THE SPATIAL DIMENSIONS OF CONTROL IN RESTRICTED SETTINGS

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SUMMARY

This thesis deals with the spatial dimensions of control in restrictive environments as exemplified by three Alzheimer's units and three juvenile detention centers. The thesis looks at the role of spatial layout in facilitating surveillance and imposing or eliminating behaviors according to institutional requirements, but also at the role of layout in sustaining the patterns of movement, awareness and encounter that are consistent with less rigorous control organizations and with the aims of institutional normalization.

"Space syntax" is both the theoretical basis for the thesis and the central methodology for clarifying, quantifying and interpreting the way in which spatial layouts affect the patterns of awareness and encounter that characterize buildings as social artifacts. The focus is on formulation, rather than evaluation, in order to identify the spatial properties of buildings that have implication, either directly or through their effect on patterns of space use, relevant to the aims of normalizing behaviors, while still maintaining control.

Spatial configuration is found to influence the probabilistic spatial patterning of movement, and through this, of interaction. In general, the effects of control can be identified in the deviation of movement and copresence from their underlying association with spatial integration. The findings suggest that the creation and management of movement, without compromising its continuous monitoring and potential suppression, can be accomplished by investing the integration core with space use, by having staff positions either on the core or with full surveillance of it, and by distributing activity spaces under the purview of staff but spread enough to sustain some contained level of movement, awareness and exposure between them.

CHAPTER I

ARE THERE SPATIAL DIMENSIONS TO WEAKER CONTROL REGIMES IN RESTRICTIVE SETTINGS?

1. Introduction

This thesis deals with the spatial dimensions of control in restrictive environments as exemplified by Alzheimer's units and juvenile detention centers. The aim is to look at the role of spatial layout in facilitating surveillance and imposing or eliminating behaviors according to institutional requirements, but also at the role of layout in sustaining the patterns of movement, awareness and encounter that are consistent with less rigorous control organizations and with the aims of institutional normalization.

While normalization of behaviors has been recognized by many as an emergent and increasingly important organizational aim and management technique (see below and Chapter II), the spatial theories of control tend to be more focused on restrictive and impositional concerns (see Chapter II). Thus, the thesis seeks to fill a limited, but perhaps critical, gap in the knowledge that informs the design of custodial environments.

This introductory chapter describes the scope of the thesis and the main arguments in it.

2. The Notion of Formulation

Frank Duffy has argued that research should test current prevailing assumptions in practice (Duffy, 1992). Testing and evaluating some of the assumptions upon which important design decisions are based can either confirm or redirect common ways of designing and common ways of interpreting design requirements. It is also natural to want to evaluate building performance after design, both to adjust one's assumptions and to improve design-decision making by providing new criteria, or adjusting criteria for selection of alternatives (Preiser, 1989). However, while testing prevailing assumptions in practice is a thoughtful and necessary goal, it is perhaps too restrictive in that sometimes one has no clear formulation of such assumptions, design aims, or evaluation criteria.

The present research takes a different approach. It will not test or evaluate prevailing assumptions or existing ideas, but will instead attempt to develop a way of looking at the control of behaviors, of space use, and of time frames in restrictive environments. The aim is two-fold and indeed similar to the goal for practical research espoused by Duffy: 1) to formulate criteria for seeing these environments and 2) to clarify strategic design alternatives. Formulation is about exploring aims that are not already well known, or even surmised, in advance of design. In order to enhance the sense of design possibilities, one must have a clear understanding of alternative principles of organization and their functional implications. This understanding is gained from asking questions about solution types and our intuitions about them (Peponis, 1993).

This thesis, therefore, takes a morphological approach to understanding building design, in the hope that an understanding of spatial configuration can assist in restructuring the principles through which one designs. To study buildings morphologically is to study buildings as relational patterns of space. The thesis is also more about asking questions than answering hypothetical ones. The emphasis on formulation still entails the use of a rigorous methodology. However, this thesis builds on a base of prior research which suggests that formulation as well as evaluation can be brought within the purview of analytical arguments (Peponis, 1993).

This research will systematically examine the control of behaviors, of space use and of time frames in two custodial, and thereby restrictive, environments. Restrictive environments include prisons, detention centers, and mental asylums, among others. They are institutional settings in that they directly control the relations between people as opposed to being settings for the reproduction of knowledge, such as museums, or for the production or exchange of goods, such as factories or shopping centers (Markus, 1993). The control of behavior, space use, and time schedules is more overt and rigorous in prisons and mental asylums. In other institutions, however, such as youth detention centers and Alzheimer's units, control must be balanced against the requirements of a more normal life for different reasons -- the age and supposed fragility of these populations. In these cases, therefore, control is more complicated because it cannot, and should not, be as overt, or as overriding an issue as it can be for more hardened populations such as in prisons, or more demented and often violent populations as in mental asylums.

3. The Concept of Behavioral Normalization

With the more marginal settings such as detention centers for youth and special care units for those with senile dementia, one of the issues increasingly discussed in recent years is that of "normalization". Normalization is a rather vague, and variously defined, term that has moral/ethical and behavioral connotations; it implies typical, ideal, positively valued, or socially acceptable (Zimring, 1978). This thesis does not deal with the ethical principles or justification of normalization, but rather with some of the behavioral aspects of this concept.

One element of behavioral normalization concerns the physical environment as an approach to the management of people with physical or social disabilities. While the role of architectural environment in therapeutic interventions for people with various pathologies has been limited largely to hygienic or aesthetic concerns, research in the last few decades has shown that the physical setting can exert influence on both the behavior and the quality of life of individuals and groups (Cohen and Weisman, 1991). However, it is acknowledged that the emergence of hard data to support planning and design has been slow.

The concept of behavioral normalization is based largely on the premise that people will take cues from their physical surroundings. One corollary of this hypothesis is that as individual ability decreases (for whatever reason), the environment assumes increasing importance in determining well-being (Lawton, 1977). A normalized environment is therefore a "prosthetic", or physically and socially supportive, one. Prosthetic environments are seen by many as one means of enhancing positive incremental behavioral changes (Calkins, 1988; Cohen and Weisman, 1991; Lawton, 1981); for example, it is assumed that an hour of people watching gained from sensitive placement of seating to provide a stimulating view can more positively affect the outlook and behavior of a person than an hour of sensory deprivation from sitting in one's room (Calkins, 1988). However, it is fully recognized that the environment, in isolation, can neither cure the pathology nor induce normal behaviors; it can merely act as a prosthesis to enhance the small increments of improvement in behavior that may be helpful in increasing independence, decreasing negative behaviors, or provoking a positive outlook.

It is therefore assumed that the physical environment can play a role in shaping and facilitating more normalized behaviors. Over fifteen years ago, Knight, Weitzer, and Zimring (1978), asserted that "the concept of 'opportunity for control' is a powerful tool for elaborating our understanding of what it means to normalize environments" (p. 10). Their concept of control centered on "homelike" settings which offered opportunities for resident control over arousal/stimulation, information, and privacy. The concept that some control over the physical environment helps mediate the experience of institutional environments (cf., Broadbent, 1971; Knight, Weitzer, and Zimring, 1978; Rivlin and Wolfe, 1979; Zimring, 1978), has been elaborately expanded upon by researchers focusing on Alzheimer's units (Calkins, 1988; Cohen and Weisman, 1991; Coons, 1990; Linn, Kliment, and Pearson, 1993) and correctional centers (Brown and Macmillan, 1979; Farbstein, 1989; Friedenauer, 1992; Sommer, 1974). However, it should be cautioned that while the overal hypothesis that normalized environments help produce normal behaviors is reasonable, it is one which is still open to question. An overriding problem lies in the clarification and measurement of terms such as "normalization" or "homelike" , the validity of assumptions which remain largely untested, and in balancing normalized environments with the control that is necessary in even marginal environments.

While a more thorough discussion of the literature on the physical environment as one focus of normalization can be seen in Chapter II, for Alzheimer's patients, several behavioral outcomes are seen as environmentally related: 1) the maintenance and enhancement of normal social roles (Cohen and Weisman, 1991; Calkins, 1988; Coons, 1990); 2) the creation of opportunities for autonomy and control (Cohen and Weisman, 1991; Calkins, 1987); and, 3) the provision of sensory and social stimulation and awareness (Cohen and Weisman, 1990; Lawton, 1981; Mace, 1987; Mace and Rabins, 1981). It is noted, however, that these aspects must be balanced with the ability for unobtrusive observation by staff (Cohen and Weisman, 1991; Coons, 1990) and the discouragement of overt forms of staff control through spatial configuration (Liebowitz, Lawton, and Waldman, 1979). Wanting to provide as normal an environment as possible, Alzheimer's units must contain it and control its use in such a way as to prevent elopements or accidents.

In juvenile detention and correctional settings, although the aim is more the containment of behaviors according to institutional norms, and less the active engagement in reform by organizational agents, normalized environments are also an implicit, if not always fulfilled, goal. For detainees, lesser possibilities for "acting out", more occasions for interactions with positive role models and others, and more opportunities for responsibility and autonomy are regarded as aspects of normalized environments .

The overloading of the juvenile justice system in the 1990's due to increasing numbers of juvenile detainees, has put more emphasis on detention than on treatment and rehabilitation (NACJP, 1990). However, the Juvenile Justice Standards Institute (1991) still promulgates the creation of environments which can flex between "supportive" and "deterrent". The Standards embrace as goals for security settings: 1) to increase interactions and personal contacts among residents and between residents and staff; 2) to control anti-social behavior by integrating it into the programs and routine, rather than through isolation of residents; 3) to reduce sensory deprivation through variety in terms of space, finishes, and so forth; and, 4) to promote normal growth and development through socialization with peers of both sexes (p. 40). The premise is that more normalized environments promote healthier and more relaxed interactions between groups, project an expectation of normal rather than deviant behavior, and foster a more successful transition to the outside world upon exit.

While recognizing the need for security, especially in short-term detention centers, researchers espouse the same trappings of normalized environments as do those studying Alzheimer's units: using accent colors and flexible furnishings to provide a more "homelike" environment (Siegel, 1989), varying spaces and programming to create a more relaxed atmosphere (McMillen, 1988), and "using design and spatial factors as therapeutic tools" (Ricci, 1971). At the same time, however, the provision of unobtrusive security is essential (Sullivan, 1988).

For both populations, Alzheimer's patients and juvenile detainees, the more life inside the institution resembles that outside the institution, the easier it is on both staff and residents. However, the allowances attendant with behavioral normalization must always be balanced with the need for constraints.

4. The Issue of Custodial Control

Custodial control has mostly been discussed in terms of imposition and elimination of accident or incident. Physical and pharmacological restraints were routinely used until recently to control the movement of the elderly impaired (Green, 1987) and physical restraints are part of the lore of prison ecology (Sykes, 1958). The nineteenth century legacy of restrictive setting design with its emphasis on surveillance, separation, and isolation has, until recently, gone unchallenged as a physical model. According to this model, space and the institution of rules and regulations were used to limit or to prevent behaviors. Such architectural determinism, or the assumption that through planning and design one can produce certain behaviors of people, is simplistic. Despite aims to limit behaviors, the literature is full of examples of the gap between intentions and outcome (Sykes, 1958).

A more realistic assessment in light of the above normalization goals, suggests that in most spatial situations, other than the most extreme, space, and organizational rules and regulations, are associated with a greater range of organizational activity patterns, some of which are subject to probabilistic effects, rather than deterministic repetitions. Deterministic function depends on whether the specific requirements of organized activities are satisfied by a given schedule of accomodation. Probabilistic function concerns the generation of movement, awareness, encounter and communication as a by-product of configuration over and above the requirements of particular organized activities. In so far as encounter and communication arise as a by-product of movement, one can argue that through the modulation of movement, spatial configuration generates social functions beyond those that are explicitly programmed.

Movement and awareness are aspects of space use which are subject to the imposition of rules as well as the constraints of space. While organizations use their space as their norms dictate and as the building shell constrains them, at the same time, space impacts, supports, or sometimes generates a multitude of "normal" daily behaviors that while allowed or absorbed by the organization, are not necessarily prescribed by it (Hillier, Hanson, and Peponis, 1984; Peponis, 1985). Buildings thus deliver functions for which they were designed, but deliver as well additional functions which may not have been intended, but arise by virtue of their spatial arrangement. Indeed, as the summary above suggests, the maintenance of normal social roles, variation in programming and routine, and the allowance of opportunities for autonomy and control, are organizational elements that must be accommodated in restrictive settings. However, because they require patterns of movement, encounter and relaxation of programmatic prescriptions, they are subject to the probabilistic aspects of space. Therefore, a more general theory of control would have to account for the probabilistic, as well as for the restrictive/impositional aspects of space use, as these are impacted by the organization of layout itself.

This thesis contrasts two different building types. Juvenile facilities require, to some degree, a restrictive/impositional organization. However, probabilistic side effects are found, and indeed, as the above indicates, often promoted in the goal of normalization. These are either assimilated or tolerated, thereby turning the organization towards a more normal "negotiated" environment, or they lead to harsher behavioral discipline aimed at counteracting the probabilistic aspects of space. Alzheimer's units start on the opposite end of the scale. They want to provide a normal environment but must contain it in such a way as to prevent elopement or accident. However, by over-controlling or "over-containing", they can fail to engender aspects of a normalized life.

By comparing these building types and their problems, the thesis seeks to develop a spatial model of control which encompasses both probabilistic and impositional dimensions. By systematically studying more marginal cases, one can perhaps understand more about control as a general organizational consideration than with the study of settings where control is the only, or the overriding, aim.

5. Awareness and Movement as Requisites of Normalized Environments

The premise of the thesis is that space modulates the ranges of awareness and free movement which are critical, both as the background to the function of control regimes and to provide a context of socialization which is conducive to a more normalized experience. It is cautioned, again, that this thesis is not about how to achieve normalization within the constraints of these environments. It is rather about how to achieve certain things that go with normalization; i.e., awareness, encounter and density under restricted conditions. Indeed, it will be argued that a spatial field of movement and encounter which balances unplanned opportunities with restrictions can reduce behavioral tensions and ease the social experience of those confined. Thus, spatially sustained forms of passive or active socialization can alleviate some of the pressures arising from life in a custodial environment, or at the least help to prevent the addition of pressure.

Generally, social awareness is intrinsic to a condition of normality. In restrictive environments, in particular, where personal control over the environment is often curtailed for either safety or security reasons, opportunity for society with others is a critical factor mediating experience of the environment. Society in restrictive environments involves either actual encounter with, or simply awareness of, others who carry information through either verbal exchange or through their membership within or outside the organization. As freedom to move is curtailed for residents, either because of infirmity or security, so information depends on encounter and awareness as determined by the spatial layout. Thus, spatial configuration becomes critical to the creation of an awareness field that make it possible for people to infer some "global experience out of local observations" (Hillier and Hanson, 1984; 144). Some layouts provide such a context through their interior structure which maximizes who and what will be seen, while others are more restrictive of the links that can be made with others, either through the ways in which they restrict visibility, or through the ways in which they restrict passage. Spatial organizations which expand awareness help make the relaxation of rules easier and in turn, are more conducive to more relaxed, and thus more normalized, control regimes. The purpose of this thesis is to understand how this works in restrictive environments; by doing so, a more general theory of control from a spatial point of view may be established.

This thesis demonstrates that certain spatial variables impact awareness and movement over and above organizational regimes and routines. It devises a new methodology for looking at both a space, "foreground", and the awareness field from that space, "background", in the hopes of broadening the description of what a space is. It further offers both a qualitative description of spatial systems and its use in Alzheimer's units and detention centers, and a way of quantifying those largely intuitive descriptions so that they can be measured. In this thesis, it is argued that certain features of spatial design can help to create a "normalized" range of awareness and movement even within the confines of a restrictive institution: 1) movement is to be encouraged but contained within an integrated core under the purview and jurisdiction of staff ; 2) activity focal points must be located on or near the integration core of a building, the integration core comprising those spaces which best tie the building together; 3) movement can be structured through the creation of bipolarity -- the provision of activity focal points in more than one location; and, 4) integration axes, the uninterrupted lines of movement forming part of the integration core, must go through activity spaces, or activity spaces must open directly onto, integration cores running past them.

Space plays an important role in sustaining and modulating socialization. Understanding how this works provides a basis for better design, especially in response to recent calls that restricted environments should, whenever possible, allow for a degree of normalized life for their residents. Accordingly, one can design programmatically restrictive environments bearing in mind the spatial properties that affect awareness and encounter, and one can better evaluate existing designs according to these properties.

6. An Outline of the Thesis

The broad theoretical themes discussed above are dealt with more fully in the following chapters. The rest of the thesis is organized as follows:

Chapter II offers a review of the literature relevant to discussion of four issues pertinent to this thesis: 1) the spatial means of behavioral imposition and elimination espoused and constructed in the nineteenth century; 2) the behavioral normalization model and its spatial correlates; 3) an examination of theories that have been developed and used to cope with more modulated forms of control; and, 4) the question of whether there is a theoretical framework that accommodates a continuum of control from imposition and elimination to the enabling of behaviors within certain constraints.

Chapter III outlines the research design and the methods used to gather data. It covers the selection of the sample for case study, the site visits, and the building and behavioral data collection methods. The research design provides for an analytical, quantitative study of spatial and behavioral variables in the two types of settings, buttressed by an observational and qualitative study of the organization and its climate.

The balance of the thesis is divided into two parts: Part I deals with the Alzheimer's units, and Part II deals with the juvenile detention centers. The four chapters in each Part are otherwise identical in terms of formatting and the presentation of information.

Chapter IV offers a general description of the three Alzheimer's units selected for study, in terms of their philosophy, their staffing patterns, their patient make-up and their social and physical ambiance. The administrative mission and description of operational data is meant to provide a "snapshot" of each center both as background and for comparative reasons.

Chapter V presents a detailed morphological description of each facility in terms of their resident use areas, circulation patterns, and visual surveillance opportunities. The application of syntactic techniques to building analysis allows for the specific identification of configurational variations both within and between plans. The key spatial dimension on which the three facilities vary are summarized and discussed.

Chapter VI offers a general, as opposed to an analytical, description of space use in each of the three Alzheimer's facilities. This chapter is largely based on the extensive observations made during the site visits, and on the evidence of staff and resident interviews. The issue addressed is how organizations that work toward certain aims acquire a definite spatial pattern through the way in which they occupy and use space.

The final chapter of Part I, Chapter VII, presents the quantitative, analytical description of space and space use. The data reported and analyzed is derived from the behavior mappings and trackings conducted during the site visits to each facility. Several themes are raised and analyzed: 1) the spread of movement and interaction, 2) the equality or inequality of staff and residents as a dimension of control, 3) the issue of "foreground" and "background" as critical measures of awareness potential and as dimensions of control, and 4) the practice of control as indicated by staff movement and interactions.

Chapters VIII, IX, X, and XI in Part II offer the same information on the juvenile detention centers. Again, there is a chapter dealing with the mission and operational aspects of each center, a chapter offering a morphological description of each center, a chapter giving a general description of space use in each facility, and a final analytical chapter.

Chapter XII offers a synthesis of the findings and a discussion of the features of spatial design that can help to create a normalized range of awareness and movement even within the confines of a restrictive institution.

CHAPTER II

THE PROBLEM OF CONTROL IN STUDIES OF SPACE ORGANIZATION AND SPACE USE IN RESTRICTIVE INSTITUTIONS

1. Introduction

The custodial institutions of today are largely derivatives of a family of forms that emerged in the eighteenth and nineteenth century as a concretization of fundamental theoretical ideas about moral order and its relationship to the physical environment. While the ideas regarding treatment and rehabilitation have changed, many organizations are still dealing with spatial forms articulated for an earlier model. In custodial settings, space has traditionally been used to eliminate or impose certain behaviors; for example, to eliminate contact between individuals, or to control the spread of disease through the separation of disorders. Today, control is more modulated in the interests of humane treatment. Thus, the extent to which eliminations or impositions and allowances for normalized behavior occur fall on a scale somewhere between two basic types of control -- "total" or "modulated" -- within, of course, varying ranges and degrees.

This chapter focuses on four issues incorporating these themes: 1) the spatial means of behavioral imposition and elimination espoused and constructed in the nineteenth century; 2) the behavioral normalization model and its spatial correlates; 3) an examination of theories that have been developed and used to cope with more modulated forms of control; and, 4) the question of whether there is a theoretical framework that accommodates a continuum of control from imposition and elimination to the enabling of behaviors within certain constraints -- in other words, a framework for examining control which can span the two models mentioned above.

2. The Nineteenth Century Legacy of Spatial Means of Behavioral Imposition and Elimination

The eighteenth and nineteenth centuries were marked by the first attempts to invent an "architecture of inescapable relationships", whereby total control is imposed through a number of architectural devices (Evans,1982; 92). Of importance to this thesis are the themes which emerge from the literature on these institutions, especially the work that focuses on hospitals, asylums, and prisons -- what Foucault (1979) labels the "carceral network" because in their physical design they all employ some disciplinary techniques. These institutional settings reveal a family of forms which articulate profound modifications in the spatialization of knowledge and the spatialization of power. The hospital and asylum were the prerequisite for achieving a particular form of professional knowledge; the prison was about the delivery of power. It is important to start at this beginning because many of the architectural devices designed during this time are still with us. It is no coincidence that those who analyze the ideas behind custodial institutions address the same spatial themes and devices (Evans, 1982; Foucault, 1973,1979; Markus, 1982; 1993; Rothman, 1971; Vidler, 1987). All look at how spatial geometry and the pragmatics of repetitive accommodation were used to provide control and gain professional knowledge through organization, isolation, separation, classification and inspection. Each of these issues is discussed in terms of how they were used and how it impacted spatial form.

Background

At the risk of accusations of brevity, the nineteenth century saw a paradigmatic shift in thinking about morality and reform and a concomitant shift in the architecture of confinement for those who in one way did not conform to the prevailing social order and were thus perceived as a threat to stability (Markus, 1993). Prisons, hospitals and asylums moved from interiors in which deviants or the ill of all types were haphazardly mixed together, to individual compartments, where those with pathologies of one kind or another were first isolated from the community, separated from one another, classified for the sake of comparison and analysis, and then organized through rules and time schedules to become subjected to power and study. Guided by an interpretation of John Locke's belief in the formability of human nature, it was argued that virtue and normalcy could be fabricated through appropriate control of the environment (Evans, 1982; Foucault, 1979). Reformation was considered achievable through the creation of an artificial universe -- a physical enclave of reason and order for a chaotic society. The prevailing question of the time, in regard to the reformation of character deformed through the pathologies of moral or physical disease, might well have been: "How can human behavior be controlled and made certain by design? "

Exclusion

According to the historical analysts of this period, the first road to reform lay in the exclusion of the sick and the deviant in separate domiciles, usually far away from those who were well and upright. The ideas behind exclusion are many. Evans (1982), in his analysis of the English prison from the 1750's to the nineteenth century, and Rothman (1971; 1980) in his studies of American institutions during the Jacksonian period, argue that physical separation and isolation was more for the security of society and the cohesion of the community than for the benefit of the confined. Physical enclosure and remote location far from the possible contamination of society accommodated the goal of security; exclusion and separation of the pathologically deformed from the rest of the community helped to insure the community's cohesion (Rothman, 1971). As Foucault (1979) notes, behind the emphasis on preserving community, however, was the guiding theme of "social reproduction" -- the idea that exclusion assists in reproducing and maintaining a climate of power and control.

In his geneology of nineteenth century French prisons, Foucault (1979) further argues that "dividing practices" make the individual an object of differentiation in order to gain power over him. Differentiation and exclusion makes power easier to maintain. As Markus (1982) also noted, in his analysis of buildings "for the sad, the bad and the mad" in urban Scotland, the separation and isolation of individuals from society socially categorizes them as deviant from social norms; social stigmatization makes one more docile and amenable to study. Thus, the mechanics of exclusion from the normal, and the stigmatization and isolation from community and family, are distinctive to a mode of power -- that of obtaining knowledge over individual pathology to establish regimes for its containment, control, and reform.

Classification/Compartmentalization

The ill and the deviant gradually were subjected to classification and separation. The idea of classifying inmates to distinguish between species and varieties of pathologies fostered the orderly distribution of categories in space and lent a sense of rationality to the manipulation of architectural form. Evans (1982) notes the architectural demarcation and division became the devices for containing and classifying inmates, organizing them in space, and then studying or curing them. The mechanics of isolating one disease or pathology from another, or relating symptoms with another, allowed various disorders to be organized and hierarchically arranged so they could be empirically analyzed according to their forms of copresence and succession. Dealing with patients in a hospital was no longer a matter of treating their ills nor of applying knowledge to them; it was a way of studying the rules of diseases formation. In prisons, the physical elimination of lateral interactions between different kinds of deviants, murderers as opposed to debtors for example, was used to "position" individuals and better control them. Power was used to discipline people, as well as to study them, but also to channel them toward reformation as productive individuals.

Plans of prisons and hospitals of this period show the close alignment between pathologies and the subdivision of people in space. Geometry was used to accomodate an irreducable patient population and to embody the disease classification. Whereas the earliest hospitals and prisons either occupied monasteries or were designed along the same lines with a long ward topped by an altar such as at Tonnerre (Figure 2.1a), the pragmatics of ever-increasing numbers gradually stretched this into cross wards as in Furttenbach's hospital (Figure 2.1b) with a chapel in the middle. This extension of wings allowed occupants to be more easily classified and separated.

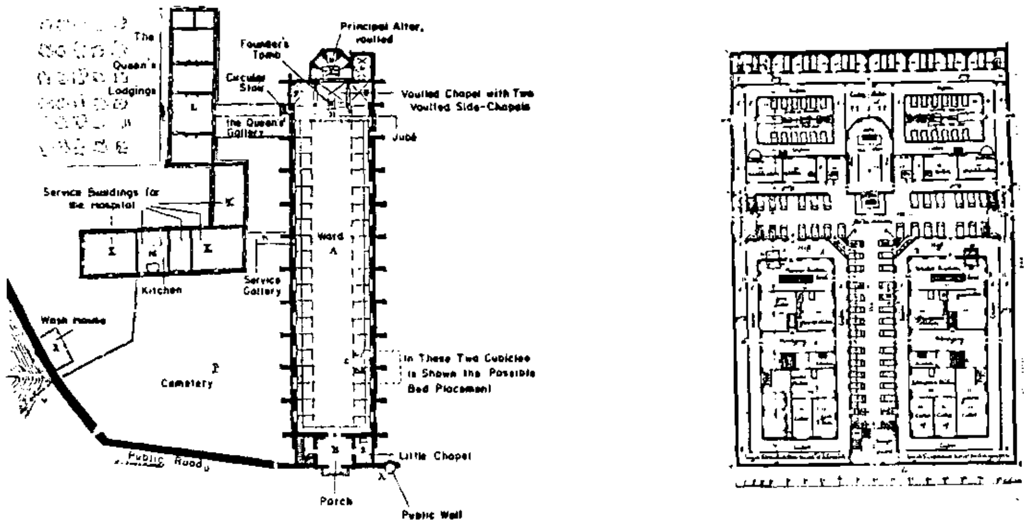

FIGURE 2.1: (a) The Plan of Tonnerre Showing the Long Ward Crowned by an Altar and (b) Furttenbach's Cross-like Hospital with Chapel in the Center (Source: Thompson and Goldin, 1975).

Thompson and Goldin (1975), in their social and architectural history of the hospital, note that while the cross wards allowed the residents to look toward a center symbolizing the divine presence, once this center was found to ease supervision, it became more accessible. Finally, it was replaced by a point of surveillance allowing the direction of the gaze to be inverted -- instead of all residents seeing a common point, all could be seen from it. This idea will be more fully discussed below, however, in the section on surveillance.

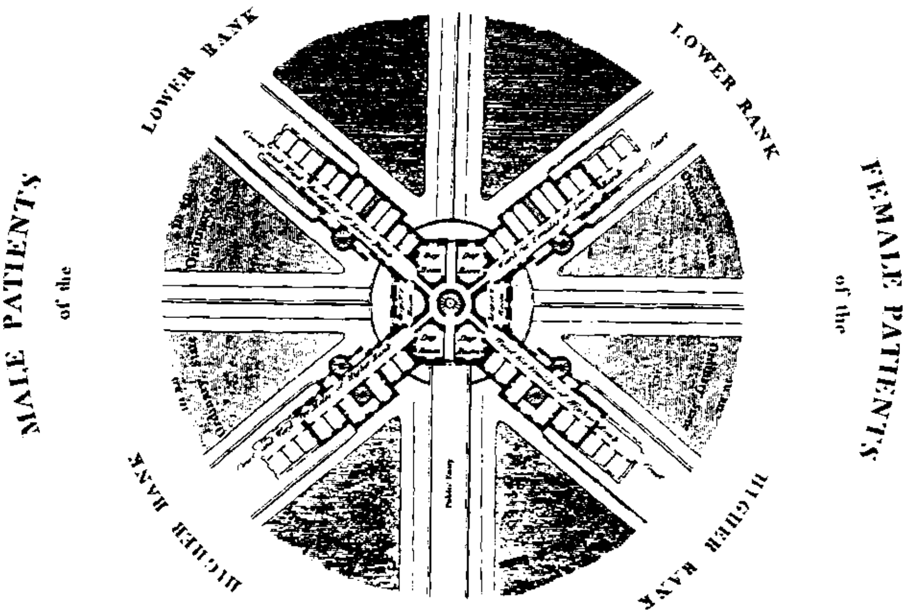

FIGURE 2.2: The Radial Glasgow Lunatic Asylum Showing Classification Demographically (Source: Markus, 1993).

The requirement for multiplication and classification, along with the desire to ventilate both sides of a building to combat the spread of infection and contagion (Thompson and Goldin, 1975), led to a variety of architectural forms. While the radial plan of the Glasgow Lunatic Asylum (Figure 2.2) shows the classifications demographically -- between higher or lower rank, males or females, ordinary or convalescent states -- the extended pavilion plan of Charenton (Figure 2.3) shows the arrangement by pathology -- monomaniacs separated from agitated, epileptics from paralytics and so forth. Prisons and hospitals took on the form of a many-headed Hydra, with extended wings separating curables from non-curables, debtors from criminals, men from women, keepers from kept.

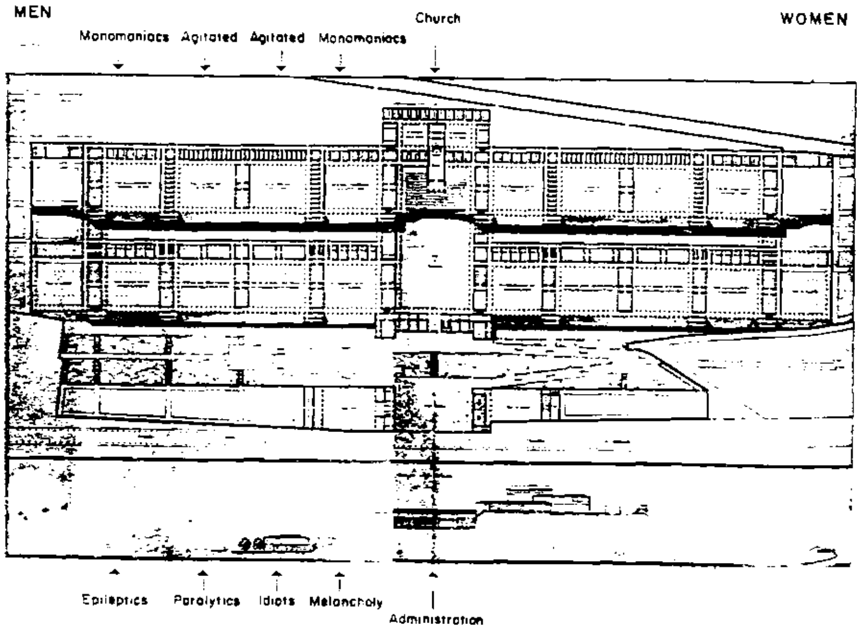

FIGURE 2.3: The Extended Pavilion Plan of Charenton Showing the Arrangement by Pathology (Source: Thompson and Goldin, 1975)

Pavilions arranged around courts as at Charenton and detached pavilions linked by a common corridor (in later prison design called telephone pole plans) as exemplified by Wormwood Scrubs (Figure 2.4), have in common the concentration of wings around, or on either side of, enclosed courts and the capability of organization into grand compositions. "It made growth by accretion easier...and was adaptable to any size or site, whereas radial ... plans were virtually fixed" (Markus, 1993; 108). Pavilion plans are problematic, however, from a management standpoint. While rigidly controlling the movement of inmates along a long central corridor whose length can be continuously supervised, the extensive length of the connecting corridor makes management of the wings difficult and more staff intensive[1]. However, total visibility of the connecting corridor from one point is possible; to achieve the advantages of security, the design continues.

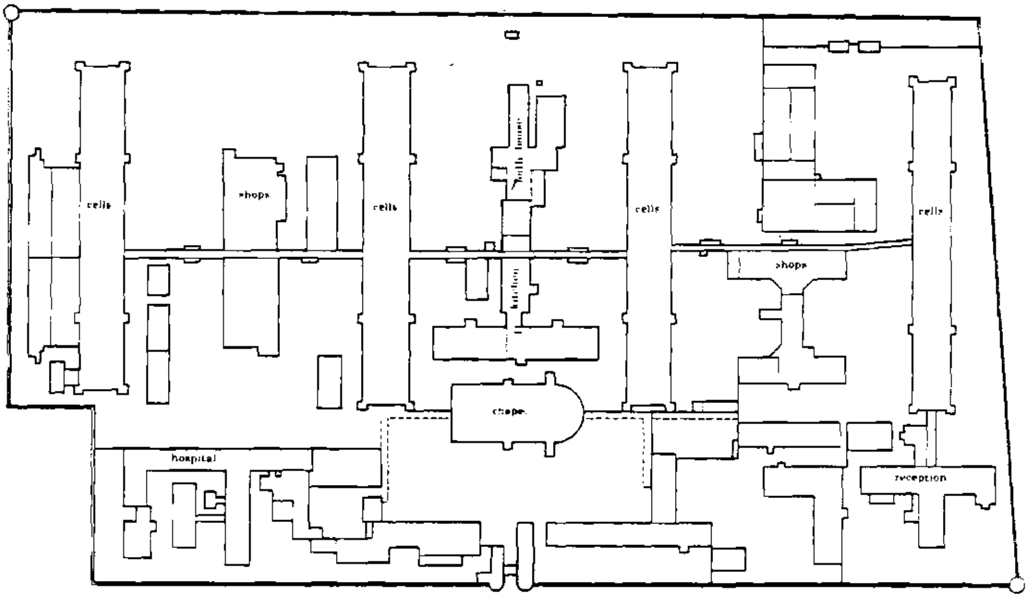

FIGURE 2.4: Wormwood Scrubs - Detached Pavilions or Telephone Pole Plan (Source: Johnston, 1973)

Architectural subdivision also insured the inequalities between inmates or patients and between inmates and staff. Inmates were assigned to different wings based on their classification and also to spaces different from their keepers; further physical demarcation was made between those who administrated and the rest of the institution.

[1]In one modern Texas telephone pole prison, the staff actually used bicycles to patrol the long corridors (Nagel, 1973).

Evans (1982) notes that the goal was to transcend the need for human intervention because the building itself would "map the location for staff and inmates, guide their movements, and mediate the transactions between them".

In order to avoid the communication of vices between like-classified felons, or the passage of disease among the ill or insane, those who were confined were further isolated from one another into separate cubicles or cells. From the twelfth century on, Thompson and Goldin (1975)note, morality implied privacy and subdivision was a device to grant it. Markus (1993) describes how cellular solitude was also considered crucial to preventing prisoner solidarity. According to Rothman (1980), confinement in individual cubicles was felt to eliminate the need or occasion for mingling with others, provided the ideal conditions to induce repention through introspection, prevented the propagation of diseases, and made it even easier to establish and maintain control[2]. What it also allowed, however, was an unequal relationship to be established between the parties; the knowledge giver had uniform access to the inmate while the inmate had only selective access in return.

Surveillance

The inversion of the spiritual center of early hospitals and prisons to a point of surveillance raised the idea that surveillance could be promoted through spatial geometry and the occupation of a center with an economy of staff. Vidler (1987) points out that the idea of surveillance actually started as a form of quality control and to speed production in the atelier (Vidler,1987). In custodial institutions it soon assumed an instrumental responsibility as well -- to guard against the spread of moral or physical

[2]Indeed, the benefits of solitude were so idealized in one US prison that even in trips beyond their cells, inmates were "hooded" as an extra precaution against any possible corruption from or to others (Rothman, 1980).

disease. As Foucault (1979) noted, "the more accurate and easy the surveillance, the less need will there be to seek in the strength of the building guarantees against attempted escape and communication between inmates" (p. 250).

Jeremy Bentham's "panopticon" became the paradigmatic idea of a perfect manifestation of architectural control and an almost perfect architectural expression of intention -- to embody and automate power. Though only a few "panopticons" were ever built for carceral reasons[3] , its principle *raison d'etre* was unlimited, but unseen, surveillance.

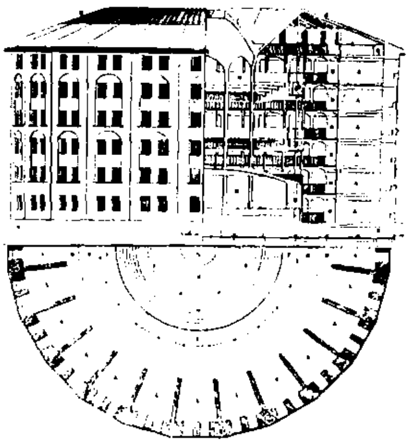

FIGURE 2.5: Jeremy Bentham's Panopticon with Unlimited and Unseen Surveillance of Living Area (Source: Markus, 1993)

Bentham's penal ideal was a multi-storied circular building with separate cells on each level encircling a louvered core (see Figure 2.5). As the illustration shows, the cells are all back-lighted by windows to the exterior thus allowing a single guard in the core to view the occupants in each cell. This is, then, the first example whereby visual

3 Panopticons were built in Holland, Spain, Cuba and one in the United States -- the Statesville, Illinois prison (Nagel, 1973).

control is exercised over living space, rather than over just corridors. Because the core is louvered, surveillance is only one way; prisoners in cells cannot tell if anyone is in the "control" core or not. As Foucault (1979) notes, the panopticon thus ideally functions as a disembodied disciplinary tool -- a mechanical eye. It eliminates guards and keepers and takes the place of physical force and harsh discipline. Control becomes internalized because the architecture of the building subjects the inmates to the objective relationship of surveillance even in the absence of a guard -- never knowing if the guard is there or not, subjects regulate themselves. The panopticon is thus a perfect "map" of relations between forces, a diagram of perfect discipline. While Foucault (1979) turns the panopticon into a paradigmatic idea, from the point of view of architectural history it is probably more of an interesting paradox; a pervasive paradox, however, which has both subtly and overtly influenced the layouts of most custodial facilities.

In prison architecture, and somewhat less overtly in hospital design, the idea of centralized surveillance with the pragmatics of repetitive arrangements produced radial plans (see Figure 2.6). Built like the spokes of a wheel radiating from a central hub in which is located the control center (or nurses station), they were based on the principle of inspection from a central point. Unlike pavilion plans, they allow synchronic visual surveillance of many wings; unlike the panopticon, however, inspection is of corridors rather than of living space. Multiplication and the placement of program spaces for visibility is also problematic; the spokes of wheels can be infinitely repeated in separate modules but their connection at some point becomes necessary. Another result is that program spaces are either too far away to be supervised from the center, thus requiring additional staff, or they are subsumed in one of the spokes with the same result. Furthermore, while staff control the corridors, control of the living units is given over to inmates, often with terrifying results of prisoner to prisoner brutality (Sykes, 1958). Many institutions today, however, use radial housing components in facilities that are essentially of other basic designs in their overall form.

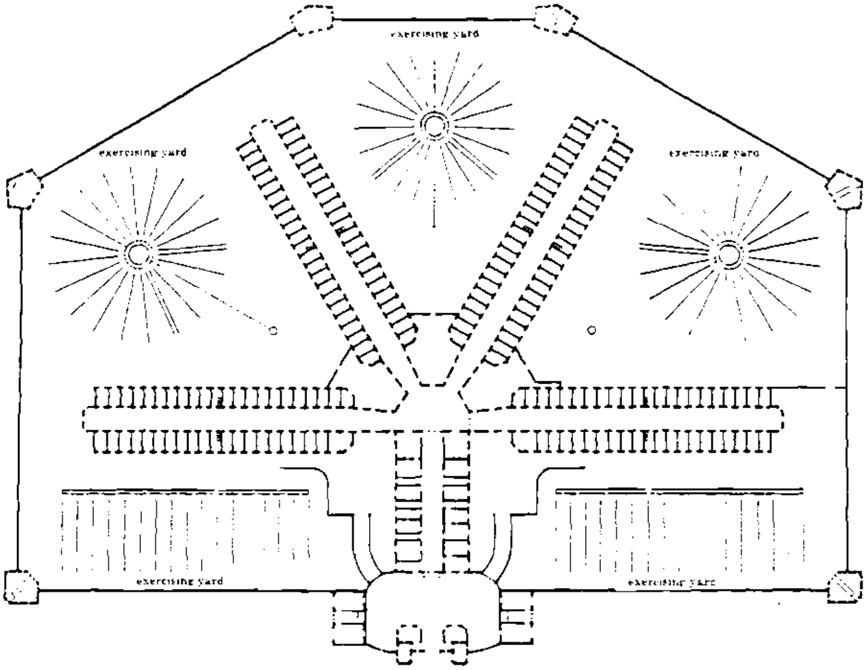

FIGURE 2.6: A Radial Plan Showing Visibility of Corridors of Radiating Wings From a Central Point (Source: Markus, 1993)

Organization - Time Schedules, Rules, Repetition of Events

Military-like regimentation was also instituted to govern inmates interactions with others, to provide order, and to specify the duration and repetition of events. The reliance on a military model for instilling order was built into space and its management. As Markus (1993) states, rules and time and space define the location of persons and things, they control the paths of movement and the degree of choice as well as the visual path, they define programmed encounters and place limits on those occurring by chance (p.97).

As Markus (1993) and Rothman (1980) note, life was routinely ordered by bells, inmates marched in lockstep coordination, residents obeyed often arbitrary rules. Prison guards wore uniforms and cells were maintained as austerely and neatly as those in the military. Institutions were stripped of ornamentation and color[4]. Spaces were assigned to discrete functions and functions were not overlapped. Rothman (1980) asserts that the purpose behind this "total routine" was to bring every aspect of the institution into accord in order to accommodate the prevailing doctrines of separation, obedience and labor (Rothman, 1980,105). Labor, by the way, never became productive in prisons, thus questioning the idea that discipline alone can produce profits, without an economic incentive[5].

Summary

As noted previously, geometry was called upon to generate the plans -- pavilion, radial, panoptical, and telephone pole -- that embodied the belief that rationality could be instilled through precise spatial devices. As Markus (1982) notes, order in function and order in spatial structure became the mechanisms believed capable of conquering the disarray of the human mind and reforming an irresolute character. Geometry helped

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[4]The exclusion of the damned was further underscored by the aesthetics of the architecture. Facades were heavy and somber, with few voids. Walls were abnormally thick and constructed of hard stone; cornices were massive. The language of form accented the impenetrability of the building and the futility of escape. As Vidler (1987) notes, aesthetics were employed as an instrument of utility for "screwing the sentiment of terror up to the highest pitch" (p. 77). Evans (1982) also traces the evolution of form with a beautiful argument about the fading and then reinvigorating fortunes of facade design set against the background of layout evolution and the hopes and illusionments that it carried with it.

[5]As Foucault (1979) argued, penal labour was never intended for profit; its use lay in the "constitution of a power relation, an empty economic form, a schema of individual submission and of adjustment to a production apparatus (p. 243).

isolate, classify, separate, and inspect; in other words, to provide the physical conditions for cure. Geometry allowed for the pragmatic requirement for repetitive accommodations, the rational and orderly serialization *ad nauseum* of identical cells in identical blocks. Radial, pavilion, and telephone pole plans allowed synchronic inspection of corridors as well as the separation of pathologies into different classifications, the separation of categories from one another, and the separation of people from themselves.

It was noted (Foucault, 1979; Markus, 1993; Rothman,1980) that space was determined in the sense that it narrowly defined decisions, space, movement and responsibility. Properties of layout offered direct control because they imposed, eliminated, or deliberately structured how, what, where, when, and with whom things could be done. Activities and social contacts in custodial institutions of the nineteenth century were predetermined and the physical setting limited rather than allowed. As Goffman (1961) and others (Nagel, 1973) note, such a context is highly explicit, predictable, regimented, and offers little choice. This condition allows groups to be easily supervised, authority to be easily maintained, and accountability for personal action to lie beyond the individual. The removal of referents by cutting off ties with the past, and by reducing contact with people, places, activities and ideas, further induces uncertainty. The recipient is left in temporal, spatial, social, and psychological suspension.

However, the probabilistic, or generative, effects of space are not considered in the literature on the nineteenth century model. What Foucault, Evans, and other examiners of that model do recognize is that an overreliance on deterministic form, e.g., overrestrictive control, has historically not worked in two senses: 1) it has not reformed character; and, 2) it has not quite eliminated unwanted contacts. Architecture can isolate, it can separate, it can classify, and it can offer surveillance, but the literature is replete with examples of how these manipulations are subverted daily by those whom they are meant to control, as well as with incidents of inmate violence against one another and with staff (Clemmer, 1958; Goffman, 1961; Sykes, 1958).

3. The Behavioral Normalization Model

The devices and issues attached to imposition and elimination placed space at the foreground of the issue. Space was seen as the key means for eliminating, or at the least, limiting behavioral accidents and incidents. Today, however, the goals and philosophies surrounding the various pathologies are changing and the physical environment is seen by some in a different light.

There is a handful of environment/behavior researchers who attempt to link the design of therapeutic and correctional settings to behavioral outcomes (Calkins, 1988; Cohen and Weisman, 1991; Coons, 1990; Farbstein, 1987). Much of their work is presented as hypotheses deserving of further investigation, being extrapolated from existing research and experience in other areas. As Cohen and Weisman (1991) note in the Preface to their guide on designing environments for people with dementia:

> It must be recognized from the outset that very little of the research into Alzheimer's disease explores linkages to the physical environment. Most research activities are directed toward either medical and biological issues, such as possible causes of the disease or social/organizational concerns, such as caregiver burden. Of the limited research that directly explores the role of the environment as a therapeutic tool, much is experiential or anecdotal (p. vii).

A similar lack exists in the literature on detention environments. At any rate, a small body of work attests to some emphasis on linking architecture to normalization of behavior; for example, in creating an architecture to help foster positive responses from individuals and provide for healing through society. As Nagel (1973) notes, "People live in social settings and to deny these forces is unrealistic "(p.11). What is this suggested model and what are its spatial correlates?

The issues that are currently being emphasized by a few researchers as useful in normalizing behaviors in Alzheimer's units and juvenile detention centers are surprisingly similar, and in almost direct opposition to those which concerned the nineteenth century moralists. Instead of a custodial/medical model aimed at reformation or curative treatment through individual reform, the behavioral normalization model focuses on creating environments that: 1) increase opportunities for socialization both in terms of resident to resident, resident to staff and resident to family and community; 2) de-institutionalize environments through softer furnishings and finishes; 3) provide opportunities for autonomy and control; and, 4) in the case of Alzheimer's units at least, maximize functional independence and freedom by allowing residents to negotiate their environments and regulate their visual/sensory stimulation. In detention centers, this fourth goal implies creating opportunities for juvenile detainees to assume responsibility as well as incentives and consequences for their actions, and providing more stimulation in the sense of variation in routine and activities.

Control and restraint in the form of containment in each of these environments are little mentioned, but underlies each of these facility types. It must be recognized, however, that actualization of the normalization model in facilities for these populations lies on a continuum of varying degrees and range[6]. While the issues above are considered more critical and achievable in the "least restrictive environments" of Alzheimer's units, some movement toward them is also recognized as helpful in the more

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[6]See Gold, Sloane, Mathew, Bledsoe and Konanc, 1991; Sloane, Mathew, Desai, Weissert and Scarborough, 1990; and Ohta and Ohta, 1988 for the critical dimensions on which special care units for Alzheimer's patients differ in philosophy, focus of care, environmental design, and therapeutic approach.

restrictive environments of detention centers. Each of the issues and suggested spatial correlates is discussed below; while they are discussed separately, they are in actuality strongly linked with one another.

Increasing Opportunities for Socialization

Increasing opportunities for awareness and socialization is regarded by most researchers, whether focused on Alzheimer's units (Calkins, 1987, 1988; Cohen and Weisman, 1991; Coons, 1987; Lawton, 1981; Liebowitz, Lawton, and Waldman, 1979; Mace 1987) or detention centers (Farbstein, 1987; McMillen, 1988), as critical to normalization. Several environment/behavior researchers have suggested that in Alzheimer's units, one way to achieve a more social and "homelike" environment is to provide public, semi-public and private spaces in close proximity to one another, and to avoid long "institutional" corridors (Calkins, 1988; Cohen and Weisman, 1991; Liebowitz, Lawton and Waldman, 1979). Indeed, a new kind of space, as exemplified in the Weiss Institute and the Corrine Dolan Center, was planned to deliberately increase opportunities for social interaction. Based on an earlier plan by the architect Izumi for schizophrenics, it widens the hallway between rooms into a large centralized activity space with resident rooms on its periphery (Izumi, 1968; Liebowitz, Lawton and Waldman, 1979). (See Figure 2.7).

As Liebowitz, Lawton and Waldman (1979) note of the Weiss Institute, the large central space is said to allow direct staff surveillance of most public areas, to diminish disorientation because residents have an almost complete view of activity possibilities, and to increase interactions between staff and residents as well as to encourage visitation by family: "All activity takes place in the central area to encourage unplanned encounters with others and socializing" (p. 60). As Lawton (1981) noted later, but in a study on environments for the elderly, a large central, open space can help negate the "unsettling" nature of enclosed, confined spaces (Lawton, 1981). The large, centralized space, as shown in Figure 2.7, also allows subdivision for small groups in the form of gazebos; the central space is supplemented, however, by additional program space in another wing.

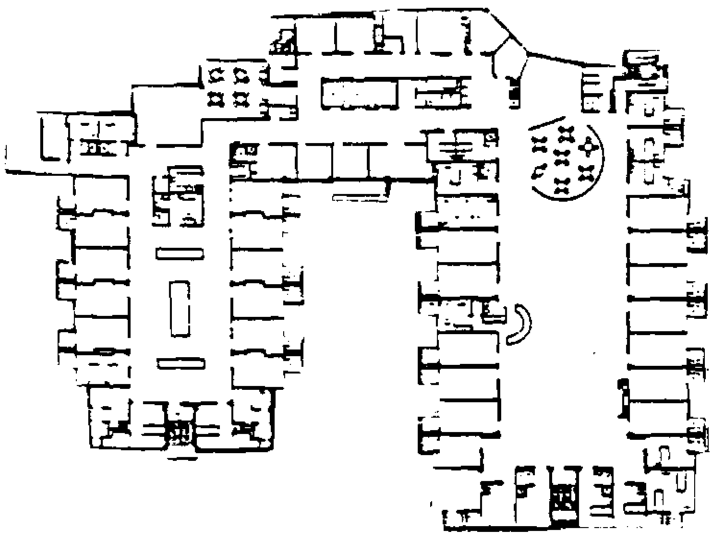

FIGURE 2.7: Plan of the Weiss Institute Showing the Central Activity Space (Source: Liebowitz, Lawton, and Waldman, 1979)

Cohen and Weisman (1991), in their book on the design of Alzheimer's units, based on extensive interviews with staff and families, observations in facilities, and a body of previous research on the elderly, wayfinding, and stress, argue that this basic concept supports the clear identification of different activity areas that help "maximize awareness and orientation of people to their social and physical environment" (p. 60). However, while the concept is considered therapeutic, the problem identified with it (like that of the earlier pavilion plans) is the pragmatics of increased numbers of patients. Either more rooms are added to the periphery of the central space, thereby making it so large as to be non-residential in character, or similar units must be joined together with the attendant problems of corridors[7]. While Cohen and Weisman (1991) offer a number of conceptual plans showing possible connections of multiple units, at some point "institutional hallways" enter the picture, or the units are so small and staff intensive as to be uneconomical.

Other issues considered crucial to increasing socialization are the location of activity spaces and furniture arrangements. Cohen and Weisman (1991), drawing on earlier research on elderly environments, suggest that defining activity areas adjacent to, but not part of, activity zones similar to a 'front porch' (Zeisel, Welch, and Demos, 1978), or having activity zones located by major paths of circulation (Howell, 1980) allows residents to "preview" activities without commiting to active participation. Previewing is felt by these authors to decrease null behavior and increase resident control over involvement; thereby ensuring potentially higher levels of stimulation. Supportive studies show that sitting spaces in peripheral locations tend to be underused while those on public view tend to have more use (Harris, Lipman and Slater, 1977), and that opportunities for privacy result in increased social interaction (Pastalan, 1974).

Thus, more normalized socialization is considered obtainable in Alzheimer's units through the clustered organization of activity space, the elimination of hallways, and total visibility of a centralized activity space.

Almost concurrently, penal design has moved toward a similar spatial arrangement aimed at a more direct method of supervision based on continuous, personal interaction between staff and inmates, along with behavior management techniques. As opposed to a more traditional, "indirect", mode of supervision based on staff separated

[7]Life Safety Codes now require corridors to be enclosed and fire rated so the central space must be enclosed and glazed in order to be visible, an additional expense.

from inmates in control booths or patrolling hallways, the "direct" model calls for smaller units and places staff and residents together. It relies on an expectation of acceptable behavior generated through the cohesion of a smaller number of residents and staff and the use of amenities as a "carrot" for better behavior (Farbstein, 1987).

In the direct supervision concept, staff are located within the resident dayroom, and the dayroom is surrounded by cells (an arrangement much like the Weiss Institute). Figure 2. 8 shows a typical layout of a direct supervision plan (comprised of two "units" in a "pod"). The units are generally limited in size for better behavioral management, and because, as in the plan shown below, infinite addition of rooms so enlarges the centralized dayroom that it becomes unmanageable. Expansion is handled through the use of split levels surrounding the activity space; visual access to each floor is thus enhanced while allowing a reduction in the architectural scale of the activity space (Sullivan, 1988).

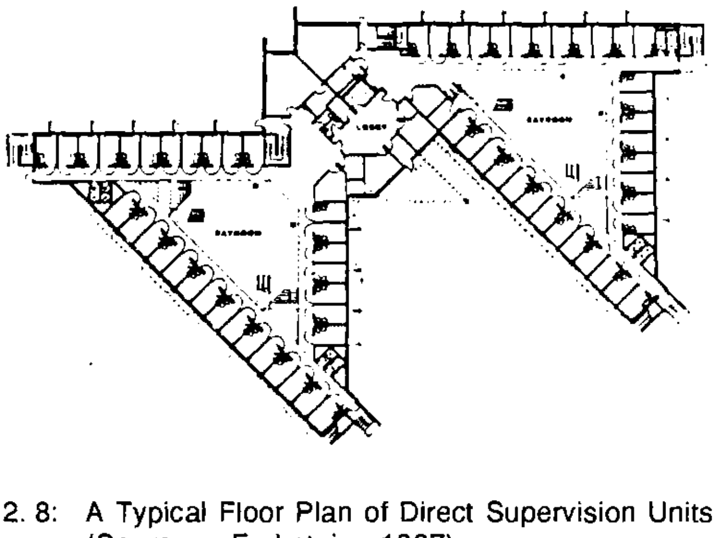

FIGURE 2. 8: A Typical Floor Plan of Direct Supervision Units in a Pod
(Source: Farbstein, 1987)

As Farbstein (1987) and others note (Zupan and Stohr-Gillmore, 1988), proximity of staff and residents and the resultant social contacts allow staff to detect and defuse potential problems before they explode; it also enables inmates to become privy to a viable social system with role model, norms, values and so forth. Farbstein (1987) notes that size of space is also a factor in normalizing the environment: "A larger living area contributes to normalization of the environment and increases the tendency of inmates to gravitate into smaller, compatible groups" (p. 1.1-1). While studies show that inmates in direct supervision facilities feel safer because of the "quick response time" of staff to potential explosive inmate problems, suffer less anxiety, and are more positive in their evaluations of the facility and staff (Farbstein, 1987; Zupan and Stohr-Gillmore, 1988), it is not clear how these spaces impact movement and encounter as a by-product of normalization.

Architecture is also directly linked to control, a control modulated through socialization: "Officers walk through and control the entire living unit, eliminating defacto inmate controlled territories" (where inmates can terrorize other inmates beyond the presence of staff) (Farbstein, 1987, 1.1-1). Zupan and Stohr-Gillmore (1988) also note: "Through appropriate architecture and inmate management practices, "total control" over inmate behavior is achieved by the institution (p. 626). The installment of staff among residents can also be said to eliminate or reduce the binary character of total institutions identified by Goffman (1961); i.e., the split between staff and inmates. Standards require both social areas in the form of dayrooms, as well as private areas in the form of individual cells (ACA Standards for Juvenile Detention Facilities, 1983; Juvenile Justice Standards Project, 1977).

There is thus an acknowledged emphasis in the Standards and in the literature on Alzheimer's and detention centers on the merits of inducing interactions between residents and between residents and staff, and in correctional settings, as a way of promoting safety and security (McMillen, 1988; The Handbook on Facility Planning and

Design for Juvenile Justice Corrections, 1992). However, while aspects of socialization are seen as critical and space is regarded as important to its promulgation, the idea of "space" in both the Alzheimer's and detention literature is rather limited. It appears that its contribution is to place two groups in proximity to one another, in order to bring them together, while at the same time providing for maximum staff surveillance. The emphasis is, however, on singular spaces, such as dayrooms or lounges, and less so on any description of how these spaces link together to form a total spatial environment. McMillen (1988) also notes that "normalized casual environments" must be balanced by emerging trends in technological security devices, but it is not clear how to incorporate this within the concept of normalization, other than through the use of CCTV's.

De-institutionalization

In addition to socialization, and as part of the behavioral normalization goal, the de-institutionalization of environments is seen as offering a viable path to normalized life. As Michelson (1987) notes: "The deinstitutionalization movement reflects the perspective that some institutions ought to reflect the statuses its clients should attain, rather than those exhibited at entrance" (p. 169). To most behaviorally-oriented researchers, institutions seem to be synonymous with "corridors". For example, the elimination of long corridors through a clustered arrangement of spaces is felt by some to not only create closer physical proximity of staff and residents, thereby leading to greater interaction between them, but also to counter the debasing environment of most institutions (Cohen and Weisman, 1991; Harris, Lipman and Slater, 1977). While corridors are almost universally maligned as "institutional", an interesting study undertaken in a psychiatric hospital in Great Britain refutes this idea and raises the question of whether corridors may instead be valuable as a field of awareness and encounter (Beattie and Curtis, 1974).

Beattie and Curtis (1974), in a study based on observations, drawings by patients, and written reactions by staff, note that the "corridor represents, despite its physical shortcomings, something vitally important to the frustrated individual -- a 'free' space" (p. 49). Corridors are one of the few places in an institution that are free of use labels telling users what they are supposed to do in the space, and therefore act as an "escape hole" offering a different social milieu from the rest of the ward. Tellingly, these authors argue that corridors, because they can be anything one makes them,

> are the only part of the institution which simulates the environment found in the lives of ordinary people....[Just] because the form is not found in the lives of ordinary people does not mean that the role it plays is not found either(Beattie and Curtis, 1974; 49).

The authors caution that while the "functions" occuring in corridors were recognized by participants as beneficial, once the physical environment was referred to explicitly, corridors were unanimously denounced. Though largely qualitative in nature, this study gives pause to the idea that institutions are more normalized without corridors. Furthermore, it causes one to wonder what role corridors do play in creating a field of normalized awareness and interaction.

While the elimination of corridors is seen by some as a means of de-institutionalizing environments, other means of making custodial environments more normalized are surface-oriented. Every guide to design of Alzheimer's units, suggests that residents should be encouraged to bring furnishings or pictures from home (Calkins, 1988; Cohen and Weisman, 1991; Coons, 1990). These personal artifacts are said to act as "reminiscent aids", provide a means of primary territoriality, and cue residents in more normalized behavior (Calkins, 1988). Homelike, "soft" furnishings and residential type wallpaper and finishes are perceived by these researchers as helpful in countering the standardization of fixtures and furnishings and avoiding the "hard" architecture typical of many institutions .

Softer furnishings and finishes are also used in correctional settings to create a more normalized environment, and similarly function to provide cues to normalized behavior. Brown and Macmillan (1979), for example, in their exhortation on deinstitutionalization of detention centers, urge that "designers should consider whether spaces encourage nonaberrant behavior", and should design accordingly (p. 62). However, in detention centers they function additionally as a behavior management tool ("Prison Explosion", 1990). Farbstein (1987) notes that inmates who "act out", or exhibit inappropriate behavior, are subjected to consequences which

> can range from restricting privileges to removing the inmate to a less desirable, more secure section of the facility. Inmates who are cooperative and well behaved enjoy the privileges of a nicer environment. The ability to regain lost privileges gives inmates the motivation to improve their behavior. [In this way], the power to manage the institution is taken away from dominant inmates and given to the correctional officers (p. 1.1-2).

