

# Effects of Environmental Changes on Elderly Residents' Behavior

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*Members of an interdisciplinary design group, funded to conduct ongoing research in state psychiatric facilities, developed a process by which a seven-year-old facility for geriatric patients could be better adapted to meet users' and program needs. The facility, considered good by many standards, had been planned on a "motel model" more suitable for transient occupancy than for providing opportunities for interaction, communication, stimulation, and challenging roles. Randomly selected residents and staff were involved in making decisions about design changes, which focused on rearranging and remodeling day-rooms to increase interaction. The controlled research design, involving baseline and follow-up evaluations, indicated that measurable, positive changes in residents' behavior occurred, especially among residents who took part in decision-making about the environmental changes.*

■ There is a basic conflict between much of the recent thinking in geriatric care and the physical facilities, even those designed in the last few years. Typically

these facilities fall short of providing challenging and interesting activities, environmental stressors, and real responsibilities and roles for the people who must live in them. The buildings tend, rather, to reinforce the attitude that the occupants are incapable of doing anything, and they in turn remain passive and immobile—increasingly dependent on help and "helpers."

The Geriatric Center for Living, a seven-year-old state psychiatric facility near Cleveland, is typical of newer construction in the field of geriatric care. The center is a 160-bed facility on the grounds of a psychiatric habilitation center and is one of several in Ohio serving elderly people diagnosed as mentally ill. Physically it is the result of architectural programming carried on in a typically bureaucratic manner by people who have not had to live or work in the building. The center is located in a semirural area, remote from community, residential, and shopping areas. It is far from most residents' homes and families, and there is no public transportation.

The building has four floors, with figure-eight, double-loaded corridors and central elevator access. The first floor, which connects to older, one-story residential units, is set aside for administrative offices and cen-

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tralized services (x-ray, meeting and conference rooms, crafts, barbershop, pool table, and the like). There is also an independent living unit attached to the first floor.

The second, third, and fourth floors are similar in layout and represent what was fairly advanced architectural thinking some years ago. Instead of dormitories there are two- and four-person bedrooms, with half-baths adjoining every bedroom. The building is air-conditioned. Some areas are carpeted. The walls are vinyl-covered and "color coordinated." Bright fluorescent lights abound. There is the same easy-to-clean plastic and formica furniture everywhere.

At first glance, these qualities seem to make the center "better" than older facilities. The building is in compliance with Medicare, Medicaid, Joint Commission on Accreditation of Hospitals, and other standards: for example, it meets minimum-square-footage requirements, has an automatic sprinkling system, is clean, and has open nursing stations. To many people, the building seems quite luxurious.

But gradually, in working in the building and experiencing it as it is experienced by residents and staff, we became deeply imbued with the feeling that people seem to be just visitors here. While the building has a different appearance from the facilities it was built to replace, there is little sense that it really belongs to anyone, or that anyone really belongs in the building. This perception led us to thinking of the building as a motel—an analogy that first came clear when a staff member from another facility, intending a compliment, said, "This place is as nice as a motel."

The analogy has stuck. We are convinced that the administrators and the architects of the building saw the residents as passive consumers of a standardized product—the same rationale on which a motel might be designed. And, as is true of a motel, the building is fixed and static; it does not bend, or let a resident leave any evidence of having lived there. This sort of "nice" may be appealing by conventional standards, but we think it is a dangerous model when applied to a home for older people.

Motels provide everything to make one's stay comfortable, but the stay is generally quite brief. And the motel patron has other places to go: keeping business appointments, touring the city, being with friends, or

whatever. For residents of a geriatric center, however, the institutional environment is the total environment, and a stay of several years is not at all uncommon.

If older people are to maintain a sense of competency and worth, they must have opportunities to do as much as possible for themselves. Although providing "everything" may seem kind and beneficial, it is not. Personal needs—for privacy and territory, for personalization, for opportunities for interaction, communication, and stimulation, and for the opportunity to assume meaningful roles—are hardly evidenced in the design or the physical form of this building, just as they are not evidenced in a motel.

