Large apartment buildings up to five floors in height and row-houses characterized these areas. It is possible that the quantity and quality of the windows and views at home have a bearing on one's cognitive "yardstick," and this enables one to evaluate major *and* subtle differences in what one encounters in the hospital. In a larger sense, all of the eight patterns associated with patients are based upon the issue of tradeoffs between quantity versus the quality of one's involvement with windows, views and related affordances.

Staff

Compared to patients, only four significant associations between background characteristics, person-window construct ratings, and outcome were identified. First, those staff persons who lived *more* than two miles from their place of employment, commuters on a daily basis, who worked in areas distant from windows to the outside, or in windowless rooms, experience less well-being compared to others (Pattern 3). This finding may be due to few PMR therapists and nursing staff members staying put in one place for very long during the workday and because they really don't have many opportunities to stop and take cognizance of such things as views through the window, unless a rainstorm, accident, or other "significant" event is unfolding outside. Patients, on the other hand, are much more anchored to

where they lie or sit because of their condition and remain in one place waiting to be moved to therapy or moved from bed to wheelchair. Patients in PMR seem to spend much time this way and things can get monotonous.

The role that a long commute has in interpreting this pattern perhaps more fully is to look at the effects of commuting on one's job performance and overall well-being. Commuting in cities such as Chicago can be stressful and a cause of fatigue. Maybe taking the time to look out the window and daydream for a short time offers respite from the rigors of having just survived a colossal traffic jam on the way to work.

The second pattern (Pattern 5) indicates that staff therapists working in PMR areas with no views or poor views experienced less well-being than others. This result echoes similar patterns identified in patients. Next, the frequent use of window screens and curtains by staff, most of whom are women, is positively related to well-being (Pattern 8). This may signify a pronounced effort to maintain choice and control -- a desire to shut out outside "distractions." And, finally, staff who worked less than forty hours per week in rooms with low or moderately positioned sills above the floor (6" to 48") experienced greater well-being than other staff (Pattern 12).

DISCUSSION AND CONCLUSIONS

The objective of the hospital rehabilitation process is to reintegrate the individual as fully as possible into the mainstream of society; therefore, windowlessness is counter-productive in philosophical and in functional terms. The patient's world must embrace the larger world beyond the walls of the hospital, offering respite -- however brief -- from the enormous burdens of one's condition. Both hypotheses were supported: (a.) inpatients, due to their weakened physical and perceptual state compared to staff, were more adversely affected by minimally windowed and windowless conditions, and (b.) patients who lack freedom of choice to derive the benefits of person-window transactions experienced lessened well-being and health status.

A theory of environmental psychology has been extended to embrace health status in the hospital environment. A basic human predilection -- curiosity and the struggle to make sense of our environment -- motivates patients to endeavor to effectively process the visual information afforded by windows. However, it would be quite naive to conclude that these factors "explain" why one person may be better off than the next. Windows are undoubtedly only one small part of the larger equation of factors that influence satisfaction and health status. These results show that only certain subsets of person-window transactions are useful predictors, and only for certain subsets of occupants. Many independent influences beyond the scope of the present research must also bear on well-being (Moller, 1968; Willems, 1976). Furthermore, of the total number of 180 correlational analyses performed on these data, only 22 identified significant associations among the variables. This may be seen as a limitation of the study, but it also shows that window views, etc., may not be as important as what one may assume when embarking on such a project. Nonetheless, the importance of view content and sill height, and, to a lesser degree, distance from the window pane are patterns consistent throughout the results for both staff and patients.

Two secondary limitations of the research warrant mention. First, the cross-section of people and settings makes it difficult to conclude if the patterns identified were subject to differences not measured in this research, i.e., did the policies of certain hospitals result in certain types of patients placed either in highly windowed rooms, or, for some reasons, systematically relegated to inadequately windowed spaces? Second, it may be advantageous to measure person-window transactions relative to more than one type of measure of well-being to cross-check for reliability, using self-evaluations in tandem with standardized attitudinal checklists.

Regardless, the findings raise entirely new questions. A "meaningful" degree of exposure to windows across a period of months may be borne out in longitudinal studies in hospitals. During the course of hospitalization, windows, at certain key points, may in fact be particularly key adjuncts to therapeutic treatment, and health status may actually deteriorate when too much sensory stimuli must be quickly comprehended. In addition, the person-window constructs await applications in other health care settings and building types.