While it has been shown that behaviors improve in softer environments (Farbstein, 1987; Zupan and Stohr-Gilmore, 1988), there is great difficulty in isolating this aspect of the environment from other factors contributing to behaviors. It appears then, that deinstitutionalization, beyond the elimination of corridors, is more surface oriented, used mostly to create an "expectation" of normal behavior, or a "carrot" to encourage it.

Opportunities for Autonomy and Control

A third aspect of normalizing environments is to create opportunities, architecturally, for autonomy and control. These are seen as primarily provided through control over access to one's room, personalization, and self-pacing of one's involvement in activities (Cohen and Weisman, 1991; Heston and White, 1983; Reisberg, 1983; Shamoian, 1984). Calkins (1988) notes that room personalization and ownership of objects allows a person to stake out a territory -- a place that is the individual's own. Territoriality is regarded as important for a sense of autonomy and control (Altman, 1975). It is manifested in a person laying claim to a certain chair or an area, and thereby exhibiting control over it. Even in detention centers, youth are encouraged to have a limited number of personal photos and books, but because of the shortness of their stay, are generally not allowed more than that. While single rooms are also touted as beneficial, there is no empirical evidence, at least in Alzheimer's units, that these are more therapeutic than doubles. Staff in both Alzheimer's and juvenile centers are quite divided on the issue, debating the benefits of privacy in single rooms and the companionship available in shared rooms. While single rooms are the standard in detention centers for safety and security, severe overcrowding often requires doubling or tripling.

Another means suggested by researchers for opportunizing autonomy and control is through layouts which allow individuals to determine the rate and pace of involvement in activities and socialization, the freedom to wander or use various areas within the institution, and to exercise choice as to where and when to do things (Coons and Spencer,1983; Peppard, 1991; Rivlin and Wolfe, 1979). How this is accomplished spatially is better discussed, however, in the section below.

Regulation of Visual/Sensory Stimulation

Several researchers (Cohen and Weisman, 1991; Calkins, 1988; Coons, 1987, 1990) see furnishings and finishes as obvious means of providing visual/sensory stimulation, but also see the general organization of spaces as critical in maximizing opportunities for functional independence and freedom of movement. Cohen and Weisman (1991) suggest that the "arrangement of spaces relative to one another" assists in the orientation of older, confused residents, and in their ability to regulate stimulation, thereby reducing stress and encouraging more independence and sociability. How to spatially achieve an appropriate "arrangement of spaces" is somewhat less clear, however.

In terms of configuration, Coons (1990) suggests that communal areas adjacent to resident rooms are more used, and that wandering paths which are continuous rather than dead end, and with a visible destination, are less frustrating to patients. Cohen and Weisman (1990) further suggest that paths linking major social spaces also provide an element of choice (Cohen and Weisman, 1991). Visibility is also considered by Cohen and Weisman (1990) as critical, but largely as an aid in understanding the physical layout:

> A commanding view of the entire facility is much preferred to the restrictive view from a long, convoluted corridor for allowing one to understand the organization or plan of the building "(p. 95).

Thus, configuration is seen by these authors as critical to understanding and negotiation of the environment, and to the adjustment of sensory levels through involvement or non-involvement. The problem is that the suggested applications are largely based on a body of wayfinding studies applicable to normal populations (Weisman,1987), or to suggestions from the field. Their value to normalization, or the creation of a spatial field of normalized awareness and encounter in restrictive environments is either largely assumed, unstated, or remains untested.

Oddly enough, the creation of opportunities for regulated stimulation and challenge is more associated by Cohen and Weisman (1990) with outdoor than indoor spaces. While this assumption, too, is largely untested in the restricted environments under study, these authors promote the value of "views" to outdoors, noting that "residents...spend a great deal of time in public spaces such as lounges and lobbies, where views are not required" (p. 76). They further argue that

> outdoor views from public areas will reduce the sense of confinement and provide valuable stimuli and information... [while] views along staircases and in corridors and elevator lobbies serve to minimize the traditional "institutional image" and provide increased levels of sensory input in public areas. [The outdoors is seen as critical to] many possible activities that should be accommodated, including both spontaneous encounters and spontaneous observations of nature and staff, neighborhood and other residents activities and planned encounters (Cohen and Weisman, 1991; 76-77, 79).

It seems counterproductive that these qualities are highlighted for exterior spaces and rarely mentioned as advantageous in interior spaces. Would these qualities in interior spaces lead to visual or social overload? The seeming emphasis on stimulation through outdoor spaces leads one to question whether interior views of other areas and activities might also serve to provide sensory input, as well as create a normalized field of awareness and encounter. Regulation of stimuli should also be considered a function of movement through spaces with views of other spaces and activities.

Spatial layout, as a means of stimulation or providing autonomy and control, is rarely discussed in the literature on corrections. While Farbstein (1987) and McMillen (1988) acknowledge the importance of layout for visibility and security, stimulation is mainly seen as provided for by a variety of activities. One of the few who do mention layout, Ricci (1971), in a study on the use of buildings as therapeutic tools in youth treatment, notes that "appealing spaces are those where there is a little action while being subtly controllable yet not overtly available" (p.26). He suggests that if a room is always available (such as a dayroom), it fails to have the appeal of a space open to only a few. He suggests providing alternative spaces as an inducement to better behavior. The reader, however, is left uninformed as to how to incorporate this quality into design. An early article on prison design in the AIA Journal (1971) is a little more pointed, recommending

> opening up the dining hall... allowing a view; ... provide an open plan of four activity zones, which encourage inmates to feel each day a normal sense of changing activities, preventing them from feeling utterly cut off from outside life patterns and abandoned by society" ("Prisons, 1971; 25).

Again, while these layout ideas are suggested as a function of normalized environments, it is not clear how spatial configuration accommodates this goal beyond its surveillance aspects by staff.

Containment and Surveillance

Finally, the raison d'etre of both Alzheimer's facilities and juvenile detention facilities is the containment and surveillance of their populations both for the protection of themselves and for the protection of others. This fact is acknowledged in the literature on detention centers but is almost ignored in the literature on Alzheimer's. As Connell (1993) acknowledged,

> [Studies] ignore the potential for older people with dementia to wander away from the safe haven of a nursing home and become lost. There seems to be an implicit belief that if residents emotional needs and declining capabilities can be supported through a more prosthetic and therapeutic environment, other concerns will be resolved in the process" (p. 308).

As Connell (1993) notes, when architecture is used to control elopement, however, it often pursues this goal single-mindedly, ignoring or diminishing other aspects and concerns. Studies that deal with control in the form of containment focus primarily on the boundaries of the unit, rather than on the spatial correlates of control. As much of the behavioral literature notes, in Alzheimer's units, it is imperative that entries and exits be monitored to prevent patients from wandering away. This is generally accomplished in a number of ways, from locating nurses stations for visual surveillance of the entry (Peponis and Choi, 1991; Connell, 1993), to alarm systems and voice-controlled doors (Cohen and Weisman, 1991). Screening the entry so it cannot act as an enticement has also been shown to be an effective means of containing patients. For example, Namazi, Rosner, and Calkins (1989) recently demonstrated that patients were unable to distinguish exits where the doorknob was concealed by a cloth, and exited less often than usual where the knob had been painted the same color. Configurational means of containment are less well known.

The issue of containment and surveillance is more explicit in the literature on detention centers. The Institute of Judicial Administration and the American Bar Association's Juvenile Justice Standards Project "Standards Relating to Architecture of Facilities" (1977) advocate that in planning a detention facility, security should be supportive but it "should also have the capacity to change to a 'deterrent' mode (p. 69). In order to be supportive, the facility should "permit as much freedom of movement within the facility as is consistent with security, provide opportunities to maintain community ties, and enable residents to exert some influence over their environment" (p. 69-70). However, while it is urged by behavioral researchers (Siegel, 1989) that buildings be designed to provide a "continuum of control", this is largely accomplished through a secure perimeter, locked doors between functional areas, and technology in the forms of CCTV's. Visual contact from a control center of living areas and traffic corridors through CCTV's and the extensive use of glazing are seen as the answers to this problem (Siegel, 1989;76).

Summary

As the above discussion illustrates, the goals of confinement have changed. Behavior is at the forefront of the discussion and space is seen as capable of supporting and enabling rather than negating behaviors -- an assumption which is, however, still deterministic. Even a superficial reading of the literature underscores the fact that the emphasis is more on the appearance of normalization than on its reality. Efforts to provide normalized environments as an inducement to normalized behaviors range from trivial changes of finishes and furnishings to rather vague, and often largely untested, suggestions for spatial innovations in the hope that if it has worked in other realms, it may work in these. Many assumptions are made as Cohen and Weisman (1990) note, based on previous research in other areas as well as anecdotes from the field. Few studies actually test the assumptions in a rigorous way in these environments, none are able to systematically describe the spaces with which they are concerned, and none look at these assumptions and practices as the basis for formulation of theory.

Finally, when the studies do deal with layout, few illustrate any real understanding of "how" space functions, or "why" it functions in a particular manner; most researchers just observe it. Furthermore, while "pair-like" arrangements of spaces are often discussed (i.e., locating a sitting nook off a busy corridor to encourage casual socialization without interfering with traffic patterns), it is unclear how these paired relations fit into the overall pattern of space. There is thus an omission in the discussion in terms of the overall morphology of the unit, e.g., in the consideration of how the paired relations fit into the overall relational patterns of space. The biggest omission is in how to balance allowance of behaviors with the constraints that are necessary in these environments without bias toward one or the other.

However, as Rivlin and Wolfe (1979) suggested long ago, analogy is not the real thing. The creation of a therapeutic physical and social environment is largely based on the "perception" of a need for a more humane environment. No matter how "homelike" a setting is, in reality, its focus is still a group of persons who are identified, and singled out, as needing a specific form of care. There is an unwillingness to give up deeply engrained notions of sickness and treatment in institutional settings. The need for constraint or control because of pathology leads to the perception that behavior itself has to be controlled and this, in turn, leads to management practices: an inability to survey private areas, for example, means staff tend to herd people into corridors or dayrooms. Put simply, the structure and social organization required to operate institutional facilities, in itself creates an institutional atmosphere. No amount of surface treatment will give the reality.

While studies have shown that smaller facilities modeled on the lines of the Weiss Institute and podular unit design have a positive effect on socialization and interaction, should organizations run headlong in this direction without fully clarifying how it all fits together? As McMillen (1988) notes, "if repetition of traditional approaches is inappropriate, neither is a free-wheeling plunge into diverse and untested facility types the answer" (p. 44). Many of the assumptions being broadcast, while based on suggestions or observations in the field, are still untested. While it is not the intention of this study either to test these assumptions, critical examination of them is necessary in order to formulate criteria for seeing these environments more clearly in order to clarify and underwrite design decisions. More importantly, these studies attest to the fact that the architectural correlates of constraint/allowance are only partially known, and that design ideas tend to lean one way or another in the absence of a theoretical framework that would account systematically for observed variety and design possibility. Further, design ideas are not described in any systematic way.

4. Theories of Control That Span Deterministic and Probabilistic Aspects of Space Use

From the studies above, it is not clear what theories of control have been developed and used to cope with the emphases of environment/behavior researchers beyond a vague assumption that prosthetic environments will somehow make this issue recede into the background. While prosthetic, or therapeutic, environments cannot be dismissed, what is perhaps more interesting is the two models of control. There is an inherited theory and model concerned with the elimination or imposition of behaviors, and on the other hand, a normalization model which is largely about the allowance of behaviors, a focus which challenges the inherited theory of control. Regardless of the attendant therapeutic values, the interest of this thesis is to move from a theory concerned with imposition and elimination to one of enablement along with constraint -- in other words a theory that spans allowance and containment. Is there such a theory?

Reversed Buildings

An interesting candidate is offered by Hillier and Hanson (1981) in The Social Logic of Space. It is interesting because it raises another issue related to control domains in various building types. Hillier and Hanson's premise is that buildings are primarily about the social relations between two categories of people -- "inhabitants" or those "with special access to and control of" the building and "visitors", who "are persons who may enter the building temporarily, but may not control it". While it seems counterintuitive, pupils in a school, patients in a hospital, and prisoners in a prison are considered "visitors", by virtue of the fact that they have no ownership nor control of the building. Put simply, Hillier and Hanson's assumption is that it is social relations which explains both society and space -- because society is embedded in space. As Markus (1993) succinctly adds, "There is no a-spatial society and no a-social space" (p. 13). The interface between inhabitants and visitors is, therefore, the *raison d'etre* of a building. How this interface is accomplished, however, has much to do with normalized relations.

Hillier and Hanson distinguish between normal, everyday, "elementary" buildings, and what they term "reversed" buildings. Elementary buildings such as banks or shops sequester inhabitants (employees, owners) in the deeper parts of the building, far from the entry, while visitors (customers, shoppers) are relegated to the shallower parts of the building. Depth becomes a mark of status. Custodial buildings such as hospitals, prisons, asylums, and some schools, however, "reverse" this usual relationship by putting "visitors" (inmates or patients), no matter their length of stay, deep in the building and having the "inhabitants" (staff) control the entry and the circulation system. The distinguishing feature of reversed buildings is that there is a pathology which needs to be redressed. According to Hillier and Hanson (1984) reversed buildings have two variants -- those concerned with the pathology of individuals and those concerned with the pathology of society. The pathology of individuals is that which is relevant to hospitals or asylums, where there is a need for a direct interface between those with the pathology (visitors) and those with the special knowledge to affect their cure (inhabitants). The pathology of society is relevant to prisons where inmates are segregated as a class, put under surveillance, then returned to society, reformed. Whereas in the case of individual pathologies, control through space and rules is seen by Hillier and Hanson as a means of protecting the interface between inhabitants and visitors; in the case of social pathologies, the interface between inhabitants and visitors is secondary, with control and power primary.

> The building exists not to create a domain where established relations are embodied and enacted, but in order to create a more highly controlled domain in which the restitution, re-creation and transmission of descriptions can take place (Hillier and Hanson, 1984,185).

Hillier and Hanson note that in inverted buildings of the nineteenth century, inhabitants have the overview because they move and visitors do not. Relations between visitors -- assigned to individual cubicles and not allowed to access the circulation areas where control is embodied -- are also eliminated, because they are presumed to be dangerous and contaminating, and relations between visitors and inhabitants is at the discretion of the inhabitants.

As an example, these authors use the medieval infirmary of Tonnerre (see Figure 2. 1), where the periphery of the visitor space (ward) has been subdivided into cubicles, still leaving the interior circulation space. As the plan shows, two sub-complexes have been added that can be accessed by inhabitants but not by visitors. There are thus two ways into the visitor space -- one through the door at the end of the ward, and one through the door leading to the inhabitant available sub-complexes. For inhabitants, then, the ward is bipermeable (that is, the layout of spaces forms a "ring" offering more than one way in and out to spaces beyond); for visitors, it is uni-permeable. Since the whole facility is the domain of inhabitants who can move through it freely, and only the individual cell is the domain of the visitor, inhabitants view the facility as continuous and relations as simultaneous, while visitors see the facility as discontinuous and relations as unequal. Relations of power are present and spatial configuration controls the interface between people. In such a way, buildings act as rule systems, governing the relations of building inhabitants and the relations of the inhabitants to visitors. The way in which power, and as Markus (1993) adds, "bonds" between people is made concrete is through bodies in space (p. 25). The way spaces are linked so that communication is free and frequent, the way it makes possible encounters between classes, groups and individuals, provides the basis for community or isolation.

Inversion, therefore, is not just about depth but also about movement and awareness. What is realistic, especially in today's more humane environment, is some balance between total inversion and everyday buildings. What the theory of inverted buildings does not fully do, therefore, is to link these underlying properties of spatial organization to the finer modulation of experience that may be possible in each model.

Strong and Weak Program Buildings

To further clarify the issues involved, one needs to consider another distinction introduced by Hillier and his colleagues in a later article -- the distinction between strong and weak program buildings and the issue of buildings generating social effects (Hillier, Hanson and Peponis, 1984). Strong program buildings are those where behavior is dictated by organizational rules; weak program buildings are where behaviors are more informal and open to change. As buildings grow larger, the authors note that "it becomes more and more difficult to maintain them as 'strong programme' buildings, that is buildings where most of what happens is specified by explicit or tacit rules, and built into the spatial structure of the building" (Hillier, Hanson and Peponis, 1984; 69). As the numbers grow, and the accommodations for visitors and inhabitants expands, "so the amount of unprogrammed contact as the natural by-product of functionally defined movement is also likely to increase" (p. 69). For example, because it is morally and politically impossible to keep an individual confined to a single cell on any continual basis, inmates, at some point, are going to be drawn into global patterns of movement and encounter. Thus, the probabilistic aspects of space will surface.

What space syntax reveals is that aspects of informal behaviors are spatially dependent and, more particularly, that movement, behaviors, and encounters depend on spatial integration (Hillier and Penn, 1991; Peponis and Stansall, 1987). Movement, awareness, encounter and communication, as by-products of spatial configuration, and over and above the requirements of particular activities, thereby generates a social field that is unstructured, but which acquires a social identity by virtue of its use[8]. What is needed, therefore, is to link the idea of the inverted building to the distinction of strong and weak program buildings. The question is: What ranges of probabilistic movement, awareness and encounter are available, and to whom?

Inversion, as described in Hillier and Hanson's example, is an extreme case in which visitors are deep and have no exposure. The idealized reversed building gives the global probabilistic effects (the "what you see when you walk down the corridors") to the inhabitants and restricts the probabilistic effects almost to zero for visitors (you "see" nothing from a cell). By contrast, ordinary buildings may make inhabitants and visitors unequal, but they expose both to some degree of probabilistic effect ("who do you meet in an office foyer even if you have no access to the board room?"). It is therefore useful to link the inverted buildings to probabilistic effects: 1) at one extreme, visitors have the most global exposure and inhabitants the most local; 2) at the other extreme, visitors have zero exposure and inhabitants all. Thus, the underlying inequality between inhabitants and visitors that is played out in any building could be about the range of probabilistic exposure available. A general syntactic theory of

[8]The sociologist Park surmised this relationship long ago in his early translation of social dynamics into the realm of space and distance: "Since so much that students of society are ordinarily interested in seems to be intimately related to position, distribution and movements in space, it is not impossible that all we ordinarily conceive as social may eventually be construed and described in terms of space and the changes of positions of the individuals within the limits of a natural area" (in Ricci, 1971, 67-68).

control should shed more light on the nature of "reversal" and how it affects the probabilistic and deterministic aspects of building function.

The issue of control is, therefore, deeper than the production of authority through material means. There is a distinction between rule and practice, between what behavior ought to be like and what it is. Space can be made to map organizational aims and to reproduce in spatial structure specific intents. However, space does more than "map" society. No matter how deterministic, space also has a generative dimension which impinges on the balance and accommodation achieved between formal rule and actual practice. Space can be considered not only as a reflection of society, but also as an independent entity capable of generating its own effects.

Studies Showing the Probabilistic Dimensions of Control

Indeed, the idea that space has probabilistic dimensions adds another layer to any theory of control. However, while itself an interesting theory, one must also ask if it has borne fruit. There are, in fact, several studies which suggest that the configurational and relational pattern of space affects other, more indirect, modulated models of control. Peponis (1985) for example, in his analysis of factory spaces, found that space contributed to two different models of supervisory control over production -- one model based on "relatively unpredictable movement and direct face to face contact" versus a model based on "continuous surveillance and adherence to formal rules" . The adjacency of foremen's offices to the best connected shop floor spaces allowed constant supervision over production. Such continuous surveillance led to some tension between workers and supervisors. An indirect model, however, existed where the location of supervisor's offices elsewhere in the building forced the supervisors to circulate through their domain on intermittent rounds. Control was thus exercised through a peripatetic model of supervision, with workers more or less controlling themselves because they never knew when the supervisor would appear[9]. Rather than constant surveillance, the relationship was between control and the modulation of movement required by the spatial location of offices. While not directly concerned with control, this study suggests that space, in the way it generates movement and interface, can contribute to different modes of supervision or control.

The mediation of the environment in terms of control was also found in a pilot study of educational spaces (Peatross and Peponis, 1994). Faculty offices were either embedded within dispersed design studios or located a distance away from them in a cohesive faculty grouping. While one would expect more direct control to be exercised by embedded faculty over their design studios, the opposite actually took place. Embedded faculty, having to pass through the studio to and from their offices many times during the day, were seen to more casually interact with studio students than faculty located further away, and who visited the studio only during their teaching time. Faculty with more distant offices seemed to profer more formal supervision over their studio, perhaps because they lacked an informal reason for being there. This study also suggests that the form of social control between teachers and taught may be mediated by spatial layout.

Control may also be exercised through circulation paths. Choi (1991) identified another definition of control -- control as a property of layout affecting the pattern of "free exploration" rather than control as an exercise of organizational authority. Studying movement through museums, Choi found that the pattern of spatial integration affected the pattern of movement[10]. Whereas earlier theorists had determined that

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9 This is surprisingly similar in intention to the panopticon principle without its overt expression.
10 Spaces are a number of steps from all others. Those that are spatially closest to them all are the most integrating.

routing of visitors to promote viewing of certain objects could be programmed spatially by segmenting space to give a selection of itineraries, or by providing a choice of routes, or even, as in the Guggenheim, coercing movement by making the circulation unilinear and sequenced, Choi found that the density of space occupancy could be modulated in accordance with the integration of spaces into the rest of the spatial system. Thus, movement could be probabilistically "controlled" through spatial layout, even though appearing to be totally free, given the lack of organizational restraint and the availability of spatial choices.

A preliminary study of Veteran's Administration hospitals also suggests that the layout of space may affect the different modes of control that are exercised (Peponis and Choi, 1991). An analysis of seven different floor plans revealed three different interface models for local control in hospitals: 1) a direct surveillance model where the location of the nurses station offers full views of circulation paths and lounges; 2) a door check model where the nurses station is located to control the entrance to the unit; and, 3) the information center model where the nurses station is located at a major circulation junction but offers no surveillance over circulation, entrance or dayroom. In addition, the potential for global control is exercised by the configuration of circulation routes. While no behavioral observations were made in this study, Peponis and Choi argued that the ability of staff to exercise control effortlessly would be affected by the degree of surveillance from the nurses station and by the circulation system. For example, if the nurses station controls the entry, the nurses know residents cannot elope. If they do not have a direct view of the entry, however, staff need to be more active in locating the position of residents. Control would, therefore, be more discreet where the nurses station controlled the entry to the unit but was segregated from patients rooms, and where circulation formed a "net" - like pattern through the unit.

Control was assumed to be more direct where the nurses station was positioned to offer surveillance of the dayrooms and lounges and where circulation was more "tree"-like.

This study was much extended by Connell (1993) in her comparative study of elopement control in special care units of hospitals. She noted that

> more localized and diffused opportunities for control offer a better model for achieving an architecture in which movement in specific locales can be scrutinized and regulated, but elsewhere normal, spontaneous movement is not only allowed but encouraged spatially (Connell, 1993; 309).

In other words, her study suggested also that movement could be contained internally through spatial configuration, thus making only the boundaries critical.

Taken together, these studies suggest that space syntax, a quantitative, descriptive theory of space, has been able to capture some of the critical differences in layout that have implications for control. Thus, space syntax provides an interesting and useful analytical framework for exploring the question of control. Accordingly, this thesis will use the analytic techniques of space syntax in order to describe the spatial organization and the pattern of space use in custodial environments. This is consistent with trying to develop a spatial theory of control that brings together the distinction of normal and inverted buildings with the distinction of strong and weak program buildings to account for strong, and more normalized, control regimes.

5. Summary and Discussion

The aim of the nineteenth century designs, architectural and organizational, was to achieve "total" control in the sense of a rigorous application of regimes under the authority of knowledge and through the elimination of horizontal interactions between people. Against this extreme model of control, which is clearly inadequate as a model of control in general because most ordinary organizations could not fit into it, are softer control models which balance restrictive aspects with permissive aspects of some sort. From the review of the literature on the normalization of custodial environments, it is not clear what theories are being brought to bear on the dilemma of balancing restriction with permissiveness. The architectural correlates of modulated forms of control are only partially known and are to be further elucidated through this study.

None of the studies examined look at spatial layout and configuration as a primary dimension of control or at how space can generate certain patterns of behavior in residents where the need for direct behavioral imposition is modulated. What they offer most clearly, however, is a strong suggestion that awareness in the form of socialization and movement are critical aspects of normalized behavior. While the literature tends to focus on design dimensions that offer specific instances of deinstitutionalization such as home-like furnishings, the avoidance of hard surfaces and long corridors, or means of subverting overt surveillance, these are merely appurtenances of a normalized environment if a resident is restricted in the ability to maintain contact with others. For life inside an institution to resemble life beyond the institution -- in other words, for an environment to be normalized -- the two main prerequisites of personal autonomy and control are the ability to move freely and to maintain awareness of others. If these are curtailed, then all the home-like features so often touted will little matter.

As suggested earlier, these aspects of space use are by-products of spatial configuration. Space use, or distribution of behaviors, in itself becomes morphologically patterned because behaviors occur in space in ways which are structured and consistent. The problem, therefore, lies not in just identifying and providing the homelike features which have been shown to opportunize movement or stimulation in other places. The problem comes in describing these features in a systematic way in terms of the spatial variables that impact awareness and movement, given the requirements of organizational regimes and routines aimed at containment and modulated control. Juvenile detention centers and Alzheimer's units are two organizational units requiring aspects of control. By addressing these two types of restrictive buildings, an attempt will be made to relate control with the broader characteristics of buildings, such as the modulation of encounter patterns and awareness.

The purpose of this thesis, therefore, is to systematically examine the role of spatial layout in facilitating surveillance and imposing or eliminating behaviors according to institutional requirements, but also to look at the role of layout in sustaining the patterns of movement, awareness and encounter that are consistent with less rigorous control organizations and with the aims of institutional normalization. This thesis is an attempt to contribute towards a more general theory of control which has permissiveness at one end and extreme regulation at the other. Such a description should allow one to develop new design bearing in mind these spatial properties as well as to evaluate and compare existing designs in terms of these properties.

CHAPTER III

THE OUTLINE OF RESEARCH

1. Introduction

The research design provides for an analytical and quantitative study of spatial and behavioral variables in the two types of settings, buttressed by an observational and qualitative study of the organization and its climate. It is anticipated that the qualitative study will provide the background information necessary in order to comment on the quantitative findings.

Alzheimer's units and juvenile detention centers, while functioning for two different populations at the pole ends of age, both entail some balance between allowance and restriction. Both settings also offer some conflict between deterministic and probabilistic functions of settings and both offer some attempt at social normalization.

The purpose of the research is twofold: 1) to examine how layout facilitates surveillance and imposes or eliminates behaviors according to organizational requirements, and 2) to examine how layout sustains the patterns of movement, awareness and encounter that are consistent with less rigorous control organizations and within the aims of normalizing environments. The central question, therefore, is how to achieve awareness, encounter and density within the constraints of the environments at hand. The thesis that certain spatial variables impact awareness and movement over and above organizational rules and routines is explored through case studies of six institutions -- three Alzheimer's units and three juvenile detention centers. The cases selected are not meant, however, to provide a statistical sample of institutions; their selection is discussed below.

The case study approach to a small number of cases will allow for first-hand observations and evaluation of the spatial setting and modes of control in their natural environment. While the problem of generalization always exists with the case study method, it is felt that such an approach allows the best means of formulating criteria for looking at control in restrictive environments and for eventually producing typological distinctions between various settings. Obtaining direct evidence was also considered critical, since previous studies have sometimes extended to the custodial environments under study conclusions based on empirical evidence from other settings (Calkins, 1988; Cohen and Weisman, 1991; Farbstein, 1987).

2. The Sample Selection of Alzheimer's Units

The sample selection of the facilities is described below. Because different selection methods were used for the two institutional types, the selection of the Alzheimer's units is discussed in this section with the selection of the juvenile detention centers discussed in Section 3.

Facility types for Alzheimer's patients vary from home care, to day care, to group homes, to long term care facilities. Alzheimer's is the most common form of senile dementia; it is a progressive, degenerative disease that attacks the brain and results in impaired memory, thinking and behavior. It eventually renders individuals totally incapable of caring for themselves. Approximately 4 million Americans are afflicted with the disease and it is estimated that by the year 2050, 14 million Americans will be diagnosed with Alzheimer's Disease.

The disease is classified into three stages. Stage I is characterized by forgetfulness, loss of familiar objects, and a word finding deficit. Stage II is distinguished by confusion, with individuals exhibiting difficulty with complex tasks, poor concentration, loss of way, and some impairment of reason and judgement. Stage III is the dementia stage where individuals are unable to initiate purposeful tasks, suffer severe memory loss, need reality orientation, and often become incontinent and in need of physical care. In the terminal phase of this stage patients often suffer from loss of basic psychomotor skills, abulia (loss of intentionality), and obsessional behavior; they may not be able to recall their name (Cohen & Weisman, 1991).

Given the etiology of the disease, only long term care facilities were considered for study because these facilities cater to those in the more advanced phases of dementia and typically entail the most regimentation and control, while still attempting to provide a residential-like ambiance.

Before a sample was selected for study, floor plans were obtained for twelve Veteran's Administration (VA) facilities, plans of facilities showcased in architectural journals were reviewed, and visits were made to five special care units in both Georgia and Florida. The study of VA and other floor plans, and the reviewed literature suggested that the location of the nurses station and the pattern of available circulation seemed to be an essential element of control. While in some plans, the station provided unobstructed views of most circulation or activity areas, in other cases it was located adjacent to a major entrance. The location of the resident activity areas and resident rooms also varied considerably in the plans; in the literature on Alzheimer's units, the location of these elements is considered critical for the spatial orientation of residents, the provision of opportunities for socialization and awareness (Cohen and Weisman, 1991), and to deter elopement (Connell, 1993). Other variability factors considered were the degree of "homelikeness" in terms of furnishings and materials versus the degree of institutionalization in terms of hard surfaces (Sommer, 1974). An effort was made to select facilities which offered enough variety in plan that any consistent findings about the correlation of spatial variables to the pattern of space use could plausibly have some broader relevance.

Until fairly recently, long term care Alzheimer units were usually carved from existing convalescent home space; therefore, most have the long, double-loaded corridors characteristic of many hospitals. Newer units, however, are being especially designed for those diagnosed with Alzheimer's disease. As noted earlier, behavioral improvements in Alzheimer's patients have been associated with facilities similar to the Weiss Institute, a facility compact in shape, with a large interior dayroom ringed by resident rooms (Lawton, Fulcomer, & Kleban, 1984). An effort was thus made to include one of these newer, more internally focused units in the sample, even though they are typically designed for smaller populations and thus would be somewhat smaller in size than convalescent centers.

Because of the scarcity of special care units for those with Alzheimer's and related forms of dementia, and because of the logistics involved in travel and in obtaining permission for extended site observations and behavior mappings, selection was largely limited to centers within a reasonable geographic distance, those willing to allow access, and those which varied in plan configuration. Three of the five special care units screened earlier were contacted and consented to study. Code names given to them are DAY, ATL, and ORM. Because the research involved human participants, the research proposal had to be reviewed and approved by the Human Subjects Review Subcommittee of the Georgia Tech Institutional Review Board before submission could be made to the various facilities.

All three Alzheimer units selected cater to Stage II and Stage III Alzheimer's patients in specialized units within larger convalescent and retirement centers offering a continuum of care. All units were were originally designed as general care geriatric nursing units; only recently (within the last two to four years) had they been renovated to cater to the growing number of Alzheimer's patients. All units are separated physically from the other service areas of the phased retirement centers. All are custodial units with alarmed monitoring systems at entries and exits with a code pad for access by staff and visitors. Because the exits cannot be locked per fire codes, they must be alarmed against elopement of residents. Within the unit, however, residents have their independence and are free to move about.

DAY, ATL and ORM vary in capacity from 20 to 39 residents, house both males and females, and have similar populations in terms of the ages, degree of disability and length of stay of residents. While the size of the facility was not a major determinant for selection, it was found that most of the newer compact designs are intentionally designed to house fewer residents; being smaller, they tend to also be more expensive. While ATL and DAY are both radial plans with the double-loaded corridors typical of hospitals, ORM is a compact plan, along the lines of the Corrine Dolan and Weiss Center, offering a central space surrounded by resident rooms. It also has fewer residents than the two other centers and is smaller in size.

In each of the units, there were one or two elderly patients who were not diagnosed with a form of dementia but who had chosen to remain in the unit when it switched service emphases, thereby changing residents and, in some cases, care personnel. Interviews with them revealed that their reasons for doing so largely related to familiarity with their own room and the unit and a disinclination to move to unfamiliar surroundings[1].

3. The Sample Selection of Juvenile Detention Centers

Three juvenile detention centers were selected for field study, using a set of sample selection guidelines. Again, the cases chosen are not meant to provide a statistical sample of detention centers. They were selected to offer a variety of floor plans and because they seemed, on initial visits, to vary in social atmosphere and degrees of overt control.

[1]For example, one 58 year old gentleman, diagnosed with brain damage, knew that his case was terminal. He stated to the researcher that he "would rather be with a bunch of crazy people who were at least interesting than with a bunch of old people on the edge of death". Another elderly woman stated that she liked the view from her room and she did not want to move again. A few of these more cognizant individuals were helpful to the aides, sometimes lending a hand in escorting the other patients to dining and so forth.

Because of the logistics involved in travel and visitation of centers, floor plans were first obtained of the 20 regional detention centers and four state juvenile institutions in the state of Georgia. The euphemism "youth development center" (YDC) is used for both detention and institutional settings in Georgia. The difference between these two settings lies primarily in their populations and length of stay but also in their building types. The regional detention centers house both pre-adjudicated male and female youth awaiting judgement and post-adjudicated male and female youth awaiting placement in a long term institutional setting. On the other hand, the state institutions house youth who have been adjudicated delinquent and in need of long term institutionalization. The regional detention centers in Georgia are all self-contained single buildings. The four institutional development centers all offer campus type environments with a variety of housing and activity components. The closest of the campus style state development centers was selected as a "pilot" site. The researcher spent a total of 14 days and evenings at the site conducting observations, talking with staff and residents, and formulating ideas before a final selection of sites and study design was made.

Of the 20 regional detention centers, eleven were built on the same prototype design with the same number of resident rooms; four were built on a newer prototype design, varying only in the number of resident rooms; and five have completely different floor plans but are mostly older facilities which have been adapted over time from other uses for the purpose of detainment. All offer some form of control room overlooking activity space and/or corridors and all use direct supervision where staff intermingle with residents in their units for the ostensible purpose of interacting more naturally with them, thus decreasing the overt control needed. Sometimes direct supervision is used in conjunction with indirect supervision, where additional staff occupy a control room which either oversees the units themselves or visually "pans" them with closed circuit television cameras (CCTV's). Both adult and juvenile direct supervision facilities are generally "unitized" in that residents are broken down into a number of small management units, usually ranging from 16 to 24 beds. The smaller units are meant to allow more direct supervision to occur, are touted as being easier to manage, and allow for easier future expansion of facilities.

Criteria for selection of facilities included ease of access, willingness of the administration to allow study, and classification in terms of floor plan. Based on these criteria, two regional detention centers in Georgia were selected as offering the most variation of floor plan in terms of architectural elements of control: the range of visibility, the location of control and activity spaces, and the patterns of circulation. The two centers selected consist of one of the newer prototypical plans and one of the five older floor plans -- the newer prototypical plan because it is representative of most of the facilities in Georgia and the older floor plan because it is representative of many of the older facilities nationwide that still house delinquent youth.

Because all but one of the housing units in the Georgia sample are radial in plan, and access to that unit was denied because of its high security, and because the newer juvenile facilities being built nationwide tend to be of the podular design type, another search was made of podular facilities that the researcher could gain access to. The closest such facility representative of this type that would allow access was selected as a third case. Access to this facility was gained through the helpful intervention of its planners, Rosser Fabrap/Justice Systems, Incorporated.

The detention facilities finally selected for study are in Georgia and Indiana. DEK, MAR, and IND are short-term detention centers housing mainly pre-adjudicated male and female youth awaiting placement in long term institutions. The DEK and MAR centers were both visited and observed for two days before being selected for study; the selection of the IND facility was made on the basis of its floor plan. Because all the detention centers hold far more boys than girls, a boys unit in each was selected for observation.

The three institutions vary in capacity from 40 to 140 total residents and vary in design configuration along a continuum from visually restrictive to visually open, in the location of their sleeping, control and activity rooms, and in the routing of circulation.

4. Observation Periods

After initial selection of the six sites, arrangements were made to visit the site for extended observations. The schedule of the field trips is shown in Table 3.1.

Table 3.1: Dates and Duration of Field Studies to Alzheimer's Units and Detention Centers

Facility	Location	From	To
DEK	Georgia	2/6 -	2/9/92
MAR	Georgia	2/13 -	2/16/92
DAY	Florida	3/12 -	3/15/92
IND	Indiana	3/19 -	3/22/92
ATL	Georgia	3/26 -	3/29/92
ORM	Florida	4/2 -	4/5/92

Each unit was observed for a total of 40 hours or more over a time period of four days. Although all the facilities operate 24 hours a day, seven days a week, observations were timed to coincide with major resident activity periods. In the Alzheimer's units, visits began at 9:00 or 9:30 a.m and ceased at 7:30 or 8:00 pm, covering most of the 7 - 3 and the 3 - ll staff shifts. While many Alzheimer's patients wander the facility at all hours of the night, most of them are ready for bed by 8:00 p.m. and are not really finished with their morning ablutions until about 10:00 a.m. Site visits in detention centers were also timed to coincide with major resident activity periods. Visits began after the youth were out of school, generally starting at 2:00 or 3:00 p.m. on weekdays and somewhat earlier on the weekend.

Observations were also timed to cover two staff shifts so a variety of staff could be observed. The visits were consecutive, including two full weekdays, and the two days of the weekend. No visits were conducted during a holiday period.

5. Data Collection

Data collection focused on building data collection and on behavioral data collection.

Building Data Collection

After the units consented to be a study site, as-built plans were obtained, where possible, from each facility or from the architects of record. Fortunately, the State of Georgia keeps as-builts of all detention facilities, and the Alzheimer's units all had plans on hand. Rosser Fabrap/Justice Systems kindly provided the floor plan for IND.

Once the floor plans were in hand, each facility, except IND, was visited for the purpose of plan verification. The researcher walked the entire facility, noting any changes to the plan such as additional doorways or spaces, and recording on it the location of all furnishings. Finally, the six floor plans were redrawn to the same scale, in preparation for spatial analysis.

Behavioral Data Collection

The behavioral data consists of behavior mapping (Hillier, Grajewski and Peponis, 1987), behavior tracking, and a paper and pencil measure.

Behavior mappings and trackings use a nonstructured field observation methodology, also known as a "naturalistic field observation" study. As Adams and Schvaneveldt (1985) note, in the nonstructured field observation technique, a particular setting is chosen in which individuals are to be observed. The environment is not tampered with but allowed to influence behavior within its own normal social boundaries (p. 238). The major distinction of this method from other observational studies is that rather than note-taking after observation periods, a formal rating form or scale is used to record each datum as it occurs. The type and form of behavior to be studied is predetermined; during the observation periods, only those behaviors delineated on the observational rating form are treated as target behaviors to be recorded. All other behaviors are treated as irrelevant, at least as far as their recording (Adams and Schvaneveldt, 1985; 238). A formal observation rating form is used to measure frequency of behaviors and the location of certain types of behaviors.

The nonstructured field technique is, therefore, more precise than informal observations, but being more narrow in focus, can also be less descriptive of the full range of behaviors within the general social ecology. In this study, the observation rating form consisting of floor plans on which the behavior mappings and trackings were recorded, was supplemented by interviews and observational notes.

Behavior Mappings were recorded to provide data on movement and interaction -- in other words, to obtain a "snapshot" of behaviors in the facility. The review of literature indicated that movement was an important feature for increasing opportunities for encounter and interaction as well as for providing stimulation and variety. Behavior mappings distinguished user category (resident, staff, or visitor) and behavior (move/stand, sit, talk); user locations and behaviors were recorded on the observation rating form (reduced floor plan) every 15 minutes during the visits (See Appendix A and B). In the Alzheimer's units, the observer walked through the facility from one end to the other, every 15 minutes; in the detention centers, the observer stationed herself with the boys unit but in a position to maximize visibility of all areas, so the recordings include those observations visible to the coder and within the isovists of the residents and staff.

The mappings do not include any interactions taking place within resident rooms (or shower and bath areas), as these rooms, for obvious reasons, were not entered unless the researcher was explicitly invited (they were not entered at all in the detention centers). In all facilities, Alzheimer's and detention, a closed door policy existed. Only the room resident (and invited guest) and staff ever intentionally entered the private rooms; in the Alzheimer's units, staff courteously knocked beforehand. Furthermore, because the research is about the effects of layout on behaviors, only such events that are spontaneously generated and self directed rather than programmatically accommodated were assessed, although this is not to say that accommodation is not a major design concern. However, the researcher did not map any explicitly programmed, staff directed activities such as activity therapy sessions or religious services in any of the units or centers.

Both residents and staff were told that the observer was a student studying the use of space. While the staff were initially somewhat self-conscious about having a constant observer in the unit, the press of their duties soon shifted their attention elsewhere. While the mappings might be considered intrusive, the Alzheimer patients did not seem to mind the researcher sitting amongst them with a clipboard or walking around the facility with board in hand. Several of the residents thought the observer was a rather young resident "doing a job for the nurses", while others "bought" the observer's story. Many asked if the observer was "getting the information needed" and commenting that she "certainly had a lot of work to do".

The detention center residents seemed more interested in the mappings than in the observer, sometimes asking which "x" on the floor plan they represented. On the whole, however, the youth seemed little phased by having a female observer in their midst; if anything, they preened to other units that their unit was chosen for a "special visitor". Administrators pointed out that the residents are often under observation by state accreditation board personnel and are used to having visitors in their unit. A part of their general disinterest may also be due to the fact that, as youth, they tend to focus on their own activities and cohorts with little interest in what the adults around them are doing.

Behavior Trackings. Because the movement of staff had seemed in the pilot observations to be associated with the amount and type of interactions between residents and staff, and thereby with the mode of control that is exercised, the researcher tracked staff for a period of six minutes after each mapping was made. The technique is an adaptation of one employed by Knight, Weitzer, and Zimring (1978) to record resident interactions with staff in a mental institution in order to assess normality. In this adaptation, however, tracking was added to the recording of verbal interaction in order to study the logic of staff movements and the areas covered. Movement patterns in the pilot study were intrinsically related to styles of control -- for example, following a definite path as if "patrolling" vs. more circumstantial movement, repeating the same path vs. varying it. It seemed during the pilot observations that more erratic movements of staff among residents was associated with less verbal control and more informal commentary while repetitive control up and down halls seemed to coincide with less interaction, or with direct orders to do something, and resulted in greater tension between staff and residents.

The trackings were operationalized by following a staff member during his or her shift and recording, on a reduced floor plan, their movement path and their verbal interactions with residents, other staff and/or visitors (see Appendix C). Sometimes in the detention centers, the staff member left the visual field of the observer; in these instances coding ceased because the observer was not allowed to move about the facility on her own. Each interaction was coded in terms of who initiated the interaction (resident, staff, or other) and its general content (directive or greetings/comment, or question or comment).

Social Climate Scale. A paper and pencil measure was used to quantify staff perceptions of the social environment. Staff most directly concerned with residents (nursing and custodial staff and security officers) were asked to complete a Social Climate Scale aimed at assessing the social environment, which also contained questions about the individual's age, sex, length of time employed in the unit, and length of time employed in the specific settings in general. This latter data was obtained to assess the consistency of care in each institution. This variable is considered important in establishing any social bonds and trust between staff and residents. High turnover of staff, and/or a high ratio of staff to residents has been regarded as detrimental to therapeutic goals.

The instruments used for assessing perceptions of social climate were developed at Stanford University's Social Ecology Laboratory (Moos, 1973; 1974; 1975). The social climate perspective assumes that environments have unique "personalities", just like people; measuring social climate is one means of characterizing human environments (Moos, 1975). As Moos (1975) notes, "almost everyone intuitively believes that the social environments or social climate has a significant impact on the people functioning in it" (p. 4). Like people, some social environments are more supportive than others, while some are extremely rigid and controlling. Moos and his colleagues assume that individuals vary their behavior in accordance with the characteristics of their social and physical settings, rather than that personality traits remain consistent across settings.

The present research is about the linkage of environment and behaviors. Because these scales assume an environmental "press", or directional tendency toward frustrating or satisfying individual needs on nine or ten subscales measuring relationship dimensions, treatment dimensions, and system maintenance dimensions, they were used 1) as a redundancy check on the researcher's perceptions of the social climate in the different units and centers and 2) as a formalized measure of organizational climate which could be correlated with spatial and behavioral data. The scales, in effect, are one means of quantifying the organizational climate.

Moos and his colleagues developed scales for both treatment environments (the Ward Atmosphere Scale - WAS) and for correctional settings (the Correctional Institutes Environment Scale - CIES). Both scales have been used extensively to measure various environments in asylums and hospitals (Milby, Pendergrass, Clarke, 1975; Moos, 1974) and in adult and juvenile correctional environments (Mitchell, Mason, and Davidson, 1991; Drummond, Barnard, and Mehnert, 1985; Ray, Wandersman, Ellisor et al, 1982). The social climate scales contain true-false statements aimed at assessing individual perceptions of the social climate in terms of: involvement, support, expressiveness, autonomy, practical orientation, personal problem orientation, order and organization, clarity, and staff control. Similar to a personality inventory, they measure, for example, whether the organizational personnel favors security and control over treatment, rehabilitation, or interaction between staff and residents.

The mean internal consistency reliability has been established, as have test-retest reliabilities (see Moos, 1974 and 1975). The WAS is 206 items and the CIES is 90 items. For this study, the short forms were used -- a 40 item short form of the WAS, and a 36 item short form of the CIES (see Appendices D and E). The short forms include the first four items of each dimension and provide a quick overview of social climate as perceived by staff in the facilities under study. Utilizing the short forms reportedly results in profiles highly similar to those obtained with the longer forms; the intraclass profile correlations between the short and longer forms are above .80 in almost all cases (Moos, 1987; 1975; 19745). As Duffee (1975) notes, there should be general agreement between the subscale scores and a general assessment of the climate by a trained observer.

Once the questionnaires were completed, the items were scored using the template provided; a score was obtained for each subscale by adding up the number of items on the subscale answered in the scored direction. Mean unit scores on each of the dimensions were then derived and standardized using the Standard Score Conversion tables provided. Unit profiles are generated by comparing these scores with one of the normative samples. For the WAS scale, a normative sample of 160 wards in 44 hospitals is available. The total number of patients and staff tested were 3,575 and 1,958 respectively. For the CIES scale, a normative sample of 112 units for juvenile (N= 3,657) and 96 units for staff (N=858) is available. The samples were taken from assorted treatment and correctional settings in various regions of the US.

Obtaining a Qualitative Picture of the Organizational Climate

Several means were used to collect background data with the aim of illustrating in a more holistic way the institution being studied. These included informal field observations and formal and informal interviews with staff and residents.

In addition to the nonstructured field observation methods described above, informal field observations (Adams and Schvaneveldt, 1985) were conducted during the site visits. Strategies consisted of observations, notetaking and gathering informant information from both staff and residents. Such informal rating techniques, while providing potentially richer and more complete information about a behavioral setting, are also more difficult to use with a high degree of reliability and validity. Observations, therefore, were used to buttress the more structured strategies described above.

Informal interviews were conducted with staff and residents during the site visits. During the visits, when not mapping or tracking, an effort was made to converse with as many staff and residents as possible to learn their impressions of the unit. Brief notes of these conversations were made on the mapping forms.

More formal interviews were conducted with unit or center administrators after the observations. The interviews consisted largely of topics determined in advance. The focus of the interview was aimed at assessing the administrative perception of the goals of the facility, staff interactions with residents, approaches to management and so forth (see Appendix F). These interviews were used as background information and were not systematically analyzed for content.

6. Techniques of Analysis

Spatial Analysis

Because syntactic analysis techniques are well developed, only an introduction to them is offered here. "Space syntax" is the name given to a research methodology and a set of quantitative analytical techniques developed in order to describe the configurational properties of built space and their underlying functional implications. The first complete statement of the theoretical foundations of space syntax is offered in Hillier and Hanson's (1984) The Social Logic of Space. However, the development of the methodology, analytic techniques and the cumulative body of research findings that stem from them can be traced in a series of articles addressing different fields including: architectural theory and design (Hillier, 1993; Peponis, 1993); building function (Hillier, Hanson and Peponis, 1984); housing and houses (Hillier, 1988; Hillier, Hanson and Graham, 1987; Hanson and Hillier, 1982); research laboratories (Hillier and Penn, 1991); wayfinding (Peponis, Zimring and Choi, 1990); museums and galleries (Peponis and Hedin, 1982; Hillier, Peponis and Simpson, 1982); the work environment and organization (Peponis, 1985); as well as the urban environment (Hillier, Penn, Hanson, and Grajewski, 1993; Peponis, Hadjinikolaou, Livieratos, and Fatouros, 1989; Hillier and Penn, 1992; Hillier, Hanson and Peponis, 1987).

Spatial Configuration as a Relational Pattern. Space syntax treats built space morphologically, or according to the relational pattern of permeability, visibility and connection that is established between one part and another or between part and whole. The rationale is that built space works not merely because it has extension, but rather because it is subdivided and conditionally reunited in ways which are supportive of habitation, organized activity and cultural identity.

Representation. The basis of syntactic analysis is to represent a plan so as to clearly define certain relationships. This is done in two main ways:

- The convex map comprises the fewest and largest convex spaces that are required to cover all the area under analysis. The mathematical definition of a convex space requires that any two points in it are joined by a line that fully lies on the space without crossing a boundary. Figure 3.1 below shows a floor plan (a) overlayed by a convex map (b).

- The axial map comprises the fewest and longest straight lines that are required to cover all the convex spaces and the connections of permeability between them. Figure 3.1 c shows the floor plan as an axial map.

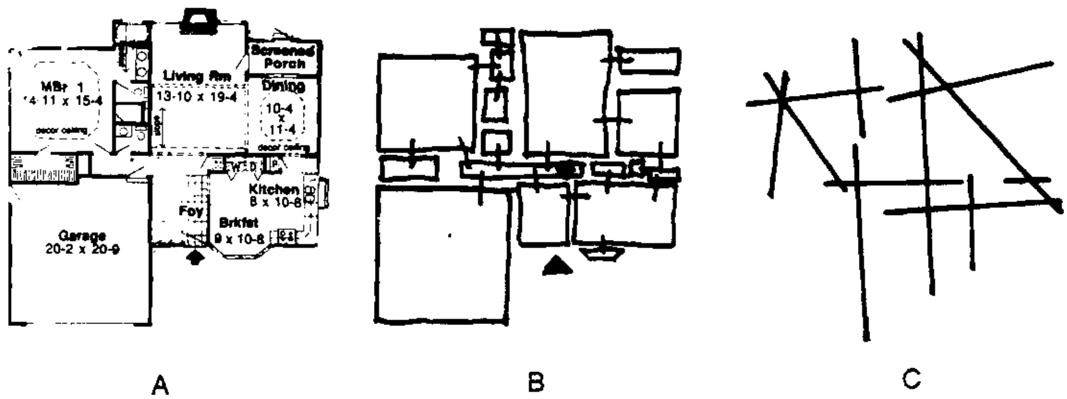

FIGURE 3.1: (a) Floor Plan of a House and (b) Its Convex and (c) Axial Maps

Thus, the convex map of a floor plan represents the largest fully continuous two dimensional components of the plan; the axial map represents the longest uninterrupted one dimensional extensions spanning across spaces that may not otherwise be fully visible. The reason for selecting these two representations as basic is that the convex map captures the complete experience of a space one has when one remains within it for a while. The axial map corresponds to the overview of connections that one experiences when one moves through spaces. Movement and stasis can be studied in relation to both maps[2].

Local and Global Measures of Connection. Space syntax is therefore about the study of convex and axial maps as patterns, or connections. Every convex or axial space belongs to its spatial system by virtue of the direct connections that it has with its neighbors; i.e., permeabilities in the case of the convex map, and intersections of lines in the case of the axial. The variable of connectivity is a measure of the number of direct connections of a space and is therefore treated as a local measure.

Another measure is needed, however, in order to deal with the relationship of a space to the rest of the system, or connections beyond the immediate neighbors. This is done through the concept of depth. The depth between any two spaces is the minimum number of other spaces that must be traversed in order to go from one to the other. Accordingly, the mean depth of a space in a system is a function of its depth from all other spaces. A space which is shallow from all other spaces is integrated to the system, while a space which is deep from other spaces is segregated. Integration is measured by a variable known as "RRA". This is a function of depth mathematically adjusted in such a way as to allow comparisons not only between spaces that belong to the same system, but also between systems of different sizes. RRA can, therefore, be treated as a global measure of connection. Smaller RRA values correspond to more integrated spaces[3].

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[2]In treatment settings, for example, one can ask whether static people position themselves so as to capture long axial views; or, one can ask how movement responds to the convex structure of space.

[3]Depth is first relativized into a measure known as RA which assumes values between O and 1. A maximally integrated space would have an RA of O while a minimally integrated space would have an RA of 1 regardless of the number of spaces in the system. Given the mean depth of a space, RA is defined by the formula RA=2(MD-1)/(k-1), where k is the number

The Integration Core: Representing the Order of Integration of a System. Integration, therefore, characterizes the extent to which a space is easily accessible from the rest of the system. The extent of syntactic accessibility of the system as a whole can be characterized by the mean integration of all its spaces. In addition, a fundamental property of the system as a whole is the order of integration of its spaces. The most integrated spaces can be treated as the integration core of the system. The usual convention is to include in the core the most integrated 10 percent of the total number of spaces. The location, shape and coverage of the integration core can be treated as structural properties of the system under investigation. The order of integration of the spaces comprising the system allows one to study how integration distributes itself, whether it gives priority to central or peripheral areas, whether it spreads through the system or clusters in some parts, and whether it suggests any definite shape such as a "spine", a "tree", or a "wheel". In order to represent the integration core of a system, an arbitrary proportion of integrated spaces can be singled out and represented diagrammatically.

The Justified Depth Map: Representing the Pattern of Integration from a Space. The pattern of integration from an individual space can also be represented diagrammatically so as to clarify the structural properties of a system. The justified depth map of a system is created by treating an individual space as the root of a tree and arranging all other spaces on successive lines according to their depth from the space taken as the root. Integrated spaces are characterized by "shallow bushes" while segregated spaces are characterized by deep branching sequences.

In the analysis of buildings, the justified depth map (shown in Figure 3.2 below) is usually drawn from the outside, taken as a single "carrier" space. Identifying the key activity or circulation spaces on the justified depth map helps to analyze the hierarchy of

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of spaces. RRA is a function of RA with values oscillating around 1. An RRA of 1 represents the average RA value for systems with a given number of spaces. The relativization of RA into RRA is based on a mathematical formula which as been used to approximate the empirically discovered trend whereby larger systems have smaller RA values.

accessibility and the extent to which there are circulation choices in moving from one space to another. For example, the foyer (F), garage (G) and porch (P) on the map below are all equally shallow to the carrier, while the master bath (MBa) is the deepest space in the system, being 5 steps from the carrier. Typically, the deeper into the building one is allowed, the higher the status. In the example, above, visitors would probably not be invited into the master bedroom or bath. In inverted buildings, such as the ones under study, being deep is not linked with high status, but with lower; i.e., the deeper one is confined in a prison, the worse off one is.

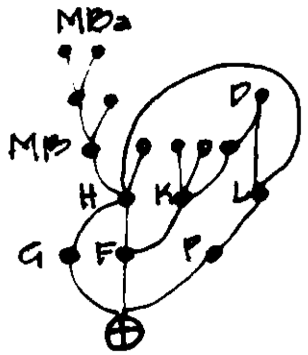

FIGURE 3.2: The Same Floor Plan Shown as a Justified Depth Map

It is sometimes useful to distinguish between the distributed and non-distributed parts of depth maps. The <u>distributed</u> parts are those spaces which lie on at least one circulation loop so that they can be accessed from at least two directions. In the figure above, all major activity spaces in the home, except the master bedroom and bath (MBR) are distributed, or lie on a "ring". The <u>non-distributed</u> parts comprise spaces (the bedroom) that lie on "trees" and can only be accessed from one direction. The distinction is important because non-distributed parts impose a single hierarchy of movement and make organized activities dependent on this hierarchy. Distributed parts provide more choices for movement and for relating movement to organized activities.

The distinction of distributed and non-distributed spaces is also important to this thesis because the more a system is distributed, the more control over access to its various parts becomes distributed around its various spaces. This diffuses social control too, since people with rights over the various spaces have an equalized opportunity to exercise control over movement. There are also more ways in and out with distributed systems, and thus more surprises in terms of who comes in and out and when.

In a system with rings (distributed), some category of users generally has exclusive rights over the use of those permeabilities. This means that a distributed system does not necessarily lead to a sharing of control but rather to a differentiation of users according to the rights of access. In an executive office plan, for example, the CEO will probably have one way in for visitors, and a "back door" allowing him to leave his office undetected by visitors in the reception area. It is interesting to compare the control that a certain category of user exercises in a non-distributed system to the control that a comparable category exercises in a distributed system.

<u>The Modulation of Movement and the Creation of a Pattern of Awareness: Spatial Configuration and Space Occupancy.</u> Integration, as measured by RRA, has proved to be a fundamental property of spatial configuration. The empirical studies cited above have shown that integration is often correlated to the numbers of people present in a space, and particularly to the numbers of people moving. Correlations between integration and the density of moving people are strong and consistent across large samples of data. Thus, the analysis of integration provides an account of the structure of one's awareness of other people as a by-product of moving through space. Through its correlation with movement, integration becomes linked to the creation of a pattern of encounter, and through this, to a pattern of potential communication. Insofar as encounter and communication arise as a by-product of movement, one can argue that through the modulation of movement, spatial configuration generates social functions over and above those that are explicitly programmed into the building.

Spatial Configuration and Space Occupancy: Cultural Genotypes. It is also possible to express the assignment of spaces to particular activities by giving spaces appropriate labels; i.e., dayroom, lounge, etc. Given a set of labels, one can ask whether there is a correspondence between the integration values of spaces and the labels assigned them. The question is relevant both with respect to a single building, when the same labels are given to several different spaces, and across samples of buildings, when one compares the spaces to which the same label is assigned. Research has shown that sometimes there are some invariant relationships between labeled space (Hanson and Hillier, 1982). For example, living rooms may be more integrated than dining rooms, which in turn may be more integrated than bedrooms. Such invariant relationships are described as "cultural inequality genotypes".

Isovist Analysis

While a syntactic analysis can reveal some of the similarities and dissimilarities between facilities, the addition of isovists to a study of syntax is helpful in assessing the field of awareness possible from a space or various spaces. The isovist field, as originally defined by Benedikt (1979; also Benedikt and Burnham, 1984) is "the set of all points visible from a given vantage point in space and with respect to an environment". In this study, isovists were drawn from all the points within a space. By drawing isovists from complete spaces, the necessity of having to choose a single vantage point is thereby eliminated.

Isovists are potentially more revealing of the life that occurs in spaces than just a study of the spaces themselves. In this study, there is one innovation that seems somewhat strategic in restricted environments. In syntactic and other studies, one usually studies behaviors in a space. In this study, both the space and its background are studied for the simple reason that background becomes an even more critical element in restricted environments than perhaps elsewhere. In Alzheimer's units, for example, background can offer opportunities for stimulation and information to frailer residents who cannot move; the activities seen beyond can still be accessed if desired, however, because residents can move independently. In detention centers, where spaces are expected to be somewhat more bounded than those in Alzheimer's units in order to better contain residents, movement is more curtailed for obvious reasons. This reduces the amount of global information that is potentially available to those who are contained; i.e., the "what is happening around here" information that is picked up through the presence of other categories of people. The background in these cases, therefore, becomes a "critical margin" in the experience of users because it can offer information and stimulation that is not available in any other way than visually. If one only measures the space, one misses out on a critical margin of awareness that can help modulate confinement. It is not difficult to surmise how background and animation can provide a measure of the potential normalization of experience in restricted environments.

In this study, the environment is distinguished as "foreground" or the spaces themselves, and their isovists, or the spaces "background". Data is derived for both from the behavior mappings. For example, the mappings reveal the density of categories and activities in the various spaces. Isovists, however, drawn from the occupied spaces reveal the density, categories, and activities seen beyond that room. In this study the isovists, or "background", are considered both "populated" when dense with people, and "animated" when they include more moving than static people. When they are animated, then even further variation is possible in the awareness potential. A measure of the background density and animation therefore allows a measure of total awareness in addition to the simple measure of what is happening in foreground, or the space itself.

These measures, and variations of them, are explained in the analytical chapters as they occur (Chapters VII and XI). It is felt that an explanation provided at that point will prove more helpful to the reader than any extended explanations here. A Glossary of Terms is also available to the reader in Appendix G.

Quantitative data such as spatial and behavioral measures, are statistically correlated using the computerized Statview package. Qualitative data, gleaned from the interviews and observation, is used to provide background information and descriptions and to characterize, and speculate upon, the more quantitative findings.

PART I: CHAPTER IV

DESCRIPTION OF ALZHEIMER'S UNITS

1. Introduction

This dissertation deals with two different populations and building types -- Alzheimer's units and juvenile detention centers. The following chapters are therefore arranged in two distinct parts. Part I of the dissertation focuses on the Alzheimer units while Part II focuses on the juvenile detention centers.