## THE PROJECT DESIGN

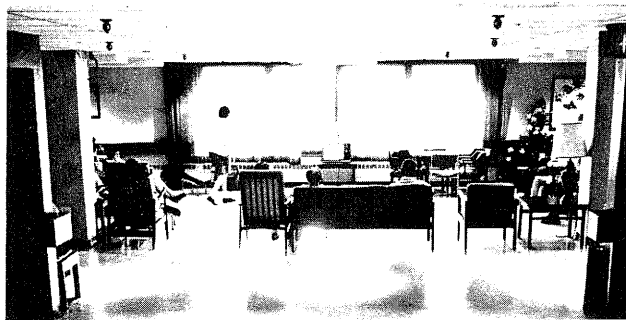
Architecture-Research-Construction became involved with the center in 1976. ARC is an interdisciplinary design group funded by the Ohio Department of Mental Health and Mental Retardation for ongoing research related to the department's physical facilities. The goal of our work with the center was to develop a process through which the building could be adapted incrementally to meet the needs of the users and the changing character of the programs.

This process, sometimes called environmental management (1), would be very different from the one that created the building in the first place. Residents and other users would be involved in an ongoing participatory process of making decisions to resolve conflicts between the strictures of the building and the needs of the users. As a demonstration of this process we planned to work with residents and staff of two floors in the redesign of their day spaces. The intent was that the staff and administration would then integrate the process as part of their ongoing operation.

To evaluate the effectiveness of the process, we set up a controlled research procedure. Because the residents of the third and fourth floors were similar in functioning levels and diagnoses and the programs for them were similar, it was suitable to use one floor as a control. From each floor we randomly selected half the residents and staff to take part in participatory workshops, conducted workshops on both floors, and then made physical changes on the third floor only. Later we made changes on the fourth floor also.

The research design involved a series of measures repeated over time. A baseline evaluation was made before any involvement with people on either floor; it gave us a clear picture of attitudes, functioning levels, behavior, and use of space. The measures were then repeated as follow-ups after the participatory workshops were completed, after the third-floor changes (nine months later), and after the fourth-floor changes (18 months later). Data analysis primarily involved multivariate covariance techniques for time series designs, using baseline data as covariates in an attempt to control for differences between randomized groups from intact populations (2).

The measures included time sampling and behavioral



*A dayroom before environmental changes were made illustrates the impersonal, motel-like quality of the facility.*

**The goal was to develop a process by which the building could be adapted to meet the needs of the users and the programs. Residents and other users would be involved in making decisions about the changes.**

mapping. Each resident and staff member on the third and fourth floors was individually time-sampled through the course of a day by observation of their behavior during randomly selected 30-minute periods. Data were gathered on the person's location, level of interaction, distance from others, type of activity, and body position. Another technique, behavioral mapping, used similar variables but involved observing the entire group of people instead of individuals. Behavioral mapping was particularly valuable for looking at the use of space and the types of activities the spaces support.

For the baseline and the final evaluation, each resident participated in a 45-minute interview with a researcher who was not aware of the rationale and philosophy of the project team. During the structured interview, residents responded to two questionnaires about attitudes on aging and feelings of dissatisfaction, loneliness, and agitation: the Philadelphia Geriatric Center Morale Scale (3) and the Attitudes Toward Old People Scale (4). Two cognitive measures from the Wechsler Adult Intelligence Scale were also administered.

## INITIAL BEHAVIORS AND ATTITUDES

What was found through the initial, baseline observations on the third and fourth floors was quite different from what was envisioned in the stated therapeutic goals of the center. On the whole, the elderly residents were found to be generally idle, listless, and remote from others. It was our hypothesis that staff efforts at initiating programs and activities had been often frustrated by the basic nonsupportive nature of the building.