The influence of physical proximity to the window aperture has policy implications for the way hospital personnel actively manipulate and optimize patient perceptual access to the external world. It is recommended that the staff should attempt to position patients close enough (within 15 feet) to windows with low sills affording full, interesting views, to orient beds to achieve this effect, and to manipulate window screening devices accordingly, if so desired by the patient. Patients need not be subjected to stark, monotonous rooms. How windows are experienced (quality) is more important than their architectural amenity alone (quantity). It may be that combined with other stressors, windows and view may push one over the edge psychologically. Stroke patients afflicted with vision impairments, paraplegics, quadriplegics, arthritics, amputees, brain-damaged patients, and others who suffer from disabilities may find it belittling and contradictory to ask others to move them nearer to windows or open curtains for them.

This research represents a first attempt to quantify the experience of windows in quasi-holistic, informational terms rather than merely in like/dislike or have/have not terms. Currently, patient rooms are required by law to be provided with a minimum of one window with a sill height of no higher than 36 inches. However, no such minimum requirements exist regarding the size or shape of windows, glazing type, or screens, for either the therapeutic treatment domain or the staff office domain. These findings indicate that windows should be an integral part of therapy treatment areas. Architectural design recommendations reported elsewhere address the three domains within PMR units (Verderber, 1982; 1986). Thirteen recommendations were distilled which clustered into three groups: (1.) Information/Content/Daylighting Factors; (2.) Aperture Characteristics; and (3.) View Surrogates.

The aftermath of spinal cord injury and other severely disabling occurrences is an intensive microcosm of the ontogeny of environment-behavior relations. The patient is thrust back to an earlier developmental point due to a severely reduced range of behaviors, and in rehabilitation, patients spend long periods challenging problems associated with performance and adaptation within the framework of goal-oriented treatment programs. Negotiation of the architectural environment is intertwined with these factors.

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ERRATA

This article appeared in the June, 1987 issue (volume 4, number 2) of JAPR. Due to an error in the production of JAPR, Table One, shown on the next page, from this article was inadvertently yet mistakenly omitted. We must express our sincerest apologies to the authors. We are publishing that table here, the next issue in our production schedule. We take every available precaution to ensure that these errors do not occur. -eds.

TABLE 1: INFLUENCE OF PERSON-WINDOW ATTRIBUTES AND HEALTH STATUS - COCCUPATION UPON OUTCOME

Patterns	N	Person-Window Construct [a,b]	Background Characteristics[a]	Interactive Effects[a]
1. Patients requiring use of walking aids/ Proximity to Aperture	81	-.20(L)*	-.10	.28**
2. Patients with impaired vision/Proximity to Aperture	54	-.24(L)*;-.20(M)	-.27**	-.22*
3. Staff who live 2 miles from hospital/Proximity to Aperture	86	-.04(M)	-.22*	-24**
4. Patients with a chronic disability/View Content	72	.21(L)	-.28**	.ll*
5. Full-time staff View Content	59	-.02(M)	.18*;-07[c]	-.19*
6. Patients with a chronic disability/Screen Use	76	-.34(L)	-.28**	.14
7. Patients with upper extremity disability/Screen Use	87	-.08(L);.27(M)*	.11;-.25*[d]	.22*;-.23[d]
8. Female staff personnel/Screen Use	66	.l8(L)*;-.22*	-.01	.20*;-.20*[e]
9. Paralyzed patients/Window to Wall Area Ratio	26	.12;-.16	.04	.38***;-.20*[f]
10. Non-White patients/Window to Wall Area Ratio	31	.06(L)	.12	.21*
11. Inner city residents (Patients)/Sill Height Above Floor	59	-.05(L);-.27(M)	-.19**	.25*
12. Staff who work 40 hours per week/Sill Height Above Floor	14	-.37(M)***	.01	-.36***

a) *p < .05; **p < .0l; ***p < .001
b)Respondent categories; L, M or H corresponds to each respondent's person- window degree of involvement rated as low, moderate, or high on that construct. Where two levels are indicated patients related low and patients rated moderate were impacted.
c) Physical Therapists, and PMR Support Staff less affected than other staff persons.
d) Persons unable to use left side only or right side only of body affected less than persons disabled on both sides of body.
e) Male staff affected less than part-time and full-time female staff persons.
f) Stroke patients and spinal cord injury patients affected more than others.

NOTES

(1) Dummy variables were created where necessary to prepare data for regression analysis. Effect coding was employed for all dummy variables for use with a trimmed regression model. This made it possible to study linear and non-linear effects.

(2) The following background characteristics, however, did not predict patient outcome relative to the six person window constructs: gender, prior tenure in other rehabilitation units, length of stay in unit, wheelchair reliance, walking aid reliance, presence of a lower extremity disability, head mobility problems, type of vision impairment, length of stay in the present hospital, age, and place of residence. However, on a more general level these factors perhaps figure in the larger sphere of factors that influence health status.

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