In this chapter, the three Alzheimer's units selected for study are described in terms of their philosophy, their staffing patterns, their patient makeup and their social and physical ambiance. This information was extracted from the formal and informal interviews with staff, from the demographic questions on the paper and pencil measure, and from the Social Climate Scale.

While the main thrust of this dissertation is spatial theory, the administrative mission and operations are intrinsically linked to the issue of providing balance between continuous care of residents on the one hand, and the creation of normal surroundings on the other. The descriptions of mission, staffing data, resident makeup and social climate and ambiance is meant to provide a "snapshot" of each residential centers programs and policies, the consistency of contact between staff and residents, and the general social ambiance in each facility. Their similarities or differences should be of use when assessing the more quantitative findings.

The spatial descriptions in this chapter are introductory in nature; subsequent chapters cover the spatial morphology of the centers in more detail as well as building use. The final chapter in this first part of the dissertation deals with the analyses of critical issues arising from the spatial and behavioral analyses.

As a brief overview, all three Alzheimer's centers are self contained units, housing, feeding, and for the most part, medically caring for the residents in their care. They vary in capacity from 20 to 39 residents, house both males and females, and have similar populations in terms of the ages, degree of disability and length of stay of residents. ATL and DAY are both radial plans with the double-loaded corridors typical of hospitals, ORM is a compact plan, offering a central space surrounded by resident rooms. It has fewer residents than the two other centers and is smaller in size.

Residents rarely leave the facilities unless on short outings escorted by staff or relatives. In DAY and ORM, resident meals are cooked in another part of the center and then carted in at mealtimes; in ATL, kitchen staff come in an hour or so before mealtimes to prepare meals in the kitchen within the unit. In all cases, unit staff serve the residents, clear the plates from the tables, and tidy up the dining areas after meals.

2. The DAY Unit

The DAY unit is part of a nursing and retirement center located in a resort community in Florida near a large shopping area. The Alzheimer's unit is only one part of a larger geriatric health care center, but is located in a separate wing of the building. It is configured like an irregular pinwheel, with three housing wings and one activity wing radiating from a central open area where the halls meet and anchored by the nurses station (the X on the plan)(see Figure 4.1).

The entry to the unit is at the bottom of the floor plan with access from the main reception area of the facility directly into the resident lounge. Each of the housing wings consists of a double-loaded corridor off which private and semi-private resident rooms are disposed[1]. Each of the wings ends in an exit door leading outside; two lead to a walking path which runs from one door to the other in an area enclosed by a high wooden fence; the third leads to a small, unused, fenced patio. All exits are alarmed.

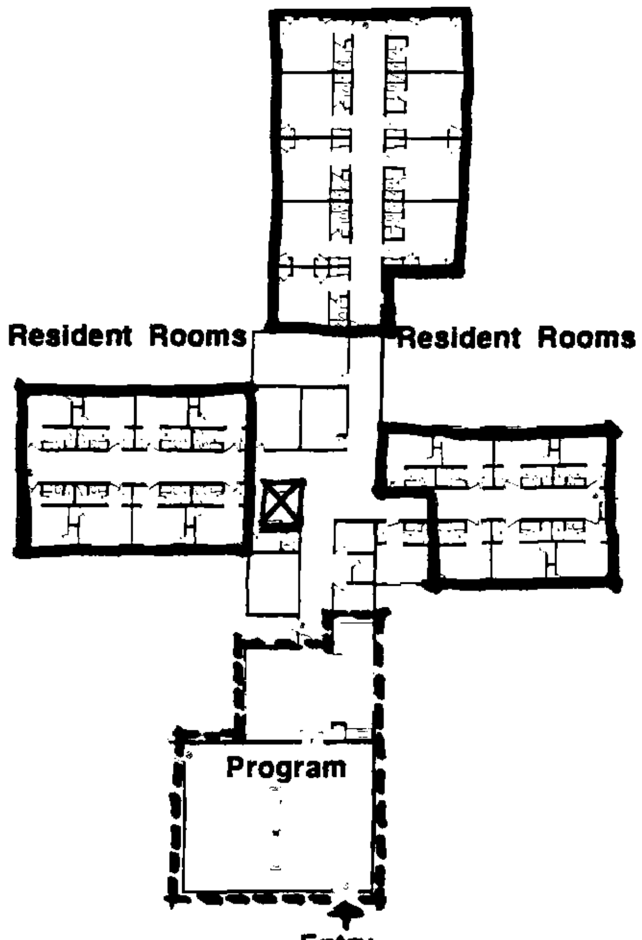

FIGURE 4.1: The DAY Alzheimer's Unit - Floor Plan Showing the Pinwheel Design With Nurses Station in the Center

[1] The single rooms are more expensive than the double rooms. There is some debate, unsubstantiated by systematic research, as to the efficacy of private versus shared rooms. Staff in all centers studied report that some residents prefer having company and perform better in shared rooms.

Mission

The mission of DAY is to improve the quality of resident's lives through involvement with others, through specialized programs, and through dignified treatment without undue reliance on medications or restraints. The stated concern of the administration is to ensure the residents a certain quality of life as they advance through the stages of the disease and to provide comfort and relief to their families. Staff report they encourage resident to resident and resident to staff interactions. The criteria for residence in the unit include: ambulation, manageability, the ability to feed oneself, and the ability to assist in daily living activities (such as dressing oneself). While continence is required for initial admittance, many of the residents have advanced to the stage of disease where they are incontinent.

Demographic Data

Resident Data. At the time of the field study, there were 27 residents living in the unit and from one to three day care residents who were on site from about 9am to 5pm during the weekdays. The 27 residents were housed in 25 private and semi-private rooms (five of the rooms have double occupancy and three rooms were unoccupied). Of the 27 residents, five (19%) were male and 22 (81%) were female. The median age of residents was 82, within an age range from 70 to 93. The unit had become an Alzheimer's unit in April, 1990.

Staffing Data. The following information is given for comparative purposes and to show consistency and constancy of staffing. This has been cited as an important element in therapeutic environments as it increases chances for stabilization of relationships and opportunities for socialization (Cohen and Weisman, 1991).

The staffing pattern during the 7am-3pm and the 3pm-11pm shift is one licensed practical nurse (LPN) and three certified nursing assistants (CNA's); the

11pm -7am shift has two CNA's on duty. During weekdays, in addition to the direct care staff, a registered nurse (RN), an Activity Therapist, and several volunteers assist in providing for the needs of the residents. In terms of direct care staff, the resident to staff ratio is 9:1.

Of the 31 direct care staff on call for this unit, only one (3%) is male. By self-report, the median age of the staff is 37. They had worked an average of one year and two months on this particular unit, but an average of seven years and seven months in treatment settings in general.

Physical Ambiance

The physical ambiance of the DAY unit is pleasant but rather spare (see Figures 4.2 to 4.5).

FIGURE 4.2: The DAY Unit - Illustrating the Linearity and Assortment of Chairs in the Lounge and Entry

FIGURE 4.3: The DAY Unit - The Dining Area With Colorful Tablecloths

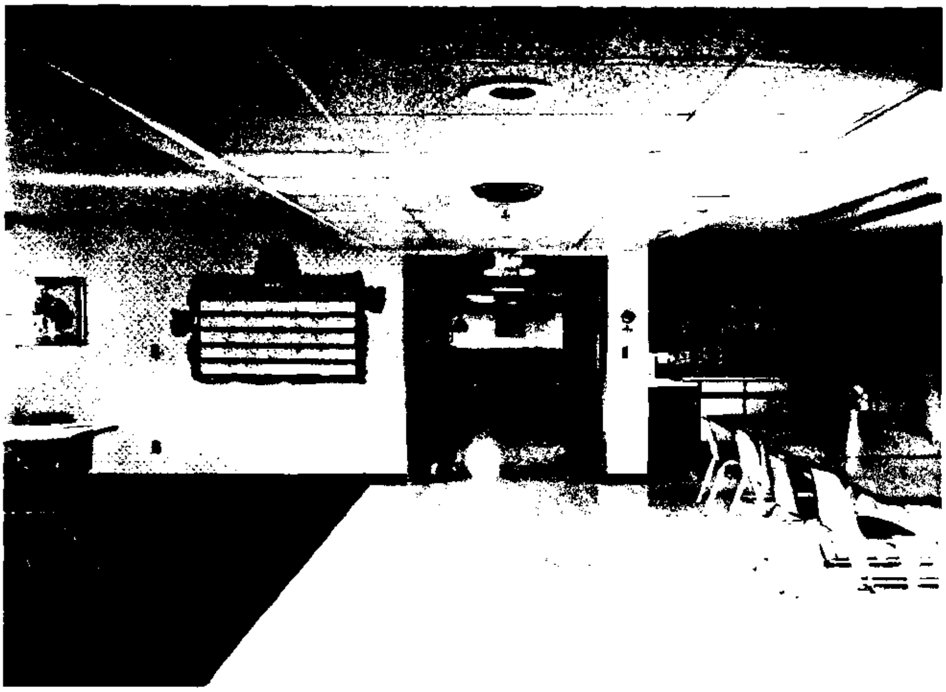

FIGURE 4.4: The DAY Unit - The Activity Areas and the Hall to the Nurses Station

FIGURE 4.5: The DAY Unit - The Nurses Station Overlooking the Nurses Hall and One Resident Hall

The finishes and furnishings in warm colors and quiet patterns are residential in character and there are colorful pictures on the walls. The floors are vinyl composition tile except in the lounge which is carpeted. The furniture in the lounge area is arrayed around the perimeter of the room and aligned in rows in front of the television set. This linearity, along with the large size of the room and the fluorescent lighting, give it a somewhat institutional "look". However, residents over the years have donated or brought their own chairs and tables, so there are a variety of styles and colors mixed together which gives the lounge a somewhat disheveled, but differentiated, character, an attribute cited as more "homelike" (Cohen and Weisman, 1991; Coons, 1990).

The dining room has round tables, covered with colorful plastic tablecloths; it is separated from the adjacent lounge by a planting shelf filled with silk plants. Overall, the unit is well maintained, well lighted, and with much natural light coming in from the windows on either side of the activity rooms and the ends of the housing corridors.

Each resident room overlooks a private patio and green lawn beyond (which is inaccessible to the residents). While the bed is provided, residents are encouraged to bring their own furnishings to their rooms. Each room is thus different, and some of them are very charming. Each door is painted a contrasting color and each resident room is identified with a handprinted nameplate of the resident(s), personalized by a small drawing showing the favorite hobby of that person[2]. This touch provides redundant cuing for often confused residents, and lends a friendly and personalized touch.

The nurses station, located deeper within the facility at the junction of the housing wings, has an access counter surmounted by a glazed panel. It has a lockable swing door to discourage residents from entering the interior of the station.

Social Climate

In order to assess the social environment of this unit, the Moos Social Climate Scale was given to all 31 of the direct care staff on call for this unit. The response rate was 88% (27 responses). The scores were standardized and compared to a national reference group sample[3]. As Table 4.1 below illustrates, while the greatest emphasis at DAY is on order and organization, of the three overall dimensions measured --

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[2] This information is provided by the family or admitting relative. Few of the residents can remember their favorite hobby when asked.

[3] The use of this scale for assessing the climate in Alzheimer's units is questionable and the results should be viewed with caution. The treatment environments generally evaluated with this scale (and those of the normative sample with which it is compared) are more therapeutic in nature, such as university affiliated acute programs and psychiatric units. While its use as an evaluative tool for Alzheimer's units is therefore limited, it was determined that it can discriminate among programs and does provide an adequate comparative profile of staff assessment of their general environment. The comparisons to the national reference sample, however, are of limited value.

relationship, personal growth, and system maintenance -- the relationship dimensions as a group receive the highest priority, being even higher than the national sample.

The relationship dimensions tap the extent to which patients are involved in the program, the extent to which staff help patients and patients care for one another, and the amount of openness and expressiveness that are encouraged among those involved in the group. Thus, the DAY staff view their environment as high on order and organization, but also with creating a nurturing and caring environment for patients. Lowest of all dimensions were those measuring aspects of personal growth of patients -- entirely understandable when considering the nature of Alzheimer's disease and the intractability of real treatment of these patients.

Table 4.1: WAS Form S Profile for Staff in DAY Program Highlighting the Relationship Dimension

	DAY Staff (n=27)			Reference Sample (n=1958)[4]		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	3.33	.961	**62**	2.42	.77	50
Support	2.96	.71	**56**	2.69	.55	50
Spontaneity	3.23	.91	**61**	2.63	.51	49
Personal Growth Dimensions						
Autonomy	2.11	.80	31	3.19	.57	50
Practical Orientation	2.32	.75	20	3.46	.38	51
Personal Problem Orient.	2.0	.93	45	2.37	.79	50
Anger and Aggression	2.12	.93	35	3.02	.61	50
System Maintenance Dimensions						
Order & Organization	3.63	.49	**66**	2.31	.81	50
Program Clarity	1.95	1.2	38	2.69	.58	50
Staff Control	1.	.0	44	1.32	.57	50

[4]The American normative sample is composed of 160 programs in 44 hospitals located in 16 states. Included are units from state hospitals, Veterans Administration hospitals, university and teaching hospitals and community and private hospitals.

3. The ATL Unit

The ATL unit is an extended care facility offering phased living for the elderly, located in a residential area of a metropolitan city in Georgia. The site is wooded and studded with several types of buildings including residential towers for independent living, an intermediate nursing facility, a skilled nursing facility and a geriatric hospital offering inpatient and outpatient services.

Two floors of a free-standing seven story highrise are devoted to the Alzheimers Service; the other five floors offer regular intermediate nursing care for older people who are no longer capable of living alone. The fifth floor unit was selected over the fourth floor unit because its residents are more ambulatory and more similar to the residents in other units being studied. The fourth floor houses the more advanced cases of dementia.

In plan, the ATL facility is shaped like a "T" turned on its side with the resident rooms located in the three extensions (see Figure 4.6). Entry to the unit is by elevator from the first floor to the center of the "T", which is anchored by the nurses station (the X on the plan). Each of the wings consists of a double-loaded corridor off which private and semi-private resident rooms are disposed. Each of the wings ends in a door leading to an enclosed stairwell linking all the floors. All exits are alarmed. The resident activity spaces are dispersed off the longest corridor. The lounge is closest to the nurses station in the core of the building; the dining room is located down the hall near the kitchen.

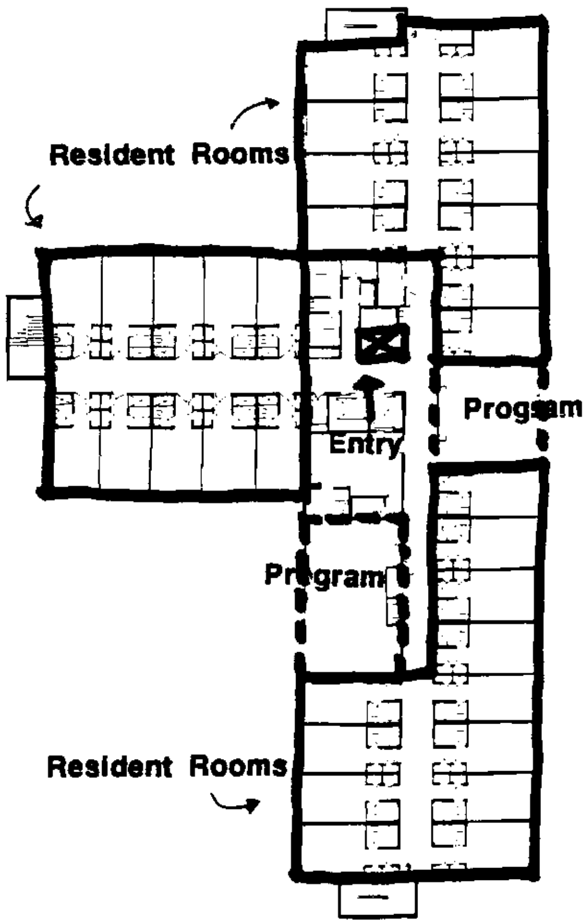


FIGURE 4.6: The ATL Unit - Floor Plan With Centralized Activity Areas and Nurses Station

Mission

The stated mission of the Alzheimer's unit is the therapeutic care of residents and families through understanding, acceptance and response to patients needs. The emphasis is on individualized care within a structured environment, and not on treatment. Since Alzheimer's disease is degenerative with no known cause or cure, the administration of ATL readily admit that the best they can do is offer patients a certain quality of life while they go through the stages of the disease. The program consists of a psycho-social program which emphasizes interaction with other patients and with staff and purposeful movement. The criteria for residence on this floor include ambulation, continence, manageability, the ability to feed oneself, and the ability to assist in the usual activities of daily living. Some of the residents have advanced to the stage of incontinence.

Demographic Data

Resident Data. At the time of the field study, the unit housed 39 residents in 32 private and semi-private rooms (ten rooms had double occupancy and three rooms were unoccupied). Of the 39 residents, 11 (28%) were male and 28 (72%) were female. The median age was 82, within a range from 55 to 94. The unit became an Alzheimer's unit in 1988.

Staffing Data. The staffing pattern during the 7am-3pm and the 3pm-11pm shifts consists of one licensed practical nurse (LPN) and three certified nursing assistants (CNA's)(with one CNA going off duty at 9pm when most residents are abed); the Il-7 shift has I LPN and 1 CNA on three nights of the week and l/2 LPN and 2 CNA's the remaining four nights of the week. During weekdays, a Registered Nurse (RN), the Program Director, an Activity Therapist, a Social Worker and a Unit Clerk move between the two Alzheimer floors. Staff also includes a Food Service Assistant for each meal and one Diet Technician who works both floors. In terms of direct care staff, however, during waking hours, the resident to staff ratio is 9.75: 1.

Of the 24 staff on call for this floor, all are female. According to self-report, the median age of the twelve respondents is 37. They had worked an average of five years and ten months on this unit (even before it became an Alzheimer Service) and an average of 13 years and three months in treatment settings.

Physical Ambiance

The unit was recently refurbished (see Figures 4.7 - 4.9). The public areas of the floor are carpeted, except for the dining room and kitchen, and the walls are embellished with pictures; the perimeter walls all have large windows overlooking the wooded site. The lounge furniture consists of an odd assortment of chairs brought by residents along with some recently refurbished; the furniture is, however, rigidly aligned against the walls of the lounge with a double row of chairs in the middle of the room facing the television set. While the linearity of the arrangement gives it an institutional look, it is functional for watching television. The primary lighting is fluorescent, but the lounge has residential table lamps. The dining room contains tables for four, with cheerful pink and teal tablecloths. It offers a pleasant prospect from its windows, although few residents take advantage of it.

FIGURE 4.7: The ATL Unit - View From the Nurses Station Showing the Nurses Hall and Part of the Lounge

FIGURE 4.8: The ATL Unit - View from Resident Lounge To the Nurses Hall

FIGURE 4.9: The ATL Unit - View into the Nurses Hall Showing the Long Corridor

Residents are encouraged to bring familiar items of furniture and accessories from home for their rooms, such as a chest, bedside table, lamps and a comfortable chair. The private rooms thus vary in the degree of personalization, with some of them beautifully furnished and some of them rather spare. Overall, the fifth floor unit is pleasant, nicely furnished in a residential fashion, and well maintained.

Social Climate

The Social Climate Scale was given to all 24 of the direct care staff assigned to this floor in order to assess its social environment. The response rate was 46%. The results indicate that spontaneity, order and organization, and involvement are emphasized in the unit, all being higher than the standardized scores of the reference sample (see Table 4.2 below). Overall, the relationship dimension is the most highlighted, but the scores of one of its scales is below the reference sample mean.

Table 4.2: WAS Form S Profile for Staff in ATL Program Highlighting Spontaneity

	ATL Staff (n=11)			Reference Sample (n=1958)		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	3.27	.90	**61**	2.42	.77	50
Support	2.54	.52	46	2.69	.55	50
Spontaneity	3.45	.52	**66**	2.63	.51	49
Personal Growth Dimensions						
Autonomy	2.09	.83	30	3.19	.57	50
Practical Orientation	2.4	1.17	22	3.46	.38	51
Personal Problem Orient.	1.8	.79	43	2.37	.79	50
Anger and Aggression	2.91	1.13	48	3.02	.61	50
System Maintenance Dimensions						
Order & Organization	3.36	.92	**62**	2.31	.81	50
Program Clarity	2.12	.83	39	2.69	.58	50
Staff Control	1.	.0	44	1.32	.57	50

While the open expression of feelings by both patients and staff is highlighted, and patients are encouraged to be active and involved in the program, not as much emphasis is seemingly placed on support, i.e., how much patients help and support each other and how supportive the staff is toward patients. As expected in an institutional setting, order and organization in the program are also of import. Personal growth dimensions are, again understandably, among the lowest scores as a group.

4. The ORM Unit

The ORM unit for Alzheimer's patients is part of a multi-phased retirement community in a seaside city in Florida. The community includes independent retirement apartments, assisted living apartments and skilled nursing care in a convalescent setting. The unit is separately located in a free-standing, one-story building.

The Alzheimer's building is compact, and square in shape (see Figure 4.10). The resident rooms surround three sides of a centralized lounge and dining area with an arcade separating the resident rooms from the lounge. The fourth side consists of the circulating arcade extending outside the building to become a screened porch overlooking a large, but inaccessible, lawn studded with ponds and palm trees.

The main entry, a small foyer, overlooks a parking area and the *porte cochere* of the extended care building next door; another exit, on the opposite side of the building, leads to a fenced trash area. The doors leading from the building to the screened verandah are only locked at night, but the doors out of the porch onto the grounds are kept locked. The two main entry/exit doors are alarmed and the entry door has a keypad for controlled access. The nurses station is located off the hallway leading from the main entry, with a small window onto the entry foyer (marked with an X on the floor plan).

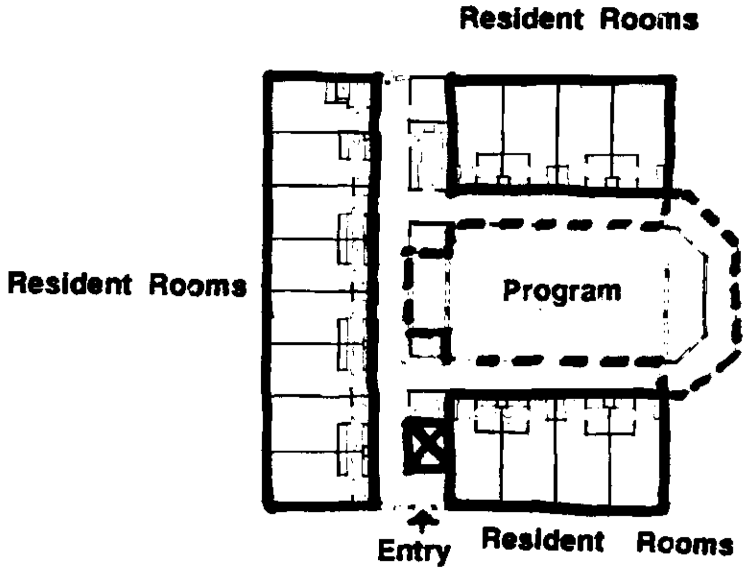


FIGURE 4.10: ORM - The Compact Floor Plan Showing a Central Activity Area

Mission

The stated mission of the administration is to allow residents to maintain their maximum level of individuality within a "family-style" environment. The program provides mental and physical stimulation, and there is an emphasis on interaction and involvement with other residents and with staff. The criteria for residence is ambulation, continence, ability to feed oneself, and the ability to assist in personal care. Several of the residents, however, have advanced to the stage of incontinence.

Demographic Data

Resident Data. There were 20 residents living in the unit at the time of the field study. The unit has eight private rooms and eight semi-private rooms; four of the semi-private rooms were double-occupied during the site visits. Of the 20 residents, six (30%) were male and 14 (70%) were female. The median age was 82 within an age range from 70 - 92. The unit has been dedicated to Alzheimer's and dementia patients for a little over three years.

Staffing Data. The staffing pattern for the 7am-3pm and the 3pm-11pm shift is one RN or LPN and two certified nursing assistants; the llpm-7am shift shares a nurse with the extended care facility and has two CNA's on duty in the unit. Most evenings (3-11pm), the nurse is available in the Alzheimer's unit only periodically for pill distribution. During weekdays, a Registered Nurse, an Activity Therapist, and volunteers are periodically on-site, but the RN and Activity Therapist are officed in the building next door. In terms of direct care staff, the resident to staff ratio ranges from 6.67:1 to 10:1 on the evening shift, depending on whether the LPN or RN is on duty.

There are 28 direct care staff on call for both the Alzheimers and the extended care unit next door. The self-reported median age of the 27 staff members is 41. They had worked an average of three years and two months on this unit, and an average of eight years and eight months in treatment settings. All the direct care staff in this unit were female, with the exception of the kitchen helpers who delivered the meals.

Physical Ambiance

ORM is residentially furnished in a rattan "Florida Look" style (see Figures 4.11 to 4.13). The lounge includes a baby-grand piano, bookcases full of books and magazines, and walls papered with a colorful print. Furniture is arranged in a sociopedal fashion for "conversational" groupings, although residents often align the chairs in a more linear fashion themselves. Lighting is residential and ambient.

FIGURE 4.11: The ORM Unit - Dining and Lounge Viewed from the Dining Alcove

FIGURE 4.12: The ORM Unit - View from the Corridor into The Lounge

FIGURE 4.13: The ORM Unit - Corridor Near the Nurses Station and Front Entry

The dining area has wood parquet floors distinguishing it visually from the lounge area of which it is structurally a part; the lounge and halls (and some of the resident rooms) are carpeted. A skylight crowns the lounge/dining coffered ceiling, bringing natural light into the deep interior.

Residents are encouraged to bring personal touches and furnishings to their rooms. The private rooms have sliding doors onto small interior patios, but the doors are alarmed and locked. The ambiance, overall, is pleasant, residential, and up-scale.

Social Climate

The Social Climate Scale - Form S was given to the 28 direct care staff on call for this unit. The response rate was 50%. As Table 4.3 indicates, the greatest emphasis at ORM is on the relationship dimensions as a group, along with order and organization as a subscale. The highest standardized score is for involvement, or the degree to which patients are encouraged to be active and involved in the program.

The other high score within this dimension is for spontaneity, or how much the program encourages the open expression of feelings by patients and staff. Slightly lower but comparable to the mean of the national reference sample is the emphasis on the help and support staff and patients give one another. The least amount of emphasis, as indicated by the lower standardized scores, is placed on the extent to which patients are encouraged to be self-sufficient and independent and to develop practical living skills.

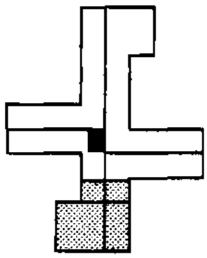
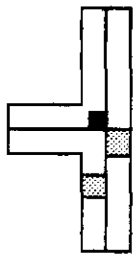
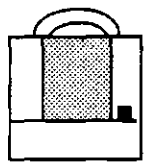
Table 4.3: WAS Form S Profile for Staff in ORM Program Highlighting the Relationship Group

	ORM Staff (n=14)			Reference Sample (n=1958)		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	3.5	.76	**64**	2.42	.77	50
Support	2.69	.75	**50**	2.69	.55	50
Spontaneity	3.0	1.22	**57**	2.63	.51	49
Personal Growth Dimensions						
Autonomy	1.93	.99	28	3.19	.57	50
Practical Orientation	2.27	.78	19	3.46	.38	51
Personal Problem Orient.	1.36	.50	37	2.37	.79	50
Anger and Aggression	2.64	1.08	43	3.02	.61	50
System Maintenance Dimensions						
Order & Organization	3.28	.91	**62**	2.31	.81	50
Program Clarity	2.09	1.13	39	2.69	.58	50
Staff Control	1.	.0	44	1.32	.57	50

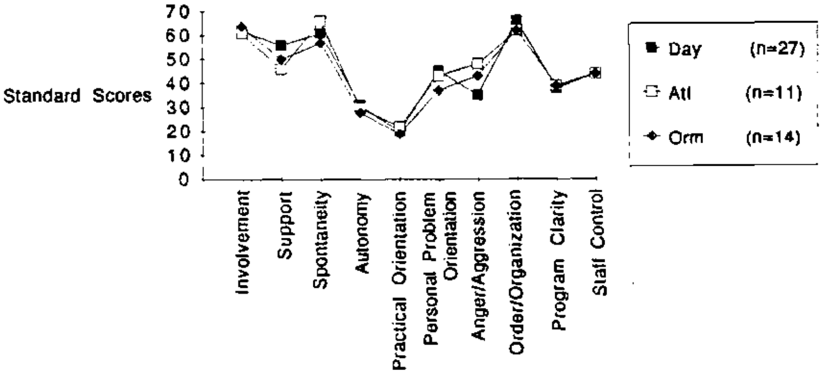
5. Summary

Table 4.4 illustrates the gross dimensions of difference and similarity. These differences and similarities are subsequently summarized and discussed.

Table 4.4: Summary Table of Alzheimer's Units Characteristics

	DAY	ATL	ORM
			
Resident Activity Areas	Clustered	Dispersed	Clustered
Circulation	Through	By	By
Total Residents	27	39	20
Number of Resident Rooms	25	32	16
Room Type	Sgl/Dbl	Sgl/Dbl	Sgl/Dbl
Median Age Residents	82	82	82
Median Age Staff	37	37	41
Resident/Staff Ratio	9:1	9.75:1	6.67:1 (10:1)

Social Climate (Form S Profiles for Staff)



The three Alzheimer's units selected for study are similar in mission, resident profiles, daily cost, social climate, and in the emphases on individual care. The units vary in spatial configuration, in size, and in general physical ambiance.

The three units vary most in terms of configuration. DAY offers a radial pinwheel plan with a clear center off which four wings pivot. The nurses station is in the center of the four wings, but the entry and the resident activity areas are located at the end of one of the wings, with the resident rooms located on the other three linear wings. Thus, nurses station and activity areas are separated. Clustering of activity areas has been identified as a salient environmental attribute for Alzheimer's patients because it is more understandable to residents and breaks down the institutional character.

ATL offers another radial plan, with three, rather than four, wings radiating from the central entry point. Again, the nurses center is located at the juncture of the housing wings, but in ATL this is also the main point of entry and overlooks one of the two resident activity areas -- the lounge. The dining room is embedded deeper in the building down one of the housing wings. Thus, the resident activity areas are separated from one another with only one under the purview of the nurses station.

ORM offers a compact cluster plan with most of the resident rooms arranged in a "U" around a centralized lounge/dining area. While the activity areas are thereby grouped and form a clear focus for the entire unit, and are easily negotiated from all resident rooms, the nurses station is located off the "U" and partially overlooking the entry, but none of the activity areas. In terms of its centralized activity areas directly accessible from resident rooms, its lack of "institutional" corridors, and because of its "homelike" ambiance, ORM could, on the surface, be considered the most therapeutic of the three environments (Calkins, 1988; Cohen and Weisman, 1991). The three centers thus offer three distinct plans with variation in the placement of resident activity areas, and in the placement of the nurses station or office. These configurational differences will be discussed in greater detail in the next chapter.

The three facilities also differ in routing of circulation paths. Circulation paths are important elements for Alzheimer's patients because they accommodate the "wandering" so characteristic of this population. Wandering has been defined as "extended periods of aimless or disoriented movement without full awareness of one's behavior" (Namazi, Rosner and Calkins, 1989, 1). The three types of wandering commonly found among those with dementia are restless activity seeking (typically found in environments that offer few opportunities to engage residents), habitual activity stemming from previous experiences, and disorientation resulting from the inability to find ones way in the setting (Gilleard, 1984). Wandering can also, however, serve as an outlet for a number of needs by providing residents with a degree of stimulation and challenge and increased opportunities for socialization with others (Cohen and Weisman, 1991). A wandering path can provide a positive outlet as well as accommodate the negative aspects typically associated with it such as elopement or wandering into unsafe areas.

Desirable characteristics for wandering paths are continuity, or a continuous loop as opposed to a dead end path, legibility (understandability in terms of one entry and exit), and landmarks along the way (Weisman, 1987). Evaluating the units circulation paths along these dimensions, both DAY and ORM provide continuous paths, while ATL provides only dead end paths. DAY's interior circulation is similar to ATL's with its three long wings, but it provides continuous loops at either end of the facility "shooting" the resident back into the main part of the unit -- one looping through the lounge and dining area, and one looping outside from one wing to another. ORM provides an interior loop with the path onto the screened porch but also contains some dead ends. In ATL, residents can only wander in a "T" -- up one wing and back, down another wing and back, and so forth except for a "detour" through the lounge. In both DAY and ATL, a checkpoint or activity landmark on each of the paths is provided in the nurses station. There is no major activity landmark in ORM; only the termination of the path.

Circulation is also considered important from the standpoint of whether it passes "through" or "by" major activity spaces. In therapeutic environments, residents should "have the opportunity to participate in activities without being required to do so", by having activity areas adjacent to, but not a part of, circulation (Cohen and Weisman, 1991). In this way, residents are not committed to entry but can evaluate the situation beforehand. While this issue will be examined more thoroughly in upcoming chapters, it is sufficient to note that DAY offers a linear path that passes <u>through</u> major activity areas (except the dining room), ATL offers linear paths that go <u>by</u> the major resident activity areas, and ORM offers another example of paths that go <u>by</u> activity areas. Thus, from a therapeutic standpoint, ATL and ORM could be said to offer more conducive paths.

The three centers also vary in ambiance with the greatest differences seen between ORM and the other two units, but all provide some "homelike" touches (Cohen and Weisman, 1991): there is no intercom blaring out messages, the architecture is not "hard" (Sommer,1976), the schedule is relaxed, and the furnishings are mixed and personalized. ORM's interior architecture and furnishings are more residential in character than the other two units, which are more "institutional" in terms of the material finishes and furniture arrangements in the lounge areas. Of the three, DAY is the most utilitarian in look, mainly because it lacks carpet in the corridors. DAY and ATL, in terms of furniture arrangement, are very similar with their rows of residents chairs aligned to face the television. In ORM, there is a similar orientation to the television but the seating is disposed in a more casual semi-circle. There are also smaller conversational groupings of chairs placed around the room, much like a small hotel lobby.

There is also a difference in numbers of residents and size, with ATL having the greatest number of rooms and the greatest number of residents, DAY being the next largest and ORM the smallest. While the number of staff on the various shifts does not differ greatly, the number of residents renders the resident to staff ratios slightly different. ATL shows the largest ratio with 9.75 residents per staff member, DAY the next largest at 9 residents to one staff member, and ORM the least at 6.67 to one (during the evening shift, however, the number of staff is often reduced, leaving a 10 to one resident to staff ratio). The age of staff does not differ widely, ranging from 37 in DAY and ATL to 41 in ORM. These ratios, and the fact that the staff had similar histories in terms of time spent in the unit, show a fairly constant and consistent staffing pattern in all. Consistency of staffing is an organizational means of providing a therapeutic and controllable environment because it allows residents to continually interact with the same individuals.

The mean age of residents is the same in all three facilities. The residents in all units were surprisingly similar in terms of their general level of cognizance and physical abilities. Indeed, they were far more interesting as studies in human psychology than the researcher anticipated, exhibiting moments of charm, humor and humanity that are unexpectedly endearing. They could also, at times, become exceedingly trying.

The three units are also very similar in terms of mission and in the way they view the provision of care. The stated policy in all is for staff to visibly oversee the residents in all public areas at all times. Visibility is considered critical for the protection and safety of residents who may injure themselves by falling or may injure others through anger or accident. The symptoms of dementia often render once pleasant and productive people disoriented, experiencing wide mood swings and personality changes that make their actions unpredictable, and at times even life-threatening. While the policy of visibility was laxly observed at some times in all the units studied, the staff in all do for the most part, keep at least a mental count of resident locations.

The units also all have recreational therapy programs conducted by an Activity Therapist with scheduled activities including exercise, crafts, current events, daily living skills, educational programs and parties. Staff occasionally take residents off-site on daily outings or luncheon trips, and all encourage resident involvement and independence to the extent possible. The caregivers are impressive in their efforts to preserve the dignity of residents and to go beyond the mere provision of personal needs.

Finally, as the social climate scale scores indicate, the direct care staff in each of the facilities perceive their social environments very similarly. As the histogram shows, the emphasis in all three facilities is on relationship dimensions and order and organization of the program. Lowest are the personal growth dimensions and the system maintenance dimensions of clarity and staff control. The lack on emphasis on personal growth is understandable in an institutional setting responsible for the welfare and safety of 20 to 40 demented patients.

The introduction to the spatial qualities of each facility and the demographic and social information is reported here for comparative reasons. Each of the three facilities includes patient ambulation as a requirement for acceptance to the unit but in each facility some residents are at threshold levels of competence. Thus, the issue of providing balance between direct supervision and responsibility for continuous care on the one hand, and some freedom and creation of normalized surroundings on the other, is one that underpins the administrative and day to day operations of all three units. The attempt to balance these two requirements within such different morphologies makes comparison of facilities and the whole exercise of analysis all the more interesting.

PART I: CHAPTER V

A SPATIAL ANALYSIS OF ALZHEIMER'S UNITS

1. Introduction

Whereas the last chapter initially described the three Alzheimer's units under study, this chapter offers a detailed morphological description of each facility. The layouts are described in terms of the resident use areas and circulation patterns and the way in which they facilitate or hinder visual surveillance and awareness. The application of syntactic techniques to building analysis allows one to identify more specifically the configurational variations both within and between plans. In the last section of the chapter, the key spatial dimensions on which the facilities vary are summarized and discussed.

2. The DAY Unit

A Morphological Brief

The DAY unit is in the shape of an irregular pinwheel, with four wings radiating from a central point (Figure 5.1). The entry, and the resident activity rooms, are clustered at the end of the entry wing (at the bottom of the plan); the other three wings (at the top of the plan) are pierced by a double-loaded corridor lined primarily with private and semi-private resident rooms.

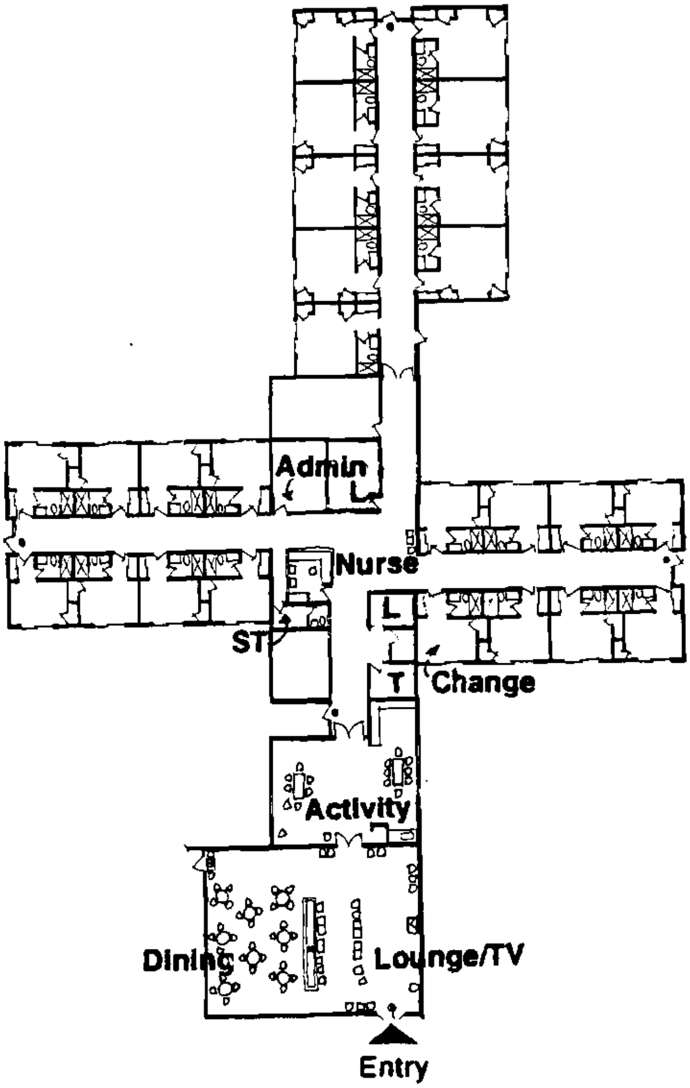


FIGURE 5.1: The DAY Unit With Major Activity Areas Sequentially Arranged

The entry is directly into the resident lounge/TV area -- half of a larger room bisected by a high planter; the other half is the dining area. The lounge is the primary resident activity area but also a major thoroughfare for people entering and leaving the unit. Immediately beyond the lounge is another large space implicitly split into two separate areas by the beginnings of a corridor leading to the center of the pinwheel.

These two areas, equipped with tables and chairs, are used for resident activities such as bible study, snack time, and so forth. Four areas -- the lounge/TV, the dining, and the two activity areas -- thus comprise the dedicated resident activity spaces.

All staff and service spaces -- the nurses station, administrators office, part-time activity therapists office ("T" on the plan), linen rooms ("L" on the plan), staff restroom, and the change room[1] -- are grouped near the center of the pinwheel, but separated from one another by dispersal on the four different corridors. The nurses station within the hall is the center of this cluster of spaces. The station has a 42" high access counter further heightened, and separated, by a 12" clear glass partition.

Thus, while the layout is radial in plan, the major use spaces in the DAY unit are divided into a staff activity cluster and a resident activity cluster. Circulation is primarily "through" major spaces, starting at the entry, bisecting the lounge and one activity room while passing by the other, and then advancing to the nurses hall where it splits off in three directions. The unit is clearly zoned in terms of use, since the resident activity areas are on the separate entry wing which is not geometrically aligned to the other resident room corridors. The location of staff at the center of the unit means that residents passing between their rooms and their activity spaces have to pass through the staff activity cluster.

The proximity of the dedicated resident activity spaces to the entrance creates obvious hazards for elopement while also providing an obvious point of interest and stimulation for residents. Even if staff see a patient moving towards the door, they cannot be sure whether they are traveling to a seat in the lounge or are about to elope. For the staff to travel towards the door every time they suspect an incident is time

[1]This was originally a resident room but is now used for physician visits and for scheduled toileting of incontinent patients. It is easier for the aides to get a resident to this point than to escort them to their room in one of the long corridors.

consuming and frustrating. To tag patients approaching the door so that an alarm sounds would also be difficult because, quite apart from issues of policy, there would be too many accidental activations of the alarm given the proximity of the activity areas to the door. Staff thus keep an eye on this point most of the time.

Relations of Visibility

Figures 5.2 a, b, c and d (below) show isovists from the main activity areas -- (a) lounge/TV room, (b) the two activity rooms, (c) the nurses hall, and (d) the nurses station. The isovist from the resident lounge offers views of that room and the entry, most of the dining room and two activity rooms, and the corridor leading to the nurses hall. The isovist from the two activity rooms offers slightly less, picking up parts of the lounge and dining area, and part of the corridor leading to the nurses hall and the entry to the unit. Both of these isovists are biased to resident space but offer views of the highly travelled hall to the nurses station.

The isovist from the nurses hall commands the nurses station and has long views down the three housing wings as well as down the activity corridor to the resident lounge and entry. The pervasiveness of this view is underscored by the fact that whenever the alarm sounds, indicating that an exit door has been opened, staff nearby circle this central hall for full visibility of each door leading out of the unit. This isovist, therefore, offers the most global view of the unit as it reaches into each wing -- but fails to encompass the main resident areas.

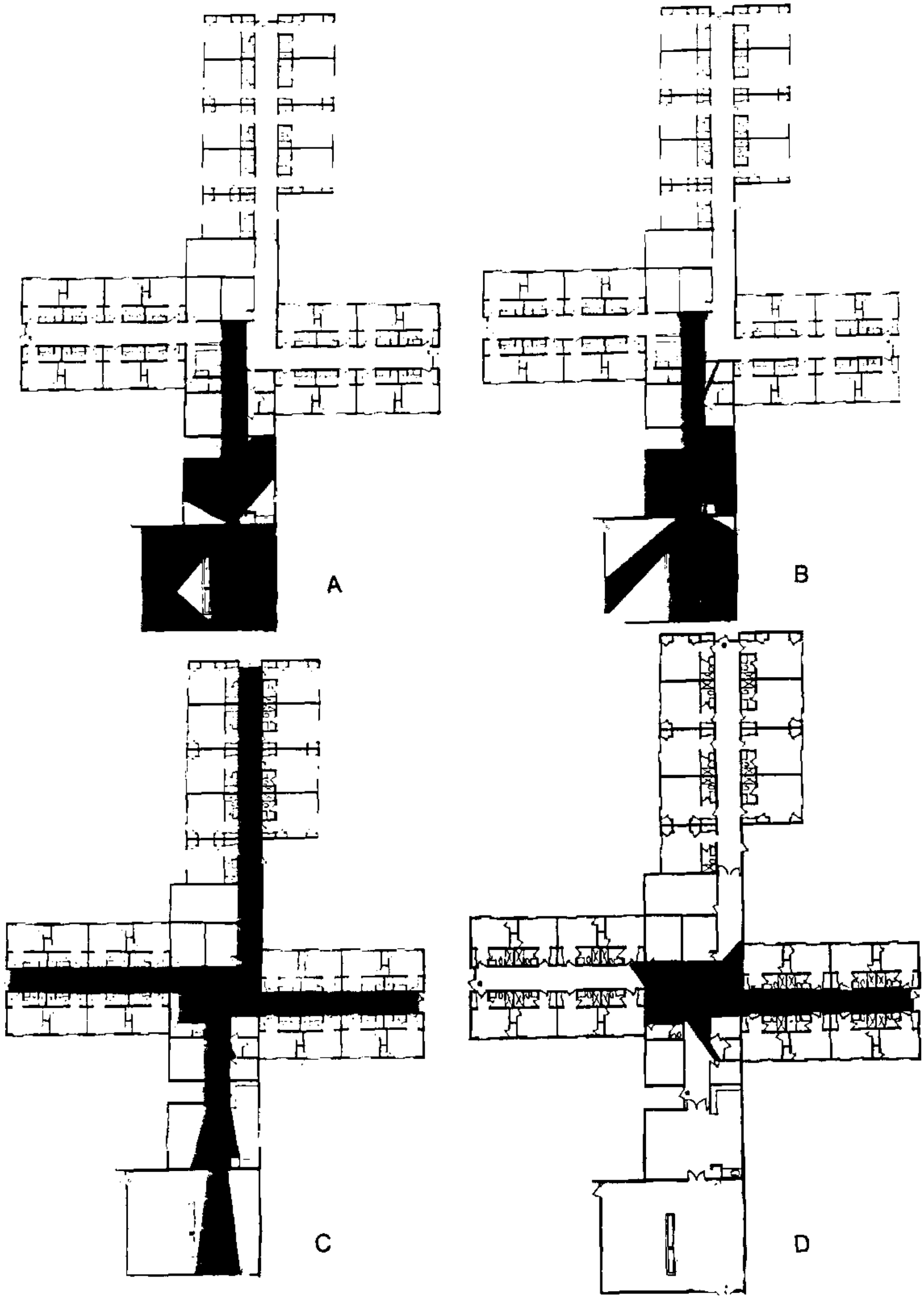


FIGURE 5.2: Isovists from DAY Showing (a) the Lounge/TV Room, (b) the Two Activity Rooms, (c) the Nurses Hall, and (d) the Nurses Station

The nurses station, with its offset location, is situated to minimize the distances to the resident rooms and see the entry to the resident wings, but not for views of resident activity spaces. The weaker isovist from inside the station illustrates the large scale effect of a designers whim to presumably avoid a long, boring view down corridors. The isovists clarify that full visibility by staff of the resident activity areas and the resident rooms is possible only through movement.

As shown, staff and residents are within two different isovists. The isovists from the resident activity spaces take in mainly other resident activity spaces, the entry, and the path to the center, but do not take in the major staff cluster at the center of the pinwheel. The isovists from the nurses station are biased to the center of the pinwheel and fail to include the major resident activity spaces.

A Syntactic Analysis of Space

In order to describe the syntactic qualities of DAY, a convex map was drawn of the floor plan and then represented as a justified gamma map. Figure 5a shows the plan of the facility "unjustified": convex spaces are represented as dots and permeabilities are represented by lines. Figure 5b shows the gamma map "justified" where all spaces of the same depth value are lined up horizontally above the carrier.

Normally, a gamma map is drawn from the "carrier", or all exterior permeabilities to the building (Hillier and Hanson, 1984). However, because the several emergency exits in any of the Alzheimer's units are never used, and indeed, are alarmed against accidental use, and because only the entry is used by staff, residents and visitors, only this main entry is considered the carrier. In the case of DAY, the two exits leading to the garden path are shown on the map, but these entries are not considered part of the carrier, since they are fenced. Thus, in the gamma maps for all Alzheimer's units, the entry point is the carrier, not the entire exterior of the building.

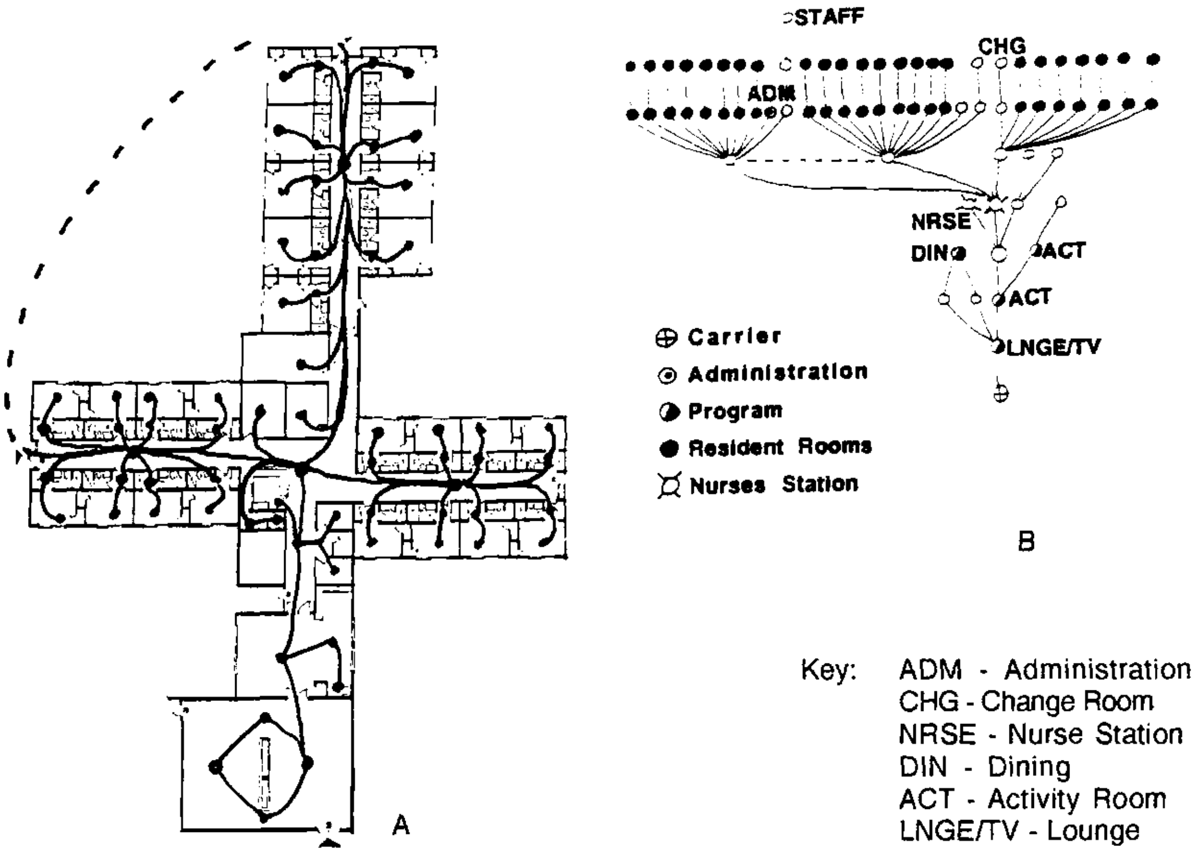


FIGURE 5.3: (a) The Unjustified Plan and (b) the Justified Gamma Map of DAY

<u>The Differentiation of Categories by Depth</u>. In every unit, there are several categories of users, each of which has a different relationship to the building, based on their status. One will recall that depth within the building is a key to status. In the Alzheimer's units, there are the nurses and aides (the inhabitants); there are the patients, or residents (visitors), who live there; and there are others such as administrative personnel, family members, activity therapists, physicians, and so forth who are only tangentially attached to the unit. In the following pages, these three groups

of people -- staff, resident, and others -- are referred to *categorically*, both in terms of their activities and in terms of their space use.

The unit, overall, has a mean depth of 5.94, while the deepest space is at depth 8, meaning that eight distinct spaces must be traversed in order to get from the carrier (the entry) to the room farthest from it (Figure 5.3b). Shallowest, at a combined depth of 2.25, are the dedicated resident activity spaces -- the lounge/TV room, the activity rooms and the dining room; deepest are the resident rooms and the staff service spaces. When the average depth is computed of the major categories use spaces, the order is as follows (moving from shallow to deep):

LNGE/TV > ACT > DIN > NRSE > RES RMS

Thus, the control point of the unit -- the nurses station -- is wedged, depth-wise, between public and private resident areas. It fails, however, to exercise direct control over the resident activity areas which are shallower to the entry. Because of the "tree-like" spatial system, two of the resident program areas must be traversed in order to go deeper into the system; residents would thus be exposed to anyone entering or moving through the unit. Circulation at DAY is linear and moves primarily through but also both past use spaces.

<u>The Differentiation of Categories by Rings.</u> A second way of looking at the differentiation of categories is by viewing the facility in terms of its subsystems (Figure 5.4). A space is considered distributed (shared) if there is more than one route to it; non-distributed (non-shared) if another space controls the only route of access to it.

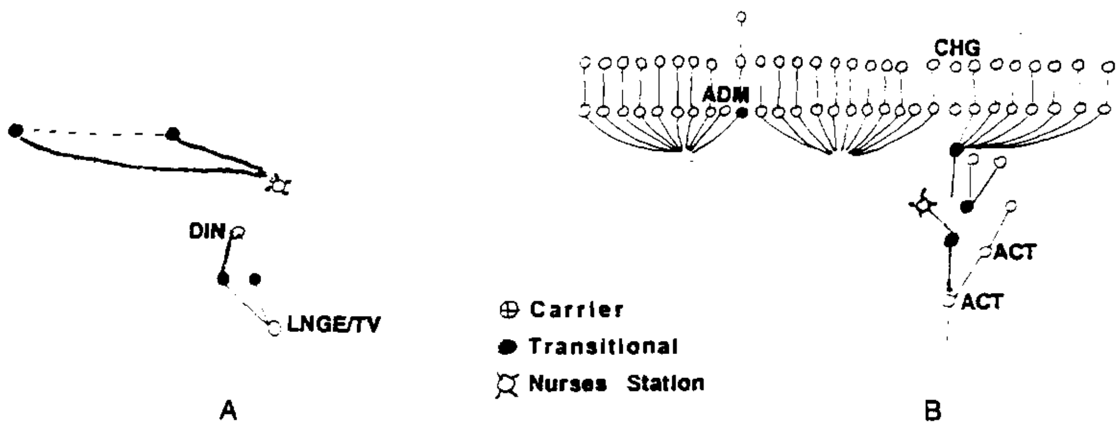


FIGURE 5.4: (a) The Distributed and (b) Non-Distributed Subsystems of DAY Illustrating the Investment in Non-distributed Space

As evident in the two maps above, the distributed system includes only two rings if the outside link to the garden path is included. Space at DAY is therefore invested mainly in non-distributed spaces. However, the major use spaces -- staff and resident -- are each on one of the two rings, but both rings are available to residents and staff. Because there is no single point at which the rings intersect, but instead are two separate hubs of activity, neither staff nor residents can navigate this building without entering resident or staff dominated space.

The ring, comprising two of the four resident activity spaces, is also shallower to the exterior (the carrier). More interface with the outside world would be expected at this boundary than deeper in the building.

Convex and Axial Maps. While the notion of depth offers more the point of view of outsiders entering and moving through the building, another way of looking at spaces is in terms of the integration of spaces. As noted in Chapter III, this type of analysis allows comparisons across different sized systems. One will recall that the smaller the RRA values, the more a space is integrated into the system.

For each facility, convex and axial maps were drawn and RRA values computed. A decision was made to report the axial values from public spaces; the private resident rooms were not systematically included in the observations conducted by the researcher. However, it should be noted that while the actual RRA values of the various spaces change according to whether they are computed from the convex or the axial map, the genotypical ordering of the rooms in terms of their integration remains the same (with the exception of the ORM facility) whether the system is analyzed in terms of public spaces or in terms of all spaces.

Figure 5.5a shows the 10 percent most integrated convex spaces darkened, and the 10 percent most segregated spaces striped. Figure 5.5b shows the axial map with the 10 percent most integrated axial lines darkened.

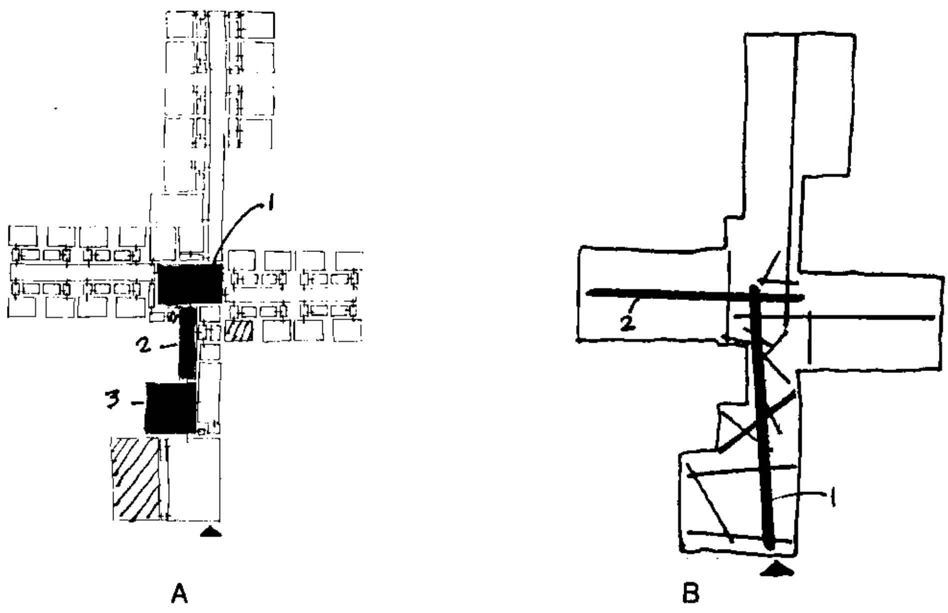


FIGURE 5.5: (a) The Convex and (b) the Axial Maps of DAY Showing the Integration Cores Including Most Resident Activity Spaces

In both maps, the integration "core" pierces the activity wing, but focuses in the nurses hall at the center of the building; it fails to enter two of the resident wings. The convex core thus includes both the major staff space and one of the resident activity spaces, while the axial core follows the corridors and pierces both staff and resident spaces with its long finger to the entry. The axial map also shows the concentration of program and service spaces (the public spaces) in one wing and the center of the building.

In terms of their integration into the spatial system, the major use spaces at DAY are ordered as follows (moving from most integrated to most segregated) [2]:

NRSE HALL > LNGE/TV > ACT> DIN

The nurses hall (and station) has an RRA value of .57, the lounge/TV room is .63, the two activity rooms combined are .682, and the dining room is .919. The axial RRA mean for all spaces is .885, the mean for the integration core is .434 and the mean for circulation spaces is .542. Thus, circulation and the nurses hall are most integrated with key resident spaces somewhat less so.

The Nature of the Lounge/TV Room. As noted above, the lounge/TV room is the shallowest resident use space and controls the entry to the rest of the spaces. This makes this area an important vantage point for residents. However, the room is neither well integrated into the spatial system of DAY, nor contained in its location at the entry to the unit, nor under the purview of control. Its spatial importance lies solely in its location at the boundary between institution and world outside, in its possibilities for elopement, and in its views of the other more integrated spaces.

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[2] To determine the integration value of a space, an average was taken of all the axial lines crossing that space.

The Nature of the Dining and Activity Spaces. As noted above, the dining room is the most segregated public use space in DAY, and tucked behind the lounge/tv room with which it is distributed. Off the major circulation path and out of the line of sight from the nurses station, it offers little other than a spatially and visually separate space for residents to go.

While the larger of the two activity rooms is very well integrated, being on both the convex and axial integration core, the smaller activity room is more segregated and pulls the combined RRA value of these two rooms down. Still, the activity rooms together are more integrated into the total system of spaces than either the lounge or the dining areas. More importantly, like the lounge/tv room, they must be traversed in order to pass into the interior of the building.

The Nature of the Nurses Station. The nurses station is located within the nurses hall, the most strategic space in the system because it is the most integrated. The nurses hall is the focus of the axial core, the most integrated of convex and axial spaces, the hub of staff service spaces, and visually offers the most global views available in the unit.

The nurses station, however, is offset in this space with its isovist encompassing only the entries to three corridors and the length of one resident corridor. The station is also located deep within the system of spaces, far from the entry and the major resident areas. It is thus neither independent, nor panoptical. Functionally, the nurses station is in a poor position for control of residents, but spatially, it is located at the spatial hub of the building.

A Comment on the Interface

The above analysis suggests that there are several levels of possibility for resident socialization. There is the lounge/tv room, which also acts as the entry to the unit, the dining alcove, and the two activity spaces. These resident spaces are loosely connected in the sense that they open off one another, allowing some layering and overlap of views and activities, and offering increased opportunities for socialization. However, none of these spaces are under the purview of staff in or near the nurses hall which is the hub of the spatial system and of staff activity areas, the most integrated space in the building, and the space which has the longest and most comprehensive isovist.