The residents on these two floors had an average age of 69 years, were ambulatory, and for the most part were oriented to person, place, and time. Eighty-one per cent received antipsychotic medication of some sort. The "typical" patient was a woman who spent half of her waking time, or six hours of the day, in the dayroom. She engaged in some form of interaction only 25 per cent of the time; it did not necessarily involve talking with someone, as speech was apparent only 11 per cent of the time. Sharing a cigarette, borrowing a light, or receiving medication or other medical ministrations were the primary forms of interaction, and they were essentially nonverbal.

While some staff did manage to keep activities going on a regular basis, the observations indicated that many of the older people were spending a majority of the day sitting and watching others or staring blankly ahead. Seventeen per cent of them chose to spend most of the day in their bedrooms, not seeking or engaging in any activity.

Through the individual interviews, it was found that the elderly people were experiencing a pervasive sense of dissatisfaction and loneliness and had a low concept of their self-worth. Intellectually, the residents on the third and fourth floors were functioning from a half to a third below what would be expected for their age. However, the high degree of regular medication correlated as a significant factor in the poor performance on these test measures for the two floors.

When the observational and interview data were analyzed in terms of how the physical spaces were facilitating the goals of the center, it was immediately apparent that there were no particular settings or spaces on either floor that encouraged active involvement among people. The dayroom was a large open room (1320 square feet), with the television at "center stage" and chairs typically lined up against perimeter walls and in a U around the television; it neither encouraged nor facilitated meaningful interactions. Residents tended to enter and sit down without speaking or interacting with others.

On the very infrequent occasions when people were interacting or were actively involved, it was evident that the interaction was directly related to the physical distances between people; interactions occurred significantly more often when residents were within three feet of each other—the highest level of engagement was over the dining room table—and they frequently involved speech. Most often, however, the residents remained more isolated and remote, sitting more than three feet from others and staring blankly into space.

## RESIDENTS' INVOLVEMENT

The participatory process was begun informally; we simply spent time on the floors, observing as strangers what was happening, learning names of the residents and chatting with them individually or in small groups, and having them become familiar and comfortable with us. We also talked with the staff, learning their particular problems and frustrations and dreams.

As part of the research design, we held a more formal series of workshops with half of the residents and staff, in small groups of six or eight, over a one-month period. The workshops focused on understanding how the physical environment helped or hindered people's efforts to satisfy personal needs and, in a general sense, to meet program goals.

As these conflicts were identified, discussions began to center around developing "patterns" to resolve them. Patterns are not designs per se, but generic spatial arrangements that resolve common or recurring problems in the physical environment (5).

A simple example, one of many presented in the

workshops, is a pattern we call "storage you can see." The conflict in this case is between security and stimulation. Walking into almost any institution, one will see spaces barren of the stimulating artifacts of everyday life that are taken for granted in one's home environment. Anything that is stimulating is also usually valuable or somehow dangerous. In institutions anything valuable or dangerous is locked up, since otherwise it will be stolen or someone will be hurt. Therefore, institutions are typically sterile places with anything stimulating locked up and out of sight, in the name of security.

One pattern for resolving this conflict—storage you can see—describes a storage cabinet, glazed on two sides and with a built-in light so that anyone can easily see inside and be stimulated to use the contents. The cabinet has a snap lock for easy security. This approach to design recognizes that both security and stimulation are real forces and that neither should be denied for the sake of the other.

Input from the workshops as well as the baseline data provided information from which patterns evolved and design decisions were made. The groups discussed each pattern and the conflict that the pattern attempted to resolve. Several alternative schemes were prepared in sketches, models, and drawings. They were discussed with the groups and then modified and refined.