The second key property is the interface of residents and staff with the outside world. The spaces given over to personnel such as maintenance staff, part-time therapist, physicians and others who are in the unit on an intermittent basis, are dispersed around the nurses hall in the core of the unit. It is here where residents would be most exposed to people other than their direct care staff, except for those initially entering the unit. Yet, these spaces are not directly visible from the cluster of activity areas dedicated to residents.

However, it is resident, rather than staff, activity spaces which provide the dividing line between the unit and the world at large. Thus, while the resident activity spaces, especially the lounge/tv room, are not as critical spatially in terms of their integration as is the nurses hall, they are the initial interface point for residents and staff and the world beyond. The boundary between the lounge/tv and the rest of the retirement center beyond is also visually penetrable and offers glimpses of those passing by outside. More importantly, this space is the initial point of entry for the entire unit where residents and staff initially see, and are first seen by, those outside their enclosed world.

The DAY unit, therefore, has two major poles of activity with residents controlling the entry and staff controlling the hub of the building. Both poles are located along the same integration axis and are thus strongly held together, even though views from one to another are not always direct.

2. The ATL Unit

A Morphological Brief

The ATL unit is on the fifth floor of a high-rise building (see Figure 5.6). The nurses station and entry dominate the center of the "T"-shaped unit. The residents rooms are off the double-loaded corridors. The longest corridor connects two of the wings; a smaller corridor running perpendicular to it, bisects the third.

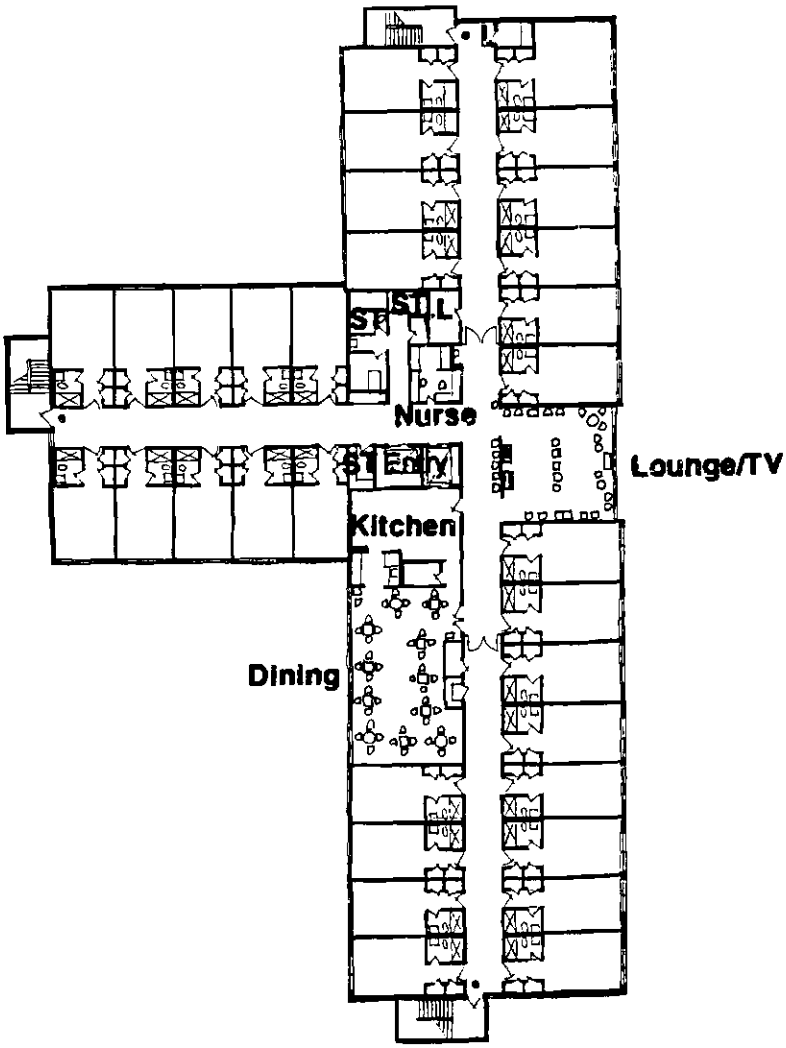


FIGURE 5.6: The ATL Unit With Activity Areas Centrally Clustered

There are only two dedicated resident activity areas, a lounge/TV room and a dining room, both located off the longest corridor but separated from one another. The lounge/TV room is diagonally opposite the nurses station, on the far side of the corridor; the dining room is down the longest hall, diagonally opposite to the lounge. Each of these resident spaces is located one step off the corridor, protected by a small setback. There are two entries to the lounge -- one near the nurses station, one across from the kitchen. The resident activity areas are thus separated but located near the geometric center of the unit.

The staff areas are loosely grouped near the center of the unit, but also dispersed. The nurses station anchors, and mostly fills, the large open area at the crux of the three corridors; it is surrounded on three sides by a 42 inch high access counter. To its side, down a short hall, is the staff restroom and locker room. Off the same hall is a set of connecting rooms containing a change room (not used for that purpose) and a room containing a sitz (therapeutic) bath where patients are occasionally bathed. Staff use the change room as a break area. The linen rooms are separated from one another and located down the long hallway (at the top of the plan marked with an "L"). A small medical room is located next to the elevators, and a kitchen is located across the hall from the lounge, between the entry and the dining room. Outside staff come in three times a day to prepare meals. Finally, circulation runs past resident areas but through the main staff area and entry.

Relations of Visibility

Figure 5.7 a, b, and c below show the isovists of the visual field from the main use spaces.

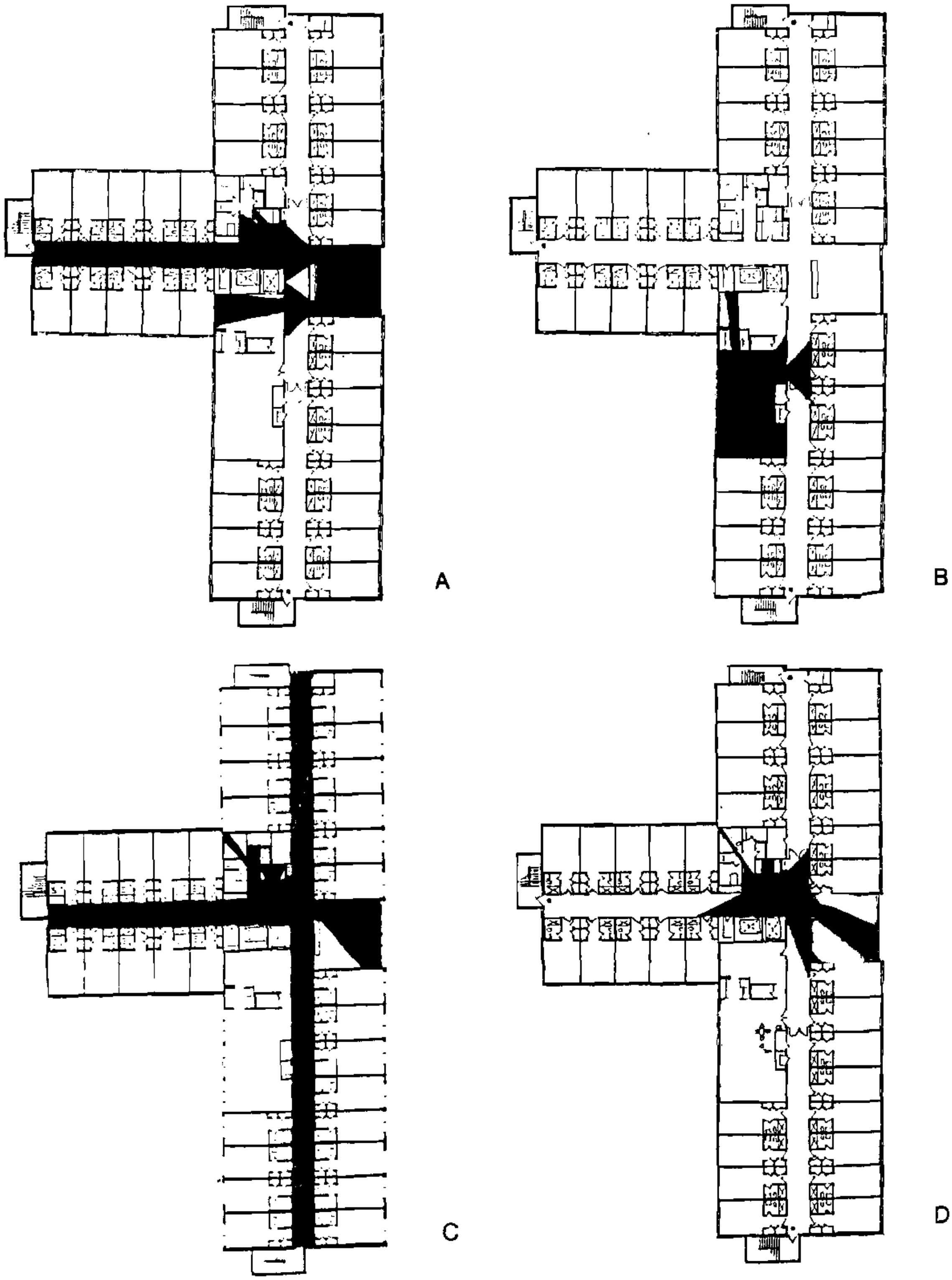


FIGURE 5.7: Isovists from ATL Showing Views from (a) Lounge, (b) Dining Room, (c) Nurses Hall, and (d) from Inside the Nurses Station

The isovist from the resident lounge encompasses that room and has two long views out, depending on where one sits: the longest includes the entire length of the entry hall and the nurses station, and the short view includes part of the kitchen. Thus, different views are available, with only the most encompassing one including the nurses station and the entry. The isovist from the dining room is more bounded with only a slivered view into the kitchen through the pantry, and a small view of the corridor immediately outside its entrance. The two together, however, show the relative boundedness of the resident spaces, with long fingers of views only from the lounge.

The isovist from the nurses hall is the most comprehensive, offering a view of the entry, the length of all three corridors, and most of the lounge; it does not, however, include the dining room or the kitchen. The nurses *station*, offset within the nurses hall, offers complete visibility (and control) only of the hall itself, the entry elevators, entry to the resident corridors, and a partial view of the resident lounge. Full visibility of the corridors and of the lounge is possible through movement within the central hall. The nurses station seems to be located, therefore, not for a panoptical view, but to control the entry while still overseeing much of the lounge.

A Syntactic Analysis of Space

To describe the syntactic qualities of the ATL unit, an unjustified plan and a justified gamma map were drawn (see Figure 5.8 a and b). It is evident from the maps that the nurses hall and/or the kitchen controls access from the carrier to the rest of the system, that circulation is linear running primarily past spaces except for the nurses hall, and that the resident rooms can be accessed without going through either of the resident activity areas.

The Differentiation of Categories by Depth. As Figure 5.8 shows, the ATL unit is fairly shallow with an average depth of 4.37; the deepest space is 6 spaces from the carrier (the entry to the building four floors below). The map, however, shows two permeabilities directly from the elevator: one to the nurses hall and one to the kitchen (the elevator opens both ways). Staff areas, therefore, are shallowest to the carrier. Resident rooms begin at depth 4, the resident lounge/TV room is also at a depth of 4, but the dining room is deepest in the building at a depth of 5 and 6.

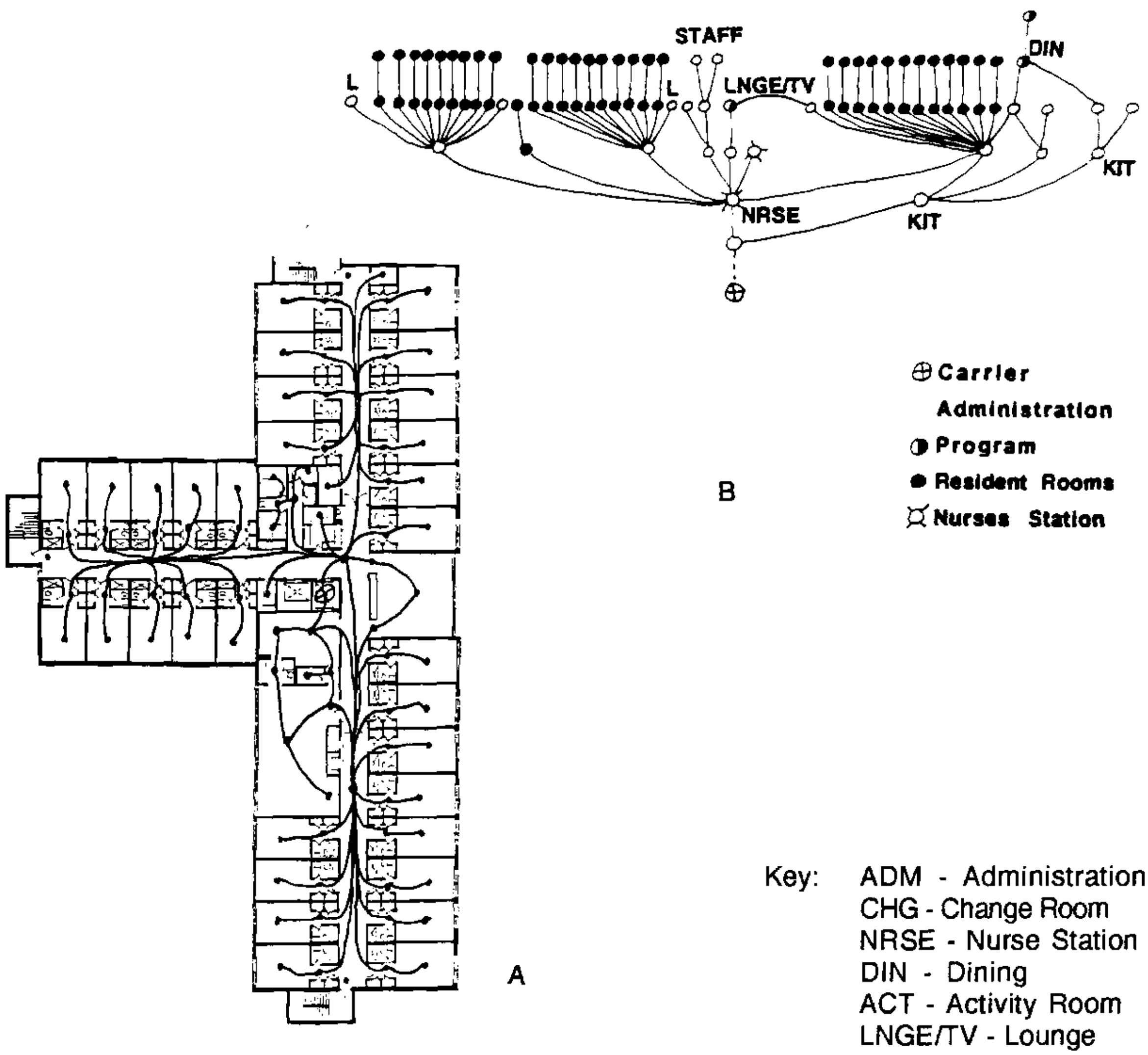


FIGURE 5.8: (a) The Unjustified Plan and (b) the Justified Gamma Map of ATL

When the average depth is computed of the major categorical spaces, the order is as follows (moving from shallow to deep):

NRSE > KIT > LNGE/TV > RES RMS > DIN

The average depth of staff areas (nurses station, staff bathroom, "getaway" room, and linen rooms) is 3.85. Contrastingly, the combined average depth of the two resident activity areas (the lounge/tv and the dining room) is 5. Thus, staff spaces are shallowest while resident spaces, both program and resident rooms, are deepest.

The Differentiation of Categories by Rings. Figure 5.9 shows the ATL unit in terms of its (a) distributed and (b) non-distributed subsystems. There is a clear division between public areas which are distributed, having more than one way in and out of them, and private areas (resident rooms and staff "getaway" spaces), which are non-distributed. The intersection of the corridors is a distributed hub; the point to several rings. Again, in distributed systems, control over access to various parts becomes shared around its various spaces. While some rings are clearly about differentiated access (the kitchen has its entry but also a door to dining and the elevator), at least one ring is more interesting: the lounge has one entry immediately off the nurses station and one down the corridor towards dining. It would seem that the presence of these two doors may provide a choice between a more discreet and a more exposed entrance. Also in ATL, there is one continuous ring cluster, instead of smaller separate ones -- a deep kitchen/dining ring and a shallower nurses hall/lounge/hall ring.

The rings equally include both resident and staff spaces, but only the lounge ring (shaded in the diagram below) is available to residents. Thus, there is a differentiation of categories in terms of the use of rings at ATL.

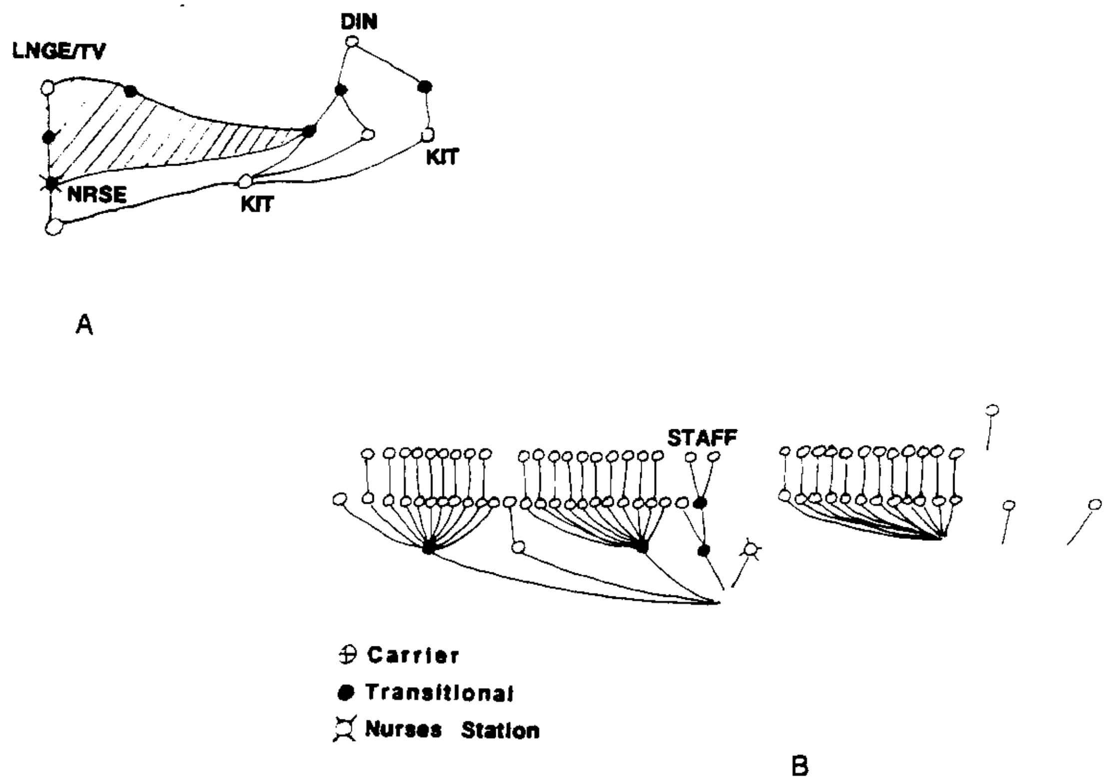


FIGURE 5.9 : (a) The Distributed and (b) the Non-Distributed Subsystems of ATL Showing the Continuous Ring Linking the Public Spaces (Residents Have Access only to the Shaded Ring While Staff Have Access to All)

<u>Convex and Axial Maps.</u> Figure 5.10a shows the 10 percent most integrated (darkened) and segregated (striped) convex spaces while 5.10b shows the axial map with the 10 percent most integrated lines darkened. Convexly, the integration core is comprised of the nurses hall, the elevator entry, and the hallway off which the lounge/tv and the dining room are located, and in which the rings intersect. The axial core extends into each wing of the unit and includes the major resident space of the lounge; it is clearly focused in the nurses hall, however, creating a spatial hub. The mean RRA of all spaces is .912, the mean of the integrated core is .489, and the mean of the circulation

spaces is .51; the nurses hall is .52, the lounge is .524, and the dining room is .871. In terms of their integration into the axial spatial system, the major use spaces at DAY are ordered as follows (moving from most integrated to most segregated):

NRSE HALL > LNGE/TV > DIN

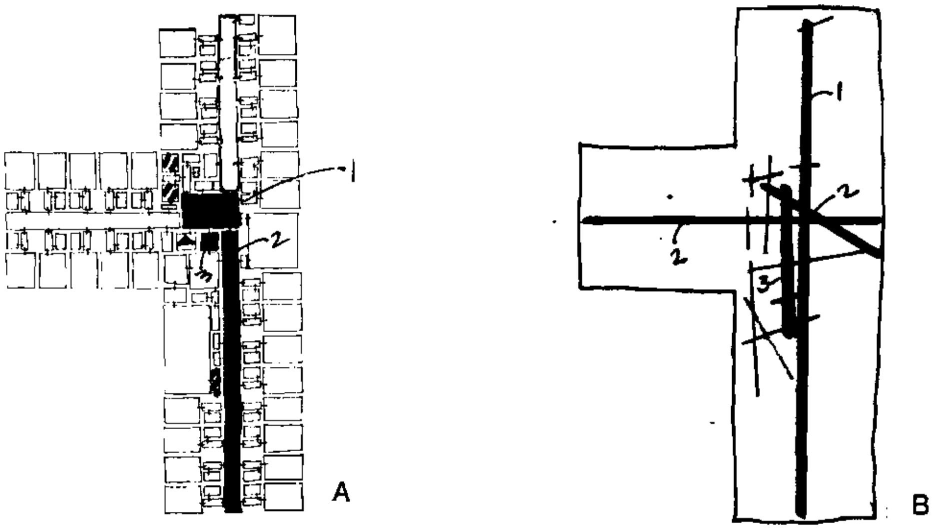


FIGURE 5.10: (a) The Convex and the (b) Axial Maps of ATL Showing the Integrated Cores Focusing in the Nurses Hall

The Nature of the Lounge/TV Room. As noted above, the lounge/TV room is the shallowest resident activity space, but is deeper than the nurses station. Its integration within the spatial system, however, is mixed according to the analysis done. Analyzed convexly, its RRA value is 1.042 while the nurses hall is .465, so it is not within the integrated core of convex spaces. It is, however, axially well integrated with an RRA of .524 while that of the nurses hall is .52, and is part of the axial integration core. Thus, the lounge is well integrated into the global spatial system, but not the local, it is distributed, and it offers a long isovist (from part of it) encompassing the entry and the nurses station. Integrated spatially though it is, it is also contained fairly deep in the system, being buffered even further by its set-back entry areas.

The Nature of the Dining Space. The resident dining hall is clearly not strategic spatially. It is the deepest space in the system, and convexly and axially is one of the most segregated spaces in ATL (axial RRA of .871), being eclipsed only by the staff "getaway" spaces behind the nurses station (1.784). The axial map underscores its containment, with axial extensions only to the kitchen and the corridor outside. Its isovist is very restricted and unlike the lounge/tv room, it cannot be seen from the nurses station. It is also located a step off the corridor, and thus, like the lounge, insulated even further from passing traffic. While it is on a ring with the kitchen, the residents cannot use the ring; the majority of the time the kitchen is closed anyway. Thus, spatially, visually, and in terms of availability, the dining room is separate.

The Nature of the Nurses Station. The nurses station, by virtue of its location within the entry hall, occupies the most strategic space in the spatial system. The entry hall is the focus of the axial core, has the lowest RRA value (RRA = .52), and visually offers the longest and most global views in the unit.

The offset nurses *station*, however, controls the entry to the unit but is not independently disconnected from the circulation surrounding it. However, it may be said that the nurses station is at the spatial hub, and the strategic heart, of the unit.

A Comment on the Interface

There are only two dedicated spaces for resident socialization, separated from one another. Both have rigid boundaries with only the lounge/tv room having any real extensions into other spaces. While the lounge is off the spatial hub of the unit, is on the same distributed system as the nurses station, and has a strong isovist of both staff and resident areas, the dining area is neither spatially strategic nor has a strong isovist. A key property of the spatial and social interface is the possibility for resident socialization and movement. However, only one of the dedicated resident areas offers views to, and is viewable from, the nurses station and the service areas loosely clustered around it. There are no offices for administrative or therapeutic personnel on this floor; these personnel use the nurses station. Thus, views to and from other categorical areas are somewhat limited.

A second property is the interface between residents and staff and the world outside. Since there is only one entry to the unit, the point of interface with the world beyond is the entry hall outside the elevators. Because of the deeper and offset locations of the resident areas, both are protected from the entry; only the lounge has a partial view of it. It is therefore possible for visitors to traverse the unit without entering a resident activity space and thus exposure to most residents. Awareness of, and exposure to, the outside world would be expected to occur in the nurses/entry hall, dominated by the nurses station.

In summary, ATL has a single spatial hub which includes the nurses station, the entry to the unit, and the resident lounge, all offering full or partial views of one another. They are integrated, visually exposed, and connected. The second resident activity area, the dining room, is neither a part of this hub, nor visible from it.

4. The ORM Unit

A Morphological Brief

The ORM unit is a free-standing structure, square in shape except for a screened porch crowning one side (see Figure 5.11). The interior configuration is that of a "U" shaped circulation path "arcading" around an interior court comprised of a lounge/TV and dining room as well as two loggias on either end, and looping through the porch.

Resident rooms line the corridors and thus face onto the centralized activity area. The bisecting entry corridor includes service rooms (laundry, kitchen) and the nurses station, in this case an enclosed room. The laundry is located at the far end of the corridor, the kitchen next to it, and adjacent to the office is the staff restroom. The entry to the unit is really an offset leg of the main corridor; because of full glazing, this leg offers views out to parking and the porte-cochere of another building.

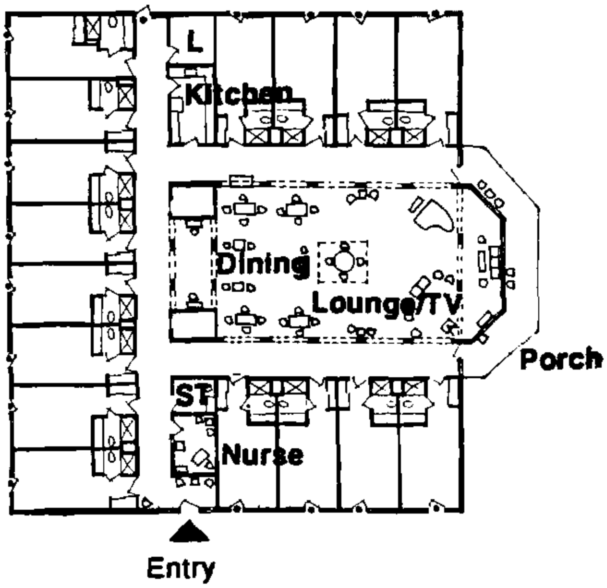


FIGURE 5.11: The ORM Unit with Contained Resident Program Areas

The main resident activity areas -- lounge, dining, and two adjoining loggias -- are clustered and contained in the center of the building, surrounded by the enwrapping corridors and overlooked by resident rooms. They are spatially separated from the entry and nurses room. Circulation is past activity spaces except the loop through the porch.

Relations of Visibility

Figure 5.12 a, b, c and d (below) shows the isovists from the lounge/dining area (including the loggias top and bottom), from the entry, and from the nurses office.

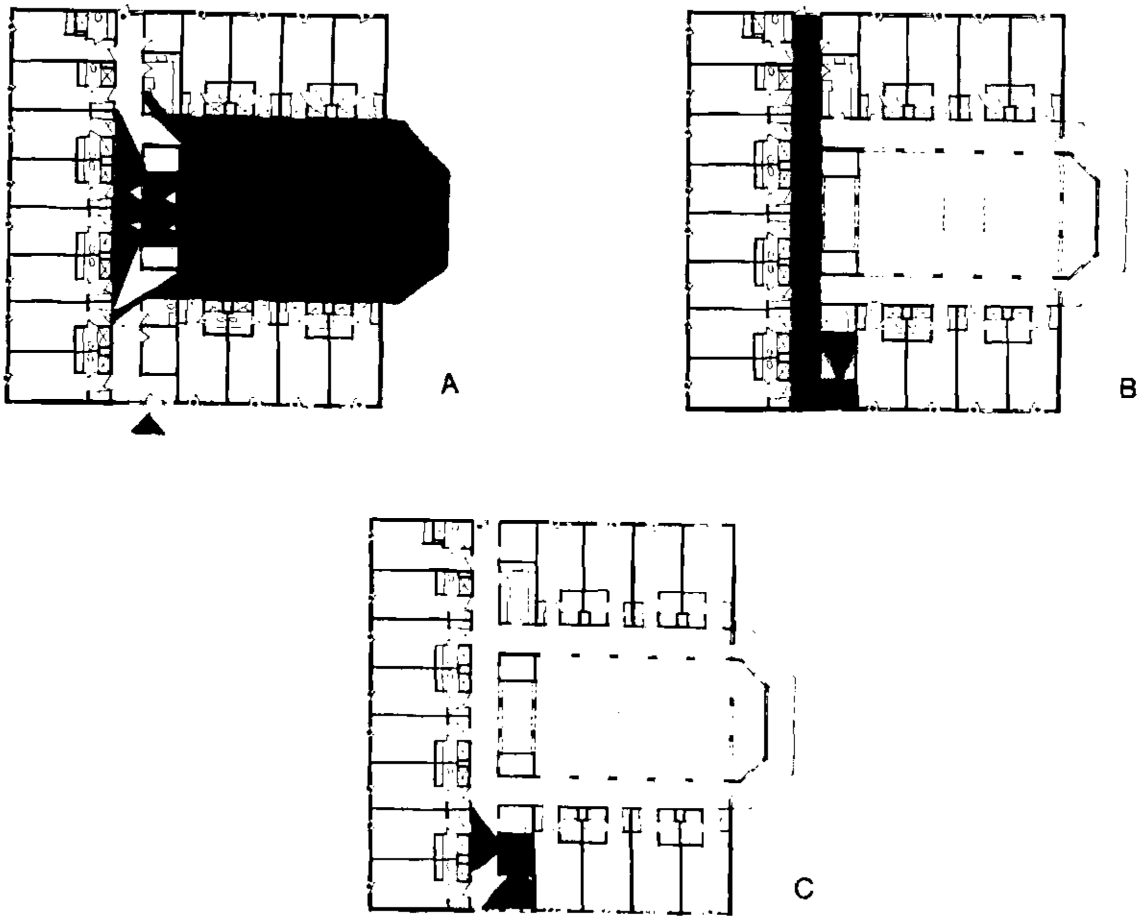


FIGURE 5.12: Isovists from ORM Showing the Expansive Views from (a) the Lounge/Dining Area, and the More Restricted Views from (b) the Entry , and (c) the Nurses Office

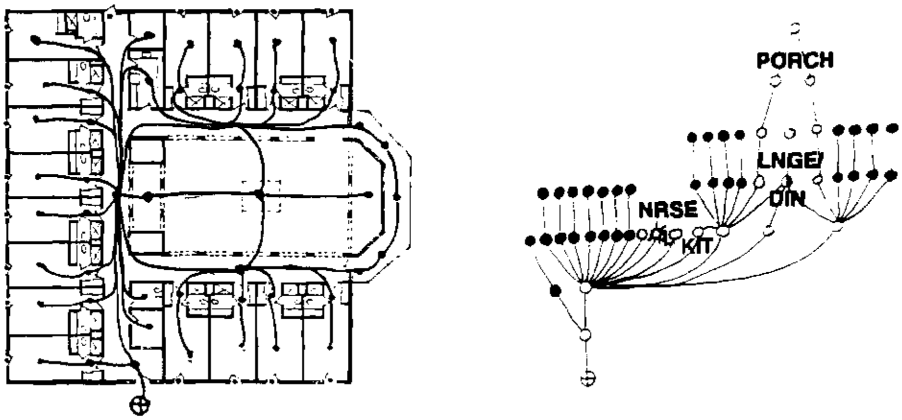
The isovist from the lounge/dining room covers that room and its loggias, the entire corridor that loops around it and the porch, the central portion of the main corridor, and the entry to the kitchen. Occupants thus view most of the spaces resonating off the interior courtyard, but cannot see the entry and the nurses office.

The isovist from the entry is far more restricted, covering itself, the long corridor, and the nurses office (but only to those standing near the window). The isovist from the nurses office offers no visibility of the resident use spaces, and only a partial view of the entry (through the window) and the corridor immediately outside. Thus, the nurses office is located not for proximity to the resident rooms, nor for a view of resident activity areas.

ORM thus offers a compact plan, with interior courtyard surrounded by a modified radial plan. While its resident areas are clustered together, and contained, in the heart of the building, the nurses office and the entry are separate from it. Circulation is past use areas but does offer a continuous loop as well as a linear path from entry to exit.

A Syntactic Analysis of Space

The unjustified plan and the justified gamma map for ORM are shown below. Evident from the gamma map is the fact that neither a staff space nor a dedicated resident space connects to the carrier, but rather a circulation path. There is thus no single use space that acts as a control point for further entry. The branching of resident rooms off corridors shows that they can also be accessed without going through either staff spaces or resident activity spaces. Thus, in one sense, the plan is neutral in terms of control.



A   B

⊕ Carrier
⊙ Administration
◑ Program
● Resident Rooms
⌧ Nurses Station

Key: ADM - Administration
NRSE - Nurse Office
DIN - Dining
LNGE- Lounge
KIT - Kitchen

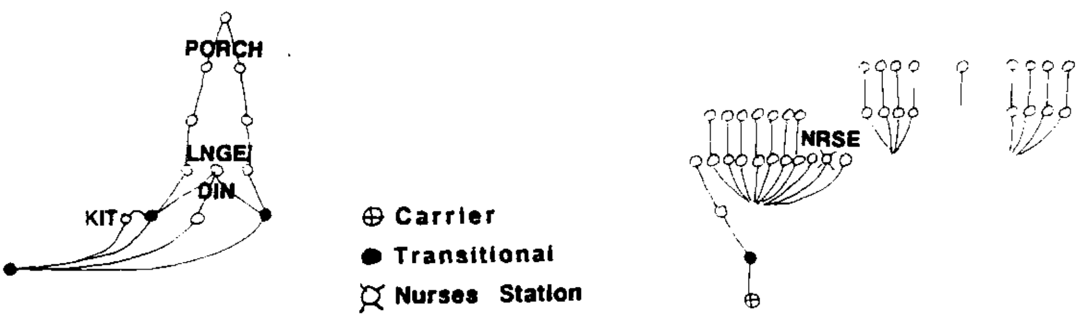
FIGURE 5.13: (a) The Unjustified Plan and (b) the Justified Gamma Map of ORM

The Differentiation of Categories by Depth. As Figure 5.13b shows, the ORM unit is deeper than its compact shape suggests, but its mean depth is fairly shallow at 4.0; its deepest space (the porch), however, is 7 steps from the carrier. Shallowest to the carrier is the entry hall, which then leads to a transitional space off which both resident rooms and staff spaces branch. The major staff spaces -- nurses office, kitchen, laundry room, and staff restroom -- are at average depth of 3; the major resident space, the combined lounge/tv and dining room is at 4; the dining loggia is equivalent to the staff spaces at 3. When the average depth is computed of the major categorical spaces, the order is as follows (moving from shallow to deep):

NRSE : KIT > RES RMS > LNGE/LOG/DIN > PCH

Thus, staff space and resident rooms are shallower than resident activity spaces.

The Differentiation of Categories by Rings. Figure 5.14 shows ORM in terms of (a) its distributed and (b) non-distributed subsystems. There is a clear division between the resident public areas of the unit which are clearly distributed, having more than one way in and out of them, and the private resident rooms which are non-distributed. The corridors leading to these rooms, however, are distributed, offering at least three separate links to reach the residents rooms. Thus, control over access to resident rooms becomes more shared. The rings do not include staff space, except for the kitchen; all other staff dedicated spaces, including the nurses office, are non-distributed. Thus, space is split between distributed and non-distributed but the distributed system is clearly biased toward resident and transition spaces.

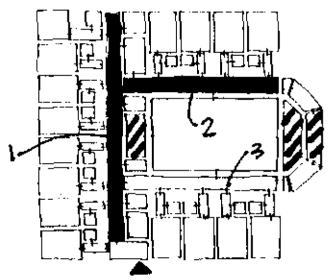


A B

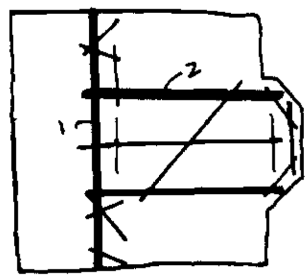
FIGURE 5.14 : (a) The Distributed and (b) Non-Distributed Subsystems of ORM Showing the Resident Activity Spaces on a Ring but the Nurses Office in the Non-Distributed Subsystem

As evident in the maps above, the single bisecting point on all rings (except the kitchen ring) is the lounge/dining area; therefore, it could be said that the lounge/dining space is the focus of a spatial "hub". Little differentiation of categories exists in terms of the rings, which are physically and visually available to all (except for the kitchen ring which is rarely used). The nurses office, however, is at greater disadvantage because it is non-distributed, and thus "captive" to anyone entering it. However, the distributed spaces are deeper in the building and thus more insulated from the interface with the world beyond. It is transition space, not use space, that modulates the interface with the external world.

Convex and Axial Maps. Figure 5.15a shows the 10 percent most integrated and segregated convex spaces in ORM ; 5.15b shows the axial map with the 10 percent most integrated lines darkened (2 of 16 lines). If the core is expanded to include one more line or space, then in both maps, the most integrated spaces are the three corridors enwrapping the central lounge/dining space. The integrated core pierces neither resident activity space, nor the nurses office.



A



B

FIGURE 5.15: (a) The Convex and (b) the Axial Maps of ORM Showing the Integration Cores Comprised of Circulation Space

The RRA mean for all spaces is .816, the mean for the integration core is .417 (2 lines), and the mean for circulation spaces only is .471. The RRA value of the entry hall is .569, the lounge/dining area is .645, the nurses office is .797, the two loggias are both .873, and the porch is 1.17. Their genotypical order is as follows (moving from most integrated to most segregated):

ENTRY > LNGE/DIN > NRSE > LOG > PORCH

<u>The Nature of the Lounge/TV and Dining Room.</u> The lounge/dining area occupies the heart of the building, and is further expanded by the two loggias at either end of it. As noted, earlier, this large space has the most comprehensive isovist of any use space and also forms a hub for the rings available to residents. Spatially, it is buffered by transition spaces all around it, and being fairly deep within the building, is well contained. As the axial map shows, however, it is also contained in the center of the axial lines, with axial fingers extending only to the nearest transition spaces. It thus has no straight shot to the entry. Finally, as centralized as it is, it is not under the purview of staff in the nurses office.

<u>The Nature of the Loggias and the Porch.</u> The loggia off the lounge and the loggia off the dining area are obviously intended to provide more intimate, spillover, areas for residents from the larger living/dining space, while still being visually connected to it. Both of these alcoves, however, are segregated spatially, with RRA values of 8.73. Like the lounge, neither is visible to staff in the nurses station. The most segregated use space, however, in ORM is the screened porch crowning the living/dining area (RRA = 1.17), even though it is a continuation of the integrated corridors leading into it.

Thus, while there are potentially four resident use areas clustered together at the heart of the unit -- the lounge and dining area, the two loggias, and the porch --

none of them are especially strategic in terms of their integration into the total system of spaces and none of them are under the purview of the nurses office or the entry.

The Nature of the Nurses Office and Entry. The nurses station at ORM is an enclosed room located off the main corridor. It has a small window overlooking the entry (observable only if the nurse is standing at the window). As the gamma map shows, however, it is not located to act as a control point for entry further into the building nor does it overlook a single dedicated resident activity areas. Strategically, then, this space is insignificant (axial RRA of .797), offering neither spatial integration, nor visibility of resident areas, nor complete independence with connection to outside.

The entry hall is the most integrated use space in the system (axial RRA = .569), primarily because of the axial extension into it of the most integrated corridor slicing through ORM. It is, however, neither connected to, nor under the purview of, resident or staff spaces.

A Comment on the Interface

In ORM, there are multiple spatial poles for potential resident socialization, all in the heart of the building, and all of which visually overlook one another. This area is bounded by the integration core but connected directly to it, offers the most expansive isovist available in the unit, and is visually available to almost every resident from their room door or during their navigations through the corridors. This area offers opportunity for further gradation of privacy, along with visibility, in the loggias. The entire cluster of resident spaces are, however, contained axially, and separated both physically and visually from the entry and from the nurses office. The only views into other categorical spaces are into the kitchen, which is only staffed briefly before and after meals.

The second interface -- that with the world beyond the unit as represented by visitors, therapists, and so forth coming into the building -- is most readily available at the entry hall which provides the division between the institution and the outside world. This room is both the most shallow of all spaces to the exterior, and is the most axially integrated use space in the system. However, it fails to offer a view of anything within the unit except a hallway, nor is it under the purview of staff.

In summary, the spatial hub of the building encompasses neither resident nor staff space but does have an axial finger into the entry and surrounds the main resident activity areas. While all resident areas are clustered together and visually pervasive to one another, and in their clustered arrangement offer several layers of potential interface for residents, none of the layers are visible to or from the nurses office nor are they shallow to the world outside. Staff and resident thus categorically occupy two separate spatial domains.

5. Summary of the Morphological Properties of the Three Layouts

The above analysis of morphology and syntax illustrates that there are several dimensions of variability and similarity among the three Alzheimer's units studied. These variations are summarized in Table 5.1 and discussed below.

The most obvious difference between the facilities concern their shape. ORM is a smaller, more compact "cluster" plan while ATL and DAY are clearly radial with long housing wings radiating from a central point. As discussed earlier, the ORM plan most typifies the therapeutic spatial arrangement recommended for those with dementia (Cohen and Weisman, 1991). All rooms face into adjoining activity space, its short corridors provide a continuous "racetrack" for wandering, and its resident spaces offer clear gradations of privacy. The other two facilities both have longer, "institutional" corridors, but also more transition from the solitariness of resident rooms to more public activity spaces.

Table 5.1: Summary of Morphological Differences

	DAY	ATL	ORM
Overall shape	Radial	Radial	Clustered
Mean Depth	5.94	4.27	4.0
Depth Inequalities	LNG/ACT>NRS>RESRMS	NRS>LNG>RESRMS>DIN	NRS>RESRMS>ACT
Mean RRA	.885	.912	.816
RRA Inequalities	NRS>LNG/ENT>ACT>DIN	NRS/ENT>LNG>DIN	ENT>LNG>NRS>LOG
Subsystems	Non-Distributed	Distributed	Distributed
Nurses Station	On core-deep	On core-shallow	Peripheral-shallow
Circulation	Through Res +Staff	Through Staff/By Res	By Staff + Res

Next, there are syntactic differences. In terms of depth from the carrier, ORM is the most shallow at a mean depth of 4.0, followed by ATL at 4.27, and DAY at 5.94. However, in terms of mean RRA, ATL is the deepest with a mean RRA of .912 while ORM is once again the shallowest at .816; DAY is in between at .885. In both DAY and ATL, the nurses hall is more integrated than any resident space; in ORM both the nurses office and resident spaces are fairly segregated.

More important is the spread of the integrated core. The core of DAY is elongated, focusing in the nurses hall, but extending the entire length of the activity wing to the entry. Like circulation, it goes through, rather than by, both resident and staff activity spaces. Integration in use spaces suggests an investment in activity rather than in separation. The ATL core focuses on the nurses hall with axial extensions down each wing; axially, the core includes the resident lounge. However, its main thrust is that of circulation, running past the lounge and dining, and only through the nurses hall. The core of ORM fails to enter any resident or staff activity space but instead follows circulation around the interior courtyard. The RRA value of the circulation spaces is in all cases lower than any of the staff or resident use spaces. Thus, ORM, in particular, spatially invests more in separation than in activity.

More particularly, there are two main differences. First, ATL places both resident activity areas and resident rooms deeper than the nurses station (NURSE ST> LOUNGE> RESIDENT ROOMS> DINING), thus facilitating the containment of residents within the unit. No resident can get past the nurses station which oversees the entry. DAY, on the other hand, allows patients access to areas shallower than the staff station thus creating risks for elopement (ALL RESIDENT ACTIVITY AREAS> NURSE ST> RESIDENT ROOMS). Thus, in DAY all who enter the unit become exposed to resident areas.

Secondly, DAY creates a continuous cluster of resident activity spaces, some very integrated and some less so, but all tangential to one another thus offering visibilities of various areas and more possibilities for sociability. The resident use spaces unfold into one another in a somewhat sequential fashion up the wing until they run into the staff and service spaces occupying the hub at the center. Thus, while staff may control the integration core, residents have views of it. ATL provides only two resident activity areas, both off the core but adjacent to it. These have limited exposure to the pattern of circulation, unlike residents in DAY. These differences, among others, illustrate how syntax is not equivalent to geometry. There are fundamentally different syntaxes within the same geometry.

ORM differs from the other two in more fundamental ways, because syntactic variation is facilitated and enhanced by the geometric differences. The first difference, not imposed by geometry, is that the resident activity areas occupy the center and the nurses station is peripheralized. The station still somewhat controls entry, but less so than ATL; its location away from resident areas, however, offers no overview of those spaces. Thus, the level of control possible through visual surveillance from the nurses station is very weak.

The second difference, more subtle, is the way in which the central space in ORM, while convexly on the core, is axially off it. The patients have some integrated circulation spaces in their isovist but the integration core fails to run through their spaces. In ORM, the nurses office is shallower, while the activity spaces are even deeper in the building than the resident rooms.

In ATL and ORM, then, staff spaces are shallower to the outside of the unit, while in DAY resident activity spaces are most shallow. DAY and ORM seem to be at opposite ends of a scale, using depth in contrasting ways. In ORM, residents in the lounge are spatially and visually contained, while in DAY residents are most exposed. In both DAY and ORM, on the other hand, resident activity areas are not visible from the nurses station, while in ATL the attempt at direct control is more obvious.

The presence of rings also has much to do with the social interface between categories. Whereas DAY is primarily non-distributed in its public spaces, with one activity space spilling into another until the nurses hall is reached, ATL and ORM are both fairly well distributed. In ATL, only one of the rings is visually available to residents. In ORM, however, all but one of the rings intersect in the centralized activity space, and these rings include circulation space but not staff dedicated space. Residents in ATL can see most of the points on the one ring they have access to, while residents in

ORM see all points on most of the rings they are on. ORM residents more than staff, then, command the system visually.

DAY and ATL, of similar shape, both place the nurses station at the point of axial and radial convergence, both in the geographical center of the building. Both nurses halls and stations are stronger in terms of integration than any resident space, being located at the integrated cores crux. Both fail, however, to provide the *station* itself with a strong isovist while the halls in which they both sit do have strong isovists. In ATL, the station is located to control the entry and partially overlook one of the two resident activity areas. In DAY, the nurses station is located distant from the entry and fails to offer a view of any resident activity space. Thus, they offer a more limited potential for direct continuous surveillance than their geometry suggests.

Finally, circulation varies in the three facilities but covers most of the integration core in all three cases. In ORM, circulation clearly passes by the major activity spaces, piercing only the entry hall. ORM, therefore, offers a clear "edge factor" whereby residents can preview activities, before fully committing themselves to entry. This has been identified as a therapeutic device in institutional settings because it does not force participation (Howell, 1980). However, there is little transition from room to activity space. This phenomena is somewhat less clear in ATL, which also has activity areas off the major circulation zones. In ATL, however, a resident has to almost enter the space before they can see it because of the set backs. In DAY, the same "edge" exists with one of the activity rooms and the dining room, but the other activity area and the lounge are passageways themselves. DAY, however, offers a back passage through the lounge, thus alleviating the need to go into the TV portion of the room.

Finally, the distribution of spaces impact the interface between user categories in its demand for, or negation of, movement from one area to another in order to know what is going on in the whole. In Alzheimer's units, movement offers residents opportunities for stimulation in the form of socialization and activity. The three facilities vary in terms of their demand for movement. In ORM, the unit is internally oriented, containing use spaces in the geometric center of the building, far from the entry. The boundaries between the resident activity spaces are weak both physically and visually because of the many rings, offering possibilities for interface, but there are no visual links with other categorical areas or with the world beyond. Therefore, movement is necessary between the poles in order to experience both. DAY has a similar problem and requires even more movement because of the spatial and visual separation of the nurses station from the activity areas. While the entry is available to residents in their program spaces, the nurses station is not. Movement is again necessary in order to experience the whole. In ATL, however, while staff have visibility of the entry and partially of the resident lounge, neither the entry nor staff service areas are available to residents. It is residents who must move, not staff.

PART I: CHAPTER VI

DESCRIPTION OF SPACE USE IN ALZHEIMER'S UNITS

1. Introduction

This chapter offers a general description, based on the observations in each unit, of the relationship between space and space use -- between the architecture analyzed in the last chapter and the organization in terms of daily life. It is felt that this more ethnographic description of the organization will be more helpful in understanding the quantitative correlations which are the subject of the next chapter. This chapter, therefore, is based on the extensive observations made during the site visits, and on the evidence of staff and administration interviews. The final chapter in Part I will offer systematic analysis of the specific data derived from the behavior mappings and staff trackings.

The issue addressed in this chapter is how organizations that work toward certain aims acquire a definite spatial pattern through the way in which they occupy and use space. As the reader will recall from a previous chapter, the mission of these facilities is to provide as normal a life as possible for residents through involvement with others and participation in the often uneventful rituals of daily life such as dressing, eating, and so forth, while still containing them for their own safety and well-being. Thus, residents in the units studied are encouraged to follow a daily routine which includes getting out of bed in the morning, attending meals, interacting with others, and, in general, participating in the programs provided for them. While residents are allowed to remain in their rooms if they so desire, and some do, they are encouraged and cajoled to be out of them as much as possible. Movement, with its attendant opportunities for socialization, and interaction with staff and other residents are emphasized.

2. The DAY Unit

DAY "feels" very busy as both staff and residents seem to be rather active. There are several resident activity spaces which appear to be used somewhat generically, in the sense that they actually support more than the single use nominally assigned to them. Finally, the social relations between residents and staff also seem to be fairly casual, although the staff appear rather harried and overwhelmed at times.

The Lounge/TV Room and Entry

As noted earlier, resident rooms and activity spaces are widely separated by the radiating plan of the DAY unit (see Figure 6.1). Residents are housed in the deeper portions of three wings, while the fourth wing is dedicated to programmatic concerns.

Because of the separation between resident rooms and activity spaces, there is a general migration in the morning and the evenings between the rooms in the deepest wings and the activity spaces at the end of the shallow wing. Some residents go back and forth to their rooms during the day but many residents remain the entire day in the more public wing, not returning to their rooms until bedtime.

The lounge is the main room most residents gravitate to at one point or another during the day. Residents seem to either position themselves here for the day, or continually return to this point, after wandering elsewhere, as if to "touch base". The television runs constantly although few residents actually watch it, visitors move in and out on an unscheduled basis to sit with residents, and there seems to be a good deal of movement and activity, with some people moving in and through the room, some people sitting and talking, and some people just sitting or sleeping.

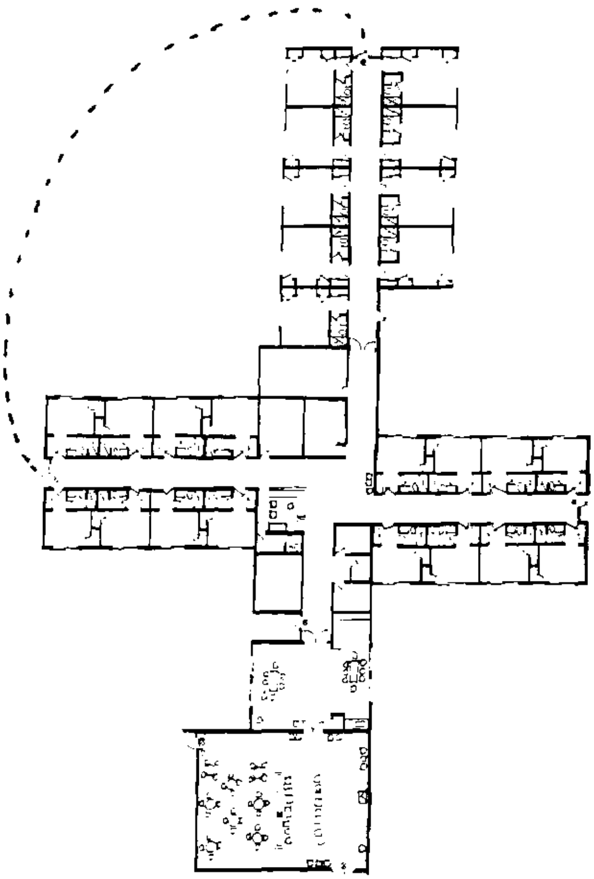


FIGURE 6.1: The DAY Unit - "A Busy Feeling"

Most people can be found in the lounge at one time or another, which may account for the movement in and out of this room. Like the family room at home, one can be sure of seeing someone there at almost any time. The disadvantage of this room for staff control, however, is its location far from the nurses station, and the fact that in order to see the entire room, staff must be present within it. One or two residents often attempt to use the code pad when staff are not about (which is why it has to be changed often) and/or to elope through the entry as visitors come in and out. Oddly enough, while the entry door is often intentionally tried, the door in the dining room seems to be tried more as an unintended consequence of confused movement.

Though no staff member is assigned to the lounge, there is generally at least one in the room seated in the back row of chairs or perched on the table against the planter where they can survey the entire room, see the entry, and still see down the hallway to the nurses hall; obviously, the most strategic position. Since each staff member is assigned to care for the residents in a certain wing[1], there is a constant rotation of staff members in this room as they watch "their" patients, take them back and forth for scheduled toileting in the change room, or go back and forth themselves to check with the nurse in charge, record on patient records, and in general perform their seemingly unending duties connected with the care of the residents.

While staff would like to be able to contain the residents to this and the adjacent activity rooms so "they can keep an eye on them", it is almost impossible to do so with all. Many of the residents are "wanderers" and they constantly move up and down the long corridors, in and around between the dining room and lounge, or in and out between outside and inside. The chairs are arranged in the lounge in two rows so the wanderers do not walk in front of those purposely watching television, but instead walk on the "back" path behind them and into the dining area. While the front row of chairs is usually full, fewer residents use the back row where staff sit. Visitors and staff entering or leaving generally use the "front" path. Therefore, while movement can be said to be "through" this room, the main entry to it for residents is from the side which is not as daunting as moving into a room where everyone is facing one. The furniture arrangement allows residents to move "past" the less active part of it before committing

[1]Staff are assigned on a daily basis to residents in one of the wings. This assignment is rotated, however, so that residents do not get dependent on a single staff member, but get to be comfortable with all of them.

to the more active front part and to allow the nursing staff to survey it from the least obvious vantage point -- from the resident row behind.

The many residents who do spend most of their time here also have to be periodically moved between this space and the change room, for toileting. While the aides say it would be easier if the change room was nearby, the resident room closest to the nurses station, has been detailed for this use. Therefore, while the lounge is mainly used for television and talking, it is also a temporary resting spot for many. The nurses have to move as much as the residents do in order to keep an eye on them or to care for them.

The Dining Room and the Activity Rooms

The location of the dining room and activity room near the lounge, the main containment source for residents, allows these spaces to be used for "spillover". The distributed nature of the lounge and dining room also allows an additional path for wanderers who can move between these three rooms while still keeping contact with other residents and staff.

While the dining room is used mainly during the three mealtimes, it is kept lighted during the daytime and thus provides a deeper layer to the lounge next door. Two and three residents will often be seen sitting at a table and talking in this room rather than in the lounge or activity room; residents also wander through it intermittently, sometimes stopping to talk with those within it. Because of its size, the dining room is also used for more active therapeutic pursuits like bowling with the activity therapist.

Meals are prepared elsewhere in the retirement center and carted in three times a day by two kitchen staff members; carts are placed at either end of the dining room. Almost in response to an internal time clock, many residents who are not already in the lounge start gathering there shortly before the meal cart is due. Staff also start gathering their residents together; if residents do not show up voluntarily, staff go back to the housing wings to find them and bring them to the lounge. The head nurse also uses this general gathering time to dispense medications, wheeling her cart from the nurses station in the lounge for this purpose.

Once the carts are brought in to the dining room, the residents either find their own table or are led to it by a staff member. Staff remove the plates and flatware from the carts, and place them on the table before the residents. There is, then, constant movement in the room as staff move back and forth between carts and tables, or encourage residents to eat. Once most residents finish, they either go back to their rooms to wash up, go to the lounge area, or start wandering again.[2] While the staff can fairly well contain the residents in this room long enough to get them fed, the weak boundaries of the room with its two entries allow residents to wander out of the room during meals. Staff then stop what they are doing to return them to the table.

The activity rooms are used mostly for scheduled activities by the activity therapist such as bible study or story-telling, but they also provide a secondary resting area away from the everpresent television in the next room. These rooms are lined on either side with windows -- one set overlooking a grassy interior courtyard and the other the busy highway beyond the grounds of the center. Because the smaller room contains an icemaker and a microwave, snacks are prepared and served there; because staff have no break room, some staff also heat and eat their own meals in these rooms. Since this is also the one place in the center where smoking is allowed because there is adequate ventilation, smoking staff also join the few smoking residents at various times during the day. Finally, the adjacency and overlap of this room with the lounge next door

[2]It was noticeably apparent that the wanderers seem to gather fresh energy after meals; movement and range increases.

enables staff to sit in the left side of the room and still keep an eye on most of the residents in the lounge. Thus, the activity rooms serve both staff and residents for various reasons, they provide a quieter place where both categories meet in a more casual, unprogrammed way, and they serve as a less obvious "watch" station for staff over residents in this room and the lounge next door. Circulation is technically through the larger of the activity rooms but realistically past both activity areas thus allowing residents to amble past the two seating areas before committing to enter either alcove. Group sizes are also smaller in these two activity zones than in either the dining or living area. In one sense, these overflow spaces might be regarded as more "normal" because they are smaller, they are differentiated, and they allow a great view of both the quieter lounge and the "movers" through the building. This set of rooms is also closer to the nurses hall and thus provides an intermediate waystation with easy access to either the staff station or the resident lounge.

The Nurses Station

The reader will recall that the nurses station is located in the center of the unit, at the crux of the axial core, but that it oversees only the entry to corridors as a result of the radial pinwheel plan. The supervising nurse is the only staff person actually assigned to the station, but aides move in and out of the open workstation to fill in records, use the phone, and so forth. Residents also like to enter the station, and some often try to use the telephone, but they are discouraged from doing so by the gate which is generally kept latched[3].

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[3]When the unit opened, the station consisted of an open access counter. Because residents often reached in over the counter to take records, use the phone, and so forth, a higher panel of glass was installed. It allows visibility in and out while a staff member is seated but residents cannot reach over it.

The nurses station is the focus of staff activity. The administrator and physician/change room are located nearby, all records and medical supplies are kept here, the linen rooms are nearby, the telephone is located here. There are generally several residents milling around in this area, either stopping here on their way to and from outside, because they purposely come here, or because they are left here after their scheduled toileting. Its centralized location also provides a halfway resting station which many of them feel need of, on their long trek from the lounge to their rooms, or vice versa.

The nurses hall is large enough to support the activity and the nurses have placed a small "Charleston" bench on the wall opposite the station, under a "Bus Stop" sign, for resident resting. Nurses relate, however, that if there were more seating for residents, then more of them would be in the area. The bench can only seat three persons, and the small number is intentional, as the residents are fairly distracting to the nurse and aides who are intent on performing their many duties. Staff spend a great deal of time charting patients, recording medications or treatment, and tabulating for the next shift which patients have been fed, clothed, bathed, etc. Thus, the nurses function requires exposure but also shelter. Maintaining a patient activity area away from the station provides for shelter and having an activity area away and visible would combine shelter with surveillance potential. In this location, however, the only area covered by the isovist from the nurses station is of the hall itself. This may account for why most of the care staff carry their paperwork to the larger activity room where they can do their business and survey more patients, and leave the nurses station primarily to the registered nurse on duty.

Finally, the central location of the nurses station allows staff to monitor residents going outside. Some residents also periodically move from their activity areas in the one wing, not so much to their rooms, but down the left corridor, circle outside through the enclosed courtyard, then reenter the building at the north corridor door. These exit doors, like the entry door, are alarmed and only certain patients are considered capable of going outside on their own. Thus, whenever either one of the exterior doors is opened and the alarm sounds, staff move around the nurses hall, because it is the only place in the unit where every door can be seen. If it is one of the more feeble residents, then a staff member must retrieve them. The location of the nurses station thus provides a check-point for the more active residents in this part of the building.

The nurses hall also seems to be a magnet for residents who are experiencing what is referred to as the "Sundown Syndrome", a phenomena which occurs in most nursing homes. Many residents get very agitated as night approaches, and become aggressive or apprehensive, often seeking the reassurance of the nurse or aides on duty. Many residents try to elope at this time, and/or get very upset and confused, saying they "have to get home to fix dinner", "my husband is supposed to be picking me up", or "I can't understand why the bus doesn't come"[4]. In DAY, most of these agitated persons gather near the nurses station (the most stable staff position), or station themselves at the closest door to the walking path outside (the short hall behind the nurses station). Oddly, the major entry does not seem to be a magnet, perhaps because it opens into the rest of the retirement center, rather than to the exterior of the building.

The nurses station, while not situated for visibility of the major resident areas, is in the most strategic space in the center, and the focus of the integrated core. Its

[4]Residents sit on the bench under the "Bus Stop" sign, and become very agitated because the bus never arrives. One woman, almost every evening, finally concludes that her husband is not coming, or the bus is not going to arrive, and she repeatedly asks the nurse if she can rent a room in the "hotel" for the night.

placement allows staff to monitor the transition of residents between the public and private areas, to move from the station to the hall to monitor their passage down the housing wings, and from the center of the hall, to keep a general eye on the resident program spaces at the end of the programmatic hall.

Staff, therefore, seem to take full charge of the spatial structure of the building by virtue of the location of their station and the simultaneous placement of the patient activity spaces off the integration core in one of the wings. At the same time patients have their own focus of unconstrained activity and can also move about. Should the spatial identities be reversed, with a more sheltered nurses station and residents right on the integration core, it could put patients in too dominant a position, almost in staff's way. As it is, while the building is on the verge of becoming "inverted" with patients pushed off and at one end of the integration core, it still retains the balance of "normality". The nurses hall is a crossroads of movement even though it is not allowed to become a hub of more prolonged patient activity. The crucial difference between this building and inverted buildings that assume a radial plan lies in the fact that patients, while off the integration core, are still shallow in the building. As a consequence, staff are forced to spend time with patients who would otherwise get out of control taking advantage of the shallow position of "their" spaces.

Interface

The environmental strategy devised by DAY to deal with their polarized activity zones is to move staff between them. Because staff cannot maintain visual contact of residents and also be in contact with the nurses station to perform the tasks needed in this centralized staff area, and because the nurses hall is the only point to check the hallways for the location of "their" residents, staff have to move between the staff and resident activity zones. A single wing of the unit, then, is seemingly in constant motion while the other three wings see little real use. Because of the localization of all programmatic activity, however, there is thus the constant possibility, indeed assurance, that the two categories will meet casually, and often, somewhere in this wing.

The layering of the resident activity rooms, and their visual accessibility from one another, however, also allows their simultaneous use by residents and staff as well as a logical organization of the various activities. Their grouped arrangement allows staff anywhere in the general area to keep an eye on residents. The clustering of spaces further requires no real mass movement of residents from one area to another for specific activities (except somewhat at mealtimes), but rather allows a loose containment of residents in the physically and visually connected areas. This lack of mass movement is in itself a function of normality. The fact that staff also use the two activity rooms as their own break area not only increases the opportunities for casual encounter with residents, but also somewhat "neutralizes" this space. The links of the resident activity zone with the entry, and through the integrated and visually accessible corridor with the centralized nurses station, extends the social horizons possible in their loosely contained, and somewhat segregated, spatial area.

3. The ATL Unit

The intuitive "feel" of the fifth floor during the field visits is one of relative calm, with little movement or activity on the floor. The nurses station overlooking the entry, the crux of the halls, and part of the resident lounge, usually had two or three staff members sitting in it, talking on the phone, or completing paperwork. The relations observed over time between most staff and residents was cordial and kind, but the division between the two categorical groups was fairly obvious and spatially supported. Staff seem to cluster with other staff in designated staff zones, and residents are encouraged to interact with other residents in dedicated resident zones.

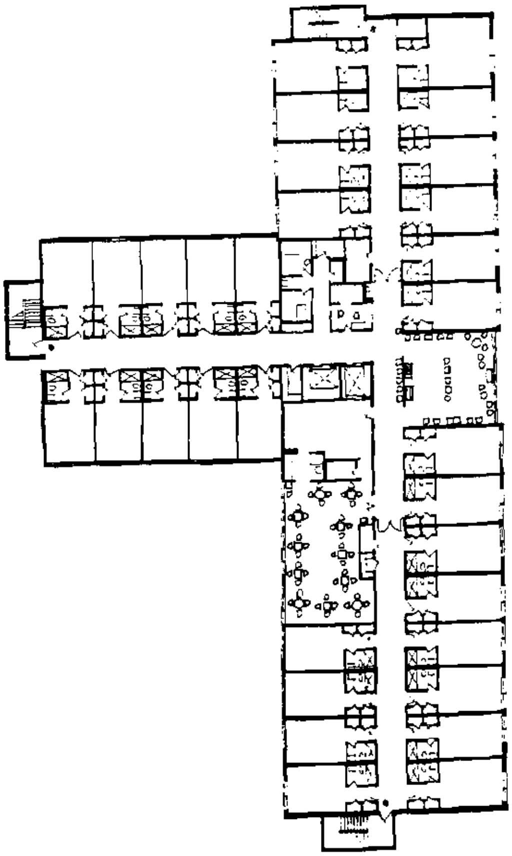


FIGURE 6.2: The ATL Unit - "Relative Calm"

The Lounge/TV Room

There are only two dedicated resident areas at ATL, the lounge/tv room near the entry and the dining room down one of the radiating halls (see Figure 6.2). Residents are housed in the deeper parts of the three wings, while staff activity areas are largely grouped around the geometric, and shallow, center of the unit.

The residents here follow the same general daily routine as those elsewhere, being encouraged to be out of their rooms as much as possible, interact with others and participate in the daily rituals of life. The majority of residents spend their days within the domain described. A very few of the more capable residents, however, are allowed to go down the elevator by themselves to the more public areas of the building or to walk on the wooded site. These few residents are known to the staff, who allow them to enter the elevator. Staff also occasionally take one or two more confused residents to these areas.

While there is generally a group of residents milling around the magnet of the entry and nurses station, many residents are usually seated in the lounge/tv room. This room has chairs and sofas disposed around the perimeter of the room and two rows of oddly assorted chairs down the middle of the room facing the television and the two entries to the room from the hall beyond. While the television is usually on, mostly the front row of occupants watch it. The majority of residents sit around the periphery of the room. A round table occupies one of the back corners of the room. The main activity in this lounge is television viewing; there does not appear to be much movement or talking in this space, nor is there much through traffic since the main corridor passes by it. Because the room is set back from the main corridor, it takes somewhat more commitment by residents to enter it. They have to practically step into the room in order to see most of the occupants, who are facing them; to wander casually through it means walking in front of those watching television.

The advantage of this room for the containment and control of residents is obvious. Its proximity to the nurses station outside negates the need for constant staff presence in the room as staff can visually survey most of the room while seated in the nurses station. Staff at the nurses station can also see when residents exit from the room by either opening onto the main corridor. Staff move into the distributed room looking for their assigned patients, moving them in and out of the room for scheduled toileting in their own rooms in the nearby housing wings. When staff do occupy this room they sit (strategically) at the round table in the rear and complete their paperwork. The table is advantageously placed for sight lines to the edge of the nurses station so they can see when visitors or residents move up to it. Very rarely does a staff member sit among the residents elsewhere in this room, but residents often sit near the round table when staff are present at it. While visitors occasionally sit with residents in this room, most of them take the resident back to their quieter room during these times.

The lounge's centralized location off the crux of all three hallways allows residents an easily accessible space, not too distant from any of the rooms. Its location off the entry corridor outside, both allows some residents to have a tenuous visual and physical connection with the staff and entry, and allows staff to accomplish three critical tasks without much movement. They can keep a general eye on the residents in the room, they can still guard the entry, and they can remain in or near the workstation which is the focus of their own tasks. The room is fairly well contained, with its two openings under the purview of staff, while still offering some views out of it to the nurses station and main hall.

The Dining Room

The dining room is a large, pleasant room with peach and green tablecloths and large windows overlooking the wooded site. However, pleasant as it is, it is rarely used between meals, except for an occasional bingo game which requires tables. Indeed, staff discourage residents from even accidentally entering this room by shutting the doors to it and turning the lights off. Most confused residents hesitate to enter a darkened area. Because the room is only used for the three meals a day, the mass movement of residents to this area at mealtimes gives the impression that the residents are "batched" despite the intentions of staff to do otherwise.

Meals are prepared in the kitchen next to the dining room by a kitchen staff worker who comes up to the fifth floor three times a day. When he/she is in the kitchen, residents sometimes wander into that area but are discouraged from doing so for safety reasons. Once residents are moved into the dining room for meals, staff move between the dining room and the kitchen serving them. It is fairly simple to contain residents to this room as there is only one opening to the hall outside; the other two openings off the room open into the kitchen from which they are quickly evicted by staff. Once all plates are served, staff retire to the small pantry between the kitchen and dining room or the small table in the corner near the pantry so as to observe the dining residents as unobtrusively as possible. Occasionally, they move into the room to encourage residents to eat, but prefer to let residents accomplish this task on their own as part of the normalization of activities. Once the meal is finished, most residents move out of the room on their own to return to the lounge or their rooms. The aides on duty then clean the room, leaving the head nurse to watch over the residents. Often, the staff will take this time to eat their own meal, gathering at one of the tables in the dining room, but turning the lights off in the room to discourage residents from bothering them.

The dining room is thus rarely used, reportedly because it is not visible from the nurses station. The distributed characteristics of this room is only taken advantage of during the serving and cleaning up process by staff who move between the kitchen, the dining room, and sometimes the hall outside both.

The Nurses Station and Entry

The nurses station is located in the nurses hall, the hub of the integrated core, the locus of the most extensive isovist, and the guardian of the entry. Its location overlooking the elevator, and thus the exit from the unit, accounts for the fact that at least one staff member must "watch" the nurses station at all times. It is also the major point of confluence for staff activity, as it contains the resident records, the medical cart, the telephone, supplies and so forth. While the supervising nurse is the only staff member actually assigned to the station, aides move in and out of the workstation often. Visitors check in at the desk on their arrival and sign patients out from there. Residents also like to enter the station, and often try to use the phone, but are discouraged from doing so by the gate which is generally kept latched and by the staff who almost continually occupy this space.

The stations centralized location allows staff a place to be together, at least physically separated from residents, while still keeping a general eye on them and the entry at the same time. Staff in or near it can see most of the lounge, and if they move to the center of the nurses hall, down all three halls.

The entry hall, buttressed by the nurses station, is also the hub of the spatial core and one of the intersecting points on the distributed subsystem. So many residents gather in this general area that staff have allowed chairs to be placed for their comfort on the wall dividing the hall from the adjacent lounge. Generally, most of these chairs are occupied and sometimes residents will move chairs out of the lounge to add to them, but staff do not allow too many chairs to remain there as they impede their progress down the long corridor.

<u>Interface</u>

The centralized location of the nurses station seems to affect the environmental strategy devised by ATL to deal with their activity spaces. The stations location in the spatial and isovist hub of the unit allows staff to largely constrain residents to the single large space which is visible to them from the visually strong nurses station, and rarely use the other space which is more distant and not visually pervasive. They have even improvised another seating area under their purview, which both provides a secondary lounge area for residents away from the television, and settles residents to keep them from obstructing the movement of staff in this busy area. Thus, staff can maintain visual contact with residents in the lounge, or in the corridors, and still be in contact with their work, and other staff, at the nurses station.

It is interesting to note, however, that from an architectural point of view the hub is undistinguished. It has no windows to the exterior, and the link between the nurses station and the resident lounge and other areas could have been better designed to further both functional and visual aims.

The separation of the lounge from the corridor, and the fact that both openings penetrate the same hall, allows the containment of most residents while still allowing residents some view of the nurses station and the entry hall. This physical separation, however, compounded by the fact that the staff have adequate space of their own in the nurses station, lessens the possibility for residents to casually encounter staff and visitors entering the unit from the elevators. Indeed, the offset location of the lounge from the hall negates the necessity for others to enter this area as they can traverse the rest of the unit without doing so. Thus, the physical separation of the ATL spaces allows some visual contact between categories but can be said to reduce the opportunities for unplanned encounters between them. Again, patients are pushed off the main integration core as much as possible, and deeper into the building. Because the shallower staff can still survey the majority of residents deeper in the building from this vantage point, they consequently are compelled to spend less time with them in "their" spaces. While the building leans toward "reversal", it is not actually reversed since patients are allowed to share the shallow nurses hall with the care staff.

4. The ORM Unit

This unit seemed to be very active, with staff and residents appearing to move all over the unit; it is compact and all spaces seemed to be occupied most of the time. The relations between staff and residents also appeared very casual, with staff sitting often with residents in resident areas and residents freely occupying the nurses office.

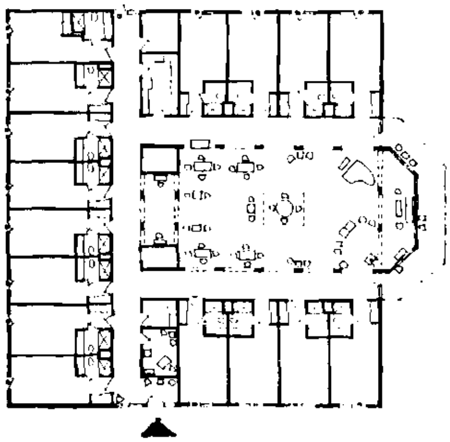


FIGURE 6.3: The ORM Unit - "Compact but Active"

The Lounge/Dining Area

The resident activity areas are clustered in a nucleated fashion at the geographic center of the unit, with the nurses office and the entry offset from it (see Figure 6.3). The large, open space and the wrapping of the circulation space around it not only allows confused residents to easily access this area, but also offers a continuous corridor suitable for wandering, while still being visually connected to activity.

The lounge and dining space, while occupying a single large space, are distinguished from one another by flooring material, furnishings, and color; their overlap with one another, however, permits their simultaneous use. Residents and staff often sit in the dining area, while several residents lounge in nearby chairs, or encircle the television area in the upper corridor of the lounge. Surprisingly, there is very little television watching in ORM, probably because the staff fail to turn it on. The groupings of conversational seating around the large room and the loggias off it allow residents either singly or in groups, to follow other pursuits such as talking, sitting or dozing; actually, the same pursuits as elsewhere. The lounge and dining area are the main site for visiting, perhaps because some privacy is available in the various seating groups. Visitors often take residents to the porch where it is more private (and also the deepest and most segregated spaces in the building).

While the lounge/dining area permits views out, and is naturally lighted by a large skylight at its center, there is no outdoor area other than the screened porch, which while intended for resident sitting, is mainly used by staff for smoking breaks. The wrap around porch is spatially segregated and despite its beautiful view, is rarely used even though it has a continuous path running through it. Residents and staff alike, however, complain about not being able to use the beautiful site surrounding them.

The centralized location of the lounge/dining area and its loggias away from the dedicated staff office, and the fact that residents have no other real space to go, requires that staff be present in it to maintain visual contact with residents. The staff functional areas of the laundry and kitchen, as well as the nurses office and bathroom, are located along the main circulation spine, at the bottom of the building where the views into the interior are restricted. Staff, therefore, mainly bring their paperwork to the dining area or to the round table in the center of the room where they can see most of the residents, and make constant trips from there to check on the progress of tasks in other areas, or to locate residents for scheduled toileting, and so forth. They are often joined by residents who freely sit and chat with them, or watch them complete their records. Even the head nurse rarely sits in the office, which is often left unoccupied and unlighted. The connection of the lounge/dining area with each of the surrounding hallways allows staff to move through the lounge/dining area, often taking short cuts through it from one side corridor to the other. The residents rarely cross through the lounge from one side or the other, tending to stay on the path around to the dining loggia and enter it that way.

The dining area, as noted above, functions as staff workspace and adjunct resident seating in addition to its function during meals. Staff get some shelter by sitting at the back tables, while still maintaining sight lines to seated and walking residents. Meals are delivered by cart from the main part of the retirement center. The carts are brought to the kitchen by kitchen workers, where the heated trays of food are unpacked by the aides and then set on the serving table in one of the arches between the dining area and the corridor. Staff, and sometimes residents who volunteer to help, set the dining tables, and place the heated trays on the serving table from which the plates are served.

Staff often have to interrupt their preparations, however, to round up their residents and bring them to the table. Because of the openness of the dining area, and its distribution with all three corridors, residents often wander from the tables in every direction. Staff move between the serving table, the dining tables, the kitchen, and the resident rooms surrounding the area, often crossing the dining space a number of times to accomplish their tasks. Meals are a busy time, with all staff present in the dining area, including the nurse on duty, if there is one. Once the meal is finished, most residents move out of the dining area, and the aides clean up while the nurse attends to medications. Staff then often take their own meal together at the round table in the lounge, where they are most often joined by the residents, or they gather in the more segregated lounge loggia, which is more sheltered and where they are less interrupted. There seems to be much comradery at these times.

Finally, the extension of the lounge/dining area beyond the confines of the arcade to the loggias at either end, offer additional layering of the space for resident use. It is somewhat separated by the columned arcade, and is one of the most segregated spaces in the system, while still being visually connected to the larger space and the porch outside. The loggia at the lounge end offers comfortable seating, but is rarely used by anyone other than staff. The dining loggia contains a writing desk and an exercise machine and seems to be a natural extension of the dining area. It, too, is spatially segregated, however, and appears to be rarely used except as a short cut from the main hall to the dining or lounge area. One or two residents will stand in it at times, where they can see both the lounge/dining area, and the long corridor to the entry.

The Nurses Station and Entry

The offset location of the nurses office, its relative separation and segregation from other areas, and the fact that it oversees no resident area or the entry, requires staff to be elsewhere in order to visually survey most of the residents. There is no real "pool" of space nearby for residents to gather, except for the nearby entry hall which has only a few chairs in it. Staff do, however, gather in the office and sometimes residents come in and sit with them. The size of the room, however, limits the numbers. Staff instead seem to spend more time in resident areas than in this dedicated staff space.

The entry hall, however, is an interesting spatial phenomena. Most residents seem to go to this area during the day and evening as if to "check it" and then move on to other areas; a few residents, however, spend a lot of time sitting here and looking out. Its heaviest use is at sundown, when many residents gather here in an agitated state, waiting for someone to come get them. While it is well connected through the integrated corridor with the interior activity areas, heavier use is limited by the few chairs that are placed here. There also seems to be little connection of this space with the nurses office, even though it is next door, and has a window connecting them.

Interface

The strategy devised by the staff at ORM to deal with the separate locations of resident and staff space seems to be to move staff to the main resident area. Here, they can easily see most of the residents as well as easily access them in their rooms off the enwrapping corridors. The poor control potential of the nurses office negates its constant use and staff seem to use it more as getaway space than work space. They conduct their business from the centralized resident areas where they often either join the residents or are joined by them. This sets up extensive possibilities for casual interaction between these two groups, and indeed, between them and the visitors who often suddenly appear in this space after punching the code pad for entry to the unwatched entry.

While the offset location of the entry potentially offers a bi-nodal distribution of use, it is small, and the bulk of activity appears to be in and around the large living area in the interior. Residents are thus loosely contained in the interior of the building, but in a somewhat layered spatial arrangement which supports different activities simultaneously. The centralized activity area is also surrounded by a strongly integrated circulation path which offers visual connection to the main space as well as further containment. The fact that a linear corridor system is joined with a courtyard activity zone accommodates both the needs of wanderers and less active residents. The distributed character of the centralized lounge/dining area offers multiple connections between it and the surrounding core off which the resident rooms are located -- a shallow location which further eases the wayfinding of patients from their rooms to the lounge area, but also offers a more abrupt transition from private to public space.

5. Summary of Space Use

The above analysis of configuration and general program illustrates that there are several dimensions of variability in the use of the three Alzheimer's units studied.

In terms of general space use, there is some similarity between DAY and ORM which both offer a clustered layering of resident space, away from the purview of staff stationed in the nurses station. Both these units largely move staff to resident space to support the requirement for visual surveillance of residents. In both these centers, the layering of spatial alternatives around a main space, in this case the lounge, and the close connections between them, offers residents the opportunity for simultaneous activities while still being somewhat loosely contained in the same general area.

In DAY and ORM, however, this containment is somewhat loosened by the off-site location of two other resident attractions -- in DAY, the outside pathway and nurses station and in ORM, the off-set entry and the nurses office. These spatially separated areas mean in DAY that space usage is extended along one of the four wings with residents and staff in constant flux within this localized area. In ORM, the same phenomenon occurs. Staff and residents must move between the two areas in order to accommodate both so the use is mainly clustered on the integrated core connecting to the entry.

The situation in ATL is entirely different in that the nurses station not only partially oversees the main resident lounge area, but it also overlooks the entry. In order to accomplish both tasks from one point, residents are largely relegated to the lounge and the area immediately off the nurses station, while another potential resident space goes largely unused. While the activity spaces for residents and staff occurs at the spatial core of the unit, they are separated from one another. Space use is territorialized with staff gathering mainly in staff spaces where they still have purview of most of the unit, and residents being relegated to spaces where they can easily be seen.

It may be said, then, that space at DAY and ORM is somewhat disposed to bring people together while still allowing some separation, while space at ATL allows their separation. This has implications for the social liveliness in these spaces, which is numerically clarified in the following chapter. At this point, however, it may be suggested that the relations between staff and residents seems to be fairly lively at DAY and ORM and somewhat more restricted at ATL. There is much less formalization at DAY and ORM about where staff position themselves, with staff and residents freely using one anothers spaces. In ATL, there is less spatial equality but clear territorialization of space with little overlap between the two groups.

Space also seems to play a role in the movement of staff and residents about the unit. The spread between the staff and resident space at DAY ensures a veritable hive of activity in the program wing as staff and residents move between the two categorical activity spaces. Staff have to move constantly between their primary work zone and watching the residents in their layered activity zone. Movement through and past use spaces must be fairly constant as there is no single vantage point from which staff can survey the totality of every resident activity space. The enwrapping corridors at ORM also accommodate movement past spaces but through movement is mostly by staff and not by residents who stay on the circulation path unless entering the room to sit. Once again, the lack of a panoptical view from anywhere in the unit ensures that staff must move at least between the lounge and the main bisecting corridor. The polarized locations of the nurses office and entry from the main resident activity zone also ensures constant movement in order to survey both spaces.

This requirement is largely alleviated in ATL, however, because staff areas are visually pervasive to most of the main resident area that is used; it requires only periodic movement of staff to check on the portion of residents in the lounge who cannot be seen. While residents and staff must still move between the center of the unit and their rooms, the location of the lounge off the movement path, while still offering views of it, virtually ensures little movement through it. Movement is thus past spaces, rather than through them.

Finally, the social/spatial interface varies among the three facilities with DAY and ORM being the most similar. The segmentation of space in ATL allows staff and residents to territorialize while still accommodating programmatic concerns. Residents are largely contained and separated from staff while still being visible to them. The interface with the external world is also shallow to both groups, but more so to staff than to residents.

In DAY residents are shallow while in ORM they are deeper in the building. There is, deep or shallow, a strong mix of staff and residents, and a rather equivalent usage of spaces, as compared to ATL. However, in both there is also a constant exchange of interaction between those in the categorical use spaces which enlarges the possibility for casual encounter between categorical groups. Furthermore, visiting in both ORM and DAY occurs largely in the lounge, under the purview of most residents. In ATL, visiting seems to be more prevalent in the private rooms; perhaps because it is easier to accommodate and to enjoy a private conversation within spaces of dense and relaxed use than within spaces of regimented and less dense use.

The function of space is to act as a mechanism for regulating people and activities, and in Alzheimer's units there needs to be a fine balance between implicit control and degree of normalization. It may be argued that DAY and ORM both accommodate programmatic concerns through the simultaneous use of spaces as well as offering a more casual relationship between them. Residents may move from one interconnected or sequentially connected use space to another for slightly different experiences in each, just as they would at home, while still being under the general purview of staff occupying any one of those spaces or a nearby one which oversees it. This mechanism for normality is more restricted in ATL, not only because there are fewer layers of space available, but also because the spaces that are available to residents are either restricted in use because they do not satisfy the requirement for visual control, or are offset from the hub of activity.

It seems that the arrangement of spaces, and their interconnections, affects the general proscription of behaviors in restrictive settings. Because spatial configuration disposes people in various ways, and structures their movement patterns, it also affects the possibilities for unplanned, and unprogrammed, encounters between people. It is these possibilities for awareness and spontaneity which seems to produce a social life, and degree of normalized behavior, beyond any programmatic concerns. This argument is more fully explored in the next chapter.

PART 1: CHAPTER VII

ANALYSIS OF SPACE AND SPACE USE IN ALZHEIMER'S UNITS

1. Introduction

This chapter offers the quantitative, analytical description of space and space use more qualitatively described in the last chapter. The data reported and analyzed in this chapter is derived from the behavior mappings and trackings conducted during the site visits to each facility.

Several themes are raised and analyzed in this chapter. The first is that of movement and interaction -- how far are these spread? It has been suggested that movement, particularly of staff, seems to be a critical link in the ease and formality of residents and staff, particularly as seen in DAY and ORM. The assumption to be tested in this chapter is that movement, which can be spatially induced, produces interaction, which is a normalization requisite. Where there is more movement, there is more interaction, and the interface between people is easier and less formalized.

The second theme that is raised is that of the equality or inequality of staff and residents as a dimension of control. As has been noted in the last two chapters, spatial inequality or quality seems to be linked to the quality of relations between staff and residents. Two questions are asked: 1) Who has the overview of the institution -- staff or residents; and, 2) Are staff and residents polarized, or separated, in space as the literature suggests typifies institutions, or are they mixed together, bringing about a different kind of interface between them? If they are mixed together, one assumes a more relaxed regime, typical to that which would occur in normal "elementary" buildings. If they are polarized, the more some form of control must be instituted in order to keep things separated.

A third theme is that of foreground and background. While this has been raised in the previous two chapters in regard to the isovists, it is treated here more critically in terms of the awareness potential in each facility. A note of explanation is in order, however, before proceeding. As noted earlier, both behaviors in spaces (foreground) and behaviors in the isovists of the occupied spaces (background) are mapped. Hereafter, "IN" refers to behaviors mapped in the spaces (foreground), while "OUT" refers to behaviors mapped in the isovists, or background, of those spaces. While IN and OUT give an idea, therefore, of population, a way of depicting the liveliness of a center is to look at moving in relation to sitting; i.e., a space or isovist is more "animated" when it includes a higher proportion of moving people to sitting people.

The theme of background and foreground, therefore, deals with questions such as: How much "background" (OUT) is there, and is IN or OUT livelier? Are spaces bounded or do they offer an awareness potential in the form of a background that is dense or sparse with people or animated or inanimate in terms of movement and activity? Behaviors are also looked at in terms of the spread of movement and interaction between and among spaces. Termed "continuity", this phenomena offers a different control environment than does the segmentation of space use which organizes experience into discrete phenomena which are either physically bounded or controlled through some other means. Segmentation of space use suggests a stronger control enforcement because the boundaries have to be protected. The continuity of activity through either physical adjacency or visual awareness suggests a more modulated and relaxed use of space, with attendant relaxation in society.

Continuity of space use also raises the idea of a "critical" margin -- the opening of information "windows" that allow access to social information helpful in modulating the restriction and regularity of a contained life. In Alzheimer's units, background can offer opportunities for visual stimulation and information that is physically obtainable if desired because residents can move around the facility on their own. In detention centers, as the next section will point out, the background becomes a "critical margin" in the experience of the users because it offers information and stimulation that can only be obtained visually since movement is restricted.

The fourth issue relates to the practice of control. Whereas the first three issues are based on data obtained from behavior mappings, the analysis of the practice of control is based on trackings of staff -- following and recording the extent of staff movement and the numbers and kinds of interactions participated in during each six minute tracking segment. It is assumed that the range of movement generated because of spatial layout and the requirement for supervision would dictate the mode of control that is exercised. For example, greater movement would seem to be associated with a more peripatetic, casual mode of control, with staff moving in and out amongst residents and interacting in a more free and casual way; the need for less movement, as engendered through spatial layout, would seem to be related to a more formal, panoptical mode of control. These also have bearing on the relations between people.

The findings are first described separately for each facility; a final section summarizes and compares the findings for the three Alzheimer's units.

2. The DAY Unit

The Spatial Distribution of Behaviors

The following description of behaviors is based on behavior mappings of all persons visible to the observer within the public portions of the unit. Every 15 minutes, the observer walked the entire unit and "mapped" onto a floor plan the location and behavior - moving/standing, sitting, talking -- of each person seen at the moment of coding. Each person was coded for category: resident, care staff, or other (administrator, doctor, visitor). The following chart tabulates the numbers of total persons and behaviors mapped over the four days in DAY and then breaks them out by category.

The first question to be examined is how animated and interactive is DAY -- how much movement over stasis is there and how much talking? This gives an indication of how lively the facility is and makes comparison with others easier. Overall, as the chart shows, of the 5,710 total persons mapped and aggregated, almost half were moving or standing (49 percent). Considering that this is a unit where residents suffer from a number of neurological and physical disorders, this seems to bear out the earlier sense of DAY as a fairly animated facility in terms of movement overall.

Table 7. 1: Behavior Mapping in DAY Showing Almost Equal Moving and Sitting

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	5710	2807	2903	1223	706	517
Percentage of Total	*100.*	*.49*	*.51*	*.21*	*.58*	*.42*
Residents	4416	1806	2610	765	370	395
Percentage of Total	*100.*	*.41*	59	*.17*	*.48*	*.52*
Staff	822	680	142	294	241	53
Percentage of Total	*100.*	*.83*	*.17*	*.36*	*.82*	*.18*
Others	472	321	151	164	95	69
Percentage of Total	*100.*	*.68*	*.32*	*.35*	*.58*	*.42*

When each category is separated out, as they are in the table above, how does each vary from the total picture? As the table shows, residents do more sitting than moving (59 percent) while staff and others do the exact opposite -- they move far more (staff = 83 percent; others = 68 percent). Thus, residents in DAY go against the composite picture in terms of animation.

How interactive is DAY? Of all persons mapped during the site visits, less than a quarter were engaged in talking (21 percent). While this does not seem on the surface to be very interactive, this proportion remains to be compared with other facilities. Who is doing the talking, however? Residents talk less than the aggregate (17 percent) while staff and others talk more (staff = 36 percent; others = 35 percent).

Are interactions biased toward moving/standing or toward sitting people? (In all the following tabulations, "moving" includes "standing"). The table shows that talking overall is more biased toward movement with 58 percent of all people engaged in talking doing so while moving or standing. In DAY, not only is there a fair amount of movement, but there is a noticeable trend for moving people to also be interacting with others. Looking at the individual categories of users, again residents are biased in an opposite direction from the total. Resident talking is more associated with sitting than moving.

Finally, are there inequalities in the behaviors of staff and residents? As the table indicates, staff and others move and talk far more than do the residents. Thus, in DAY, it appears that although the unit as a whole is fairly active with about half the people present moving and half sitting, staff and others are moving a lot more than residents. Figures 7.1, 7.2, and 7.3 below illustrate the spread and density of resident, staff, and other movement and stasis in DAY.

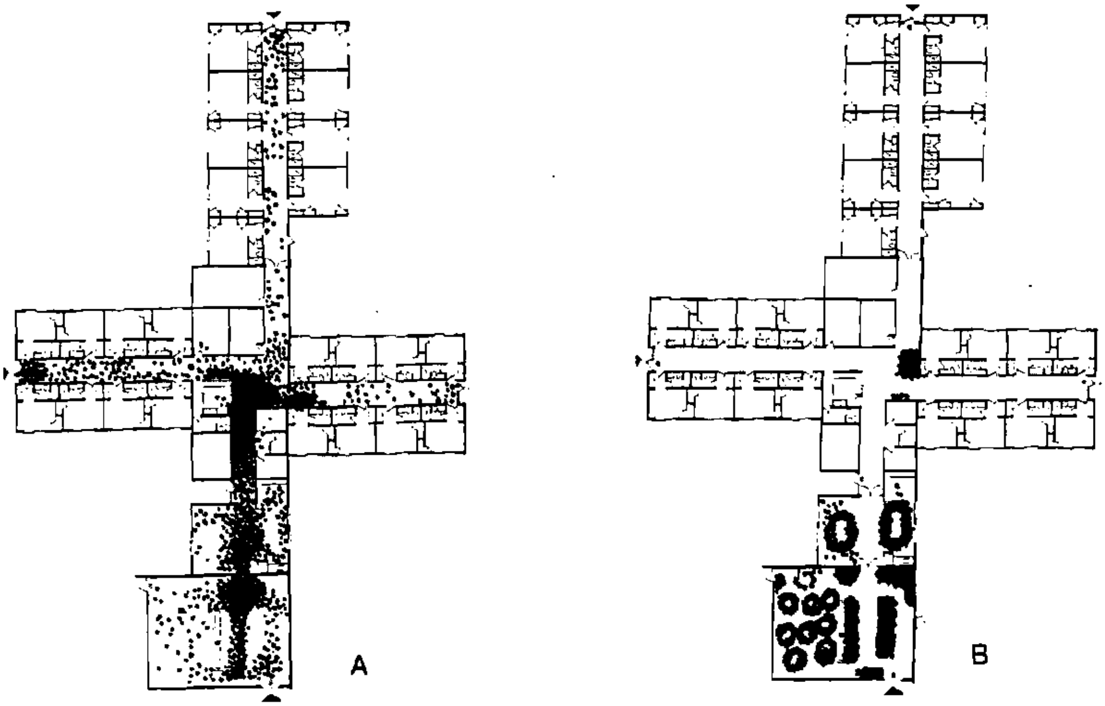


FIGURE 7. 1: The Pattern of Resident (a)Moving/Standing and (b) Sitting at DAY Showing the Concentration in the One Wing

The mapping confirms the earlier assessment that residents move all through the unit, with the highest density between the center of the building and the resident activity areas -- in the most integrated spaces. The mappings also visibly underscore the polarity of activity noted in previous chapters -- there is a heavy concentration of activity at the center of the building near the nurses station, and another cluster in the activity wing between the lounge and the two activity rooms. The reader will recall that the isovists in these areas were comprehensive, so residents standing here could visually "touch" both poles. Movement is thus fairly well concentrated to the dedicated circulation paths, except the strong path created in the lounge between the two seating areas, thus connecting the points on the living/dining ring. Movement is contained in the interior of the unit, partially because of the strong circulation link between the staff and resident activity zones, but also because the two resident available rings at the ends of the integrated main path do not dead end, but "loop" movers and wanderers back onto the path leading again to the center hall. As expected, the hallway most heavily used is that which has the most activity nodes off it, and offers the greatest visibility of activity.

Resident sitting predictably clusters in activity areas, where furniture is placed, but the main sitting area, as noted, puts residents at the most shallow depth, close to the entry -- where the "action" starts. When one looks at the two activity rooms however, both of which have long rectangular tables, it seems that both are about equally occupied. However, the room to the right is programmed for snacks, bible studies, and so forth; the room to the left is unprogrammed. As the mapping shows, it draws residents and staff there on their own, perhaps because it has a larger isovist than the right room and offers views of the lounge and entry. While there is sitting on the bench provided in the nurses hall, the illustration shows that residents also move chairs from their rooms to add to the limited seating in the nurses hall.

Staff movements also spread throughout the unit, with higher density in the two polarized activity zones -- the nurses station and the lounge -- where they can survey both poles (Figure 7.2a). The static mapping shows a concentration of staff sitting in the nurses station but also in the resident areas of the activity room, the lounge, and on the bench in the nurses hall. Comparison with the resident mappings illustrates that staff freely occupy resident seating positions, but as expected, residents do not reciprocally occupy the single dedicated staff area of the nurses station.

Since staff move more and sit everywhere, they may be said to have the overview which is an important dimension of the behavioral inequality associated with control as discussed in Chapter 2. However, the shallow resident space gives them overview of this important feature; it also draws staff out of their central domain in order to control it.

Thus, residents and staff mix freely in the resident areas, helping to soften the polarity of use zones. They mix most informally, however, in the activity rooms which are less nebulous as to category -- staff or resident -- than are the "resident lounge" and the "staff station".

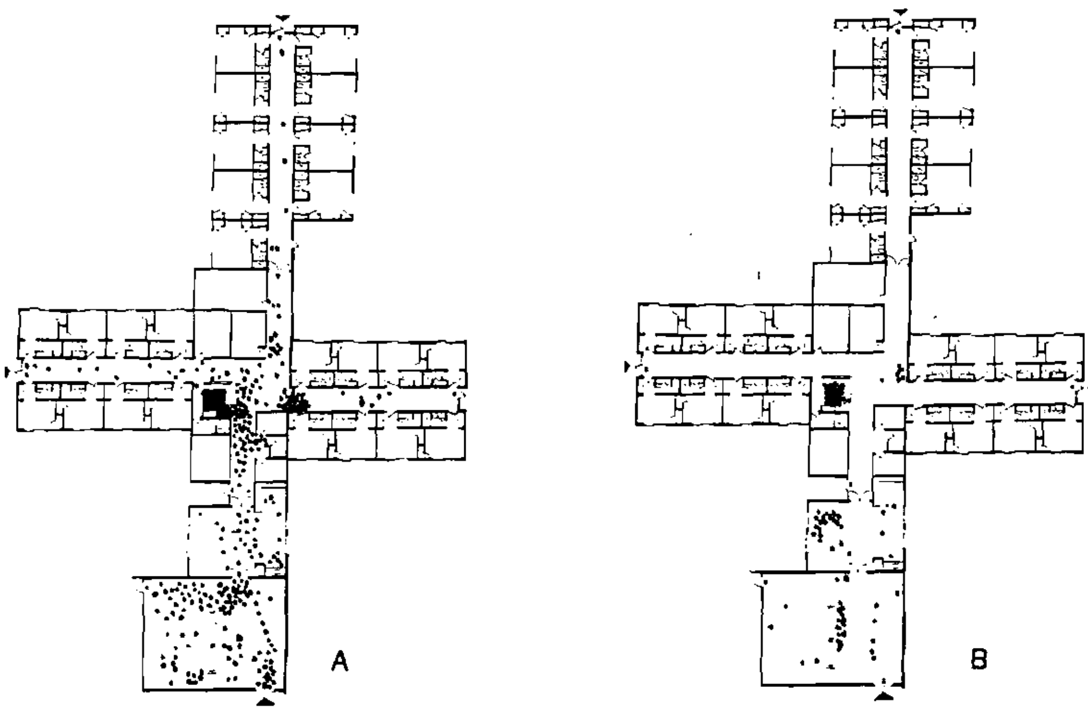


FIGURE 7.2: Mapping Showing Staff (a) Moving/Standing and (b) Sitting in DAY

The mappings of visitors and others (Figure 7.3a and b) shows that other movement is spread throughout the unit but is more concentrated in the shallow portions of the entry and lounge. Visitors also cluster around the nurses station, deeper in the unit, again underscoring the spatial polarity in this center and the pull into the center. Others sit, however, mainly where residents sit, with higher concentrations in the lounge and the activity room which offers the best view of the lounge and entry.

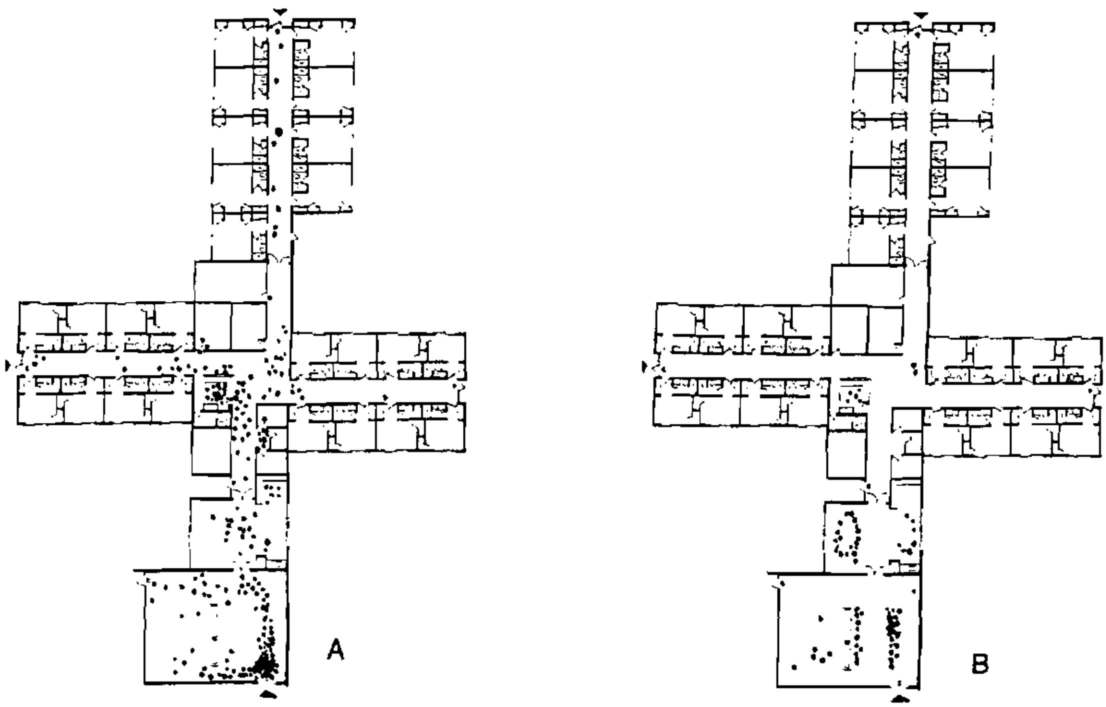


FIGURE 7.3: (a) Other Moving/Standing and (b) Other Sitting in DAY

Overall, these mappings illustrate the spread of movement intuitively sensed, but also the relative containment of activity within and between the two polarized activity zones. All in all, DAY has equal amounts of movement and stasis overall, even though residents mostly sit. Staff are far more in motion than in stasis, which is to be expected anywhere, but especially so in this plan which requires the movement of staff between poles in order to fully survey residents and perform their recordkeeping duties. Talking is associated with movement, a fact to be further explored later in the chapter.

This description, however, offers only an elementary representation of the spatial distribution of behaviors. The following analysis is intended to quantify the aspects of space use described earlier and to correlate these with specific spatial qualities.

The Animated Isovists

As was outlined in Chapter III, a special problem arises in organizations which largely proscribe behavior and control movement, or in which because of their own infirmity, residents cannot move as much or as freely as they would like. While architecture influences how far their experience is fully bounded by the settings in which they find themselves, it also influences the degree to which one can be aware of activities other than the main proscribed activity of the hour, beyond the boundaries of the space they are in. Views beyond offer variety in a setting, as well as visual and sensory stimulation; furthermore, through movement, the variety and stimulation available can be individually regulated, thus offering residents a measure of autonomy and control.

Every setting, therefore, has behaviors which occur "within" it -- foreground or "IN" --but it also almost always has views "beyond" it -- background or "OUT". To disregard the isovist from analysis of these spaces is to limit experience to a single confined space. Foreground and background data are essential variables to any characterization of spatial experience because they give a sense of the total quality of animation, variety, and experience in a facility.

Considering that the main characteristic of Alzheimer's units is sitting because of the infirmity of most residents, a way of depicting the liveliness of a center is to ratio the amount of movement to the amount of sitting. An "animation" quotient can be determined for both the behaviors in spaces and in the isovists from those spaces.

Table 7.2 illustrates two data points in the form of ratios: 1) how much background there is (the proportion of persons IN to OUT), and 2) how much animation (moving or standing/static) there is in the foreground and background. (Only animation in terms of moving/static is considered, because interaction between people cannot be seen well from a distance, and thus would be unavailable to those with visual infirmities). The closer the ratio is to "1", the more balanced are the proportions; the farther away from "1" , the more imbalance.

Table 7.2: IN/OUT and Animation Ratios for DAY Showing Balanced Animation in Foreground and Background

		All Persons	*Residents*	*Staff*	*Other*
IN/OUT		.42	.42	.44	.35
		5710/13723	4416/10532	822/1859	472/1332
Moving or Standing/Static					
	IN	.97	.69	4.78	2.12
		2807/2903	1806/2610	680/142	321/151
	OUT	1.06	.78	5.1	2.09
		7069/6654	4616/5916	1552/307	901/431

As Table 7.2 shows, the background is far more populated than the foreground; the ratio of .42 indicates that more than twice as many people are seen beyond as within a space. Is the background or foreground more animated? The ratios close to 1 for both IN and OUT show that both foreground and background at DAY are about the same -- .97 for IN and 1.06 for OUT. Thus, at DAY, the background is more populated than the foreground, but both are about equally lively, overall.

How does this play out in terms of residents and staff equalities? As the ratios for the separate categories illustrates, both staff and residents have more of their own category out than in but in similar proportions; the ratios of .42 for residents and .44 for staff are very close. In other words, when residents look beyond they see a similar proportion of residents and staff, rather than a greater proportion of staff to residents. This proportionality can be said to ease the sense of isolation in spaces. It is important also for staff from a control standpoint, in that if staff see staff beyond, they are reassured that cover is readily available, especially if the numbers of residents beyond are not overwhelming the number of staff. If staff look beyond and see fewer other staff, they would know they are pretty much on their own. Thus, background is important as an added margin of experience in the form of additional information and the variety it may offer, but also from a standpoint of representation of ones category, and how balanced or unbalanced it is.

For both residents and staff, the background and foreground are surprisingly equal in terms of animation as is the overall situation. For residents, OUT is more animated than IN (.78 to .69) but sitting dominates both; the isovist is thus picking up the external activity as well as the mere presence of others. Staff also have a more animated background (4.78 IN and 5.1 OUT), but moving predominates both. Put simply, for staff and residents in DAY, the background is over twice as dense as the foreground, and background is more animated. The overall numbers, however, substantiate the liveliness intuitively sensed -- while the background is more populated than the foreground, movement and stasis are almost balanced with one another, and foreground and background are almost equally animated.

The Animation of Activity Spaces

While the composite of spaces in DAY give a fair indication of the overall environment, one might well question the experience in some of the key activity spaces -- is there a difference between halls and activity spaces, for example, halls being the province of staff and activity spaces the province of residents? Table 7.3 tabulates the numerical differences and ratios between IN/OUT and between moving or standing/sitting in all key spaces. As before, the closer to "1" the ratio is, the more balanced are moving and stasis; the farther from "1", the more unbalanced.

Looking at the IN/OUT ratio of key spaces, it is evident that the lounge and dining space are biased toward foreground (ratios higher than 1.0) while the halls and activity rooms (1 and 2) are biased toward background (ratios less than 1.0); the lounge, however, is the one space which balances IN and OUT (1.05). In terms of animation within each space, the key resident activity spaces are characterized by sitting (ratios under 1.0), while the halls and activity 1 are biased toward movement (ratios over 1.0). In terms of their isovists, however, the views from dining, activity 1 and activity 2 are of sitting, while those from the nurses hall and all halls combined are of moving; the lounge, again, is the only resident space that equalizes moving and static in its isovist.

Table 7.3: Ratios of IN/OUT and Animation in Key Activity Spaces

		Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Lounge						
	IN	*.31*	461	1470	1931	*1.05*
	OUT	*1.0*	925	917	1842	
Dining						
	IN	*.26*	200	772	972	*1.18*
	OUT	*.48*	266	559	825	
Activity 1						
	IN	*1.17*	192	164	356	*.18*
	OUT	*.78*	890	1145	2035	
Activity 2						
	IN	*.79*	136	173	309	*.30*
	OUT	*.85*	480	567	1047	
Nurses Hall						
	IN	*2.0*	575	287	862	*.47*
	OUT	*1.66*	1151	692	1843	
All Other Halls						
	IN	*336*	672	2	674	*.17*
	OUT	*1.09*	2116	1924	4040	
All Halls Combined (includes Nurses Hall)						
	IN	*4.31*	1247	289	1536	*.29*
	OUT	*1.05*	2752	2616	5368	

Thus, in DAY, there is a split between halls (staff) and activity spaces (residents) for the most part, with experience varying with movement. The key resident space of the lounge, however, offers balanced views of moving and sitting, while at the same time also balancing the numbers of people IN and OUT It thus interfaces residents directly with these behaviors; furthermore, its shallowness to the entry interfaces residents directly to the external world. The only other views of animation must be gained by moving through the halls, including the nurses hall. In DAY, therefore, the experience to be gained by moving in halls is superseded by a resident space that offers a similar, or better experience and stimulation. Staff space is balanced with resident space. Sitting, or moving, staff or resident, one has access to an animated background; and variety in the form of changing scene and behaviors.

Correlations Between Behavioral Variables

Before proceeding with the next section, another note of explanation is in order. In all the following tests, correlations are tabulated between the spatial or behavioral variable and (1) the numbers of persons within convex spaces - IN, (2) the numbers of persons mapped within their isovist - OUT, and (3) the number of persons both in the spaces and within the spaces isovist - TOTAL. All behavioral variables are "adjusted" for the *size* of the spaces in which they are mapped, by dividing the numbers of persons mapped within each space by the square footage of the convex space for IN analyses, by the square footage of the total isovist for the OUT analyses, and by the square footage of the convex space plus its isovist for the TOTAL analyses. The adjusted measure allows one to discern whether larger spaces not only have more people (which is expected), but also have more people per square foot; i.e., whether they are more dense. The adjusted measure is more discriminating than a gross measurement of people. (A composite table of all correlations for the three Alzheimer's units can be seen in APPENDIX H).

Density and Liveliness. As a beginning, it seems reasonable to ask if greater numbers of people generate more liveliness. Does movement and interaction vary in proportion to the numbers of people in a unit? Total number of people in DAY is correlated with moving and talking densities IN, OUT, and TOTAL. In all following results, significance level is in italics below the r value.

TALK, and slightly less so, MOVE are strongly associated with the density of ALL PERSONS with correlations stronger for TOTAL, then for OUT and then for IN (.99, .98, and .95 all at .0001). Correlations for MOVE are stronger for TOTAL and OUT (.98 and .95) than for IN (.77). Density, especially as seen in the background, is related to more talking and moving, in that order.

Table 7.4: Correlations Between DENSITY of ALL PEOPLE and ALL MOVING PEOPLE and ALL PEOPLE TALKING in DAY: Density is Related to More Talking and Moving

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN - DENSITY	.77	.95
ALL PEOPLE	*.0001*	*.0001*
OUT - DENSITY	.98	.98
ALL PEOPLE	*.0001*	*.0001*
TOTAL - DENSITY	.95	.99
ALL PEOPLE	*.0001*	*.0001*

Movement and Talking. Because it was seen earlier that talk seems to be associated with moving, these two variables are correlated. As Table 7.5 shows, movement is strongly associated with interactions whether the analysis is for inside spaces, for background, or for a combination of foreground and background. Correlations are stronger, however, for TALK OUT, then for TOTAL (IN and OUT), then for IN (.98, .96 and .93 all at .0001). The more one moves, the more opportunities are generated for verbal interaction with ones fellows.

Table 7.5: Correlations Between ALL PEOPLE MOVING and ALL PEOPLE TALKING in DAY (Excluding One High Outlier): Movement is Strongly Associated with Talking

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL-ALL MOVE
IN - ALL TALK	.93 *.0001*		
OUT - ALL TALK		.98 *.0001*	
TOTAL- ALL TALK			.96 *.0001*

Foreground and Background. Based on the above correlations, which are stronger for background than foreground, one must also ask if behaviors are continuous, that is spread amongst neighboring spaces, or discontinuous; i.e., discrete to single spaces. Are foreground activities spread beyond to the background? This is a simple measure of the critical margin that background offers.

As Table 7.6 shows, there is a fairly strong correlation between the density of All Behaviors Inside with All Behaviors Outside, for ALL PERSONS combined (.58 at .0036). However, for the variables themselves, only MOVE shows a moderate but significant correlation between IN and OUT (.57 at .005). This suggests that the density of movement seen beyond a space may affect the density of movement inside a space, and because movement is spread, so is talking. In DAY, the stronger correlations for background seem to be related to the experience of movement which is continuous within, through, and across spaces. Where behaviors are continuous, rather than discrete, a somewhat relaxed use of space seems to exist, concomitant with less overt control.

Table 7.6: Correlations Between IN and OUT Behaviors in DAY: Suggesting that the Density of Movement Seen Beyond a Space May Affect the Density of Movement Inside a Space

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN - MOVE	.57 *.005*			
IN - SIT		.29 *.1776*		
IN - TALK			.39 *.0644*	
IN - ALL PEOPLE (MOVE+ SIT)				.58 *.0036*

Correlations Between Configurational Variables and Space Use

Configurational variables are correlated with behavioral variables to assess the relationship between space and space use: 1) the measure of direct visual access, the size of a space and the size of its isovist (SQFT), is correlated with behavioral densities to see if larger spaces or isovists generate more use; 2) connectivity (CON), a measure understandable through local movement (permeabilities from space to space), is correlated with behavioral densities; 3) integration (1/RRA), the measure available through global movement and a value descriptive of how each space relates to all others in the system, is correlated with behavioral variables.

In the following cases, all 24 spaces in DAY are first correlated with densities; when the scattergram is badly skewed by one high behavioral outlier, the outlier is excluded. To see if the trend persists if unused spaces and high outlier(s) are removed, a second analysis removes all unused spaces (usually staff intensive spaces potentially available but discouraged for resident use) and the high outlier(s). If the correlation persists through the second analysis, the trend is strong; if it weakens or loses significance on second analysis, the trend is considered tenuous. Each scattergram was visually checked to insure that its pattern was not an artifact of an outlier. Only genuine outliers were removed. Selected scattergrams can be seen in Appendix I.

Square Footage/Isovist and Density. The visual awareness -- size of spaces and the size of their isovists (SQFT) -- is correlated with behavioral densities to see if larger spaces (and their isovists) are more densely occupied and more interactive.

Size of isovist (SQFT) and ALL PERSONS are more strongly correlated for TOTAL and OUT densities (r= .82 and .86 at .0001) than for IN (.46 at .0291). SIT is more strongly correlated than TALK, which is stronger than MOVE. Correlations for SIT OUT are stronger than for TOTAL (.88, .86 at .0001); SIT IN is insignificant. Correlations for TALK are also strong and significant for OUT and TOTAL (.77 and .80 at .0001) as are correlations for MOVE OUT and TOTAL (.81 and .74 at .0001). Correlations for external densities (OUT) are stronger than internal plus external (TOTAL), which are stronger than internal (IN).

Table 7.7 : (a) Correlations Between SQFT and SQRT DENSITY in DAY Excluding High Outlier and (b) Excluding One High Outlier and Unused Spaces on SQRT: Larger Spaces and Larger Isovists are Denser with People and Generate More Sitting, Talking and Walking

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.46	.28	.41	.40	.22	.06	.04	.14
	.0291	*.1937*	*.0497*	*.0578*	*.4056*	*.8363*	*.8969*	*.7609*
OUT-SQFT	.86	.81	.80	.88	.76	.67	.64	.61
	.0001	*.0001*	*.0001*	*.0001*	*.0011*	*.0063*	*.0104*	*.0355*
TOTAL-SQFT	.82	.74	.77	.86	.76	.62	.66	.67
	.0001	*.0001*	*.0001*	*.0001*	*.0005*	*.0076*	*.0038*	*.0129*

The findings suggest that larger isovists and larger spaces with larger isovists are denser with people, but also generate more sitting, talking and walking. There seems to be an accelerated preference for spaces highly viewable from others; higher densities are thus associated with larger backgrounds. This finding underscores the critical dimension that background plays.

Connectivity and Density. The local syntactic measure of connectivity (CON) is correlated with behavioral densities to determine if more spatially connected spaces and isovists are associated with denser movement, stasis, or interactions.

As Table 7.8 shows, there is a tendency for correlations of CON with the density of All People, but correlations are stronger for external than internal variables. CON is strongly correlated with density of ALL PERSONS OUT and TOTAL (.69 and .65 at .0008 and .0002, surviving even with the removal of the highest outlier and 0's); there is a weaker connection with ALL PERSONS IN; it collapses on second analysis.

MOVE is more strongly correlated with connectivity than is TALK, than is SIT. MOVE OUT, TOTAL and IN are all strongly correlated with CON (.70, .68, and .63 at significance levels of .0002, .0032, and .0012); all survive second analysis. Correlations between TALK and CON are significant for OUT, TOTAL and IN, but show a weaker tendency, surviving only for TOTAL (.61 at .0021). Correlations for SIT OUT and CON are strong and significant (.65 at .0008); SIT TOTAL is weaker, failing to survive second analysis.

Figure 7.8: (a) Correlations Between CON and SQRT DENSITY in DAY Excluding One High Outlier and (b) Excluding One High Outlier and Unused Spaces on SQRT: Connectivity is Correlated with Movement, Interaction and Sitting

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.56	.63	.52	.23	.43	.54	.25	.28
	.0052	*.0012*	*.0105*	*.2856*	*.0993*	*.0302*	*.3882*	*.5429*
OUT-CON	.69	.7	.64	.65	.58	.60	.48	.56
	.0002	*.0002*	*.0009*	*.0008*	*.0243*	*.0185*	*.0674*	*.0584*
TOTAL-CON	.65	.68	.61	.55	.55	.61	.49	.46
	.0008	*.0003*	*.0021*	*.0062*	*.0215*	*.0087*	*.0487*	*.1167*

Correlations for external densities and internal and external combined are stronger than for internal densities. Thus, configuration in the form of local connectivity affects more the experience beyond a space than in it, again evidence of the importance of "margin". Sitting is the least configurationally dependent variable. Sitting requires more space than movement, so tends to cluster in spaces of larger size; these spaces are therefore more programmatically determined. In the case of DAY, however, because of the sequential spillover of activity areas, the heavy sitting areas, except for dining which is offset, have large isovists into other areas.

Integration and Density. Integration (1/RRA), the global variable expressed most through movement, is correlated with behavioral density to see if more integrated spaces are more densely occupied and associated with more movement, talking or sitting in themselves or in their isovists.

As Table 7.9 shows, correlations between integration and ALL PERSONS TOTAL and OUT are strong (.73 and .64 at .0001 and .001), while it is weaker for All PERSONS IN, failing on second analysis. MOVE is stronger than TALK which is stronger than SIT. MOVE is strongly and significantly correlated for OUT and TOTAL and, more weakly, for IN (.77, .74, .62 at .0001, .0001, and .0016). TALK is also strongly correlated for OUT and TOTAL (.74 and .66 at .0001 and .0007), and more weakly with IN. There is a weak tendency for SIT OUT and TOTAL, because the correlations collapse on the second analysis.

External densities and the combination of internal and external are again more strongly correlated than internal densities. These findings suggest that movement and interaction are configurationally driven -- people move and talk where they can be seen by more people. Sitting does not appear to be strongly related to integration which is understandable given the fact that people, for the most part, will sit where chairs are placed, and in areas sized for sitting.

Figure 7.9: (a) Correlations Between 1/RRA and SQRT DENSITY in DAY Excluding One High Outlier and (b) Excluding One High Outlier and O's on SQRT: Integration is Correlated with Movement and Interaction (*See APPENDIX I for Scattergram)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.48	.62	.46	.04	.25	.49	.1	.52
	.0221	*.0016*	*.0257*	*.8517*	*.3511*	*.0564*	*.7389*	*.2305*
OUT-1/RRA	.73	.77*	.74	.64	.62	.70*	.64	.51
	.0001	*.0001*	*.0001*	*.0001*	*.0139*	*.0035*	*.0103*	*.0914*
TOTAL-1/RRA	.64	.74	.66	.49	.53	.71	.56	.27
	.001	*.0001*	*.0007*	*.0181*	*.0291*	*.0015*	*.0202*	*.3815*

The Practice of Control

While common sense dictates that people will sit in lounges and move in hallways, there is always the probability of encounter engendered through movement, depending on spatial layout. The arrangement and juxtaposition of spaces within a unit can generate a certain "virtual" society that is purely spatially induced.

The early observations in Alzheimer's units, prior to commencement of the study, suggested that movement is associated with interactions between staff and residents. Therefore, in this study, staff were tracked for six minutes in each fifteen minute mapping segment; a record was made on a reduced floor plan of the number and kind of interactions occurring between staff and residents; i.e., whether it was staff or resident initiated, general comment or directive/question. The tracking figures are derived from following the movements of one staff member at a time, but provide, in aggregate, a somewhat random selection of staff movement patterns across the board.

Table 7.10 illustrates the mean number of interactions between staff and others and their correlations with the average linear feet walked by the staff tracked over the tracking periods. The DAY unit has approximately 335 linear feet of corridor space, not including paths through use areas such as the lounge or dining room. On average, DAY staff walk 284 linear feet per tracking segment, or a ratio of .85 if taken as a proportion of total available corridor length. As the table shows, staff initiate more conversations with residents than vice versa (3.3 to 1.4 total); only staff to resident directives/questions and total interactions are weakly but significantly correlated (.32 and .326 at .0001). All interactions between resident and staff, no matter who initiates, are also weakly but significantly correlated (.298 at .0003). Staff interactions with others are far less than those with residents; only staff to staff is weakly correlated (.203 at .0145). Finally, all interactions in DAY, averaging 6.0 per six minute tracking segment, are weakly correlated (.349 at .0001).

This suggests that the intuition from the early observations was valid. Staff movement at DAY is positively, albeit somewhat weakly, correlated with staff directed, "business" interactions with residents and with the interactive level in general. The direction of the correlations, however, suggests that staff movement may be about surveillance and care of residents, or about maintaining staff solidarity, but the peripatetic mode of control that is necessitated by the bipolarity of the spatial layout, seems to open opportunities for casual interaction with residents as staff move in and amongst them. The fact that resident to staff interactions are not correlated with staff movement suggests that staff may generate interactions with and from residents as they move amongst them, but that residents are not purposely seeking out staff for interactions.