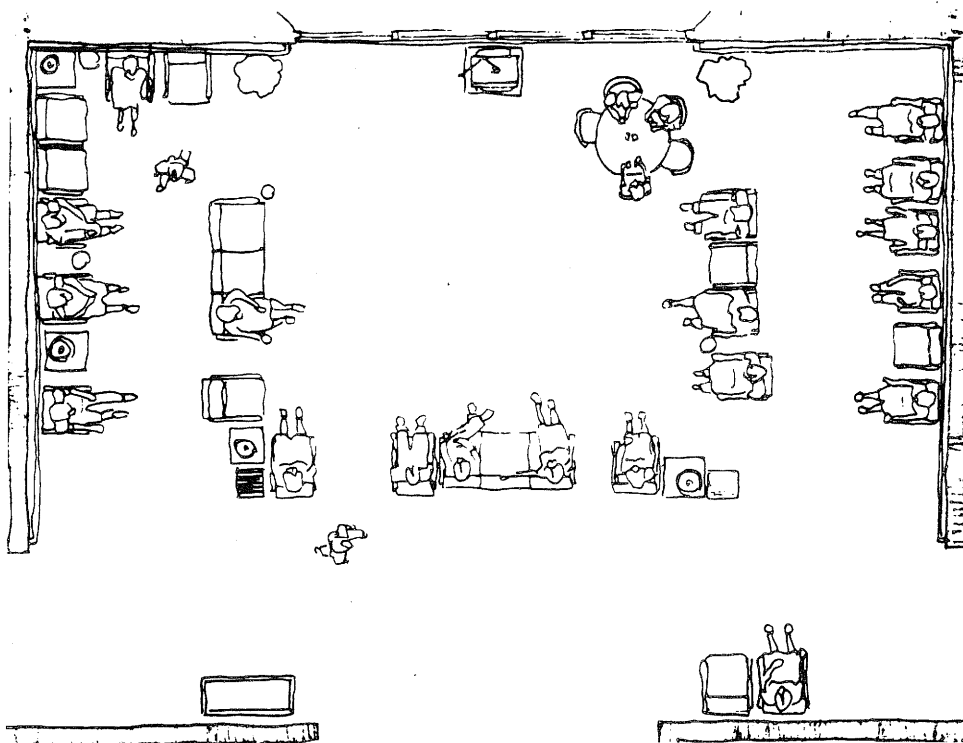
## CHANGING THE ENVIRONMENT

As noted, the arrangement of the third floor dayroom actually discouraged people from talking and inter-

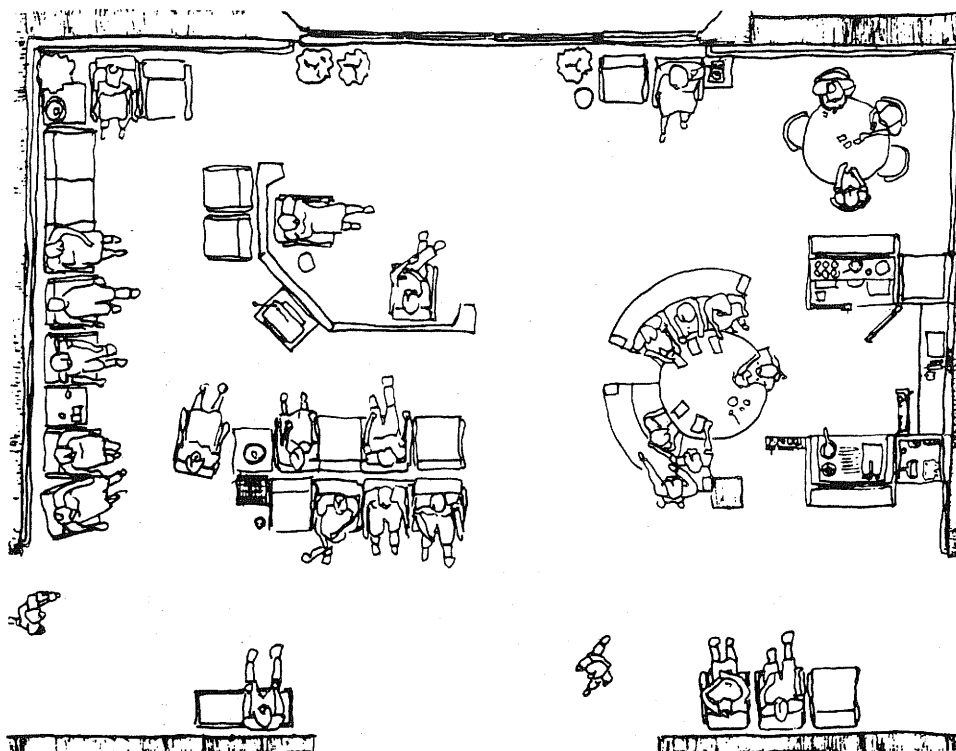
acting. The dayroom was organized as a single space (with no defined smaller territories) focused around the television to the discouragement of other activities, as the drawing below shows. The prime objective of the changes was to support several different kinds of activities that would reinforce each other and add a liveliness to the place. The physical changes were made primarily by rearranging existing furniture, constructing modular units, and adding a kitchenette.