Table 7.10: Means and Correlations between Linear Feet Staff Walk and Interactions in DAY: Showing Staff Movement is Associated with Greater Interaction with Residents and With Interaction Overall

	Mean	r Value	Significance
Linear Feet Walked	284		
Staff to Resident			
Directive/Question	1.9	.32	.0001
Comment	1.4	.14	.0913
Total Interactions	3.3	.326	.0001
Resident to Staff			
Directive/Question	.59	.041	.6243
Comment	.83	.102	.2230
Total Interactions	1.4	.107	.2035
All Resident/Staff Interactions	4.7	.298	.0003
Staff to Staff	.91	.203	.0145
Staff to Others	.38	.03	.7213
All Interactions	6.0	.349	.0001

Summary

In summary, the findings indicate that DAY is a fairly interactive and relaxed unit with more people seen in the background than in the foreground, but with moving and stasis balanced in both. About one-fifth of the total population is talking. Residents are characterized by more sitting and less talking, while staff and others move and talk more. Movement is contained in the activity wing, partly because of the rings at either end, but also because of the concentration of animation stretched along the integrated core. There is much overlap of staff and residents in resident areas because the bipolarity of the layout makes it impossible for staff to remain in their own zone and still oversee patients at the far end of the wing and oversee the entry. The background for both staff and residents is proportionately balanced, providing stimulation for residents and additional cover for staff. More importantly, while (staff) halls are more biased to moving and views OUT, and (resident) activity spaces are more biased to sitting and views IN, the key space of the lounge interfaces the two; it offers an animated background where movement and stasis are balanced. This is an important feature because it allows the majority of sitting residents to experience the same stimulation one usually gains only from movement through hallways. This may account for the fact that there are more people in the lounge than in the halls in DAY.

It was further demonstrated that the presence of more people per square foot, i.e., density, is significantly related to more talking and moving, especially as seen in the background. Movement is strongly and significantly related to talking and the peripatetic control mode of the staff seems to aid this. Background and foreground densities are correlated for all people and for moving people, suggesting continuity of activities across spaces rather than segmentation of use. There seems to be a preference for spaces highly viewable from others: the size of the isovist, more than the size of the space, is correlated with sitting, then talking, then moving people. Configuration is clearly correlated with moving densities, a finding which corroborates other studies (Peponis, Hadjinikolaou, Livieratos and Fatouros, 1989; Hillier, Burdett, Peponis and Penn, 1987), and with interactive variables in general more than with sitting, and appears to affect more the experience beyond a space than within it. The stronger correlations for the background underscore the criticality of this awareness margin to modulate the experience and variety of life within this unit.

3. The ATL Unit

The Spatial Distribution of Behaviors

Table 7.11 summarizes the numbers of total persons and behaviors mapped over the four days of observation in ATL and then breaks them out by category. The explanations and format follow those of the previous unit.

IN ATL, of the 5,070 persons mapped and aggregated, about a third are moving (37 percent) making for a fairly sedentary center. When the categories are broken out, typically, residents are shown to move less than the aggregate (27 percent), while staff and others move more (63 and 88 percent).

As to verbal interaction, about one-fifth (19 percent) of all persons are talking. Residents talk less than the aggregate (14 percent) while staff and others talk more (34 and 30 percent). Thus, residents are characterized by sitting and less talking; staff are characterized by moving and talking. There is a preference for talking while moving overall (57 percent), but while staff and others follow the general trend, residents talk more while sitting, but not proportionately so.

Table 7.11: Behavior Mapping in ATL Showing More Sitting Than Moving

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	5070	1874	3196	945	541	404
Percentage of Total	*100.*	*.37*	*.63*	*.19*	*.57*	*.43*
Residents	3926	1056	2870	568	270	298
Percentage of Total	*100.*	*.27*	*.73*	*.14*	*.48*	*.52*
Staff	757	478	279	261	169	92
Percentage of Total	*100.*	*.63*	*.37*	*.34*	*.65*	*.35*
Others	387	340	47	116	102	14
Percentage of Total	*100.*	*.88*	*.12*	*.30*	*.88*	*.12*

As Figure 7.4 shows, resident movement is throughout the unit but heavily concentrated at the centralized activity zone of the nurses station and entry; the hub of the integrated core of the spatial system. Movement mostly occurs on the two corridors with the greatest visibility of activity areas of nurses station and lounge. The dining room, is discouraged from use; the rings connecting it to the kitchen are for staff, not residents, nor are they visible to residents. The third (short) corridor, with views only of hall, is less used.

Resident sitting occurs in three areas -- the dedicated seating areas of lounge, dining room only during dining, and the improvised seating row overlooking the nurses station. Comparing the two mappings, it is evident that resident movement is largely restricted to hall while sitting is largely associated with offset spaces.

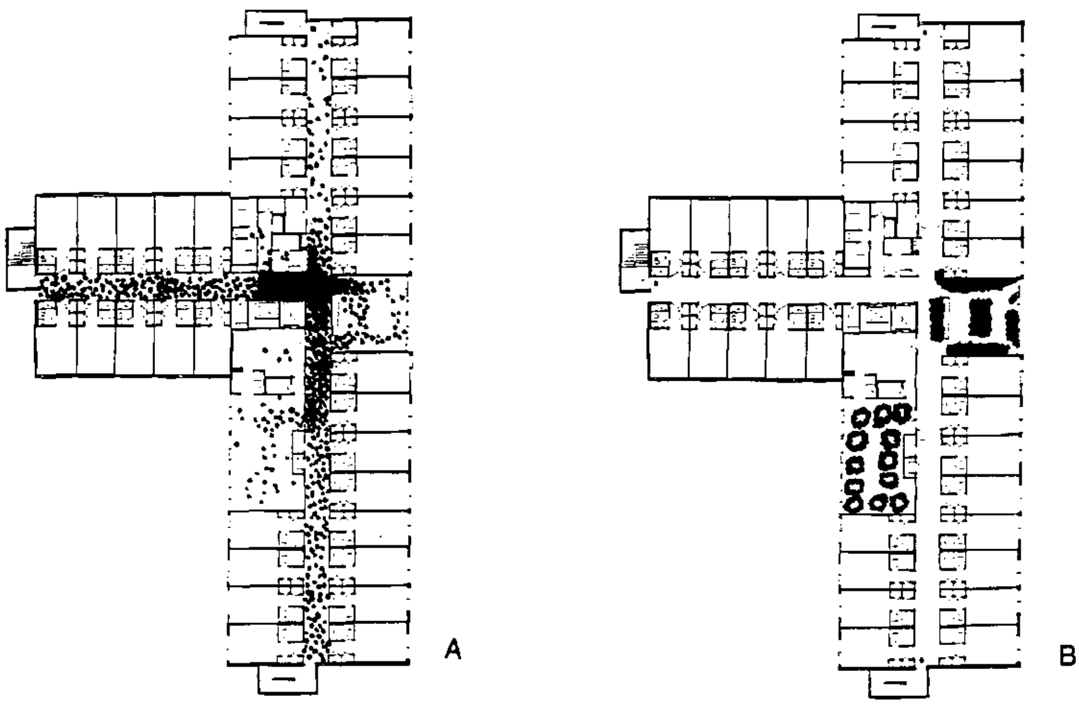


FIGURE 7.4: Mapping of Resident (a) Movement and (b) Sitting Showing the Concentration of Activity at the Center of ATL

While staff movements naturally spread throughout the unit because of task and surveillance requirements, there is a heavy clustering of staff in and near the nurses station in the center of the building (Figure 7.5). The only other potential cluster is in the dining room, in the area where staff stand or sit while residents dine.

Staff sitting also occurs largely in concentrated groupings -- in the nurses station and at the strategically placed round table in the corner of the lounge; staff thus align themselves to the global axis into the lounge seeking to maximize visual overview and surveillance. This is interesting, because it appears that staff in ATL occupy only two strategic places, thus exerting a more panopticon model of control than a peripatetic model based on movement.

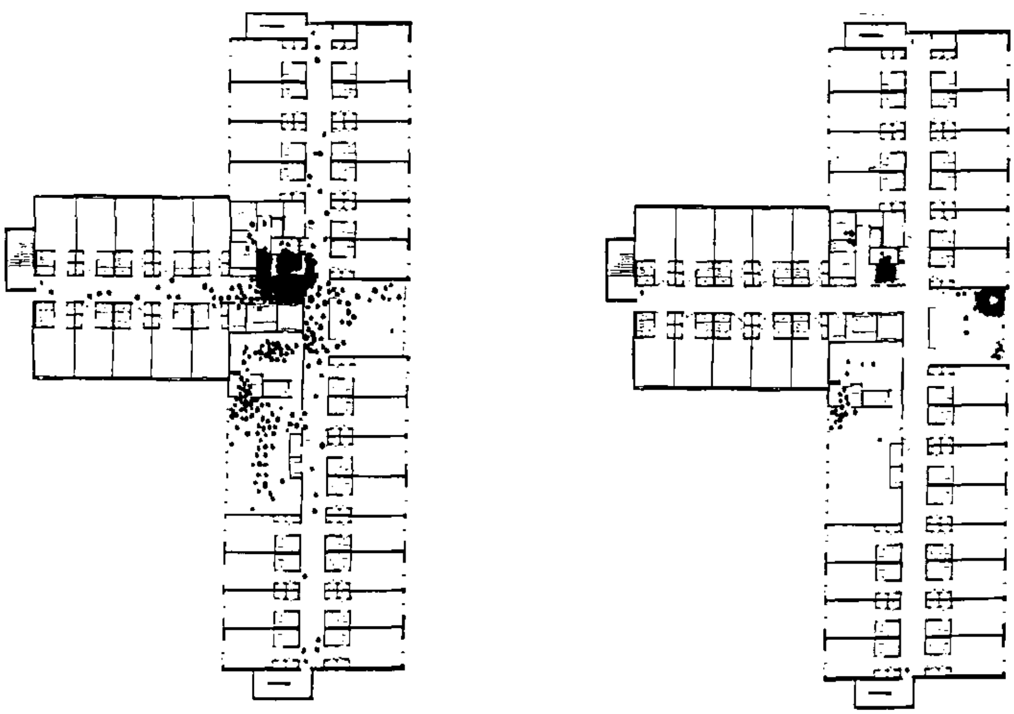


FIGURE 7.5: Mapping Showing Concentrated Groupings of Staff (a) Movement and (b) Sitting in ATL

A comparison of resident and staff mappings illustrates that residents and staff have distinct and separate sitting areas. Few residents sit at the "staff table" and few staff sit in dedicated resident seats. Staff have access to spaces (the largely unused dining room) which allow them to separate from residents, thereby underscoring their custodial roles. All in all, there is an institutional bipolarity of categories, and an inequality in the use of spaces (Goffman, 1961; Rivlin and Wolfe, 1979).

Other movement (Figure 7.6a) is concentrated at the entry and nurses station and in the kitchen (food preparation personnel) with surprisingly little spread into the rest of the unit. Very few visitors actually sit as the only cluster shown is in the nurses station which indicates administrative personnel. Thus, visitors do not go deep into the unit and few remain long enough to sit. This is, again, an indication of the lack of integration between residents and others in the facility, a subtle hallmark of stigmatization (Goffman, 1961).

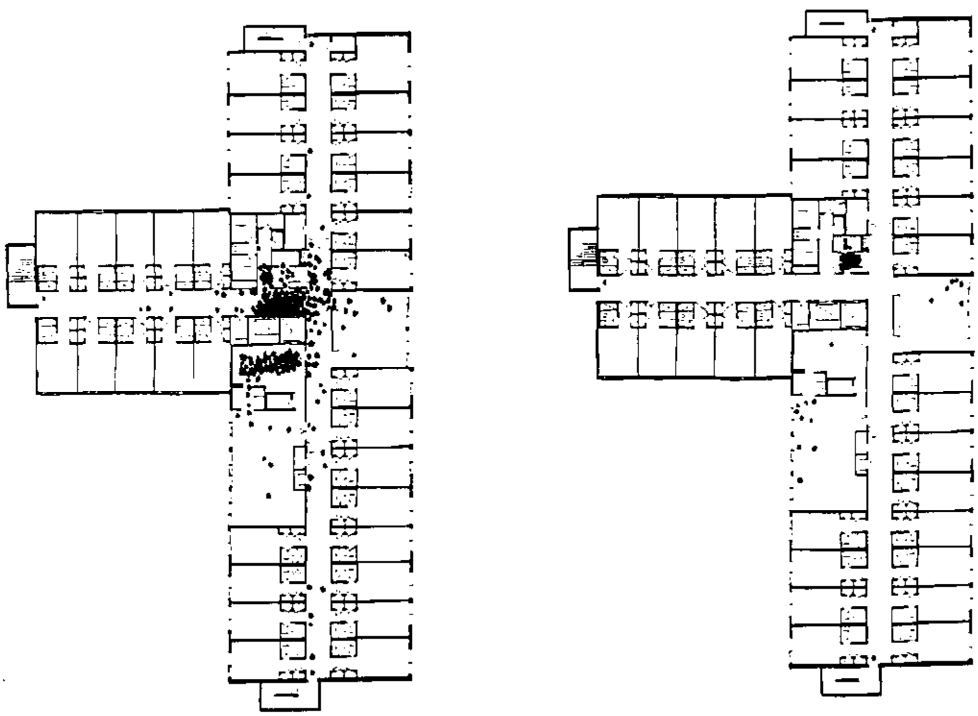


FIGURE 7.6: (a) Other Movement and (b) Other Sitting in ATL

The mappings and numbers support the intuitive assessment of ATL as a relatively sedentary center. While staff do move more than residents, the spatial layout centers most staff movement in one zone. Staff have also a few spots from which they can sit and survey most residents, while being somewhat separated from them. Staff also control the entry, which is not visible to most residents in the lounge, and residents move seats into the central hall, or mill around in this area, possibly to increase the interface with both staff and the outside world. Overall, movement and stasis concentrates at the spatial center which is the hub of activity and the intersection of the integrated core of the spatial system.

<u>The Animated Isovists</u>

The following table illustrates, again in ratios, the amount of background to foreground and the bias of animation. The closer to "1" the more balanced.

The IN/OUT ratio of .44 indicates that the background is far more populated with people than the foreground. The ratio of animation is also uneven between IN and OUT, with more sitting in both but the background, with its ratio of .78, is more animated than the foreground. People see more movement, or the potential of movement, in the background than in the foreground.

Table 7.12: IN/OUT and Animation Ratios for ATL Showing a More Animated Background

	All Persons	*Residents*	*Staff*	*Other*
IN/OUT	.44	.46	.39	.38
	5070/11493	3926/8541	757/1940	387/1012
Moving or Standing/Static				
IN	.59	.37	1.7	7.2
	1874/3196	1056/2870	478/279	340/47
OUT	.78	.5	1.9	11.5
	5046/6447	2844/5697	1271/669	931/81

As the ratios for residents and staff illustrate, there is a differential in proportions IN and OUT, and in animation. Staff have a higher proportion of their own category in the background than do residents (ratio of .39 for staff and .46 for residents). There is then for staff, comfort beyond. Residents see more residents out also, but not proportionately to staff; another small sign of inequality.

In terms of animation, staff and residents are further differentiated. Residents have a more animated background than foreground (.5 to .37) while staff have an equally animated background and foreground (1.9 to 1.7). Since the OUT component is more animated than the IN, the isovist extends to cover the more "lively" areas beyond at the expense of the less lively. To residents, the background appears more animated than the space they are in, but overall, they see sitting everywhere. Thus, staff have a different margin of experience than do residents, more evenly spread. Others have similar proportions OUT as do staff (.38), and are very biased toward movement.

Overall, ATL can be characterized as having a larger and more active background than foreground, but a preponderance overall to stasis, except for staff. There is a margin of awareness here, but it incorporates mostly views of sitting.

The Animation of Activity Spaces

The animation and IN/OUT ratios of the key activity spaces in ATL are given below in Table 7.13, below. As before, the closer to "1" the ratio is, the more balanced are moving and stasis; the farther from "1", the more unbalanced.

Looking at the total numbers, it is evident that there are more people in the (staff dominated) halls than in the key activity space of the lounge. The lounge, therefore, fails to generate the use that the halls generate, even though there is little sitting available in the halls. It is also evident that the two activity spaces are biased toward foreground, while the halls, including the nurses hall, are biased toward background, increasing the margin of awareness. There is a further division in terms of animation in the spaces, with activity spaces heavily biased to sitting, and halls heavily biased to movement and standing. In terms of isovists, the views from lounge and dining are biased to moving, while those from all halls are of sitting.

The experience of animation, and differentiation of category, therefore varies considerably in key spaces, depending on where one is; there is considerable difference between halls and activity areas. One must be in the halls, excluding the Nurses Hall, in order to experience an evenly animated isovist (ratio of 1.06) where movement is balanced with sitting.

Table 7.13: The Ratio of IN/OUT and Animation in Key Activity Spaces at ATL

		Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Lounge						
	IN	*.08*	119	1466	1585	*1.12*
	OUT	*3.67*	1115	303	1418	
Dining						
	IN	*.15*	132	856	988	*14.1*
	OUT	*10.7*	64	6	70	
Nurses Hall						
	IN	*2.52*	800	317	1117	*.52*
	OUT	*.56*	772	1377	2149	
All Other Halls						
	IN	*1.41*	658	466	1124	*.24*
	OUT	*1.06*	2417	2284	4701	
All Halls Combined (includes Nurses Hall)						
	IN	*1.86*	1458	783	2241	*.33*
	OUT	*.87*	3189	3661	6850	

Thus, in ATL, some tension is exhibited. One must move through hallways for a sense of balance between sitting and moving. While the lounge is where the staff want residents for easier accountability, the residents want to be in the nurses hall; they mill in or near here and place their chairs to overlook it, possibly to achieve a sense of balance and counter their separation from staff and activity zones. The lounge and dining room, being biased toward sitting and not requiring movement through them, view only movement out rather than a mix. While variety can be obtained through movement, the key resident space is too sheltered from the two interfaces deemed critical -- staff and the entry to the world beyond. The result seems to be a tension alleviated to some degree by the few chairs in the entry hall.

Correlations Between Behavioral Variables

In ATL, 27 convex spaces are included in all following analyses, unless noted. These 27 spaces comprise the public areas of the facility available to the residents.

Density and Liveliness. As before, overall density is correlated with densities of movement and talking IN, OUT and TOTAL, as a simplistic indicator of liveliness. Correlations are stronger for TALK than for MOVE, and for external densities than internal densities, but there is a very strong relationship between density and talking and moving/standing. Correlations for TALK TOTAL are stronger than TALK OUT which are stronger than IN (.99, .97, and .88 all at .0001); those for MOVE TOTAL are stronger than MOVE OUT, which are much stronger than MOVE IN (.97, .93, and .67). Thus, the more people, especially in the background, the more talking and moving.

Table 7.14: Correlations Between DENSITY ALL PEOPLE and ALL MOVING PEOPLE and ALL TALKING PEOPLE in ATL: Suggesting the More People, the More Talking and Moving

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN-DENSITY	.67	.88
ALL PEOPLE	*.0001*	*.0001*
OUT-DENSITY	.93	.97
ALL PEOPLE	*.0001*	*.0001*
TOTAL-DENSITY	.97	.99
ALL PEOPLE	*.0001*	*.0001*

Movement and Talking. MOVE and TALK are correlated to determine their relationship in ATL.

As Table 7.15 shows, MOVE is strongly and significantly correlated with TALK for ALL PEOPLE IN, OUT and TOTAL (all with r of .92 or greater, at .0001 significance). Correlations are higher for external densities than for internal, suggesting that movement is related to interactions with others, particularly in large isovists.

Table 7.15: Correlations Between ALL PEOPLE MOVING and ALL PEOPLE TALKING in ATL: Movement is Strongly Correlated with Talking

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL-ALL MOVE
IN-ALL TALK	.92 *.0001*		
OUT-ALL TALK		.98 *.0001*	
TOTAL-ALL TALK			.96 *.0001*

Foreground and Background. To see whether the behaviors in ATL are continuous, or spread, densities inside spaces are correlated with densities in the isovists.

As Table 7.16 shows, there is a moderate but significant correlation only between the density of All Behaviors IN with All Behaviors OUT (.47 at .0128). There are no significant correlations between density IN and OUT of MOVE, SIT or TALK. What occurs in or beyond spaces depends on something other than any strong correspondence between behaviors in the two areas. This suggests that behaviors are more segmented and not as continuous in this facility; rather to be expected given the boundedness of activity spaces.

Table 7.16: Correlations Between IN and OUT Behaviors in ATL: Density of People In Spaces is Correlated with Density in Isovists

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN-MOVE	.25 *.2088*			
IN-SIT		.29 *.1382*		
IN-TALK			.33 *.0907*	
IN-ALL PEOPLE MOVE + SIT				.47 *.0128*

Correlations Between Configurational Variables and Space Use

The following correlations include 1) all 27 spaces, excepting noted exclusions, and 2) a second analysis removing all unused spaces and the high outlier(s).

Square Footage/Isovist and Density. Size of spaces and their isovists (SQFT) are correlated with density of behaviors in spaces or isovists.

As Table 7.17 shows, size of space and/or isovists are strongly correlated with density of ALL PERSONS TOTAL (.78 at .0001), and more tentatively with density of ALL PERSONS OUT and IN, because they do not survive the second analysis. Correlations for TALK and MOVE are stronger than for SIT, but only TOTAL TALK, MOVE and SIT survive the second analysis (.82, .81 and .72 at .0001).

The findings suggest that large spaces with large isovists are more densely occupied, and sustain more talking, moving, and sitting per square foot. This finding, however, is weaker in the spaces themselves suggesting a preference for spaces more visible from others.

Table 7.17: (a) Correlations Between SQFT and SQRT DENSITY in ATL and (b) Excluding One High Outlier and O's on SQRT: Suggesting that Large Spaces with Large Isovists are Denser with People and with Talking, Moving, and Sitting (*see APPENDIX I for Scattergram)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.56 *.0025*	.56 *.0028*	.56 *.0028*	.53 *.0143*	.45 *.0695*	.21 *.4298*	.24 *.4598*	.52 *.1211*
OUT-SQFT	.74 *.0001*	.72 *.0001*	.75 *.0001*	.71 *.0001*	.51 *.0614*	.46 *.0963*	.37 *.2356*	.25 *.4381*
TOTAL-SQFT	.78 *.0001*	.81* *.0001*	.82 *.0001*	.72 *.0001*	.66 *.0042*	.83* *.0001*	.70 *.0051*	.53 *.0496*

Connectivity and Density. The local syntactic measure of connectivity (CON) is again correlated with density of behaviors to determine if more connected spaces are associated with more movement, stasis, or interactions per square foot.

As Table 7.18 shows, correlations are strong for Connectivity and ALL PERSONS TOTAL and IN, in that order (.6 and .58 at .0012 and .0017) and less strong for OUT, which collapses on second analysis. Correlations are strong for MOVE IN and TOTAL (.70 and .65 at .0001 and .0003) but weaker for MOVE OUT, because it fails on second analysis. Correlations are less strong for TALK, with only TALK TOTAL surviving second analysis (.60 at .0012). Correlations for SIT are weaker yet, failing to survive the second analysis.

MOVE survives better than TALK, which is better than SIT. Correlations for TOTAL densities (external and internal) are stronger than internal densities (IN) which are stronger than external densities (OUT). This suggests that in ATL, configuration in the form of connectivity affects more the experience in a space than beyond it.

Table 7.18: (a) Correlations Between CON and SQRT DENSITY in ATL Excluding One High Outlier and (b) Excluding One High Outlier and O's on SQRT: Suggesting that Connectivity Affects More the Experience in a Space than Beyond It

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.58	.70	.68	.38	.61	.54	.26	.47
	.0017	*.0001*	*.0001*	*.1495*	*.0069*	*.0318*	*.4081*	*.169*
OUT-CON	.56	.56	.55	.52	.34	.36	.29	.21
	.0031	*.003*	*.0038*	*.0066*	*.2346*	*.2105*	*.3672*	*.5183*
TOTALCON	.6	.65	.60	.5	.54	.67	.58	.37
	.0012	*.0003*	*.0012*	*.0098*	*.0262*	*.0032*	*.0284*	*.19*

Integration and Density. Finally, the integration variable (1/RRA) is correlated with density in order to see if more integrated spaces or their isovists are more densely occupied and associated with more movement, talking or sitting.

The correlations between 1/RRA and ALL PERSONS TOTAL, OUT, and IN are weak, collapsing on the second test. The densities of MOVE IN and MOVE TOTAL are more strongly correlated with integration (.67 and .54 at .0001 and .0034), surviving second analysis; MOVE OUT is weakly correlated, collapsing on second analysis. TALK is also weakly correlated with integration for IN, TOTAL and OUT, in that order,all collapsing on second analysis. The correlation for SIT OUT is tentative, it too collapsing.

Figure 7.19: (a) Correlations Between 1/RRA and SQRT DENSITY in ATL(b) Excluding One High Outlier and O's on SQRT: Movement is Correlated with Integration

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.49	.67	.60	.28	.23	.52	.27	.27
	.0099	*.0001*	*.0011*	*.1519*	*.3747*	*.0317*	*.3913*	*.4523*
OUT-1/RRA	.45	.5	.44	.42	.37	.42	.43	.33
	.0197	*.0098*	*.0208*	*.0284*	*.1887*	*.1321*	*.1644*	*.292*
TOTAL-1/RRA	.42	.54	.49	.33	.48	.64	.51	.18
	.0299	*.0034*	*.0095*	*.0936*	*.0527*	*.0061*	*.0629*	*.534*

Overall, in ATL, the correlations between integration and densities of people or behaviors are not very strong. Correlations for external densities (IN and OUT) are somewhat stronger than internal which are stronger than external alone. MOVE is more strongly correlated than either TALK or SIT, suggesting that movement, in particular, is associated with spatial integration.

The Practice of Control

Table 7.20 illustrates the results of the tracking of staff in ATL to determine if their movement initiated or received more interactions.

The ATL unit has approximately 305 linear feet of corridor space, not including paths through use areas such as the lounge or dining room. On average, staff walk 219 linear feet per tracking segment, or a ratio of .72 if taken as a proportion of total available corridor length. Staff average more interactions with residents than do residents with staff (2.7 to 1.4 total) and only the staff to resident interactions and the total interactions are correlated (.46 and .465 at .0001). All interactions between staff and residents are also moderately correlated (average of 4.2; .399 at .0001); staff to staff interactions are weakly correlated (.253 at .0022); and, all interactions total are positively correlated (.434 at .0001).

The significant correlations for staff initiated interactions with residents and other staff only suggests that these may be maintenance oriented and in the interests of maintaining solidarity with other staff. During the course of the movement, however, some opportunity is also opened for casual comments to and from residents but also to other staff, as witness that correlation. The spatial layout, with its emphasis on centralization of both resident and staff zones, requires less movement and therefore possibly opens fewer opportunities for interaction with residents, or vice versa.

Table 7.20: ATL Means and Correlations between Linear Feet Staff Walk and Interactions: Staff Movement is Associated with Staff to Resident Interactions and with All Interactions in General

	Mean	r Value	Significance
Linear Feet Walked	219		
Staff to Resident			
Directive/Question	1.9	.46	.0001
Comment	.80	.13	.1183
Total Interactions	2.7	.465	.0001
Resident to Staff			
Directive/Question	.69	.001	.988
Comment	.74	.055	.5128
Total Interactions	1.4	.044	.6051
All Resident/Staff Interactions	4.2	.399	.0001
Staff to Staff	1.3	.253	.0022
Staff to Others	.43	.057	.4944
All Interactions	5.9	.434	.0001

Summary

ATL is a unit characterized by more sitting than moving, both in its foreground and in its background. About one-fifth of the population is talking, but talk is more dominated by staff than residents. Resident sit, while staff move. Movement and sitting of staff and residents is concentrated at the center of the unit, mainly because this is where the activity zones overlap. Staff have the overview, however, both because of their access to all spaces and their control of the entry, but also by territorializing the most advantageous places for surveillance; there is little overlap with residents in resident areas. The background for staff and residents is larger, but proportionately unequal, with more staff out than residents; the background for residents if more static while that for staff is more animated. Other inequalities exist in terms of spatial distinctions: resident activity spaces are characterized by sitting but look to moving, while staff owned halls are characterized by moving but have more balanced views. While variety is available, one has to be in the halls to gain balanced views of moving and sitting, which may account for the tension that seems to exist here. Staff practice control more through surveillance from a few advantageous points, than through movement. The configuration of the unit, with its strong central focus, lends itself to this management style but it seems to result in a more formalized interface between residents and staff, and some tension, with residents dragging chairs into the unit hub.

To summarize the correlations, there are strong correlations between density and liveliness (general moving and talking), and between movement and interaction. There is a correlation between in and out total densities, but not for any specific behaviors, which suggests less continuity of use and more segmentation of behaviors. Configurational variables are somewhat weakly correlated with density in ATL, but there is an overall tendency toward more dense behaviors in spaces with larger isovists, and then in more connected spaces, and finally in more integrated spaces. Moving densities, however, are solidly correlated with integration and with connectivity, and then with the spaces with large isovists. Thus, configuration is clearly associated with moving densities, and less so with talking and sitting.

4. The ORM Unit

The Spatial Distribution of Behaviors

Table 7.21 summarizes the numbers of total persons and behaviors mapped over the four days of observation in ORM and then breaks them out by category.

Of the 3467 persons mapped at ORM, over half were moving (53 percent). Residents move less than the total aggregate (40 percent) while staff and others move more (60 percent for staff and 68 percent for others).

How interactive is ORM? A little over a fourth (28 percent) of all persons are talking. However, when talking is categorized, residents talk less (24 percent) than the aggregate, while staff and others talk more (40 percent and 34 percent). Talking in ORM, however, is not biased toward one behavior or the other, but equally distributed between moving and sitting persons (50 percent each). Residents differ again, talking more in proportion to sitting (55 percent) while staff and others talk more while moving (55 and 58 percent). For all, talking is loosely proportional to the direction of behaviors.

Table 7.21: Behavior Mapping in ORM Showing Relatively Balanced Moving and Sitting

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	3467	1620	1847	977	484	493
Percentage of Total	*100.*	*.47*	*.53*	*.28*	*.50*	*.50*
Residents	2466	983	1483	601	273	328
Percentage of Total	*100.*	*.40*	*.60*	*.24*	*.45*	*.55*
Staff	610	371	239	242	133	109
Percentage of Total	*100.*	*.61*	*.39*	*.40*	*.55*	*.45*
Others	391	266	125	134	78	56
Percentage of Total	*100.*	*.68*	*.32*	*.34*	*.58*	*.42*

Figure 7.7 illustrates the spread of resident movement and stasis in ORM. As shown, residents move throughout the unit but the highest numbers of moving residents are seen in the longest hallway near the entry. Because resident activity space is contained relatively deep from the entry and from the staff office, residents must move on this hallway in order to interface these zones. While this hallway, ORM's most

integrated space, offers views into the resident areas, a comprehensive or connecting view of all activity spaces from anywhere on this hall is blocked by the large mass on either side of the dining alcove and by the chicane that blocks the entry itself from view.

Figure 7.7b shows that resident sitting occurs in almost every space. As is evident in the mapping, residents or staff move the lounge furniture around to create informal groupings, or drag chairs into the corridors, and residents freely occupy seating in the nurses office which is ungated.

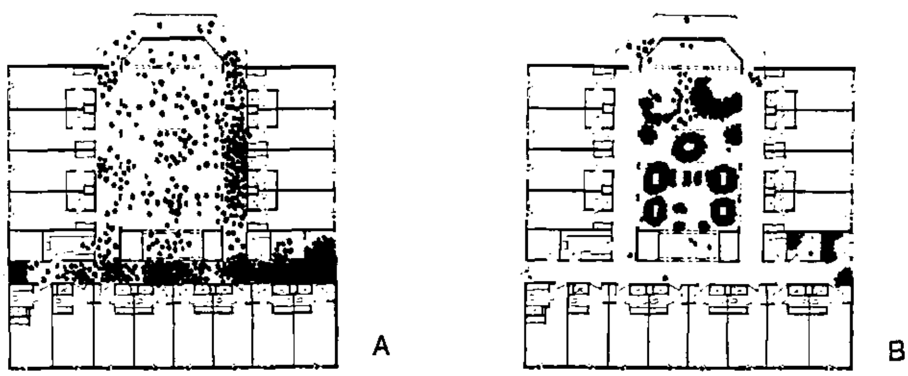


FIGURE 7.7: Mapping Showing Resident (a) Movement and (b) Sitting in ORM: Movement Clusters on the Most Integrated Hallway

Mappings for staff movement and stasis, shown in Figure 7.8a and b, show that while staff movements naturally spread throughout the unit, staff cluster in their own activity zones -- the nurses station and the kitchen. Staff movement also ranges in or near the entry corridor, as opposed to the deeper portions of the lounge -- where they can keep an eye on both the entry hall, but not the entry, and the lounge/dining area. However, because visibility of residents from the nurses office is impossible, staff must keep moving on this hallway between the units center in order to supervise residents and their office.

Staff sitting patterns show a cluster in the office and around the table in the lounge center. Interestingly, however, a comparison of this mapping with that of the residents indicates that staff and residents freely occupy one anothers areas -- there is no clear categorical distinction of space. This confirms the relative lack of polarization between residents and staff in ORM and the informal interface that exists here.

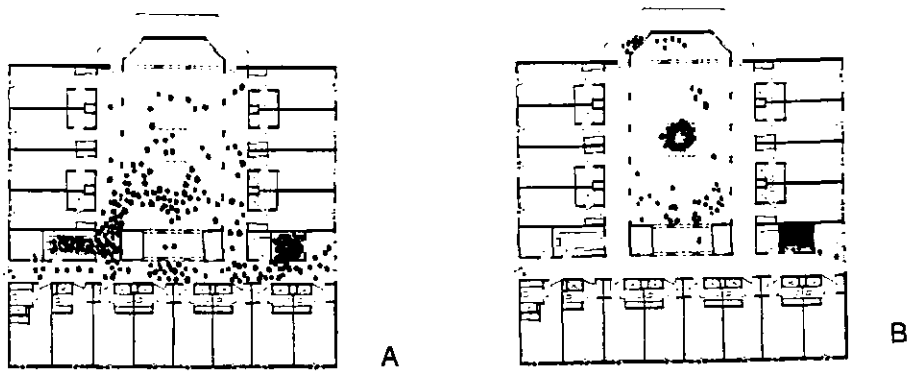


FIGURE 7.8: Mappings Showing Staff (a) Movement and (b) Sitting in ORM

Other movement is also concentrated in the entry hallway, but others move throughout the unit into all parts of it. Oddly enough, while movement clusters in the more shallow regions of the unit, other sitting mostly occurs in the deepest and more segregated portions of the unit -- in the lounge area and on the porch.

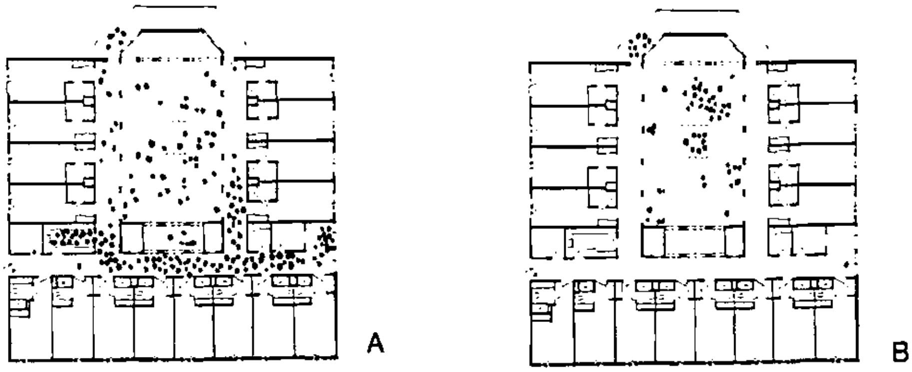


FIGURE 7.9: Mapping Showing Others (a) Movement and (b) Sitting in ORM

On the whole, these mappings illustrate the relatively dense use of this small unit, and the concentration of movement in shallow areas with seating in the deeper areas, except for the nurses office and the small number of seats the residents have placed at the entry. All in all, use is clustered toward the integrating hallway.

The Animated Isovists

The IN/OUT and animation ratios for ORM are shown in Table 7.22 below. As before, the closer the ratio is to "1", the more balanced the behaviors; the farther away, the less balanced.

In ORM, the background is more populated than the foreground with almost two and a half more persons out than in. The background, however, is less animated than the foreground (ratios of .69 and .88), and both behaviors and views are biased to sitting.

Categorically, there are fewer staff in the background proportionately than residents. The ratio of .47 for staff indicates that for every staff in the foreground, there are 2.13 in the background, while for residents this ratio is .38 or 2.62 out for every one in. Thus, while there are more persons of both categories in the background, staff are less proportionately represented than residents. In terms of animation, for staff, foreground and background are relatively equal (1.6 and 1.4) with a bias toward moving in both; for residents they are unequal, with the foreground being more animated, but with a bias in both to sitting. Others also are more balanced in foreground and background, with a slight bias to foreground. Thus, in ORM, background is more populated for all, and the foreground is more animated for all, but foreground and background are more balanced for staff and others than for residents. This suggests that residents have to move to get variety and a change of scene.

Table 7.22: IN/OUT and Animation Ratios for ORM Showing a More Animated Foreground

	All Persons	*Residents*	*Staff*	*Other*
IN/OUT	.40	.38	.47	.42
	3467/8695	2466/6469	610/1300	391/926
Moving or Standing/Static				
IN	.88	.66	1.6	2.1
	1620/1847	983/1483	371/239	266/125
OUT	.69	.5	1.4	1.8
	3555/5140	2194/4275	762/538	599/327

The Animation of Activity Spaces

Table 7.23 tabulates the IN/OUT and animation ratios for key activity spaces in ORM.

In terms of IN and OUT, the key resident and staff spaces of the lounge and Nurses Office are clearly biased to IN (ratios above 1.0), while more peripheral spaces are clearly biased to OUT(ratios under 1.0). Simply put, halls (staff space) or alcoves have more background while key spaces have more foreground. The lounge is the most used space.

In terms of animation within spaces, the same trend occurs; lounge and nurses office are biased to sitting (ratios under 1.0) while halls and alcoves are biased to moving. Isovists of the key spaces are split, however, with the lounge, entry and nurse's office biased to moving, while the dining alcove and the halls are biased to views of sitting. This shows a clear division of space use, and underscores that different spaces offer different experiences, all biased heavily in one direction or the other. Halls are for moving and views of sitting, while the main resident and staff space are biased to foreground and sitting with only views of moving. There is no space for either staff or residents that equalizes both moving and sitting, or from which balanced views of either IN/OUT or moving/static are possible. The experience in ORM, therefore, is unbalanced in terms of IN and OUT, and in terms of moving/static, no matter where, or who, one is.

Table 7.23: The Ratio of Animation in Key Activity Spaces

	Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Lounge/Dining					
IN	*.24*	374	1565	1939	*3.22*
OUT	*8.88*	542	61	603	
Dining Alcove					
IN	*5.42*	38	7	45	*.05*
OUT	*.46*	276	599	875	
Nurses Office					
IN	*.83*	83	100	183	*1.81*
OUT	*0*	101	0	101	
Entry					
IN	*1.58*	169	107	276	*.59*
OUT	*0*	467	0	467	
All Halls					
IN	*106.*	848	8	856	*.15*
OUT	*.48*	1858	3828	5686	

Correlations Between Behavioral Variables

In all following analyses, 13 spaces in ORM, comprising the public areas of the facility, are the basis of analysis. Locked staff restroom and closet and resident rooms are excluded.

Density and Liveliness. Do greater numbers of people per square foot generate more liveliness overall in ORM? As shown in Table 7.24, total density is more associated with TALK than MOVE, but both are strongly and significantly correlated. Correlations for TALK TOTAL, OUT and IN are all very strong (all at .99 at .0001). Correlations are very strong for MOVE TOTAL (.96 at .0001), but still strong for MOVE OUT and IN (.89 and .70 at .0001 and .0023). Thus, TALK and WALK are highly related to total densities. Correlations for external densities of MOVE are slightly stronger, however, than internal densities suggesting that background densities, in particular, are more related to talking and moving.

Table 7.24: Correlations Between DENSITY of ALL PEOPLE and ALL MOVING PEOPLE and ALL TALKING PEOPLE in ORM: Talking and Moving are Strongly Associated with the Density of People

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN-DENSITY ALL PEOPLE	.70 *.0023*	.99 *.0001*
OUT-DENSITY ALL PEOPLE	.89 *.0001*	.99 *.0001*
TOTAL-DENSITY ALL PEOPLE	.96 *.0001*	.99 *.0001*

Movement and Talking. Is the density of moving associated with the density of talking, as indicated earlier?

As shown below, densities of movement are strongly correlated with densities of interaction, but correlations are higher for TOTAL densities, then for external, and then for internal (.92, .86, .81, at .0001). While this is a general assessment only, it suggests that when people move in ORM, they talk, even though talking, as shown earlier, may be proportionately related also to activity.

Table 7.25: Correlations Between ALL PEOPLE MOVING and ALL PEOPLE TALKING in ORM: When People Move, They Talk

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL-ALL TALK
IN-ALL TALK	.81 *.0001*		
OUT-ALL TALK		.86 *.0001*	
TOTAL-ALL TALK			.92 *.0001*

Foreground and Background. The next correlation asks whether behaviors are continuous between foreground and background by correlating all densities in with all densities out.

As Table 7.26 shows, there are strong and significant correlations between density IN and density OUT for ALL PERSONS (r=.58 at .0194); and somewhat stronger for the densities of TALK (.63 at .0092), and then MOVE (.58 at .0092). Thus, there is a suggestion that all people, and all people moving and talking, are continuous within, through and across spaces. Continuity across spaces suggests a somewhat relaxed use of space and of control.

Table 7.26: Correlations Between IN and OUT Behaviors in ORM: Density of People in Spaces is Associated With Densities in Background

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN-MOVE	.58 *.0186*			
IN-SIT		.33 *.2107*		
IN-TALK			.63 *.0092*	
IN-ALL PEOPLE				.58 *.0194*

Correlations Between Configurational Variables and Space Use

Square Footage/Isovist and Density. The size of spaces and their isovists (SQFT) is correlated with densities of behaviors to see if size relates to density of people.

Only SIT OUT shows any correlation with size, and this is mild because it falls apart on the second analysis. Thus in ORM, it seems safe to suggest that there is little tendency for people to place themselves in larger isovists, except for sitting. This makes sense in that the highly used lounge has the largest isovist and the most seating.

Table 7.27: (a) Correlations Between SQFT and SQRT DENSITY in ORM and (b) Excluding One High Outlier and O's on SQRT: Tendency Only for People to Sit in Larger Isovists

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.39	.20	.32	.40	.52	.27	.33	.42
	.1332.	*4629*	*.2234*	*.1281*	*.0586*	*.3487*	*.326*	*.0555*
OUT-SQFT	.07	.37	.10	.62	.12	.44	.01	.24
	.7853	*.1639*	*.7107*	*.0104*	*.6718*	*.1149*	*.9644*	*.5075*
TOTAL-SQFT	.07	.18	.02	.45	.13	.31	.11	.53
	.7911	*.5037*	*.9512*	*.0819*	*.6693*	*.3049*	*.1507*	*.0768*

Connectivity and Density. Connectivity (CON) is correlated with behavioral densities to see if more connected spaces are more dense with people.

Again, as shown in Table 7.26, SIT OUT is the only variable tentatively correlated with connectivity in ORM; it shows a weak tendency only, however, falling apart on second analysis. Thus, there is no trend between connectivity and the density of sitting in connected spaces.

Table 7.28: (a) Correlations Between CON and SQRT DENSITY in ORM and (b)Excluding One Outlier and O's on SQRT: No Trends Between Connectivity and Behaviors

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.23	.34	.17	.14	.36	.53	.14	.7
	.3967	*.1955*	*.5383*	*.6087*	*.2102*	*.0531*	*.6919*	*.0801*
OUT-CON	.24	.001	.24	.63	.29	.05	.30	.47
	.3756	*.9957*	*.3774*	*.0091*	*.3095*	*.8585*	*.3137*	*.1711*
TOTAL-CON	.29	.14	.25	.47	.41	.23	.42	.34
	.2689	*.6101*	*.3503*	*.0645*	*.1444*	*.4287*	*.1502*	*.2747*

Integration and Density. Finally, (1/RRA) is correlated with densities of behaviors to see if more integrated spaces are more densely occupied.

As Table 7.29 shows, there is a correspondence between integration and densities of ALL PERSONS TOTAL and OUT (.65, and .6 at .0094 and .0189) but it is weaker for TOTAL because the correlation collapses on second analysis. MOVE TOTAL and MOVE IN are strongly correlated with integration (.76 and .65 at .0015 and .0084) as are TALK TOTAL and OUT (.65 and .62 at .0089 and .0147). Also, SIT TOTAL and OUT show a strong correlation with integration (.57 and .65 at .0277 and .0086).

Table 7.29: (a) Correlations Between 1/RRA and SQRT DENSITY in ORM Excluding One High Outlier and (b) Excluding One High Outlier and O's on SQRT: Moving, Talking and Sitting are Correlated with Integration (* see APPENDIX I for Scattergram)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.4	.65*	.30	.3	.41	.67*	.16	.61
	.1556	*.0084*	*.2987*	*.2987*	*.1472*	*.0092*	*.6337*	*.1448*
OUT-1/RRA	.6	.36	.62	.65	.61	.34	.62	.76
	.0189	*.1944*	*.0147*	*.0086*	*.0212*	*.2408*	*.0321*	*.0063*
TOTAL-1/RRA	.65	.76	.65	.57	.51	.79	.63	.62
	.0094	*.0015*	*.0089*	*.0277*	*.0532*	*.0013*	*.0206*	*.0303*

Thus, in ORM, MOVE, TALK and SIT, in that order, are solidly correlated with integration. Correlations for external densities are stronger than internal densities. This suggests that both the interactive and the static variable are configurationally dependent, and related to spaces with strong backgrounds.

The Practice of Control

Table 7.30 summarizes the results of the tracking of staff in ORM. Interactions are correlated with the average linear feet walked by the staff tracked over the tracking periods.

ORM has only 200 linear feet of true corridor space, not including paths through use areas such as the lounge or dining room, but on average, ORM staff walked 274 linear feet per tracking segment, or a third more than the available corridor length if taken as a proportion (1.37).

When mean feet walked is correlated with the interactive level, ORM is shown to have strong and significant correlations between staff to resident directives and total interactions (.66 and .66 at .0001) and weaker but significant correlations between resident to staff directives and total interactions (.32 and .38 at .0001). All resident/staff directives are also strongly correlated (.68 at .0001) as are all interactions in general (.71 at .0001). While on the whole these are strong correlations, the weaker correlation for resident directed interactions is more interesting. While the staff directed interactions could be accounted for by surveillance or staff solidarity coordinations, with attendant conversations with residents, the fact that resident interactions to staff is even weakly correlated suggests that ORM induces residents to generate interactions with staff as well. This could be due to the compactness of movement generated by the plan, thus making contact more often, or the smaller population; this is undetermined in this study. In brief, however, the movement of staff here appears not just "business" directed, but has a clear social side to it as well.

Table 7.30: Means and Correlations between Linear Feet Staff Walk and Interactions: Staff Movement is Associated with Greater Interaction with Residents, Staff and All

	Mean	r Value	Significance
Linear Feet Walked	274		
Staff to Resident			
Directive/Question	2.1	.66	.0001
Comment	1.8	.29	.0005
Total Interactions	3.3	.66	.0001
Resident to Staff			
Directive/Question	.83	.32	.0001
Comment	.86	.28	.0007
Total Interactions	1.7	.38	.0001
All Resident/Staff Interactions	4.9	.68	.0001
Staff to Staff	1.3	.10	.2493
Staff to Others	.64	.18	.0291
All Interactions	6.9	.71	.0001

Summary

The findings indicate that ORM is fairly interactive in terms of both movement and talking, with half the population moving and roughly a third talking. Residents move and talk less while staff move and talk more. The foreground in ORM is more animated than the background, even though the background is more populated, but both are dominated by views of sitting. Different spaces offer different experiences, but no space offers a balance between moving and sitting either in the space or in the views. While the configuration allows a loop movement through the porch and through the lounge, this is little used, possibly because the porch is so deep and segregated. Movement is mostly along the dead end integrated core between the poles of the kitchen and the entry. This fluctuation allows one to touch base with the entry while still keeping in touch with the main resident area. However, staff and residents are in a similar position, with neither having an overview nor complete control of spaces; staff must move inward to survey the majority of residents while residents have to move out of their area to interface with the entry and staff moving in the main hall.

There are solid findings for a correspondence between movement and interaction, both in terms of total density and in terms of staff movement and interactions. There is also a correspondence between in and out for overall densities, but not for the spread of movement or talking. While connectivity and size of spaces and their isovists are not well correlated with behavioral densities, integration is solidly correlated with external densities of moving, talking, and sitting, and with the internal densities of moving. In ORM, therefore, integration is the only solidly correlated spatial variable.

5. Summary of Findings

The above analyses of space and space use illustrate that there are dimensions of similarity and variability among the three Alzheimer's units that are clearly spatially related. The aim of this summary is to clarify the underlying structure of space and space use and to identify the genotypical dimensions of the organizations.

Spatial Distribution of Behaviors

The intuitive feeling that DAY and ORM "seem" more animated than ATL is confirmed by the mappings showing a relative balance of movement to stasis in these two units, a more actively moving staff, and a sharing of the same spatial domains that seems to result in more informality between these two groups.

The configuration of the unit determines where movement will occur; while sitting is more programmatically induced, movement takes a definite spatial pattern. Movement in DAY occurs primarily between the two poles of activity, the entry/lounge and the nurses station; similarly, in ORM, it is stretched between the entry and the lounge. In contrast, in ATL it clusters at the center of the unit; there is little inducement to stretch it further because not only are all the activity areas clustered at this center, but staff visibility of residents is largely achievable from this point. The commonality in the three units is that movement is on the integrated core, in the most shallow areas of the facility.

Movement and the Practice of Control

Movement is associated with talking. Indeed, there is a mutual correlation in all three facilities between the density of ALL PEOPLE and TALK and MOVE, in that order, and between the densities of MOVE and TALK. Further, in all three facilities, there is a marked preference for densities in general, and densities of MOVING and TALKING in particular, to occur in spaces with large isovists, attesting to the importance of background for awareness of others.

The presence or absence of controlling isovists from the nurses station seems to generate staff movement, which in turn offers opportunities for not only maintenance related conversations but also general commentary between staff and residents. The following table compares the three facilities in terms of staff movement and interactions as tracked during six minutes of each mapping segment.

As Table 7.31 shows, ORM stands out for having more staff movement overall while ATL staff show the least movement. The plan of ORM generates even more staff movement (274 linear feet) proportionately to its total corridor length (only 200 linear feet) than does that of ATL, even though ORM is smaller than ATL. The fact that staff must check the offset entry as well as the lounge may lead to some redundancy in movement which is eliminated in ATL by the relatively panoptical view of the lounge and hallways from a centralized point.

At the level of all interactions, ORM again stands out with an average of 6.9 interactions per segment with DAY and ATL each around 6.0. ATL seems similar to DAY until one looks at the staff to resident interactions; there, ATL is a lower 4.2 to DAY's 4.7, and ORM's 4.9. One sees then, that the facilities are not similar; staff in ATL average less interactions with residents than do staff in ORM and DAY, and more with staff and others.

Table 7.31: Linear Feet Walked by Staff and Average Interactions: ORM Staff Move Most As Proportion of Total Corridor Length While ATL Staff Move Least

	DAY	ATL	ORM
Ft. Walked/segment	284	219	274
Staff/Resident Interactions	4.7	4.2	4.9
All Interactions	6.0	5.9	6.9
Ft. Walked as Proportion of Total Corridor Length	.85 284/335	.72 219/305	1.37 274/200

In all three facilities, however, staff movement correlates with staff to resident interactions, and with all interactions *in toto*. Thus, movement generates task-related interactions, which have as a by-product other types of interactions. The plan of ORM, however, seems to induce resident to staff directed interactions as well. Whether this is due to the compactness of the movement, as opposed to the spread of it in ATL and DAY, or the smaller population, is undetermined in this study. Coupled with the higher staff movement in this facility, it suggests that higher rates of movement not only generate more talk, but may also generate reciprocity. While staff can easily talk to patients as they move on their self-directed tasks, if residents want to talk to staff they must make an effort. With more movement, however, the more exposure to more people; this may generate more reciprocity.

At any rate, there is a solid finding that movement, which can be spatially induced, generates interactions, and these interactions are a normalization requisite. More importantly, what the trackings also suggest is that the lack of staff visibility of resident areas seems to link to a peripatetic mode of control in DAY and ORM, which in turn has an independent effect on movement, which in turn has an independent effect on interaction, and indeed, when coupled with spatial overlap of categories, on the informality or casualness of relations across the unit. Awareness, in the guise of visibility, therefore, has spatial and social implications.

The Interface Between Staff and Residents

The theme of inequality, also a dimension of control, seems to be related to who has the overview and how much overlap there is between staff and resident domains. Again, these are both spatially induced. In all three facilities, staff move and talk more than residents, but this is understandable given the reduced mental capacities of most residents and the fact that they do not have any tasks to do which would generate discussion. While their speed and range of movement naturally gives staff more overview, their placement in space also structures their relations with residents. In DAY and ORM, for example, staff move, work and converse at the same tables and spaces as residents, largely because they are unable to survey residents from the dedicated staff spaces in these units. In ATL, however, staff are more polarized in space, they have dedicated spaces in which to work as well as survey residents, and their relations with residents are, as observed, more task-oriented[1]. Enforced spatial proximity leads to some informality.

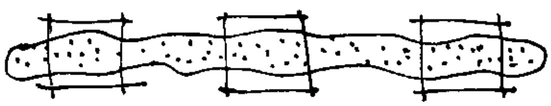
What residents and staff see in the background also underscores their role in the unit. Whereas in DAY, residents and staff are represented proportionately in foreground and background, with similar proportions of animation in each, in ATL more staff are seen beyond than residents, proportionately, while in ORM less staff proportionately are seen beyond. Thus, in DAY and ORM, it may "seem" that residents and staff are sharing the same experience in the same spaces, whereas in ATL, it could "seem" that staff "control" the background because there are more of them, proportionately.

Foreground and Background

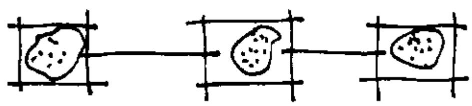
If one aspect of normalized liveliness is the copresence of moving and static densities, then another is the creation of a direct interface between local and global awareness. As shown, the presence of more people is associated with more movement and more talking, and thus more liveliness. Awareness of others has much to do with the quality of the experience in these facilities. In ATL, the ratios of moving/sitting and IN/OUT illustrate that generally while resident spaces are characterized by sitting; the halls (staff controlled) look onto some balance between moving and sitting. The background in ATL is more animated. In ORM, spaces are also characterized by sitting; halls, however, also look to sitting; the background , therefore, is less animated. Only in DAY does a key space, the resident lounge, and the halls, offer balance of moving and static in the isovist, as well as some evenness of the local and global awareness (IN/OUT ratio).

[1]Conversely, the fact that staff are able to congregate together in the nurses station, and in the dining area away from residents, leads to higher solidarity among staff.

It was demonstrated that internal and external components, foreground and background, or local and global awareness, are correlated for the density of ALL PERSONS in DAY, ATL and ORM, and more discriminatingly, for densities of MOVING in DAY and ORM, and for TALKING in ORM. These correlations suggest a spread in terms of the overall density of people, and for moving in all except ATL, as opposed to a more segmented use of space. Continuity, or the spread of behaviors between foreground and background, suggests a modulation of space use whereas segmented or sporadic space use suggests a boundary that someone or something must control. The measure of continuity, therefore, operationalizes the form of the critical margin. For example, if two rooms connected by a corridor are linked by a stream of people in and between them, then behaviors between these spaces can be said to be continuous; if people gather primarily in the two rooms but fail to densely occupy the linkages between them, one may say that space use is segmented, or discontinuous. The graphic below simply illustrates the difference between these properties.



Continuous



Segmented

FIGURE 7.10: Diagram Illustrating Continuous and Segmented Use of Space

While the correlations suggest continuity and the ratios give an indication of the margins for IN and OUT and for MOVE and SIT, what they cannot capture is where foreground and background are evened out, and where moving and sitting are balanced, when density is high. To address this issue, it seemed important to find another index. A mathematical formula was therefore devised to determine where MOVE and SIT are balanced and where IN and OUT are evened out in spaces with large numbers of people[2]. The same formula is used to compute the balance of moving/sitting and IN/OUT, weighted for density, but of course different behavioral variables are used in the formula; i.e., All Moving and Sitting people are used to compute MOVE and SIT balance, while All People IN and All People OUT are used to compute IN and OUT continuity. Figure 7.11 below shows where these qualities occur in each facility.

As the three figures show, relative balance of moving and static (weighted for density) is seen largely in activity spaces, while the continuity of foreground and background is largely a property of halls, and therefore carried through movement, further underscoring its importance. More importantly, in each of the three facilities, continuity of IN and OUT follows the integrated core.

When the correlations between balance of moving and sitting and continuity of IN and OUT weighted for density were computed to determine whether spaces that offer a relative balance of behaviors also have continuous space occupancy, the results are inconclusive[3].

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[2]First, a measure called Difference Factor has to be computed to show how much moving and static (or in and out) differ as a proportion of the total number of people in a space. Difference Factor = (Absolute Value (Moving-Static)/(Moving+Static). To determine where IN and OUT differ substitute (IN-OUT)/(IN+OUT). This value oscillates between 0 and 1. O means that moving and static are equal and 1 means that they are as unequal as possible. Then, this value is used in a formula called Weighted Density to calibrate the total number of people by a factor in proportion to the equalization of moving and static (or continuity of in and out). Weighted Density = (Moving + Static) ^{2} / (Absolute Value (Moving-Static) + .0001). Substitute IN and OUT data for Moving/Static data for continuity.

[3] Table shows values of correlations between equalization of moving and sitting and continuity of in and out, weighted for density.

	DAY	ATL	ORM
All Spaces	.29	.21	.16
	.1653	*.3039*	*.5604*
Outlier	.78*	.78**	-
Removed	*.0001*	*.0001*	

* = four outliers removed (one is key space) ** = one outlier removed (not a key space)

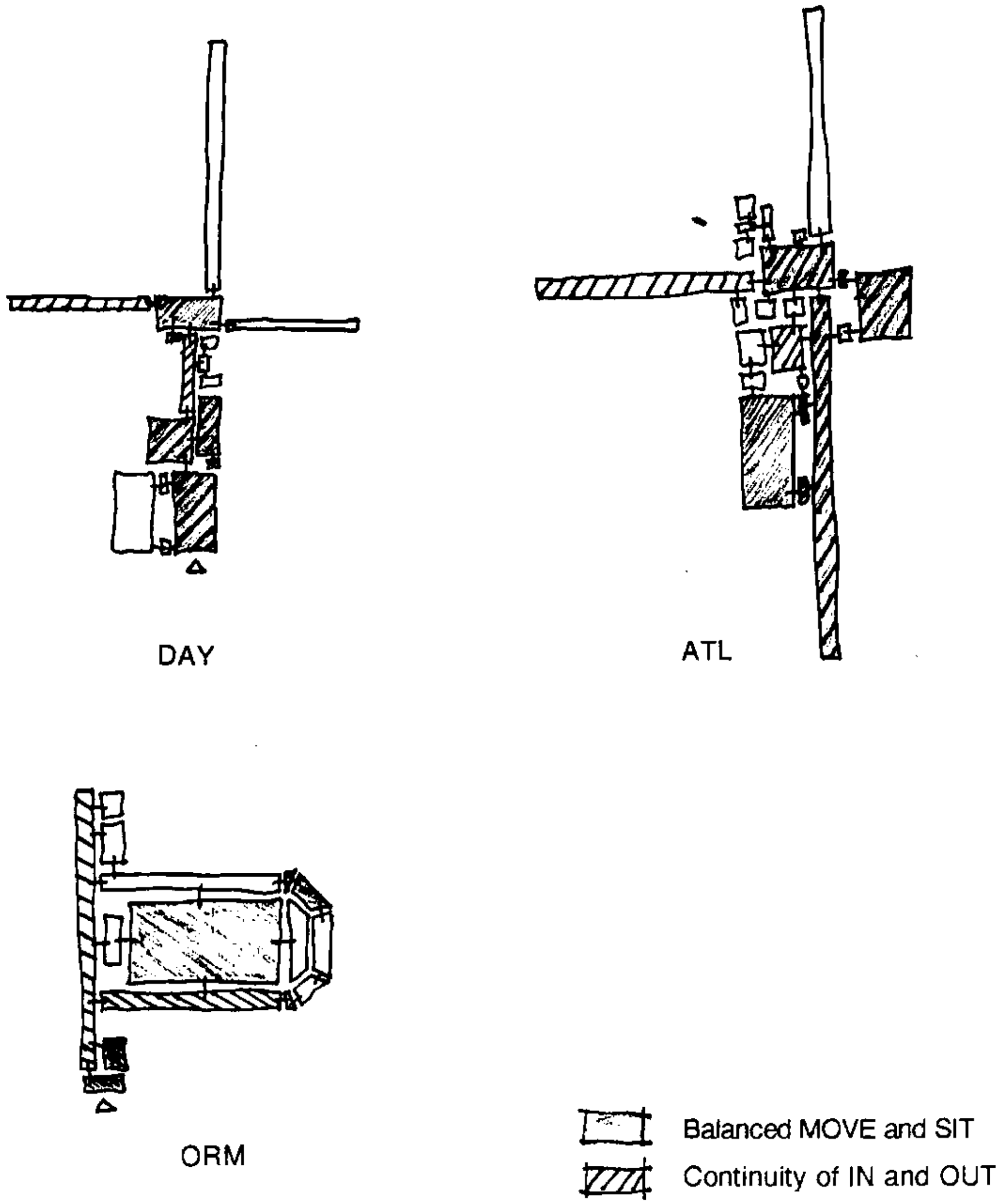

FIGURE 7.11: The Overlap of Balance of MOVE and SIT and Continuity of IN and OUT Weighted for Density

There are no correlations when all spaces are included, but DAY and ATL show strong and significant correlations when strongly performing outliers are removed from the analysis (.78 at .0001 for each). Thus, a trend exists in two of the three facilities for spaces balancing moving and static and having a continuous IN and OUT to correlate, but it is not a strong one since it depends on removal of high outliers and is inconsistent across the three.

Correlations Between Space and Space Use

Table 7.32 summarizes the numbers of significant correlations when the density of ALL PERSONS is correlated with the measure of size (SQFT), and with the local and global measures of connectivity (CON) and integration (1/RRA). The ratio in the tables below is the number of significant correlations on the first and second analysis (surviving when outlier(s) and unused spaces are removed from analysis) out of the total number possible. A level of .05 significance is considered reasonable because of the small numbers involved.

On the grossest level of analysis, the density of ALL PERSONS is most correlated with the syntactic variables of integration and connectivity, and then with the size of the isovist. DAY is the most spatially sustained environment with 15/18 significant correlations, followed by ATL at 12/18; total density is least spatially related in ORM (3/18). However, integration is the only consistently correlated variable across the three facilities. Thus, configuration is predictive of the overall density of people, with integration being the most strongly predictive of the variables tested.

Table 7.32: Significant Correlations Out of Total Number Possible For Density and Configurational Variables

	DENSITY ALL PERSONS			TOTAL
	DAY	ATL	ORM	
SQFT	5/6	4/6	0/6	9/18
CON	5/6	5/6	0/6	10/18
1/RRA	5/6	3/6	3/6	11/18
TOTAL	15/18	12/18	3/18	

Table 7.33 summarizes the number of significant correlations out of all possible for the density of moving, talking and sitting with the spatial variables. Integration (1/RRA), the most global measure of configuration, is correlated with the density of moving/standing, talking and sitting people in all three facilities (33/54). There are more consistent correlations of these behaviors in DAY and ORM (12/18 in both) than in ATL (9/18). Size of spaces and their isovists (SQFT) is the next most significantly correlated variable, with DAY showing the most correlations (13/18), ATL the next most (12/18), and ORM the least (1/18). Local Connectivity (CON) is also consistently correlated in DAY (12/18) and in ATL (11/18), but not in ORM (1/18).

Thus, behavioral densities in DAY and ORM are driven most by integration, while the size of space or isovists is stronger in DAY and ATL. Integration is the most consistently correlated spatial variable across all three facilities. MOVE produces more consistent correlations with 1/RRA (14/18), than does TALK (12/18), than does SIT (7/18). Furthermore, going back to the values previously reported, there is a tendency for the correlations of MOVE to be stronger than those for TALK, which in turn is more predictable than SIT generally, but also specifically with respect to 1/RRA (MOVE $\geq$ TALK $\geq$ SIT).

Table 7. 33: Significant Correlations Out of all Possible for Density of Moving, Talking and Sitting with Configurational Variables

	MOVE			TALK			SIT			TOTAL
	D	A	O	D	A	O	D	A	O	
SQFT	4/6	4/6	0/6	5/6	4/6	0/6	4/6	4/6	1/6	26/54
CON	5/6	5/6	0/6	4/6	4/6	0/6	2/6	2/6	1/6	24/54
1/RRA	5/6	5/6	4/6	5/6	3/6	4/6	2/6	1/6	4/6	33/54
TOTAL	14	14	4	14	12	4	8	7	6	

The findings in the Alzheimer's units are thus consistent with those found in other types of buildings; movement is predicted by integration. While talking is also configurationally driven in all three facilities, it is also more dependent on the size of the isovists in DAY and ATL. Sitting in ORM is more driven by integration whereas in DAY and ATL it is more driven by the size of the isovist.

Table 7.34 summarizes the correspondence between significant spatial variables and internal and external densities of MOVE, TALK, and SIT in the three facilities out of all possible.

As shown, while TOTAL densities (36/54) outperform those IN and OUT, external (OUT) densities (30/54) outperform internal (IN) densities (17/54) almost two to one on all the spatial variables correlated. The theorem that ranges of awareness in the form of a background to a foreground are critical dimensions of normalized life and are spatially predictable is consistent across the three facilities, again with ORM being the least compliant building. Integration is, again, most predictive of significant correlations with external (and internal) densities, followed by size of space or isovist, then by connectivity.

Table 7. 34: Significant Correlations Between Spatial Variables and Internal and External Densities in the Three Units

	SQFT			CON			1/RRA			TOTAL
	DAY	ATL	ORM	DAY	ATL	ORM	DAY	ATL	ORM	
IN	1/6	3/6	0/6	3/6	3/6	0/6	2/6	3/6	2/6	17/54
OUT	6/6	3/6	1/6	4/6	3/6	1/6	5/6	3/6	4/6	30/54
TOTAL	6/6	6/6	0/6	5/6	5/6	0/6	5/6	3/6	6/6	36/54
TOTALS	13	12	1	12	11	1	12	9	12	

Table 7.35 shows the correlations of balanced moving and static and continuous IN and OUT, weighted for density, with size of areas and with integration. (Means and correlations of Difference Factors with densities IN, OUT and TOTAL may be seen in APPENDIX J).

ATL is the only facility to show consistent correlations between size of spaces and isovists with weighted densities of balanced moving and static and continuity IN and OUT. Looking for consistency across the sample, however, one finds it only in integration. Weighted densities for balance (MOVE/SIT) is moderately, but significantly, correlated with 1/RRA in DAY and ATL (.46 and .71 at .0287 and.0001), but not in ORM. More interestingly, weighted densities for continuity (IN/OUT) are consistently correlated with 1/RRA in DAY, ATL and ORM (.41, .44, and .74, at .0492, .0238, and .0023). Thus, integration influences the extent to which high density is balanced locally in terms of moving and static and, more importantly, influences the extent to which high density is evenly distributed globally, across foreground and background.

Table 7.35: Correlations Between Balance of Moving and Static and Continuity of IN and OUT, Weighted for Density, With Size of Areas and With Integration

	DAY		ATL		ORM	
	M/S	Cont.	M/S	Cont.	M/S	Cont.
IN AREA	.38	.34	.66	.63	.07	.09
	.0774	*.1163*	*.0002*	*.0005*	*.7985*	*.7457*
OUT AREA	.57	.36	.71	.66	.34	.23
	.0004	*.0962*	*.0001*	*.0002*	*.1915*	*.3985*
TOTAL AREA	.59	.28	.79	.75	.33	.23
	.0029	*.1246*	*.0001*	*.0001*	*.2171*	*.3999*
1/RRA	.46	.41	.71	.44	.14	.74*
	.0287	*.0492*	*.0001*	*.0238*	*.6162*	*.0023*

Thus, integration, across the three buildings, is predictive of the density of all people, of moving and talking densities, of densities in the isovists, of densities balanced for moving and sitting, and of densities which are evenly distributed over space. Furthermore, integration is the most predictive spatial variable tested.

PART II: CHAPTER VIII

DESCRIPTION OF DETENTION CENTERS

1. Introduction

The second portion of this thesis focuses on detention centers as examples of environments where residents are more restricted than those in Alzheimer's units, both for their own safety and for the safety of others. In detention centers, residents cannot move at will or interact with whom they please, but are subject to an explicit set of rules and regulations. The theory of control that is presented can be more stringently examined in detention environments than in Alzheimer's units, both because of the different building type, but also because the measures of control are more overt.

Once again, this part of the dissertation provides a chapter generally descriptive of the facilities and their mission, a chapter offering an analysis of the spatial morphology of the three detention centers, a chapter offering a more qualitative description of space use, and a final chapter where space and space use are quantitatively presented and their correlations explored.

Based on the information gleaned from the formal and informal interviews with staff, from the demographic questions on the questionnaire, and from the Moos scale for assessing social climate, the three centers are described in terms of their philosophy and mission, their staffing patterns, their resident makeup, and in terms of staff perceptions of the general social climate. Once again, this description is offered for comparative reasons, and to provide some background as to how administrative mission and operations are linked with the issue of providing a balance between the control of residents and some semblance of a "normal" life in these institutions.

The three detention centers described are self-contained communities in the sense that they house, school, medically care for, and administer, to the residents placed there. They vary in size, numbers of residents and in location -- DEK and MAR are in rural areas; IND is in an urban center. As indicated in the floor plans, each of the centers has more than one male housing wing but in the case of DEK and MAR, all the boys were observed together because they were mostly out of their rooms together. In the case of IND, however, the distinct physical separation and separate scheduling of units for various activities required the observer to stay with and study a single male unit.

In true institutional fashion[1], youth sleep, eat, and recreate on schedule and in "batch." Schedules, however, vary somewhat with resident behavior. All three facilities incorporate a behavior modification system whereby "levels", and a token economy, are established with a corresponding set of privileges or penalties for residents. Higher level (better behaved) youth receive more privileges in terms of time out of room, measure of autonomy, access to recreational activities, and, by default, personal time with other residents and staff. Residents leave the facility only for court appearances or major medical care.

2. The DEK Center

The DEK center is located in a rural area studded with other state-run facilities: a regional hospital and an adult correctional center. The juvenile facility is nestled into the rolling hills and overlooks woods and a large lake. The structure is a modified cross-plan with three radial wings attached to a pavilion-like program space (see Figure 8.1). An exercise yard enclosed by a high fence topped with razor ribbon is located behind the

[1]See, for example, Irving Goffman's (1961) analyses of life in "total institutions."

facility, and accessible through a chain-link enclosed "run". Boy's wings are sight and sound separated from the girl's wing, and the housing units occupy one half of the building; the program, administrative and service areas occupy the other half. At the center of the cross is the control room (marked with an "X") which overlooks all the housing wings and the program areas. Youth care staff, detainees and detainee visitors enter the facility at the Intake entry on the left hand side of the plan, while administrative staff and visitors enter the administrative area at the bottom of the plan. There is a third entry for kitchen staff located on the upper right hand side of the plan.

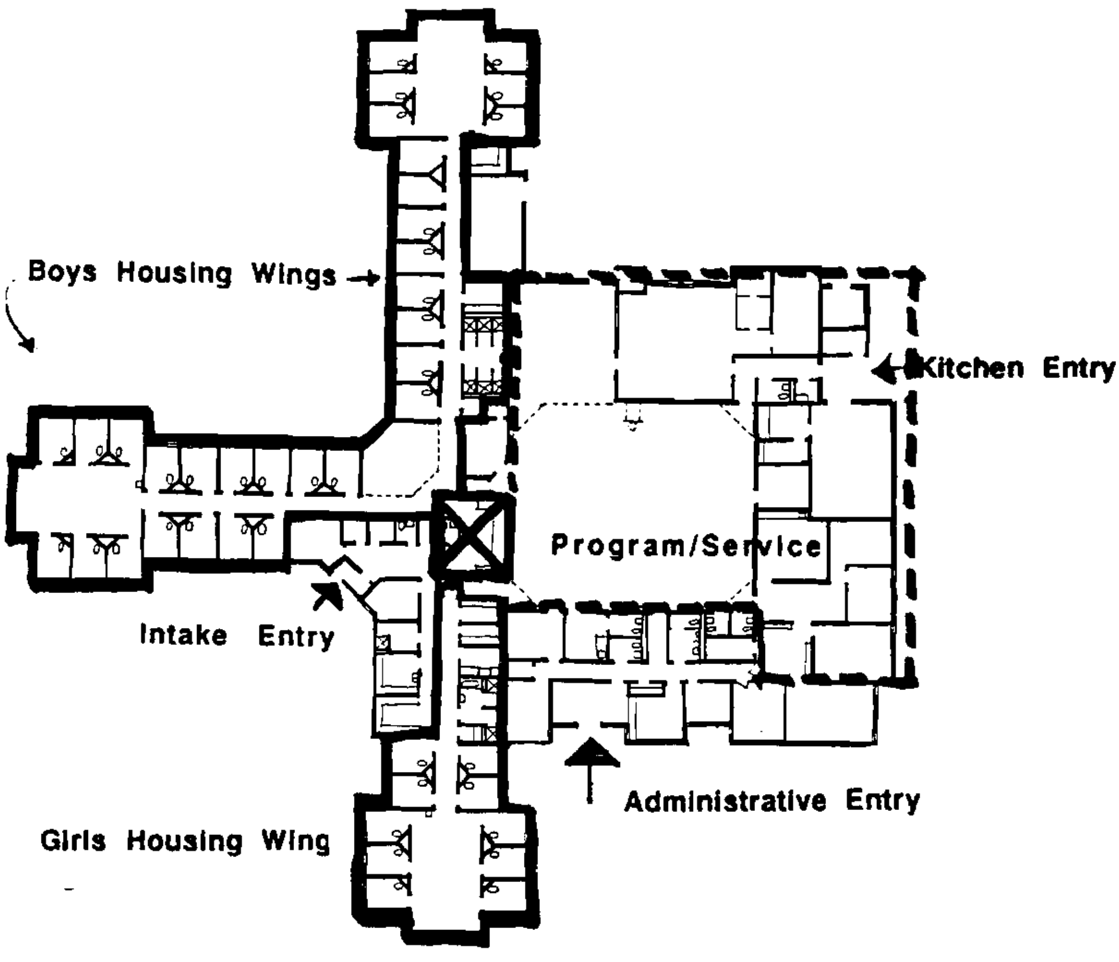

FIGURE 8.1: The DEK Center - Floor Plan Showing A Modified Radial Attached to a Pavilion Plan

Mission

The stated mission of DEK is to provide for "the safety and custody of all the detained residents." In addition, the administration strives to provide "constructive experiences" for the residents in their care. There is no pretense at "rehabilitation" as overcrowding and a shortage of staff mitigate against any "real" treatment, but staff attempt to provide a daily structure and role models "in the here and now." "Fairness and consistency" are the personal goal of most of the direct care staff at DEK. Their primary goal is to have residents take responsibility for themselves and learn to live in the "real" world.

The staff regard communication both up and down the ladder as "open door". Team meetings are held monthly and staff say they feel free to air ideas and grievances. Most staff have been at the center for a number of years and know one another well. As a group, they seem universally interested in the residents, but realistic about their impact. Most look for short term improvements in the youth and feel if they "can touch one resident in a positive way", they have done a useful service. As in every other facility visited, there are too few successes and too many failures; too many youth are recidivist and too few go on to a responsible adulthood. Staff, here and elsewhere, who have been in corrections for a number of years note a definite change in the youth being detained today -- many say "todays kids have no conscience" and "no respect" for others. Staff feel that these kids are more dangerous, less trustworthy, and generally more unpredictable than youth in previous years.

Demographic Data

Resident Data. At the time of the field study, DEK averaged 37 residents (the average daily population (ADP) in 1991 was 51, however). The average length of stay

(ALOS) for residents in 1991 was 20.9 days but stays ranged from two days to one year. Whenever possible, the administration tries not to double-bunk (30 of the 40 rooms are singles) but sometimes overcrowding forces them to. Sex offenders are always housed singly. Of the residents, on average 28 (76%) were male and 9 (22%) were female; this number, however, fluctuated slightly from day to day. The median age of residents was 15 years and seven months, within a range from 13 to 18.

All residents housed during the visits are delinquents (in 1991, only 2.5% of 920 youth served were status offenders while 97.5% were delinquent). DEK also holds Superior Court referrals. Most kids are picked up in the inner city and are black (1991 demographic statistics show 86.7% black, 13% white, and .3% other). Offenses of those being housed during the field study ranged from parole violations to murder: fourteen (38%) were being held for violation of parole; eleven (30%) for theft or robbery; five (13%) for assault or battery; four (11%) for possession or sale of drugs (plus prostitution in one case); two (5%) for carrying a concealed weapon; and one (3%) for murder. In 1991, four capital offenders were detained in the center.

Staffing Data. The usual staffing pattern on the two shifts covered is one Senior Youth Development Worker (SYDW) and three Youth Development Workers (YDW), for a resident to staff ratio of 9.25:1. In terms of direct care staff for the boys unit, however, the ratio was two staff for an average of 28 boys or a ratio of 14:1. The same staff are assigned to the same units in order for boys to get to know them and build trusting relationships. Typically, the SYDW covers the control room, one female YDW is assigned to the girls unit, and two male YDW's cover the two boys units. The night shift, from 11pm to 7 am, has one SYDW and two YDW's. In addition to the youth care staff, during weekdays there are four Administrative staff, three and a half education and counseling staff, and four maintenance and kitchen staff for a total of 31 staff or an average total resident to staff ratio of 1:.83.

Direct care staff are both male and female. By self-report, the median age of the care staff was 40. They had worked an average of seven years and eleven months in correctional environments.

Physical Ambiance

The physical ambiance of this facility is much like a high school (see Figures 8.2 - 8.5). There are colorful graphics in the resident areas, carpeting in the dayrooms and corridors, and sturdy, but movable lounge type furnishings in the dayrooms. The views out of the dining area and boys dayroom are of the rolling hills and lake. The dining room tables are bolted down with attached seating. The multipurpose room has a half court for basketball and a pool table in one corner. The schoolrooms are visible from the multipurpose room and contain colorful posters, plants, and posted student work. Only the resident rooms are institutional in character, with stainless steel toilets in each room and a steel bunk. Residents are not allowed any clothing in their room except for t-shirts and underwear (sneakers and outer clothing are folded neatly outside each door as a suicide prevention measure). Residents on higher levels may have Walkmans, books, and pictures in their room but everything has to be placed outside the room at night. Televisions are elevated in the dining area and in the dayroom, but largely controlled by majority vote of kids. While the control room is visible from both the dining and lounge area (on the boys side), control room staff move in and out of it often and easily, thus deflecting a sense of total surveillance.

FIGURE 8.2: DEK- The View from the Dining into the Multipurpose Room

FIGURE 8.3: DEK- View from the Multipurpose Room of the Control Room

FIGURE 8.4: DEK - View from the Boys Dayroom Down One of the Halls

FIGURE 8.5: DEK - View from Hall of Boys Dayroom and Window to Control

Social Climate

In order to assess its social environment, the Moos CIES Form S Social Climate scale was given to all 20 of the direct care staff who work on the boys unit at DEK. The response rate was 50%. The scores are standardized and compared to a national reference group sample.

As Table 8.1 illustrates, all scores except for two are lower than for the national reference group sample. As the standardized scores show, the greatest emphasis at DEK is on expressiveness and on order and organization. The expressiveness subscale is a measure of the extent to which the program encourages the open expression of feelings for staff and for residents, while order and organization measures how important order and organization are in the program -- such as how residents look, what staff do to encourage order, and the maintenance of the facility itself.

Overall, the system maintenance dimension is the highest of the three dimensions overall, not unexpected in a detention center. This indicates an emphasis on order and organization, on the extent to which the resident knows what to expect and the explicitness of the rules and procedures, and on the measures staff uses to keep residents under necessary controls -- the formulation of rules, the scheduling of activities, and through resident/staff relationships. The main emphasis on order is balanced, however, with an equally strong score on expressiveness. Thus, there is some dichotomy of intent in this center -- control with allowance.

Table 8.1: CIES Form S Profile for Staff on Boys Unit at DEK Center Showing the Emphasis on Expressiveness and Order and Organization

	DEK Staff (n=10)			Reference Sample (n=858)[2]		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	1.5	1.08	36	2.67	.82	50
Support	2.1	.57	44	2.55	.69	50
Expressiveness	2.7	1.06	**50**	2.39	.73	50
Treatment Dimensions						
Autonomy	2.4	1.17	43	3.01	.83	50
Practical Orientation	2.3	1.42	30	3.34	.53	49
Personal Problem Orient.	1.8	1.03	41	2.48	.72	50
System Maintenance						
Order & Organization	2.4	1.27	**50**	2.42	.90	50
Clarity	2.6	1.17	48	2.71	.50	50
Staff Control	1.4	.97	48	1.55	.73	50

3. The MAR Center

The MAR center is located in a rural government services zone which is also the site of a county jail, the county landfill and a regional health center, among several other county government agencies. The center is housed in an old, rambling one-story building of concrete block originally designed as a holding center for abandoned and/or abused children (see Figure 8.6). The plan is a modified telephone pole plan with housing wings on either side of a dual hallway. The front portion of the building is shared with the Investigative Unit of the Department of Youth Services (blocked off in the plan), who are charged with picking up runaways from State custody. The side

[2]The nationwide juvenile normative sample includes 96 units for staff. Included are units from state training schools and reception centers, country juvenile halls, country and state managed ranches and camps, a privately managed vocational training school, and a work release program. Seven of the units were for females; the remainder were for males.

yards of the facility are enclosed with a ten foot high chain link fence topped with razor ribbon.

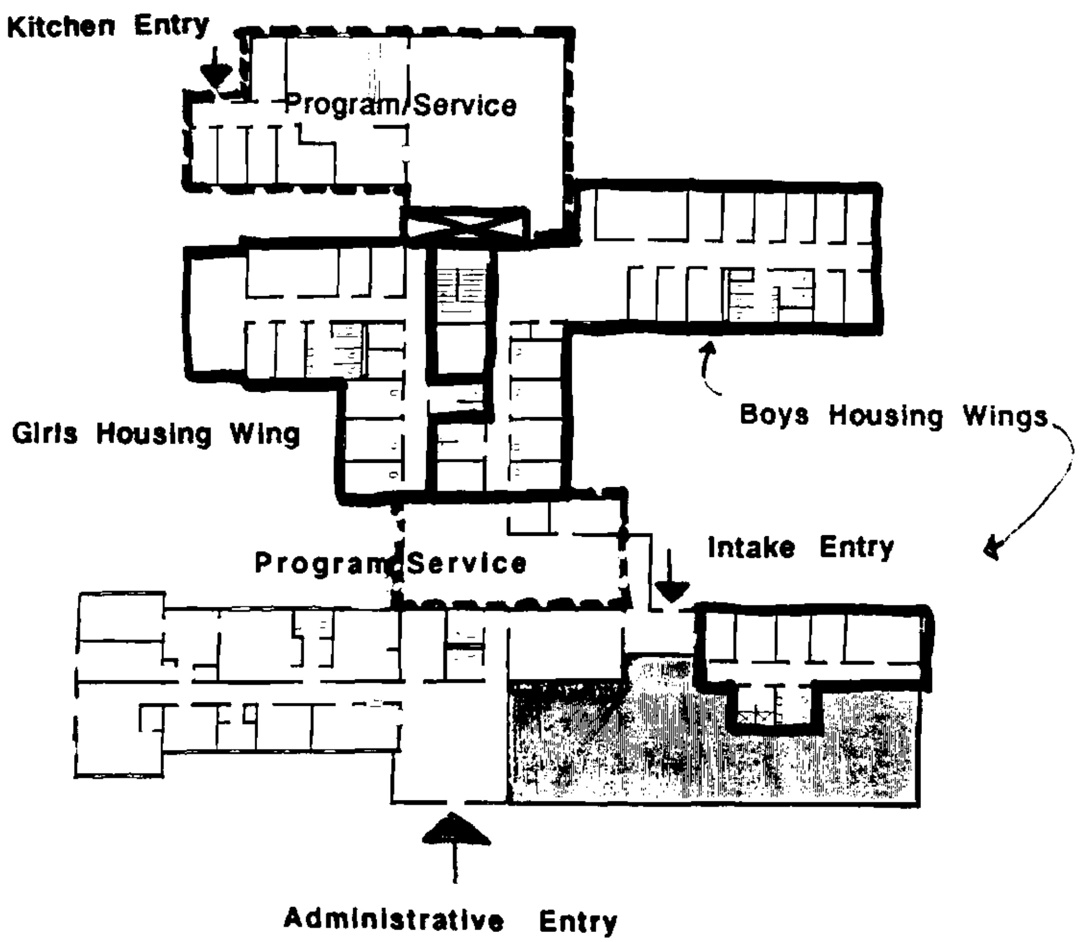

FIGURE 8.6: MAR - Floor Plan showing a Modified Pavilion Plan (Telephone Pole)

The administration and Investigative unit is at the bottom of the plan and program/service and housing units are at the top of the plan. The program areas are scattered, however -- one program area is located above the housing units while another program area bifurcates administration and detention in the middle of the structure; a third program area is located in the basement below the boys housing wing (not shown on plan). The control room occupies a central position in the top portion of the plan, but only overlooks a single program area and, partially, the boys dayroom. Administration, the public and most staff enter through the administrative wing (at the bottom of the plan); youth in custody, some staff, and visitors to detainees enter through the fenced side yard at the Intake entrance (on the left of the plan). There is a door in the rear of the facility for kitchen personnel.

Mission

The ostensible goal of the MAR center is to provide safe and secure custody for detained youth. Informal staff assessments of the facility mission, however, range from "watching the kids" to providing them limited opportunities for skill and knowledge development. While the administration in this facility places verbal emphasis on treatment and the development of independent living skills, the direct care staff regard their role more as "keepers" than facilitators. While there are some very involved staff who do see themselves as role models, other staff baldly stated to the interviewer that they are there to "pick up a paycheck". There is some discrepancy in goals, both within and between levels of hierarchy. This seems to be both the result of greater frictions and tensions and indicative of an informal regime of accommodation at odds with formal organizational goals.

This ambivalence between official goals and unofficial practice is demonstrated by a strict adherence to official schedule and timetable, and the provision of fewer opportunities for youth to exercise autonomy. Higher level youth are not encouraged in MAR to exercise responsibility and care over lower level youth; higher level results instead in more time out of one's room, access to a different activity room, and the opportunity to stay up later at night and help with chores such as laundry or taking out the trash. This perk, however, does offer time for comradary with staff on a somewhat more informal footing than when many other residents are around.

As the interviews revealed, most MAR staff, however, recognize the importance of establishing rapport with the kids in order to protect themselves from what they regard as "unpredictable behavior," and to make life for all more agreeable. Almost all detention staff, and especially those who have been in corrections for a long time, regard rapport as an important inducement for early warning of impending resident actions against them. Staff also confided to the interviewer that life inside the institution is a lot more pleasant and smoother running when less authoritarian measures are used and a level of mutual respect is established between staff and residents. Thus, while the prevailing practice in this facility is somewhat authoritarian, there is an emphasis on staff/resident interactions and facilitating youth in the development of self esteem and confidence. Staff also say they regard communication up and down the hierarchical ladder as open, even though there seems to be a discrepancy in the official line.

Demographic Data

Resident Data. At the time of the field study, there were 34 male residents housed in a combination of room types: two rooms with four bunks, one room with three bunks, seven rooms with double bunks and 13 rooms with single bunks. The administration and staff like this flexibility of rooms and feel that some kids do better sharing a room while others do better in single rooms. Again, sex offenders are housed in single rooms. Unlike DEK, only six of the rooms (three on the boys side and three on the girls side) are equipped with a combination sink/toilet; these are used for youth on isolation or those considered as needing maximum security.

The ADP in 1991 was 43, with a median age of 15, and the ALOS for residents was 15 days. Of the 38 youth in residence during the field study, 34 (89%) were male and 4 (11%) were female. Their median age was 17, with a range from 12 to 19 years.

All residents housed during the visits are delinquents (in 1991, 19% of 1129 youth served were status offenders while 81% were delinquent). Most of the kids held are from the County, a predominantly white suburb of a large Southern city. In 1991, 63% of the detained youth were white while 36% were black; 1% was "other". Offenses of those being housed during the field study were: seventeen (45%) held for violation of parole or probation; eleven (29%) for theft or robbery; three (8%) for possession or intent to sell drugs; two (5%) for obstruction of justice or terroristic threats; two (5%) for criminal trespass; one (3%) for hit and run; one (3%) for forgery; and one (3%) for child molestation.

Staffing Data. The usual staffing pattern on the two daily shifts observed is one SYDW manning the control room and CCTV's and three YDW's in the housing units, for a resident to staff ratio of 9.5:1. Of the three YDW's, a female is assigned to the girls units, and two males to cover the boys units; during the field study, a part-time male volunteer also helped cover the boys side from 5pm to 8 pm. Thus, in terms of male residents and direct care staff, the ratio is 34 boys to 2.5 male staff or a ratio of 13.6:1. The night shift, from 11pm to 7 am, has one SYDW and three YDW's; one for the girls side and two for the boys side. During weekdays, in addition to the resident care staff, there are four Administrative staff, three education and counseling staff, and four maintenance and kitchen staff for a total of 32 full-time and 4 part-time staff, or an average total resident to staff ratio of 1:.95.

Direct care staff are both male and female. According to self-report, the median age of the fourteen respondents was 38. They had worked an average of seven years and three months in correctional settings.

Physical Ambiance

The physical plant of this facility is old. While an effort has been made to brighten the interior with colorful graphics painted on the concrete block walls, the small windows bring in little light and the ceilings are littered with exposed electrical conduit and mechanical system ductwork (see Figures 8.7 -8.9). The multipurpose room (at one time a recreational gymnasium) doubles as a school room for lower levels, an activity room for higher level boys and the girls, and a dining room for all. It is the only truly bright room in the center with huge clerestory windows and colorful posters on the walls.

There is much diversion here for the kids, however. The activity room (at the middle of the plan) has two pool tables, five video machines, a foosball game, an elevated television and a radio. Directly outside is a fenced basketball court. While all residents have scheduled time in the activity room during each day, the girls and the higher level boys use the multipurpose room as a dayroom while the lower level boys use the boys dayroom. Those in the multipurpose room have access to a wide variety of board games, cards, and television while those in the boys dayroom only have television. This differential is to encourage movement to a higher level. The two schoolrooms located in the basement of the facility are never used except during school hours, because it splits up staff; they are very open and colorful and well equipped with computers and individual desks. The prevailing philosophy at MAR is to keep the kids moving from activity to activity. As one YDW related: "Things stay smoother when they have more to do. It's when they have time to think that problems surface".

In the boys dayroom, plastic chairs are stacked under the TV when not in use. The only other furniture in the boys dayroom is a row of mismatched chairs at the rear of the room for staff and an old metal desk for supplies. In the multipurpose room, there are movable school-type tables, with individual, movable plastic chairs.

Views outside are obscured by the scratched lexan windows; there is little to view anyway except a parking area and the fenced outdoor tarmac for basketball off the activity room. The resident rooms are institutional in character, with old metal bunks. Residents are not allowed any clothing in their room except for t-shirts and underwear as a suicide prevention measure. Kids wear their own or state issued used clothing, rather than a uniform of sorts.

Residents on higher levels may have Walkmans, books, and pictures in their room during the day but everything must be placed outside the room at night because of the risk of suicide. All televisions are elevated. The one in the boys dayroom is largely controlled by staff who sometimes, when things go smoothly, allow majority vote to rule. The TV in the multipurpose room is controlled by residents but only after requesting and receiving permission from staff to turn on or change channels. The control room is actually a converted hallway and has good visibility only of the multipurpose room -- the boys dayroom, the girls corridor, the intake entrance and the activity room can be panned on the CCTV's[3]. The control room is continuously manned by staff who answer the telephone, watch the CCTV's and oversee the multipurpose room.

[3]There is a great sense of modesty at this facility; during showers the CCTV's are diverted from the boys dayroom and the door to the dayroom closed out of a fear by female control staff that the boys will expose themselves. There were no such inhibitions at DEK. The observer sat in the boys dayroom during showers while boys exited and entered the showers and dayroom area with towels wrapped around them. Female staff also wandered in and out of the boys dayroom during these times.

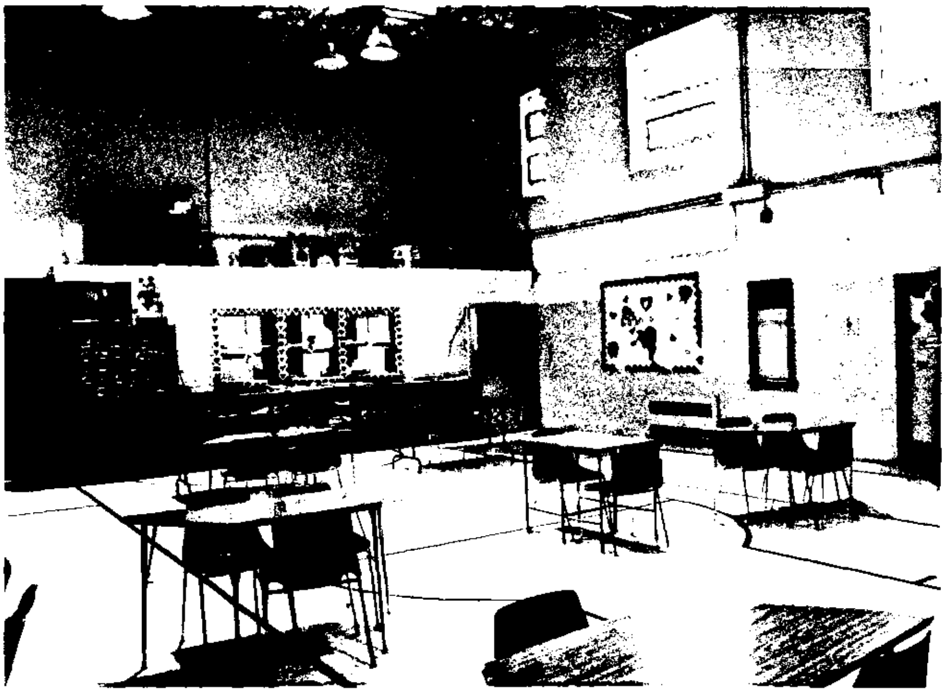

FIGURE 8.7: MAR - View from Control of the Multipurpose/Dining Room

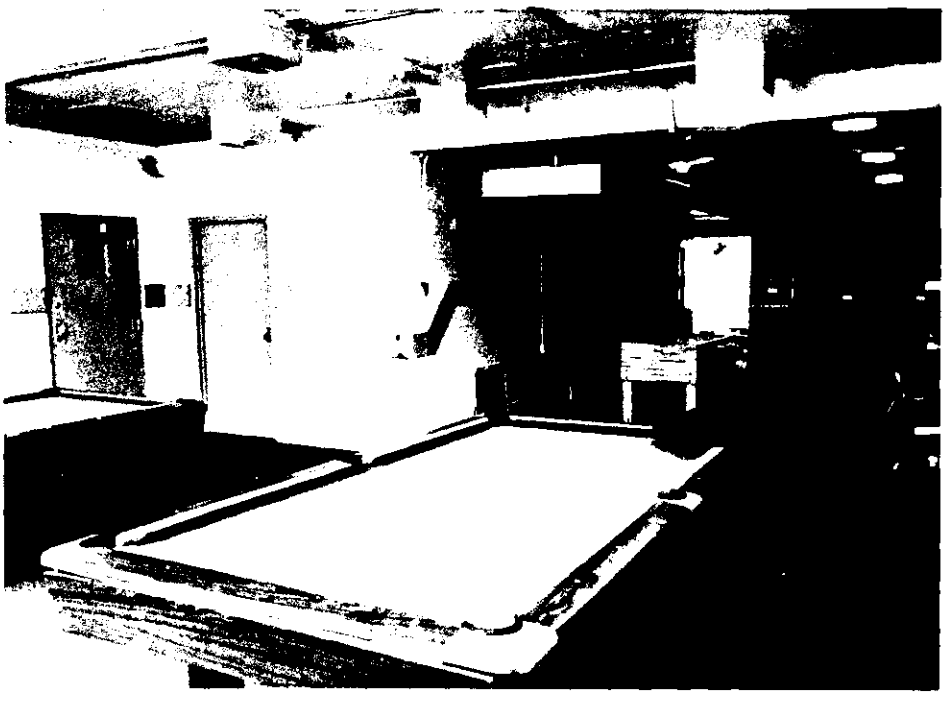

FIGURE 8.8: MAR - View from a Corner of the Activity Room

FIGURE 8.9: MAR - View from Staff Position of the Boys Dayroom

Social Climate

The CIES Form S Scale was given to all 20 of the direct care boys staff. The response rate was 70%. As Table 8.2 indicates, all standard scores are lower than the national sample except for two of the subscales under the systems maintenance dimension; one of these, staff control is far higher than the national norm. The highest degree of emphasis, therefore, is on staff control, or the extent to which staff use measures to keep control, with the next highest on order and organization. The third subscale in this dimension, clarity, a measure of the extent to which residents and staff are aware of expectations and how explicit the rules and procedures are, is among the lowest scores.

Table 8.2: CIES Form S Profile for Staff on Boys Unit at MAR Center Showing Emphasis on Staff Control

	MAR Staff(n=10)			Reference Sample (n=858)		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	.714	.994	26	2.67	.82	50
Support	1.86	1.23	40	2.55	.69	50
Expressiveness	1.14	1.23	33	2.39	.73	50
Treatment Dimensions						
Autonomy	1.43	1.28	31	3.01	.83	50
Practical Orientation	1.86	1.65	22	3.34	.53	49
Personal Problem Orient.	1.43	.938	35	2.48	.72	50
System Maintenance						
Order & Organization	2.57	1.09	**52**	2.42	.90	50
Clarity	1.57	1.28	27	2.71	.50	50
Staff Control	2.43	.756	**62**	1.55	.73	50

4. The IND Center

IND has the smallest housing unit studied but the largest and newest detention facility. The facility, which is part of a Superior Court Juvenile Justice Complex including juvenile courts, judges chambers and administrative offices, is located in an urban black neighborhood. The facility was completed in 1990 and the detainee areas are of the podular design type. The capacity is 144 male and female juveniles, housed in nine, 16-bed units. All rooms are single bunked with a combination toilet/sink in each.

As illustrated in Figure 8.10, this center is comprised of a compact square grid-like structure of program/service areas, appended by three general housing pods which are grouped in two's off three distinct entry spokes. The housing pods surround two enclosed outdoor exercise yards which are scheduled for use (none were used during the visit due to inclement winter weather). General housing is thus separate from intake and classification housing and from the girls housing, all of which are attached directly to the compact program structure. The facility is binucleate in the sense that there is a true separation between general housing and the program/service areas with only a tenuous link through the entry corridors.

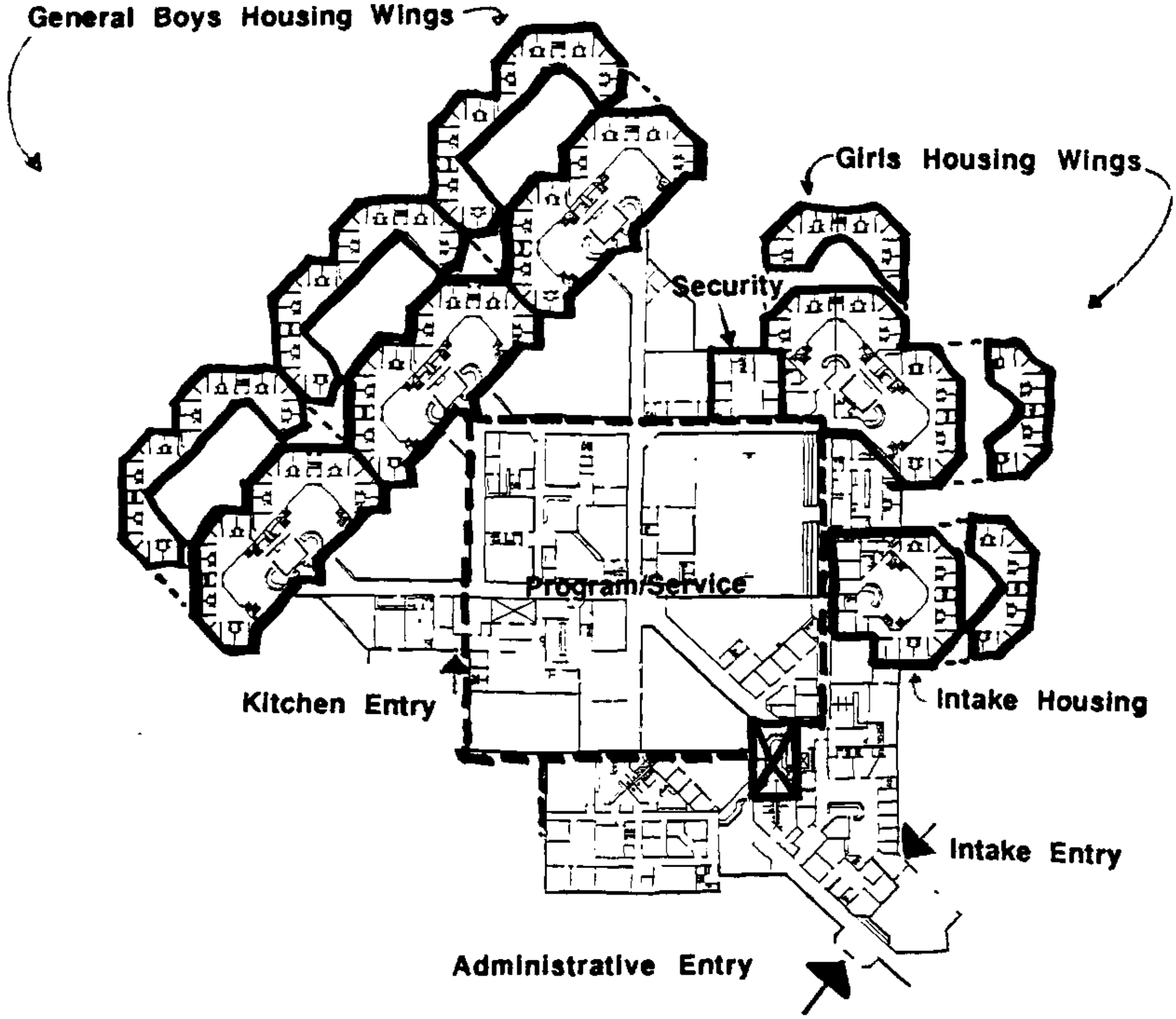

FIGURE 8.10: The IND Center - Floor Plan Showing Housing Pods Attached to a Grid

Security is also split with a central control room located near the entry (the "X" at the bottom of the plan) and a security staff room located within the detention areas. The main control room sees little of the facility, acting primarily as a gatekeeper, but panns the entries and the corridors with CCTV's. The security office also sees little, but is at least proximate to resident areas. Administrative staff, some care staff and administrative and detainee visitors enter the facility through the administrative entry (at the bottom of the plan) which also is the public entry to the courts; other staff and detainees enter through the intake entry on the right hand side of the plan. There is a third entry for kitchen staff on the left hand side of the plan.

Mission

The stated mission of IND is to provide "a secure, safe, healthy and humane environment for juveniles temporarily housed under the order of the Juvenile Court." There is no "treatment" of juveniles, but there is a stated emphasis on a program of constructive activities conducive to fostering positive attitudes and relieving stress. The large facility has a full court gym, an activity room where youth "can interact with each other doing 'kid' things", an arts and crafts room, a separate chapel, as well as the usual educational, medical and dining areas. The activity room has five pool tables, a foosball table, five pinball machines, a television, computers, and passive games. Each unit is tightly scheduled, separately, for activity area usage. Each housing unit has a dayroom with movable plastic chairs and an elevated television, four smaller alcoves outside the resident rooms each containing a table and four chairs, and access to a "quiet room" with a television and lounge chairs.

"Structure" is strongly emphasized by administration and security personnel, who also stress positive interactive experiences between staff and residents. Staff are regarded by the administration, and see themselves, as role models, and they are, on the whole, younger and more educated than the staff in the Georgia facilities. Most staff place much credence on establishing rapport as a management tool and on maintaining mutual respect between residents and staff. While the new facility is highly regarded by staff for its ambiance and ease of maintenance, most say it has made little difference in their management styles. They report that the new space "makes it somewhat easier to run the program" than their old space which was reportedly more like an army barracks.

This facility operates somewhat differently in that each unit is directly managed by only one or two Youth Managers (YM's), with scheduled relief by floater and utility staff. There is thus more consistency of staff because there is a smaller number assigned to each unit. Neither the control room nor the security office are visible to residents in the units. Shift Managers (analogous to the Senior YDW's at DEK and MAR) roam from unit to unit, keeping a check on how things are going in each unit. If there is any verbal altercation between a YM and a resident, the Shift Manager is generally called to settle the dispute. The IND youth thus have the ability to go over the local YM. Shift Manager meetings are held monthly and while the higher level staff state they feel free to air ideas and grievances, several YM's indicated that the resident care staff do not "stick together" -- many are "more interested in climbing the ladder" by pandering to upper level staff. Many direct care staff also resent the ability of residents to go over their head to settle disputes.

The detention area appears to be tightly run in the sense that the schedule and rules and regulations are strictly adhered to, but within the housing unit studied (the "F - Frank unit"), the atmosphere seemed friendly and relaxed. The F-unit staff, for the most part, appear to be genuinely interested in the residents, but, again, realistic about their relative impact on the youths lives. Most staff strive to show kids that they can change their life if they choose to do so and put credence in firmness and consistency and resolving issues through a mutual give and take.

IND has a behavior management system to reward appropriate behavior and correct inappropriate behavior. Points are awarded and taken away and privileges are tied to levels. Those in higher behavioral levels are allowed liberal access to activities outside the unit where they can exercise more responsibility and autonomy such as Teen Time, Bingo Night, Pizza parties, and so forth. They also get to view first the new video movies and make extra phone calls.

Demographic Data

Resident Data. At the time of the field study, IND averaged 127 residents (the ADP in 1991 was 131). The ALOS for residents in 1991 was 13.32 days. Of the 3333 residents served in 1991, 2703 (81%) were male and 630 (19%) were female. The median age of residents in 1991 was 15 and a half years and almost 99% were delinquent as opposed to status offenders. The 1991 racial makeup of residents was 60.3% black, 38.5% white, and 1.3% other. Most residents are from the inner city.

The unit studied housed 16 boys whose median age was 15 with a range from 13 to 17. They were all delinquents. Offenses of those housed in the unit during the field study ranged from parole violations to attempted murder: three (19%) were being held for carrying a concealed weapon; three (19%) for assault or battery; two (13%) for violation of parole; two (13%) for theft or robbery; two (13%) for criminal trespass; one (6%) for possession or sale of drugs; one (6%) for fleeing law enforcement; one (6%) for criminal mischief; and one (6%) for attempted murder.

Staffing Data. The usual staffing pattern for the unit on the two shifts observed is supposed to be two YM's (an 8:1 ratio) but because of staffing shortages, there generally is only one (a 16:1 ratio). Total security staffing, however, for the 7-3 shift is 2 Shift

Managers, 27 YM's and 5 Utility Staff; for the 3-11 shift it is 2 Shift Managers, 32 YM's and 4 Utility Staff; and for the 11-7 shift, it is 2 Shift Managers, 20 YM's and 2 Utility Staff. Female staff are assigned to the girls units, and male staff to the boys units. On weekdays, there are additional staff: three General Administrative staff, 22 residential services staff (medical, activity, educational, classification), 11 security staff, 13 support services staff (food services, laundry, records) and a chaplain. Including the 94 youth management staff, there is a total of 144 staff at IND, or an average total resident to staff ratio of 1:1.

According to self-report, the median age of the 94 youth managers, utility staff and shift facility managers on call for the unit is 33. They had worked an average of four years and eleven months in correctional settings in general.

Physical Ambiance

IND is very well furnished and maintained but the experience of the facility is mixed (see Figures 8.11 - 8.13). The corridors forming the structural grid of the public areas are bland and monotonous, and a wayfinding nightmare. After four days in the facility, the researcher was unable to find her way through them without making extensive use of the small signs posted over the doorways. All halls have the same color carpet, the same color walls, and the same floor to ceiling windows overlooking what appear to be the same interior recreation courts.

FIGURE 8.11: IND - View of a Typical Corridor in the Main Structure

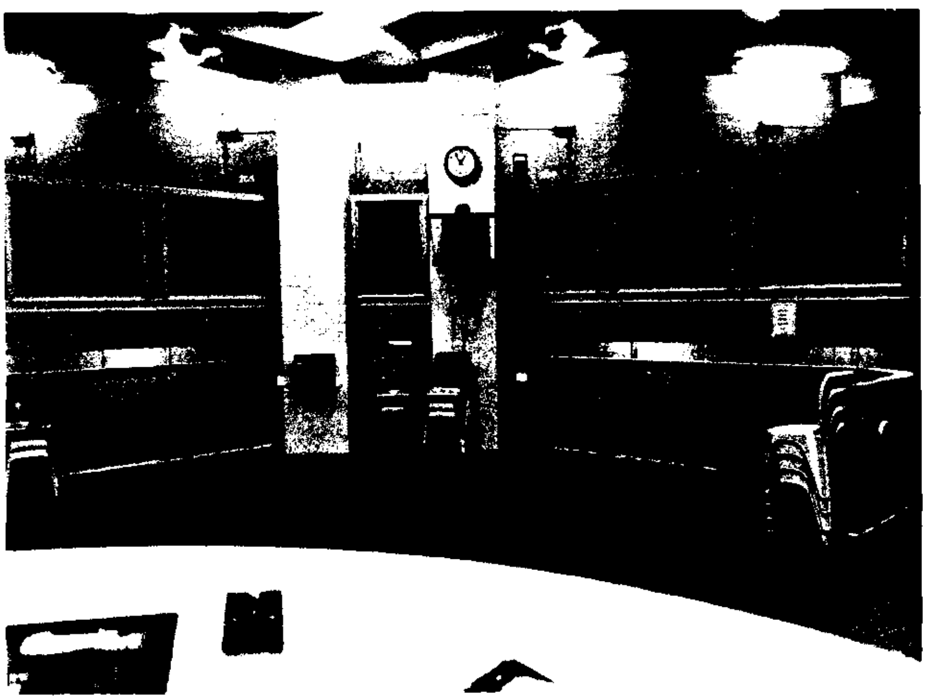

FIGURE 8.12: IND - View from the Staff Station of Dayroom and Mezzanine

FIGURE 8.13: IND - View of Dayroom and Staff Workstation

The activity rooms and housing units located off the corridors, however, are bright, differentiated and well lighted with both natural and ambient lighting. Each housing unit is differentiated by brightly colored railings and furnishings in colors like yellow, orange, or parrot green. The units themselves are open with a mezzanine plan -- the dayroom on one level with the resident rooms located either a half floor below or a half floor above. Every four rooms are grouped off a small alcove containing a table and chairs. From the alcoves and the dayroom there are views into the outdoor recreational court and into the adjoining unit through the glazed quiet room. The television in the dayroom is elevated but program choice is by majority vote of those watching. There is a staff control station (the curved desk in the dayroom), but the policy calls for staff to interact closely with residents and not remain behind the desk. This is, however, not always the reality[4].

The facility furnishings are new and similar to those in a high school, and they are impeccably maintained. The resident rooms are clean, with a clear panel window, a molded plastic bunk and desk and a ceramic combo-toilet/sink. Residents wear institutional clothing of blue pants and blue shirt, but leave all personal items outside their room at night. Those on higher levels may listen to Walkmans, play cards and games in the alcoves, take their turn on the phone, or use the quiet TV lounge which is shared with the adjoining unit. Lower level boys may watch TV or listen to radios in the dayroom. Higher level residents are also allowed to stay in their own room with the door open when in the unit. Thus, IND offers several gradations of privacy.

Social Climate

The Moos CIES Form S Scale was given to 94 of the direct care staff working with the boys unit in this facility (staff are shifted between the various units). The response rate was 66%.

Table 8.3 illustrates that the strongest emphasis is in the systems maintenance dimension. The highest standardized score, and thus receiving the most emphasis is the Order and Organization subscale. Staff Control is the next strongest score with the third subscale in this dimension, Clarity, also being higher than others. All other scores, both for the relationship and for the treatment dimensions, are below average. Thus, in IND, the staff assessment of the social climate is one of system maintenance.

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[4]See, for example, Farbstein, Wener and Associates (1989) comparison of "direct" and "indirect" supervision in adult correctional facilities.

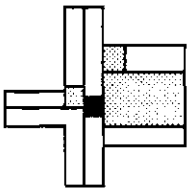
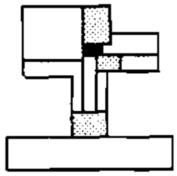
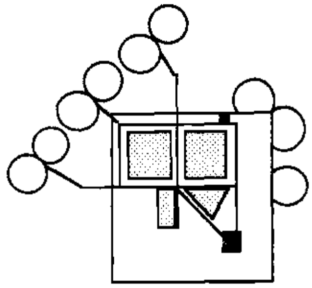
Table 8.3: CIES Form S Profile for Staff on Boys Unit at IND Center Highlighting Order and Organization

	IND Staff (n=62)			Reference Sample (n=858)		
Subscales	*mean*	*S.D.*	*Std.Score*	*mean*	*S.D.*	*Std. Score*
Relationship Dimensions						
Involvement	2.07	1.32	43	2.67	.82	50
Support	2.0	1.02	42	2.55	.69	50
Expressiveness	1.77	1.14	41	2.39	.73	50
Treatment Dimensions						
Autonomy	1.95	.965	38	3.01	.83	50
Practical Orientation	2.4	1.18	32	3.34	.53	49
Personal Problem Orient.	1.37	.854	34	2.48	.72	50
System Maintenance						
Order & Organization	3.76	.564	**64**	2.42	.90	50
Clarity	2.47	1.02	47	2.71	.50	50
Staff Control	2.16	.853	**58**	1.55	.73	50

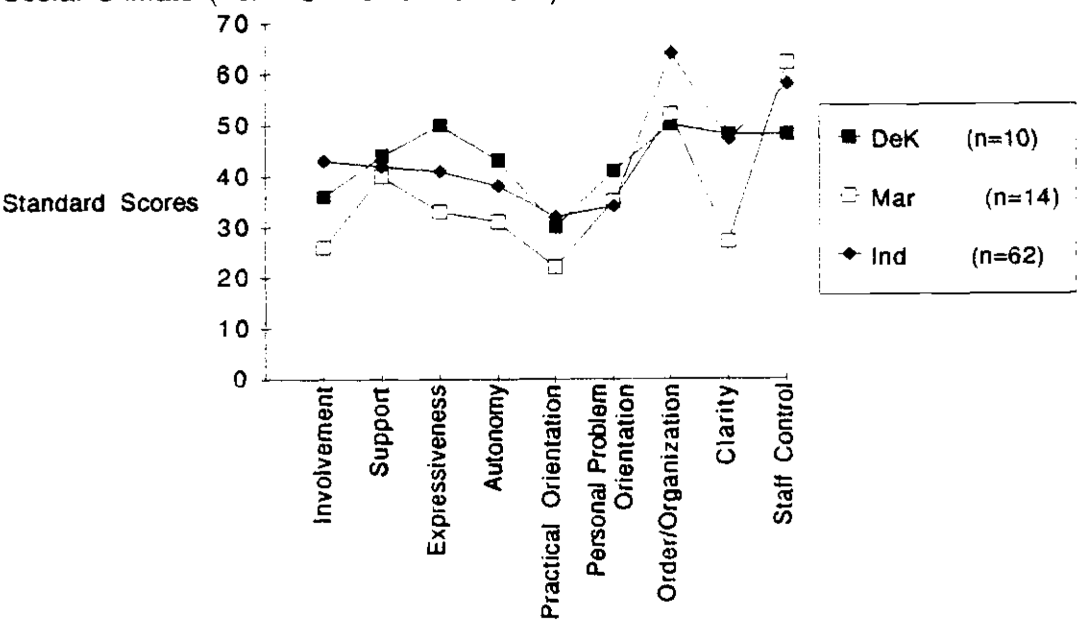
5. Summary

The three units studied are similar in mission, philosophy and resident and staff profiles, but vary in size, in spatial configuration, in social climate and in general ambiance. Table 8.4, below, illustrates the gross dimensions of difference and similarity.

Table 8.4: Summary Characteristics of Detention Centers

	DEK	MAR	IND
			
Total Residents	37	38	127
Boys Unit	28	34	16
ALOS	20.9 days	15 days	13.3 days
Room Type	Sgle/Dble	Sgle/Dble/Trpl/Quad	Sgle
Median Age Residents	15.7 years	15 years	15.5 years
Median Age Staff	40 years	38 years	33 years
Unit Res/Staff Ratio	14:1	13.6:1	16:1
Total Res/Staff Ratio	1:.83	1:.95	1:1

Social Climate (Form S Profiles for Staff)



In terms of configuration, DEK offers a combination radial and cluster plan with a clear center, the control room, off which all other resident areas pivot. The control room oversees the linear housing wings and the major resident program areas.

MAR is an irregular pavilion plan, segmented in terms of its housing and activity spaces. Boys are housed in two wings separated by program and service areas and the program areas themselves are binodal. There is a regular alternation occuring in space -- housing, program area, housing, program area. The control room occupies an approximated center in the detention end of the facility but oversees only one of the bifurcated resident program areas.

IND is a compact, gridded mass appended by three separate housing pods. Housing and program areas are distinctly separated with only a tenuous connection in the form of linking corridors. While the major resident program areas are grouped (albeit separated from one another by the grid-like circulation system), the two control or security rooms are also bifurcated and separate from both housing and programs. The housing units are of the podular type, but grouped so that two units more or less join through a glazed television room. Thus, the centers offer three distinct plans with varying placement of activities, housing, and control. These configurational differences are discussed in greater detail in the next chapter.

The three centers also diverge in terms of their general ambiance. While DEK and IND are painted and equipped much like a modern high school, MAR is more grim. The furnishings and the physical plant are in need of repair and replacement. MAR also admits little natural light, except to the multipurpose/dining room, which adds to the gloom. The boys dayroom is particularly dark and depressing. On the other hand, DEK and MAR, with their alternation of spaces, have little of the monotony characteristic of the grid-like corridors at IND, and spaces seem a little more varied than IND' pod units.

While there is some difference in the sizes of the units, with IND having the smallest number of residents, other dimensions seemingly vary little. The average length of stay is not widely divergent, the ages of youth are close, and the total resident staff ratios are also similar. The offenses are also similar, with MAR youth relatively committing less serious crimes. While there is, ostensibly, a higher resident/direct care staff ratio at IND than in DEK and MAR, these numbers fluctuate daily at DEK and MAR while they remain the same at IND. This might be said to result in periods of stress and strain for everyone during overcrowding. IND also has the youngest staff of the three while DEK and MAR staff are somewhat more mature.

The professed mission and official policy in all three centers is surprisingly similar in the emphasis on structure and control, and most of the staff at each seem equally concerned with their roles. However, the social profiles resulting from the Moos Social Climate Scale paint a slightly different picture in terms of staff perceptions of the actual social environment in these places. While one expects a strong emphasis on systems maintenance such as staff control and order, staff at DEK seemingly place as much emphasis on the open expression of feelings, thus distinguishing it from the other two; at MAR, the overriding emphasis is on staff control with a secondary emphasis on order and organization; at IND the highest emphasis is on order and organization and a secondary emphasis on staff control. MAR and IND therefore, in contrast to DEK, appear as more impersonal regimes.

MAR also stands out for low scores on clarity, indicating that a level of uncertainty exists -- staff are unsure of what they are expected to do -- whereas staff in DEK and IND have high clarity scores indicating staff know what they are doing even though they seek to do different things. The lowness of MAR's clarity score, especially in contrast to the highness of the other two subscales in the maintenance dimension, suggests that people have little dependable information about their environment (Moos, 1974). Residents and staff may not know what to expect and the program rules and procedures may not be explicit. Thus, there are two different paradigms and one case that seems problematic. MAR leans towards IND in that it is about regime maintenance, but differs from IND in that it has signs of "pathology".

Finally, while all the centers studied conduct little treatment of residents, they do offer a wide range of recreational programs, as much to provide constructive experiences for an often unwilling audience as to keep the kids active and busy. As one of the staff noted, "The more there is to do, the less trouble we have". All the centers have a behavior management program with similar rewards and punishments. Most of the correctional staff observed are impressive in their efforts to deal fairly and respectfully with the residents but naturally some do this better than others. The kids naturally gravitate to those staff genuinely interested in them and remain distant from those who are there to "pick up a paycheck".

On the whole, the centers are surprisingly inspiring to an observer fairly new to them. Kids are much the same everywhere, and the staff seem genuinely concerned about those whom much of the public would like to forget.

PART II: CHAPTER IX

A SPATIAL ANALYSIS OF DETENTION CENTERS

1. Introduction

The last chapter offered a general description of the three detention centers. This chapter aims at a detailed description of their morphology and syntax. Through the application of syntactic techniques, the configurational parameters underlying the variation in the detention center plans will be quantified. The application of syntactic analysis to plans can help to better identify different models of spatial layout that sometimes "appear" to be similar. It is hoped that by analyzing and quantifying the spatial parameters of the three centers, some hypotheses may be developed about the relationship between their syntax and the resultant life within.

Each of the three detention centers are briefly described morphologically; they are then more fully described syntactically in terms of resident use areas, circulation patterns, and their relative clarity in terms of visibility and control. Finally, the key spatial distinctions of the facilities are summarized and discussed.