Watching and observing activities is an important first step toward participating; with the existing arrangement, television was the only thing to watch. From the mapping, it was apparent that most of the positive interactions were taking place when people were physically closer to one another. The rearrangement aimed at making several more intimate areas for activity and for watching each activity (see the drawing opposite). The television set was moved to one side of the room and placed behind a freestanding carpeted partition, which helps direct the sound and makes it less disruptive to others. Those interested in a particular show can now sit close enough to see the screen clearly. The back of the partition defines one of several areas for conversation or people-watching.

On the opposite side of the dayroom, a small kitchenette-snack area was installed. Cooking activities take place within a three-sided unit that can be partly closed off; even when it is closed, the area is visible through wire-glass openings in the doors. Adjoining the cooking area is a built-in circular seating area and round table. It has uses besides eating; for instance, staff find it a convenient place to do paperwork while remaining in con-



*Before the changes were made, the dayroom was set up with the television in the dominant position and chairs lined up in a U around it and against the walls. The arrangement did not facilitate interaction among residents or encourage any activities besides television viewing.*



*The changes made in the dayroom establish several groupings for conversation and other activities. The television is placed behind a carpeted partition at left, which makes it less disruptive. A kitchenette was installed at right, along with a raised circular seating area that can be used for cooking classes, eating, doing paperwork, socializing, watching people, and other activities.*

tact with residents and it is yet another place residents may use for watching nearby activity. The circular area is raised so that the eye level of someone seated there is similar to that of someone standing nearby—another pattern—facilitating eye contact and conversation.

With the addition of the kitchenette, a cooking class began. Snacks and simple meals are prepared as a way of relearning basic domestic skills, the kinds of skills that are lost when one is confined in an institution where all meals come from a central cafeteria.

The remainder of the dayroom was arranged in small conversation groupings, one of which has a table for cards and games. These new settings make it possible for people to be within comfortable conversation distances of others.

### EFFECTS OF THE CHANGES

Residents who were involved throughout the entire process of the design, from planning through experiencing and living in the new settings, made significant gains in more functional, adaptive behaviors. (All differences reported here were significant at the .05 level or less.) None of the elderly residents made immediate or dramatic recoveries. But there were clear indications, at the nine-month follow-up immediately after the third-floor changes, that these people, who had been so idle, listless, and unresponsive, were increasing their level of participation by getting themselves out of bed and into a more interesting place—a place where there were other people, staff supports, and a more stimulating milieu. They were able to look at each other

more often and sit closer to one another than they had in a long time.

These increased levels of adaptive skills not only occurred in the person-oriented dayroom but were also generalized to other situations, such as the residents' looking at and electing to sit closer to interviewers than they had during the baseline period.

While certain documented gains were evident immediately following the environmental changes, the research team was concerned whether these changes were due only to novelty and might fade out over time. But at 18 months third-floor residents continued to tolerate and seek out closer proximity to others, although they were still not able to actively engage in conversations to any great extent. (Speech and cooperative interactions were occurring less than 10 per cent of the time on both floors.)

The residents also were electing to go to the new dayroom spaces rather than to remain isolated in their bedrooms. Not only were they choosing to be in a more stimulating social environment in closer contact with each other, but they were watching each other and the activities going on rather than continuing their initial tendency to stare idly ahead.

Staff on the third floor were also spending more time in the dayroom, and were engaging residents in more conversation. The staff were spending much less of their day alone in the nursing station and therefore were visible and available to the people in their care. The type and level of activities staff engaged in did not change, but the enabling nature of the new arrangements in the dayroom actively supported their roles.

The fourth-floor residents who participated in the workshops demonstrated some heightened interest in and awareness of their environment. Specifically, they were motivated to come out of their bedrooms and spend more time in the dayroom with other people. Since changes in the fourth-floor environment were purposely delayed, residents there were found, within three months, to return to their prior levels of solitary, isolated behaviors. At the 18-month follow-up, when new designs on the fourth floor had been installed and in use for six weeks, fewer measured differences were apparent between the two floors. Gains were not lost; the fourth-floor residents were reflecting some increased adaptive behavior levels as a result of their new surroundings.

## PARTICIPATION VERSUS CHANGE

Because of the arrangement of groups and the timing of changes, we were able to ask an interesting question: were the changes in residents' behavior a result of participation in decision-making or were they the result of the environmental changes? If the changes in behavior came from participation alone, then it could be argued that in future projects no real change is necessary, only "participation." (Why bother to actually make changes as long as people think they are making a decision?) But if the changes in behavior were the result only of the changed environment, then it could be argued that participation is not necessary; that centralized decision-making is perfectly adequate.

Actually, we found neither answer adequate by itself. Residents who participated in decision-making on both floors showed an improvement on the measures we have described, even before physical changes were made. When physical changes were made on the third floor, residents who had participated in the decision-making showed the most improvement; those who did

not participate in decision-making also changed, but not as much.

On the fourth floor, however, physical changes were delayed and the positive effects of participation dropped off—we could no longer distinguish those people who participated from those who did not. Later, after physical changes were made on the fourth floor, we saw more improvement in those who had participated in the workshops than those who had not. So the answer to the question is that neither participation alone nor environmental change alone is adequate; both are necessary.

These findings raise new questions about the typical processes for making decisions about the design of new facilities. The present procedures let bureaucrats in positions of considerable power control the physical environment of persons they will never know; they are usually excused by the self-serving assumptions that "we" have to take the responsibility for "them" because residents are incapable of making decisions for themselves. The motel model of providing facilities does not apply simply to this building, but is a whole set of attitudes and preconceptions frequently employed in bureaucratic planning and design.

The motel model restricts both staff and residents by depriving them of control over their own space and lives. The consumer, the institutionalized person, does not have the option of going to a competitor. Our work suggests that residents can benefit from having the responsibility of influencing decisions. ■

## REFERENCES

- 1) S. Boutourline, "The Concept of Environmental Management," in *Environmental Psychology: Man and His Physical Setting*, H. M. Proshansky, W. H. Ittelson, and L. G. Rivlin, editors, Holt, Rinehart & Winston, New York City, 1970, pp. 496-501.
- 2) D. T. Campbell and J. C. Stanley, *Experimental and Quasi-Experimental Designs for Research*, Rand McNally, Chicago, 1963.
- 3) B. Patnaik, M. P. Lawton, M. H. Kleban, et al., "Behavioral Adaptation to the Change in Institutional Residence," *Gerontologist*, Vol. 14, August 1974, pp. 305-307.
- 4) N. Kogan, "Attitudes Toward Old People: The Development of a Scale and an Examination of Correlates," *Journal of Abnormal and Social Psychology*, Vol. 62, January 1961, pp. 44-54.
- 5) C. Alexander, S. Iskihawa, M. Silverstein, et al., *A Pattern Language*, Oxford University Press, New York City, 1977.



The built-in circular seating and table, near the kitchenette, is raised so the eye level of people seated there is similar to that of those standing nearby, which facilitates eye contact and conversation.