2. The DEK Center

A Morphological Brief

As noted in the last chapter, the DEK center is shaped like an irregular cross, literally and figuratively divided in two, with three housing wings of unequal length attached to a fat program and administrative and services section (see Figure 9.1). The two top wings on the plan are devoted to the boys and the shorter wing (on the bottom of the plan) is shared between Intake and girls housing. Each housing wing is pierced by a wide, double-loaded corridor lined with resident rooms (locked cells) and showers, radiating from the center of the structure which is dominated by the nerve center of detention facilities -- the control room.

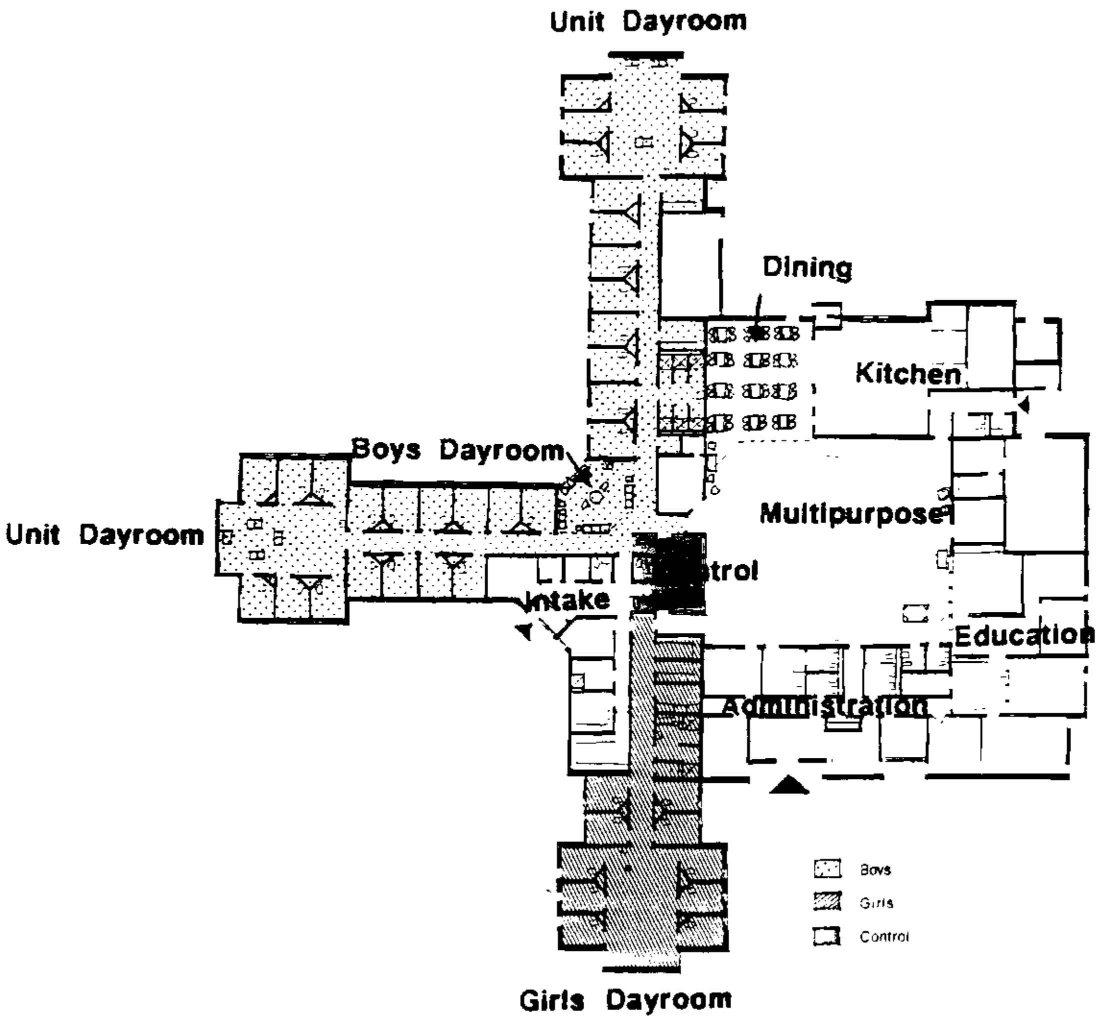


FIGURE 9.1: The DEK Center Showing the Clustered Program Spaces

As shown in Figure 9.1, the major resident use areas -- the multipurpose room with its adjoining dining area, the intake room, and within the boys housing wing, the boys dayroom -- cluster around the control room. The medical room and laundry room also open off the multipurpose room. Wrapping the multipurpose and dining room are program and service clusters -- the administrative offices, the educational classrooms, the kitchen and food preparation spaces. On one hand, the multipurpose room functions as an interior courtyard in that it is both a place of daily usage and a circulation node to the areas disposed off it. On the other hand, this major resident use area can be said to be surrounded by staff areas.

The boys dayroom is located at the juncture of the two housing corridors with unit dayrooms located at the end of each housing wing. While the girls unit dayroom is used, the boys use the centralized dayroom rather than the two end unit rooms.

Because of the clustered arrangement, the use spaces themselves act as pathways to one another. Thus, circulation in the detention area is primarily "through" spaces, except for the radial housing wings (and the administrative area) where it is "by".

Relations of Visibility

Figure 9.2 a, b, and c show the isovists of the visual field from the main resident use areas at DEK. The isovist from (a) the fully glazed control room is fairly comprehensive, reaching into most areas of the facility. If the control room officer moves around this room, he can view the length of each housing wing corridor into part of the end unit rooms, all the boys dayroom, most of the intake area, all of the multipurpose room, and most of the dining and classroom area. The window to the girls side is usually kept curtained for modesty but it is also possible to see part of their dayroom[1]. Of course, this isovist changes with the movement or stasis of staff.

[1] The control room has an electronic control panel which controls the locking and unlocking of doors, the fire alarm system, and the two-way intercom system to each resident room. Closed circuit television monitors (CCTV's) pan the unit rooms at the end of the corridors and the intake entry.

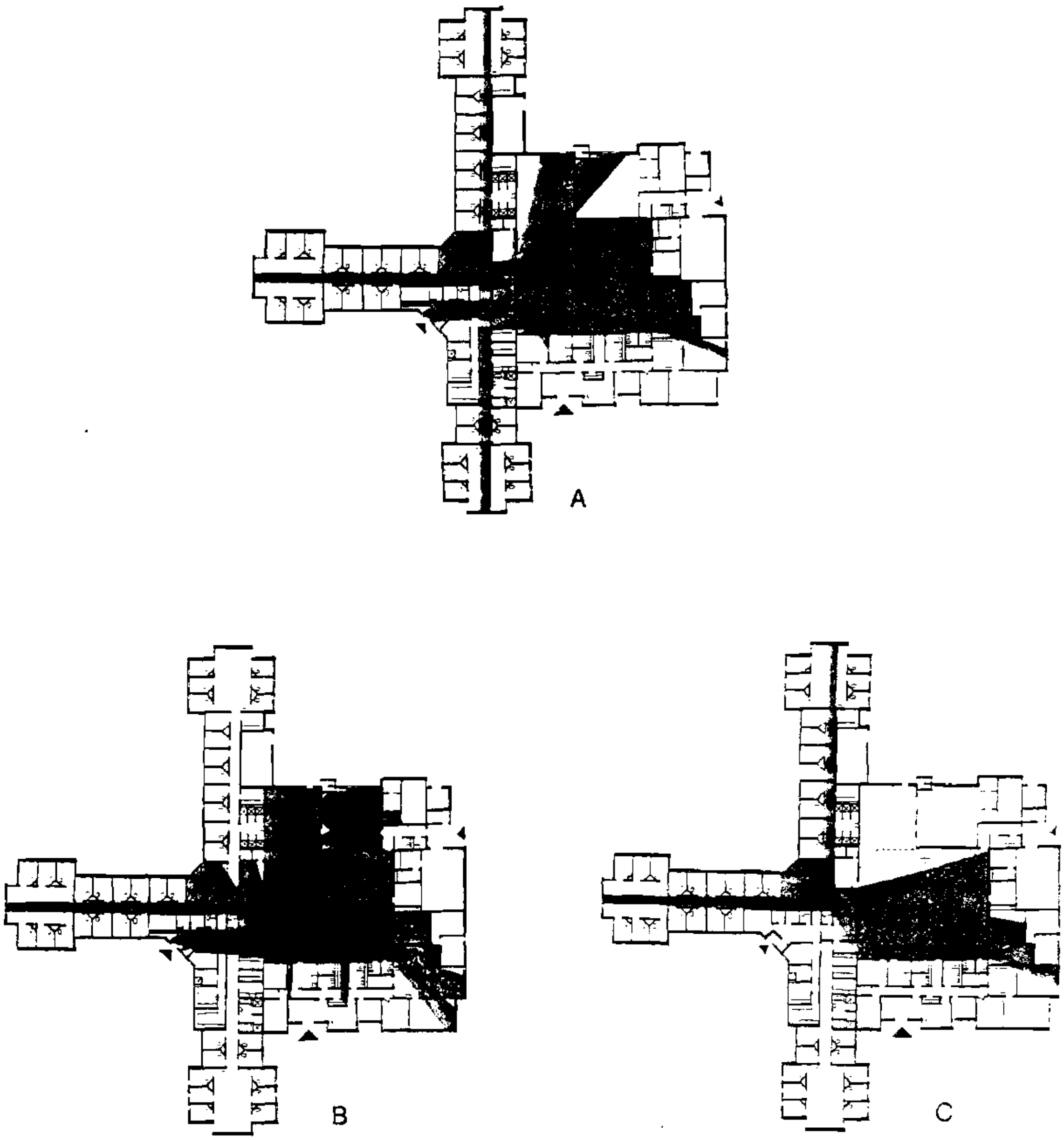


FIGURE 9.2: Isovists from DEK Showing Views From (a) the Control Room, (b) the Multipurpose and Dining Room, and (c) the Boys Dayroom

Figures 9.2 (b) shows the isovist from the multipurpose and dining room (the residents view of the center). The view from these rooms is shown together because in use they are interchangeable with residents in the dining area moving into the multipurpose room and vice versa. This isovist is also fairly comprehensive but biased more toward the program and services portion of the center, taking in the control room, the intake area, more of the classrooms, and even offers slivered views into administration through the glazed doors of the conference room and hallway. The classrooms are glazed so that most of them can be seen from the control room and from the dining, multipurpose, and even the boys dayroom. Those in the multipurpose room can also see through the control room to the intake entry door and to the boys dayroom.

Even the view (c) from the boys dayroom is fairly broad, with sightlines into both male housing corridors and, through the control room windows, to the multipurpose room and classrooms. The offset location of this dayroom, however, prohibits any view by a seated staff member down either hallway; only with one's back against the control room window can both hallways be seen simultaneously.

While this facility was intentionally designed for control room staff surveillance of the major resident areas, the plan is full of blind spots. Staff in the control room cannot see part of the dining room, nor is there full visibility of the male housing wings or the unit dayroom, except with movement. The dayroom's location, offset at the juncture of the two boys corridors, prohibits views from it down either unless one pins oneself to the control room wall. If control room staff move to see either housing wing, then they leave the control panel and full surveillance of the multipurpose and dining areas. The two unit dayrooms at the end of the boys corridors are also not fully visible.

A Syntactic Analysis of Space

For a description of the syntactic qualities of DEK, a convex map was drawn. The map was then represented as a justified gamma map, in this case keyed in terms of user categories (see Figure 9.3). Figure 9.3 a shows the plan of the facility "unjustified" with convex spaces represented dots and permeabilities as lines. Figure 10.3b shows the gamma map "justified"; all spaces of the same depth are lined up horizontally above the carrier.

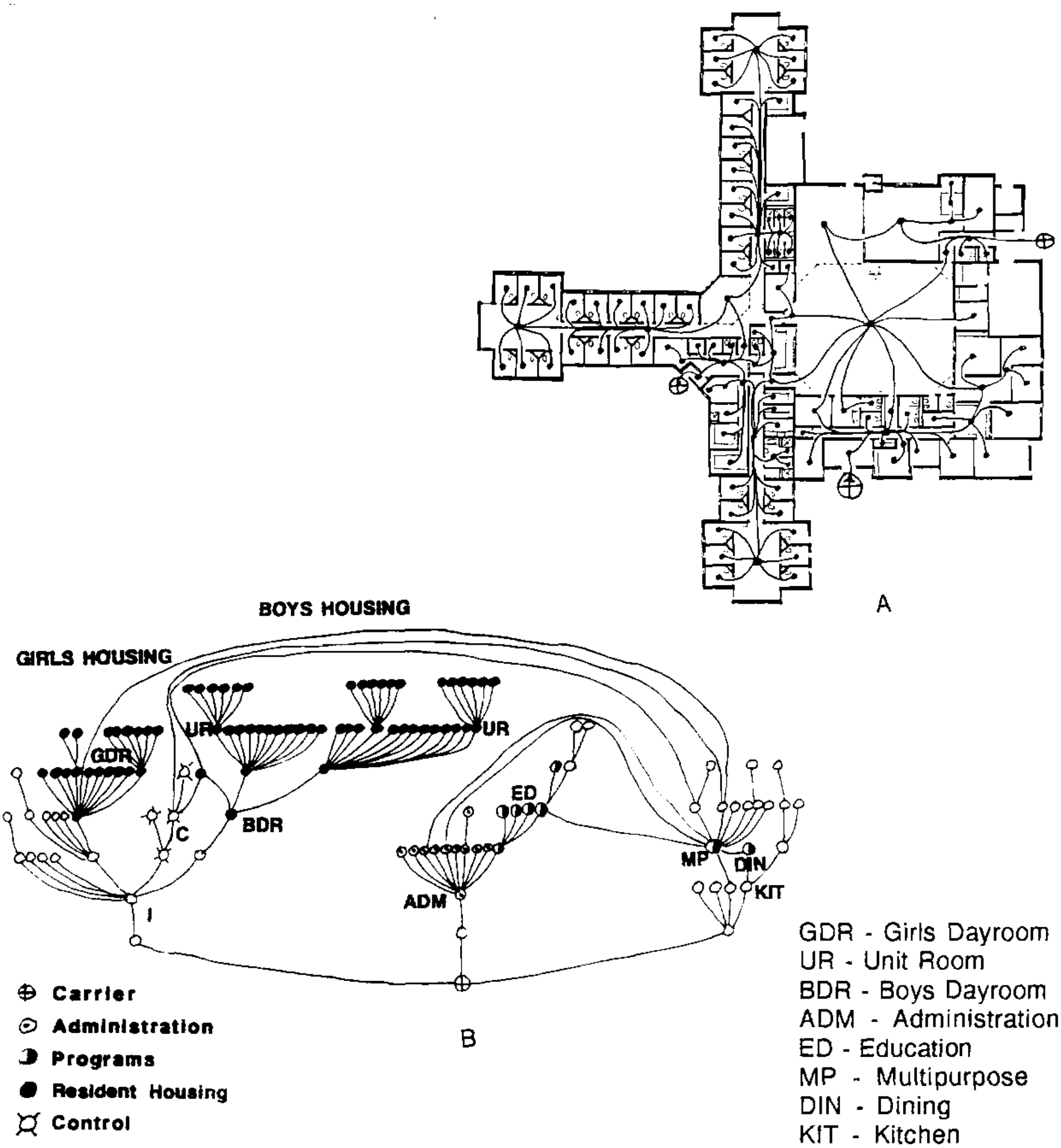


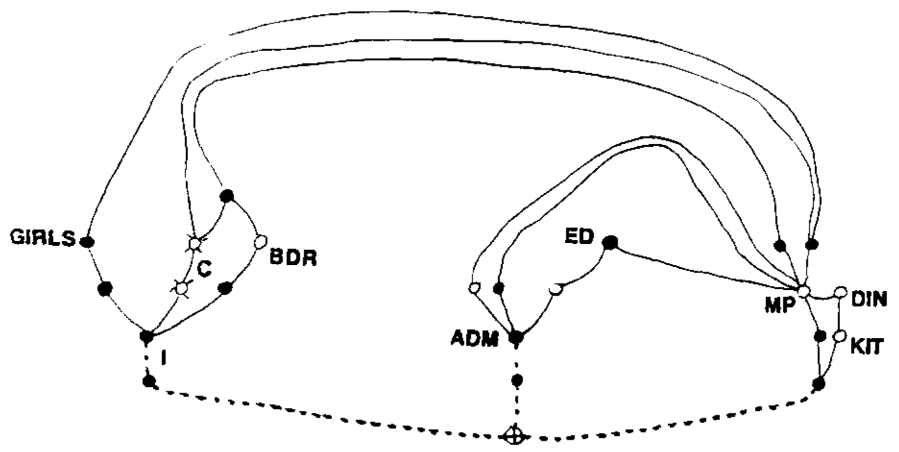
FIGURE 9.3: (a) The Unjustified Plan and (b) The Justified Gamma Map of DEK

The Differentiation of Categories by Depth. As Figure 9.3b shows, DEK is relatively shallow; its mean depth is 4.87. No point in the center is more than seven "steps" from the carrier. The deepest spaces in the system are resident rooms and two spaces in the educational area; the shallowest spaces are services (intake and kitchen). When the average depth is computed of the spaces belonging to each category of user, the order is as follows (moving from shallow to deep):

INT > ADM > PROGRAM > BDR : C > HOUSING.

Lying squarely in the mid-range are the resident program spaces (at average depth of 3.71) the boys dayroom and control (both average 4). Thus, from one point of view (as viewed from the carrier), the major resident use spaces are as shallow as the control room space. The activity spaces are also closely arrayed together at the third and fourth level of depth, being only one or two spaces from one another, and within only one or two spaces from the staff dominated spaces of the control room, education offices, administration and the kitchen.

The Differentiation of Categories by Rings. Another way of looking at the differentiation of categories is by viewing the facility in terms of its subsystems. Figure 9.4 shows DEK in terms of its (a) distributed subsystems and its (b) non-distributed subsystems. Rings increase the number of alternative paths connecting two spaces and therefore reduce the scope of control of single spaces. When, however, a given category of users has exclusive or differential use of a ring, then rings articulate the spatial relationships of control between categories.



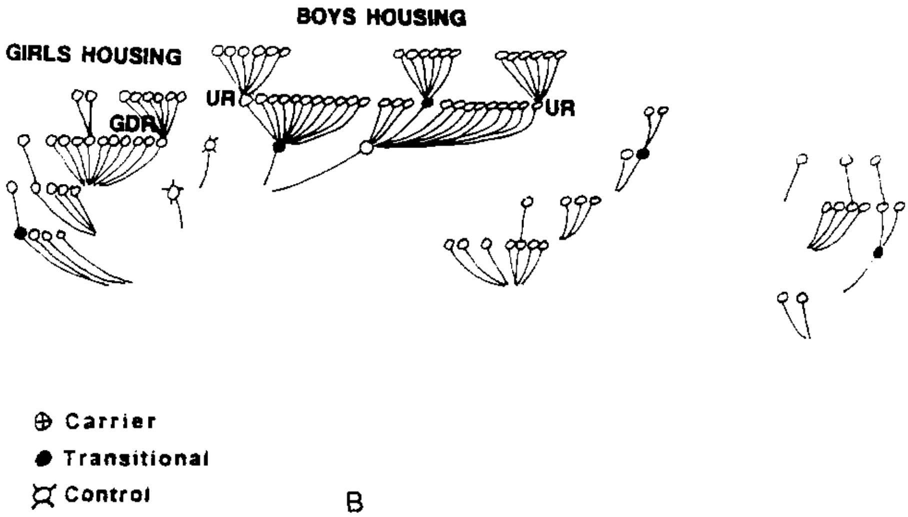


FIGURE 9.4: (a) The Distributed and (b) Non-Distributed Subsystems of DEK Showing the Strong Investment in Rings

As evident in the figures above, the non-distributed subsystem is very shallow from the distributed system with no space being greater than three spaces, while the distributed subsystems are comprised of at least four or five spaces. Thus, depth is invested in the distributed system. Comparing the two, it is obvious that every major use space (except the girls dayroom), and every categorical area, is on the distributed system while resident housing makes up the bulk of the non-distributed system. On careful inspection, it also becomes obvious that all of these rings (not counting the dashed links to the external carrier) intersect in the multipurpose room. The boys dayroom and girls hall also have a secondary link to control. While control and the multipurpose room share space on two of the rings, the multipurpose room has access to three other independent rings taking in the dining area and kitchen, the education rooms and administration.

While rings are potentially available to all, the staff exercise control over their actual use. However, it will be recalled that because of the strong isovists in DEK, most of the points on the rings are visible to the residents. Thus, at DEK, while there is a differentiation of categories in the use of the rings, albeit little in the placement on the rings, there is little differentiation of categories with respect to the purview of those rings. Residents have the same visual access, if not slightly more, to rings at DEK as staff. Furthermore, the rings are fairly shallow to the exterior, thus somewhat modulating the strength of the boundary between the interior and the outside world.

Finally, it is evident also that the distributed system includes both use and transitional spaces. While, with the exterior links, it is possible for staff to navigate most of the system of spaces without going through a resident use space, the focus of most of the rings in the multipurpose room renders this space critically biased to residents. Staff have no real way of going around this space so, like the residents, are exposed here. This criticality is somewhat moderated, however, by the high visibility of this area both by the control room and by staff in the surrounding categorical areas.

The Convex and Axial Cores. While the relationship of the system to the carrier is one of depth , one must look at the whole set of spaces in the buildings in terms of integration in order to describe the complete set of relationships. As with the Alzheimer's units, a decision was made to report the RRA values taken from the axial maps of the "public" spaces only, not including resident rooms, closets or restrooms. Values were computed for all spaces as well as for the public spaces. While the integration cores are essentially the same for both analyses, the genotypical order of the rooms sometimes changes.

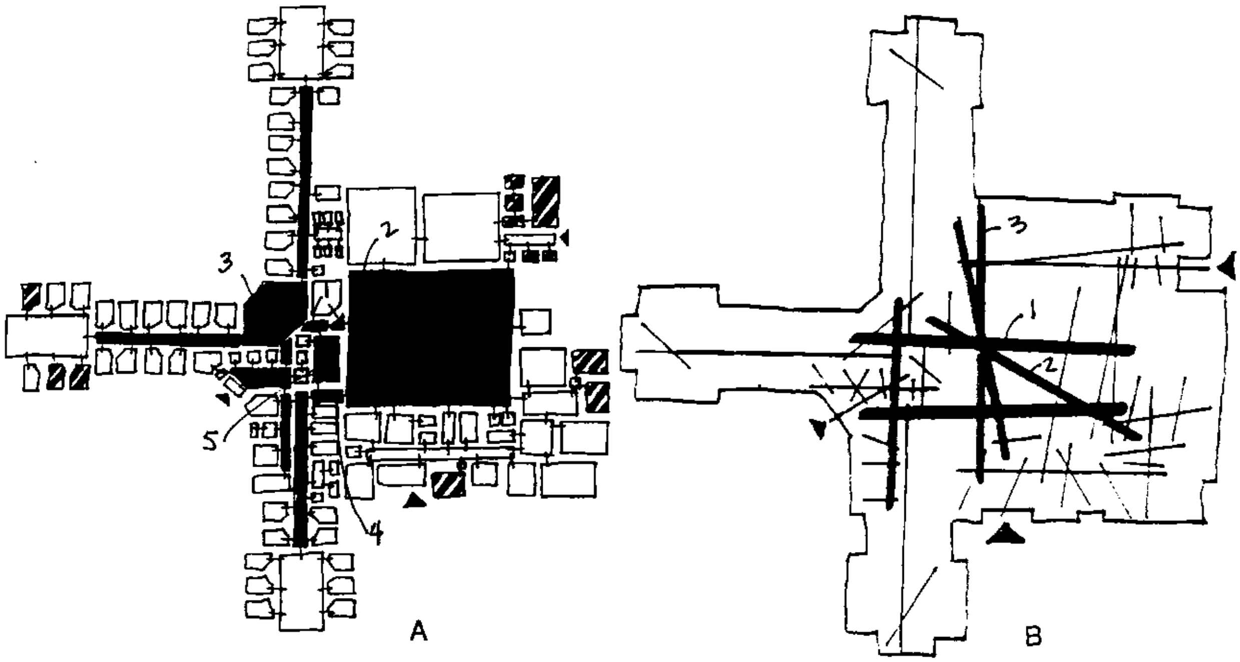


FIGURE 9.5: (a) The Convex and (b) the Axial Maps of DEK Showing the Integration Core in the Key Resident Spaces

Figure 9.5 (a) shows the 10% most integrated convex spaces in DEK (darkened) and the most segregated (striped) and (b) the 10% most integrated axial lines in the axial map. In both, the integration core is invested in the spaces around the control room while the most segregated spaces, or lines, are dispersed in various parts of the building. The major use spaces at DEK are ordered as follows in terms of their axial RRA value (moving from most integrated to most segregated)[2]:

MP >DIN > BDR > C > ED > ADM > INT

It is clear that resident spaces are more integrated than are other categorical spaces.

Local - Global Relationships. Another way of looking at the spatial configuration of the facility is to look at the relationship of the boys unit spaces to all the spaces in the center[3]. Because detention centers do not offer equal access to all spaces, the main resident areas of the plan are analyzed separately as a mini-system (local) comprised only of those spaces that the boys under study actually use.

The relationship of part to whole can be studied in two ways: 1) in terms of the relationship between the unit and the whole plan, and 2) in terms of the circulation systems. The axial integration core for the whole system was shown earlier in Figure 9.5. Figure 9.6 shows the integration core (the 10% most integrated axial lines) for the "local" system -- that part of the center used by the boys on a daily basis. In comparing the two axial maps, it is evident that the cores of the local and the global system both focus in the multipurpose room with extensions into the boys wing, dining, and the education spaces.

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2 To determine the RRA value of a space, an average was taken of all the axial lines crossing that space.

3 Often there is no "best" way to analyze a plan. Previous research (Peatross and Peponis, 1994) indicates, however, that frequently some interesting findings arise when the analysis of the plan as a whole is compared to analysis of a separate part of the plan.

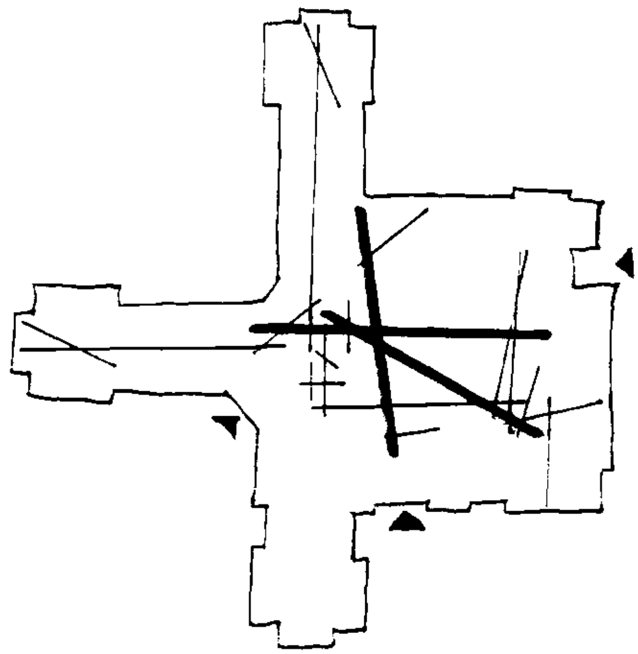

FIGURE 9.6: The Axial Integration Core for the DEK Local System

While the center as a global whole has a mean axial RRA value of .773, the local system is slightly more segregrated at .925. As noted earlier, the gentotypical order for the global system spaces is:

MP > DIN > BDR > C > ED > ADM > INT.

When only the local level is considered, the order of spaces is:

MP> BDR > DIN > C > ED

(with the following RRA values: MP = .567, BDR = .739, DIN = .822, C = .948, ED = .95). The boys dayroom and dining room fluctuates according to whether the range is global or local. The fact that only one pair of spaces changes with respect to rank order out of a large number of such pairs suggests that there is comparatively little fluctuation between the local or global system. Since the spaces excluded from analysis are the administrative and kitchen wings at the opposite sides of the multipurpose room, it is not surprising that the integration hub moves inward towards the boy's dayroom.

Studying the circulation zones of both systems, which in totality are available only to staff, it becomes clear that while circulation paths of the global system are more integrated than those of the local system (mean RRA of .654 to mean RRA of .922), the integration core is biased more towards use spaces than toward circulation spaces in both analyses. Integration around use spaces suggests investment in activity rather than in separation. Secondly, the spatial system used daily is overall less integrated than the whole, although naturally more stretched out than the parts which have no detention function. Removing the non-detention parts, such as the administration wing, reduces the overall level of integration. The third key issue, is that the shape of the core remains stable. The system does not flip over depending on the point of view of the analysis. This suggests that there are no great differences between local and global systems, and they are a continuous part of a single spatial system.

<u>The Nature of the Multipurpose Room.</u> The multipurpose room is the hub of the distributed system, and the shallowest use space. As computed, the multipurpose room is the most integrated and thus strategic, use space at DEK with an RRA of .47. Comparatively, the dining room RRA is .549, the control room has a mean RRA of .709, and the educational spaces a mean of .642.

The confluence of axial lines in the multipurpose space and its strong RRA value underscores its "hub" value noted earlier. It is also clear that the "integration core" extends from this space into every other categorical area of DEK -- intake and girls hall, the boys dayroom, dining, education, and even into administration. As the totality of lines show, however, although the multipurpose room is well connected axially with most other parts of the system, a "chicane" effect is evident: the lines passing through the multipurpose room fail to extend much farther beyond it. Thus, the containment of this room in terms of axial connections, is evident. In simple terms, this room is the most strategic room in DEK, it is the hub for most of the distributed system, and it both integrates the entire system and is bounded by it.

The Nature of the Control Room. As shown above, while the control room is convexly on the integration core, it is not among the most integrated spaces axially (RRA = .709). Nor is its actual control value over its surrounding neighbors especially high (CV = 1.84)[4].

However, as the distributed subsystem map and the isovist of this area shows, this room completely or partially oversees every major resident use area, while being spatially independent from them. It is possible to maintain an independent relation from the control room while still preserving working connections between all the other parts of the interior system. It is, at the most, three (short) steps from every major resident use space while visually overseeing all. More interestingly, however, it is only two steps from the outside carrier through the protected intake area. Thus, it stands syntactically in two ways -- it becomes engulfed within the overall flow of movement while always maintaining its dominant position of inspection, or it becomes an independent island with its own connection to the carrier. In this way, it has hierarchy over the resident use spaces to which, in terms of depth from the carrier, it is largely equivalent, but in terms of its RRA value, it is higher.

The Nature of the Boys Dayroom and Wing. The boys dayroom, at the crux of the two boys corridors, is also on the convex and axial integration core and forms a second

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[4]As noted in Hillier and Hanson (1984; 109), a measure of control value can be computed by partitioning one unit of value among its neighbours and getting back a certain amount from its neighbors. For example, each space has a certain number n of immediate neighbors. Each space therefore gives to each of its immediate neighbours $1/n$, and these are summed for each receiving space to give the control value of that space. Values greater than 1 are indicative of strong control while values below one indicate weak control spaces. Control is a local measure since it only takes into account the relationship of a given space and its immediate neighbors.

hub of activity for the boys. Its RRA value is .576, slightly less than the multipurpose and dining room, but more than the control room and other categorical spaces. It is visible from the control room and only two (short) steps from the multipurpose and dining room. The two unit dayrooms at the ends of the housing wings offer another venue for a dayroom, but are rarely used as more than passage. These rooms are far more segregated than the dayroom and the program spaces (RRAs = .982 and 1.011). If there were regular activities there, then the residents would be restricted deep into the building and different groups could be separated. This potential for separation is clearly indicated by the axial chicane effect whereby the corridor of one wing never extends into the corridor of the other, but abutts instead the control room. The lack of visibility from a center, however, prohibits their use.

A Comment on the Interface

The convex and axial mappings illustrate that there are actually multiple spatial poles for potential resident socialization. As noted previously, the multipurpose room is the hub of the building, in terms of its strong isovist, its integration of the spatial system both locally and globally, and in terms of its high potential for visual control of its neighbors. As indicated by its local RRA value and its place on the convex and the axial integration core, however, the boys dayroom exists as a second pole for socialization. It has a strong isovist, is well integrated into the system, and is shallow to the program spaces. A third potential pole exists in the unit dayrooms at the deepest part of the resident wing axes which are partially visible from the control room, but are largely unused because they are not fully visible. Thus, a key property of the spatial and social interface is that there are several levels of possibility for resident socialization and movement within various parts of the building, but with the same level of dominance of staff. These three poles for potential resident socialization are all under the purview of the physically separate but visually pervasive control room.

The second key property is the interface between the residents and staff and the world outside as represented by the categories in DEK -- teachers, counselors, kitchen workers, administrators, visitors. Because the major resident program spaces offer both views and local and axial extensions into the surrounding staff areas, and because of their distributed nature as indicated on the permeability map, residents are exposed to administrators in the adjacent administrative areas, teachers in the adjacent education areas, counselors and visitors in the adjacent intake area, and kitchen personel in the adjacent food preparation areas -- what might be considered a normal flow of activity in, for example, a school. More importantly, perhaps, detention staff both see and are seen by personnel in other areas. The boundaries on the program and service side of the building are visually penetrable and offer if not full views, at least glimpses, to the external world. Thus, while DEK offers some division along the inner wall of the resident wing between a normalizing and a more institutionalized interface, there are cross connections between these areas. The radial and the courtyard principle are brought together to create a more-or-less continuous spatial system.

3. The MAR Center

A Morphological Brief

The MAR Center was remodeled repeatedly over the years to the point where it seemingly has little rhyme or reason to its configuration (see Figure 9.7). The facility is an irregular pavilion plan (telephone pole) comprised of several wings branching to the right and left of a bifurcated central spine. The kitchen-dining wing is at the top of the plan; a female housing wing on the left and the lower level males housing wing on the upper right; at the bottom of the plan are an administrative wing on the left and Intake and Level I boys housing on the right. The central spine to which these wings attach is pierced by two corridors. The left corridor runs through the girls hall and through the control room before terminating in the multipurpose/dining room; the right corridor runs through the boys dayroom before terminating in the control room. The corridors thus separate and link the two major housing wings as well as the detention and administrative space.

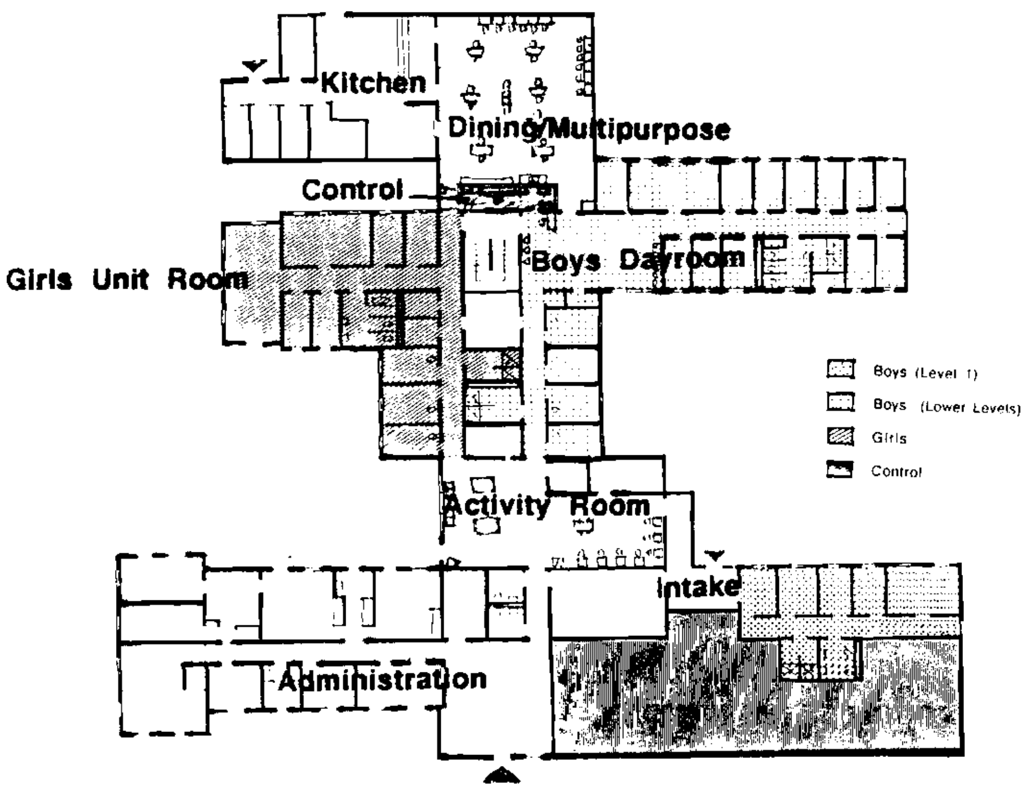


FIGURE 9.7: The MAR Center Plan Showing a Pavilion-like Configuration

As evident in the annotated plan, the major resident use areas are separated and distinct except for the contiguity of the multipurpose/dining and boys dayroom. The educational classrooms are located on a lower floor with access from both the girls and the boys wings through the stairs behind control. The multipurpose/dining room is located at the top of the plan adjacent to the kitchen and, through a short hallway, to the boys dayroom, while the activity room is located at the bottom of the detention area between the administrative wing and housing. The control room is embedded in the heart of housing but actually oversees only the multipurpose room; it does have a doorway, however, into the boys dayroom.

The girls and Level I boys use the schoolrooms downstairs while lower level boys are schooled in the multipurpose room. When not used as a classroom, the multipurpose room doubles as the girls and the Level I boys dayroom. The lower level boys use the boys dayroom at the crux of the male housing wing. The service areas are also split and "sandwiched" in two ways between the detention areas. The food preparation areas are located at the top of the plan adjacent to the dining/multipurpose room; the administrative rooms have their own wing at the bottom of the plan. Between the boys and girls housing wings lies the medical room and laundry. Thus, there seems to be a certain "squeeze" for space. The mode of space use allows no direct reflection of the organizational regime on the layout.

Relations of Visibility

Figures 9.8 (a), (b) and (c) show isovists of the visual field from the main use areas. As Figure 9.8 (a) illustrates, the control room is partially glazed for views of the dining/multipurpose room, and, if staff move from the control panel, the corridor in the girls wing and the corridor and part of the dayroom in the boys wing. It has CCTV's scanning the girls short corridor to the end dayroom, the boys dayroom and the Intake exterior entry.

A

B

C

FIGURE 9.8: Isovists of MAR Showing Views from (a) the Control Room, (b) the Multipurpose/Dining Space and Activity Room (in Two Separate Isovists), and (c) the Boys Dayroom

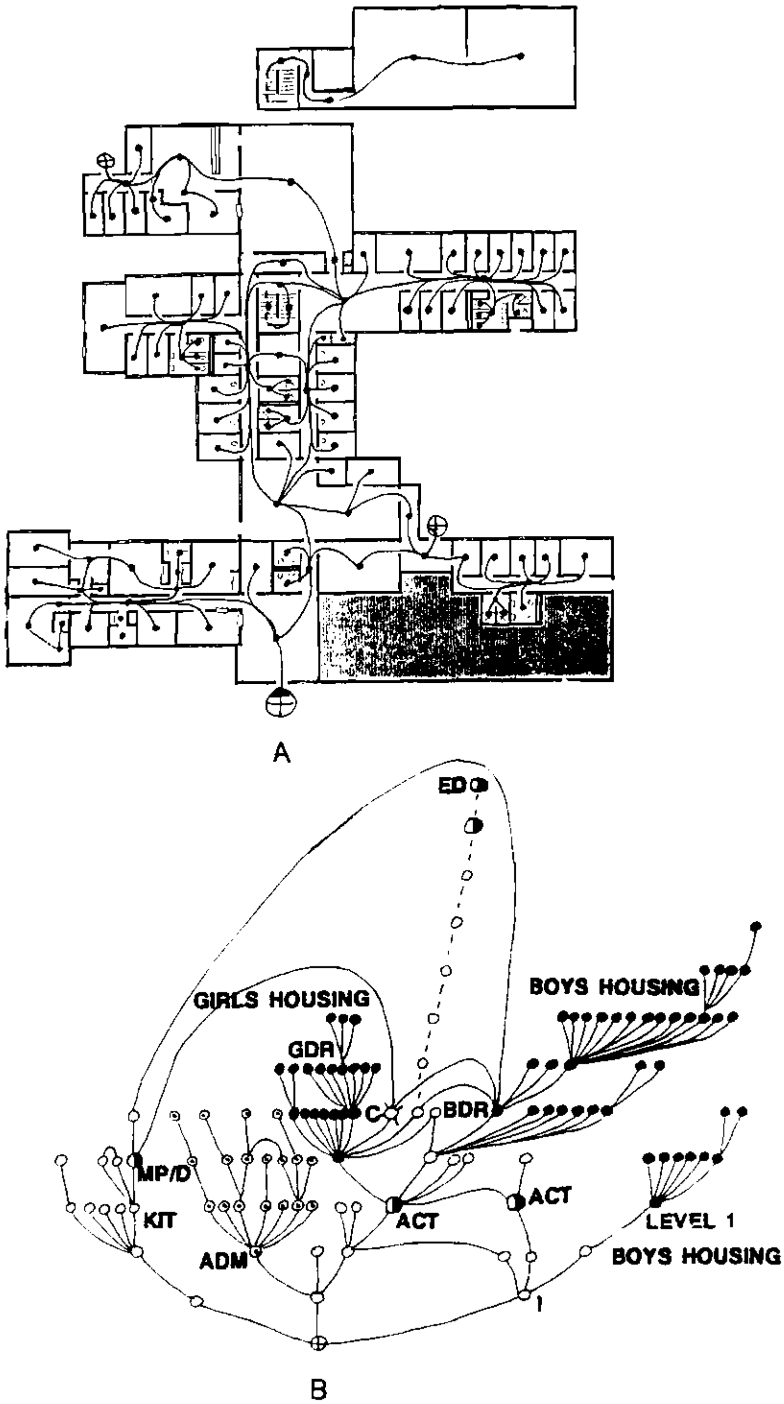
More representative of the residents views are Figures 9.8 (b) and (c). The isovist from the dining/multipurpose room includes the control room and, with movement by the resident, through the control room to a portion of the boys dayroom. (Actually, views to or from the boys dayroom by either control room staff or multipurpose room residents are rare as the door from the control room is generally closed; even the curtain over the window is usually pulled.) The isovist of the activity room includes only that room. The isovist from the boys dayroom has views to the control room, through the control room to part of the multipurpose room, and down both the housing wing corridors. The isovist is, however, somewhat misleading as the actual use of the dayroom prohibits these views to all but the staff.

In summary, the isovists underscore the separation and exclusivity of use spaces and the relative restriction of views through the building. The views of staff and residents also differ dramatically, as staff place themselves in the most visually advantageous positions, a fact that will become more clear in the following chapter on space use. Thus, there is not only a disjuncture of use spaces at MAR but also a disjuncture and inequality of views in this facility. There is no panoptical view from any one point in the facility.

A Syntactic Analysis of Space

The Differentiation of Categories by Depth . Figure 9.9 (a) shows the MAR center as an unjustified plan and (b) as a justified gamma map. Overall, MAR has a mean depth of 4.75 with the single deepest space being the educational classroom(s) at a depth of 12. If the depths of the categorical spaces are averaged together, the depth of the various categories is as follows moving from shallow to deep:

INT > ADM > C:BDR > HOUSING > PROGRAM.



⊕ Carrier
Ⓓ Administration
◑ Programs
● Resident Housing
⌑ Control

GDR - Girls Dayroom
ACT- Activity Room
BDR - Boys Dayroom
ADM - Administration
ED - Education
MP - Multipurpose
DIN - Dining
KIT - Kitchen

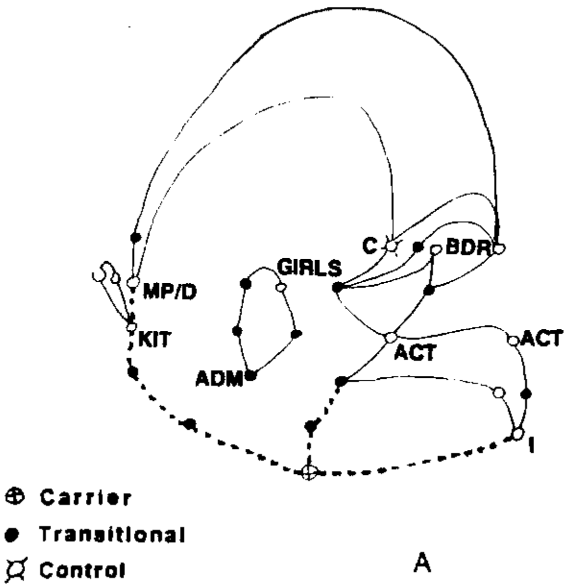
FIGURE 9.9: (a) The Unjustified Plan and (b) The Justified Gamma Map of MAR

Looking at the gamma map, it is obvious that administrative and services spaces are shallow while detention spaces are deep. Control and the boys dayroom are equivalent at a depth of 5, while the program areas are, in totality, the deepest (average depth of 6.6). The resident rooms are almost as deep as the program areas (6.05) except for the Level 1 boys who are housed fairly shallow at an average depth of 4.2. The program spaces are also sequentially arranged, with the activity room being the shallowest program space at level three, the multipurpose/dining room at level four, and the boys dayroom and control being equivalent at level five. Thus, there is a differentiation of categories by depth with residents overall being programmatically and residentially located at the deepest portions of the building, farthest from the carrier.

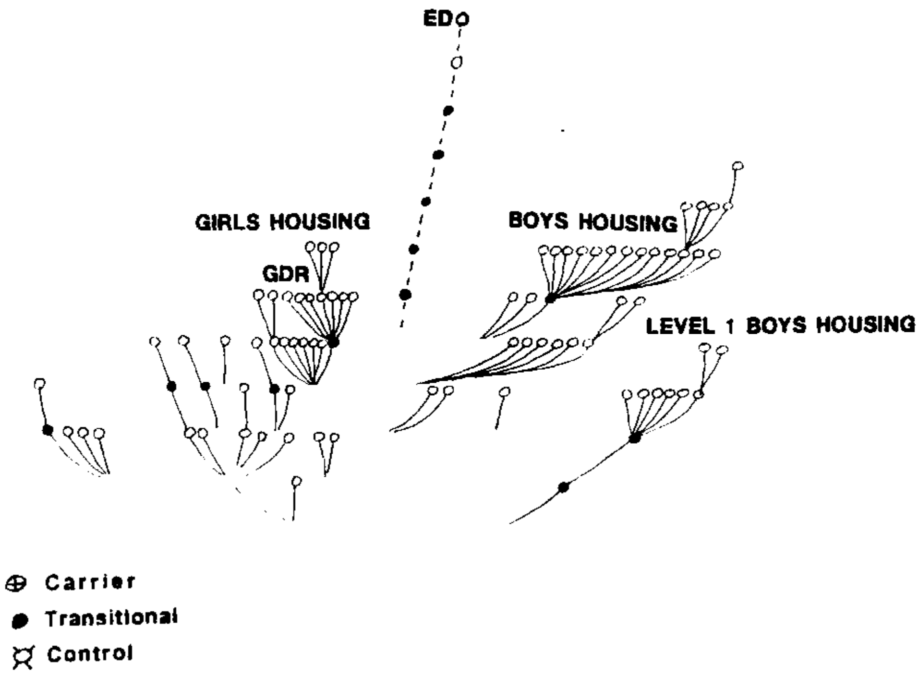
<u>The Differentiation of Categories by Rings.</u> Figures 9.10 a and b show MAR in terms of its distributed and non-distributed subsystems. The non-distributed subsystem is somewhat deep from the distributed system, especially education at level seven; there are also some "trees" evident in the boys and girls housing areas with some rooms being four steps deep from the distributed system.

Looking at the internal rings only (not the dashed lines attached to the carrier), the distributed system is comprised of a number of separate rings at varying depths in the system. Administration and the kitchen have completely independent rings. Thus, except for the intake/activity ring which is only one step from the carrier, the rings are internally oriented. The detention rings also include within them only detention spaces; the other categories (administration, kitchen, education) are on separate and independent rings, if on a ring at all.

Three of the rings come together in the boys dayroom at the deepest level of the distributed system while a third ring connects these rings to that of activity/intake. Thus, there are two minor hubs "ringwise" -- the boys dayroom and the activity room.



A



B

FIGURE 9.10: (a) The Distributed and (b) Non-Distributed SubSystems of MAR

The control room is on two of the three rings attached to the boys dayroom but not on the two attached to the activity room. While the staff have physical access to any of the rings, neither staff nor residents have visibility of many of the points on the ring. The physical separation and visual exclusion of the detention rings from other categorical rings underscores their isolation. The rings, therefore, change the relations between categories in two ways: detention staff are separated from other staff by the categorization of rings, and residents have neither visual nor physical access to the rings they are on.

It is also clear that the distributed system is rather equally composed of transitional spaces and use spaces. Following the linkages of the transitional spaces on the map above underscores the fact that staff cannot navigate this building without going through a resident use space even by going outside. While there is some alternation between resident use spaces and transitional spaces , with no two use spaces connected except for the two convex spaces comprising the activity room, there are no clear passages around resident use spaces.

<u>Convex and Axial Maps.</u> Figure 9.11 shows the convex and axial maps for MAR with the 10% most integrated convex spaces darkened and the most segregated striped, and (b) the 10% most integrated axial lines in the axial map. Convexly, the integration core runs from activity spaces through the girls wing, but the control room and boys dayroom are on it also. Axially, the core is split with one line running through the girls hall and into the multipurpose/dining area and the other extending from entry to boys dayroom with extensions at one end to administration and at the other end to the boys housing wing. The only categorical area the core enters other than detention is administration but there are three intervening locked doors between that and the boys dayroom. The major use spaces at MAR are ordered as follows in terms of their integration into the spatial system (moving from most integrated to most segregated):

BDR>C>ACT>MP/DIN>INT>ADM>EDU

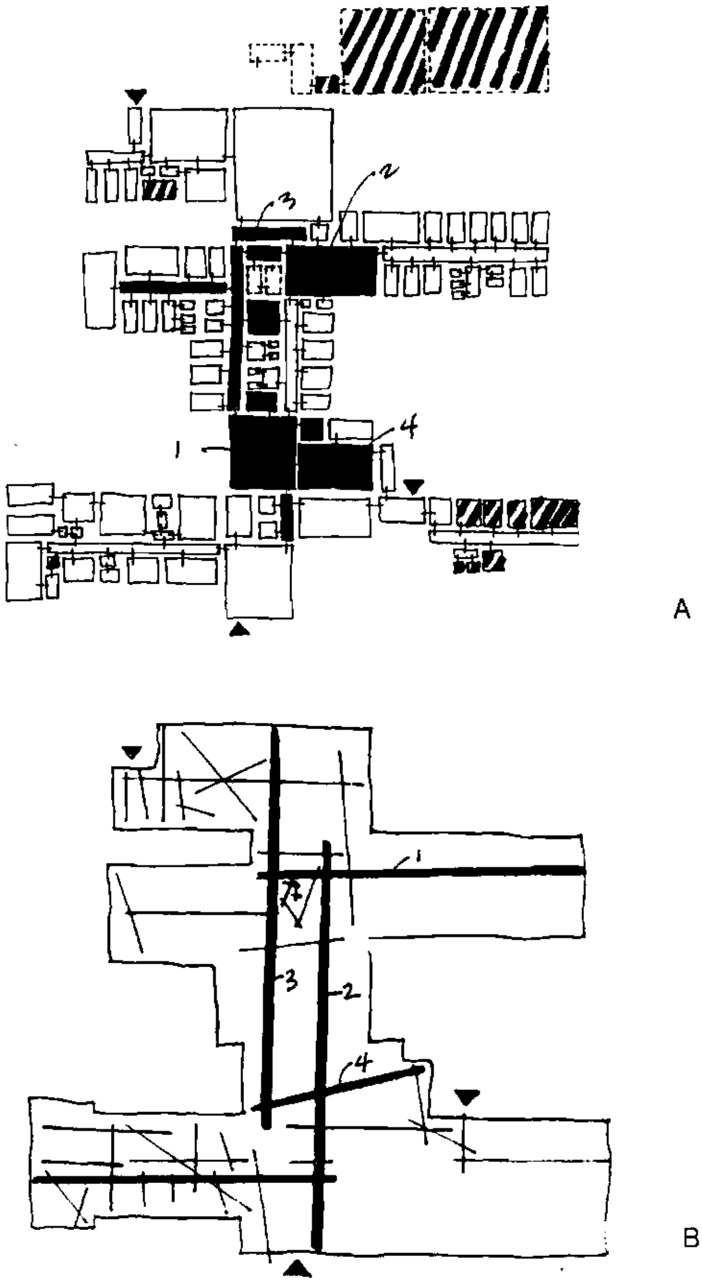


FIGURE 9.11: (a) The Convex and (b) The Axial Maps of MAR Showing the Integration Core

As computed, the boys dayroom has an RRA of .705, control is .712, the activity room (both spaces combined) is .734, and multipurpose dining is .844.

Local - Global Relationships. Again, this issue is discussed in relation to the integration cores (the 10% most integrated axial lines) of the whole system (global) and of the unit system (local) (see Figures 9.11a and 9.12). It is evident that the axial integrated core of the whole system is split and biased toward the rear of the building. While the branch in the activity room has extensions into the intake hallway and into administration, and the branch in the boys dayroom links to the girls hall, control and back to the activity room, the kitchen areas and the educational areas are not included in the core. The axial integration core of the local system (see below), however, clearly focuses in the area of the boys dayroom. Thus, the integration core at the local and global level are different with one pole completely lost.

While the center as a global whole has a mean axial RRA of 1.17, the local system is more segregated at 1.79. The most axially integrated space at the global level is the control room (RRA = .709), followed by the boys dayroom (RRA = .712), and then by the activity room (.734). The multipurpose/dining room is the most segregated of the use spaces on the same floor at an RRA value of .844. The genotypical order is as follows:

C > BDR > ACT > MP/D > INT > ADM > ED.

When the local level is considered as a separate system, the values of these spaces shift somewhat: the boys dayroom is the most integrated into the system (RRA = 1.12), followed by the activity room (RRA = 1.19),then by control (1.32) and the multipurpose/dining (RRA = 1.46). The control room fluctuates in position according to the system being analyzed. The genotypical order is:

BDR > ACT > C > MP/D.

The RRA value of the circulation areas of both the global and the local systems, in totality available only to staff, are higher than the use spaces except for the educational rooms. The mean RRA value of the global circulation spaces is .945 while local circulation is 1.708. The circulation spaces, therefore, do not integrate the spatial system at either level as much as do the use spaces, even though the use spaces are separated by circulation paths. However, at the local level, both the circulation spaces and the control room, both the domain of staff, are less well integrated into the system of spaces than are the resident use spaces.

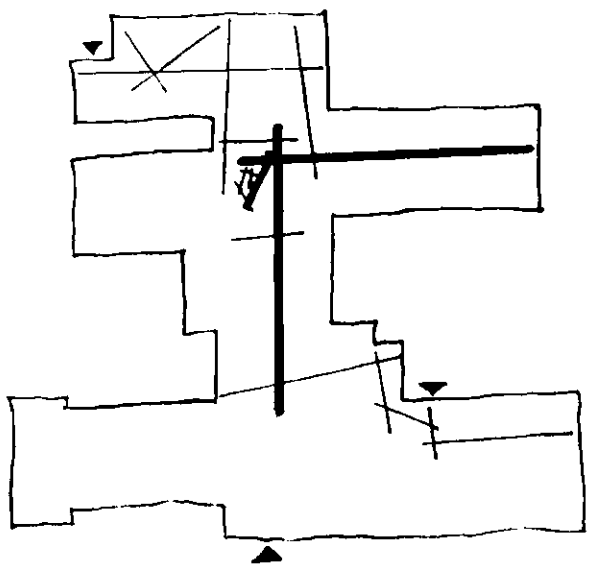


FIGURE 9.12: The Axial Integration Core of the MAR Local System Centering in the Boys Dayroom

<u>The Nature of the Multipurpose/Dining Room and the Activity Room.</u> It is clear from the above analyses that the multipurpose room holds a rather indefinite position

spatially. On the distributed subsystem of MAR, it only mediates the relationship of the detention spaces to the kitchen and its auxiliary spaces. It will be remembered that this space is completely overseen by the control room but in turn has an isovist that is largely restricted to that room. As shown in Figure 9.11a, its segregation from the rest of the system is indicated by its exclusion from the convex integration core. Even the axial map (Figure 9.11b) shows only tangential connection of this room to the total spatial system, the primary link being the long axial line through the girls hallway to the activity room. Its axial RRA of .844 also underscores its segregation. Thus, it is not convexly or axially well integrated into the system, nor does it visually overlook other program areas. It, however, is overlooked by the control room to which it is adjacent.

Conversely, the activity room occupies a more strategic position spatially. Comprising two convex spaces, the activity room is the most shallow of the program spaces, is on the convex integration core and is also axially well integrated, being the juncture of three of the most integrated axial lines. From this room, there are axial extensions into administration, the intake hall, and both halls leading to the male and female resident housing wings. As noted previously, it is one of the two mini-hubs in terms of the distributed subsystem and is the major link between the custodial areas and the administrative wing at the front of the building.

The larger of the two convex spaces is also the most integrated convex space at MAR; the activity room as a whole (two convex spaces) has an axial RRA of .734, only slightly less integrated than the boys dayroom or control room. Thus, the importance of this room spatially seems rather clear.

The Nature of the Control Room. It will be recalled that the control room completely oversees the multipurpose/dining room and, through a doorway, partially overlooks the boys dayroom. It is one of the deepest use spaces on the distributed system, equivalent to the boys dayroom. In terms of its control value over its neighbors, however, it has a CV of 1.85. Conversely, the CV of the multipurpose/dining room next to it is 2.58. While it is among the spaces on the convex integration core, it is not a part of the axial integration core. However, it has a low axial RRA value, and thus is strategic spatially, as a result of the two highly integrated lines extending into it.

As evident on the distributed map, however, it is completely surrounded by resident use spaces or by a circulation path running through resident areas. Indeed, the girls must pass through this room in order to get from their wing to the multipurpose/dining room which functions as their dayroom. Further, it has no independent connections to the carrier while still allowing operational connections between parts of the building to function. Thus, this room is neither separate nor independent, nor does it hold a dominant position of inspection except over one resident activity space. Oddly, while syntactically significant in the whole system of spaces, its value in terms of control seems rather limited by its lack of visibility and its island-like isolation within a surrounding sea of resident spaces.

The Nature of the Boys Dayroom and Wing. It will be recalled that the boys dayroom comprises a mini-hub in terms of the confluence of rings in the distributed system; it is also located at the same depth from the carrier as the control room. It is partially visible from the control room (if the door is open) and only one short step from the multipurpose room and one long step from the activity room. In spite of its distance from the carrier, however, it is well integrated into the spatial system. Convexly, it is the most integrated use space; axially it is the second most integrated (RRA = .705) (after the larger of the activity spaces). Syntactically, therefore, the boys dayroom is strategic. As the axial map shows, it has axial links into several other places. The boys dayroom also functions as a major passage: the Level I boys pass through it to get from their rooms to their dayroom, the multipurpose room, and male staff pass through it to get to control.

Of interest is the fact that the Level 1 boys housing is among the most segregated of spaces, along with the deep education area. Thus, while the regular boys wing is highly integrated in terms of its dayroom, the higher level housing is very segregated from the rest of the spatial system. It is also necessary to pass through both the activity room and the intake rooms in order to access this area.

A Comment on the Interface

The analysis above suggests that there are actually four poles of potential resident socialization, all bearing different relationships to the structure of the building. The girls dayroom, at the end of the secondary hall in the girls wing, can be used to contain and isolate socialization but cannot be surveilled from the control room. This room is also one level deeper into the building than the boys dayroom and is not part of the distributed subsystem. The activity room, while spatially integrated into the system of spaces, is remote from other program spaces and also cannot be surveilled by control room staff. The boys dayroom is strategic in that it is very well integrated spatially and anchors several of the "ringy" circulation systems. It can be surveilled from the control room, with effort (staff then lose sight of residents in the multipurpose/dining room). It is also a major crossroads for Level I boys passing to and from the multipurpose room. Finally, the one room that is completely under the purview of the control room and which also offers containment, the multipurpose/dining room, is segregated in RRA value and separated from the other use spaces. Thus, three of the four potential resident socialization spaces are separated from one another, and under only haphazard purview by control room staff. The control room itself, is neither separate nor independent, being surrounded by resident areas, with no independent access out of the building or to other categorical areas.

MAR also exhibits a relative lack of interface with other categorical areas, and with the world at large (except for the multipurpose room residents and kitchen staff working on an intermittent basis.) While the activity room walls abutt both the intake and administrative areas, and there are axial extensions into these areas, the doors are kept locked and there are no filtered views into these areas from the activity room. The program areas are thus largely separated from one another and bounded as well from the external world; the various categories of building users exist largely in isolation. The potential exposure by either residents or staff to non-detention staff is thus slight except for that which is scheduled or intentional. The spatial - social interface at MAR might be described, therefore, as more a disjointed interface than an interface with several layers.

4. The IND Center

A Morphological Brief

The IND center (and attached courts) occupies almost an entire city block (see Figure 9.13). As the annotated plan shows, the general housing pods are only indirectly attached to the service and administrative cube at a single access point for each. More directly attached to the program and service mass are two housing units for girls and female arrivals and an intake unit for new male arrivals who are in the process of being classified for placement in the regular units (both on the right side of the plan). Wrapping the main square on two of its sides are the service areas of intake and classification, the administrative and visiting wing, and the public entry and control room.

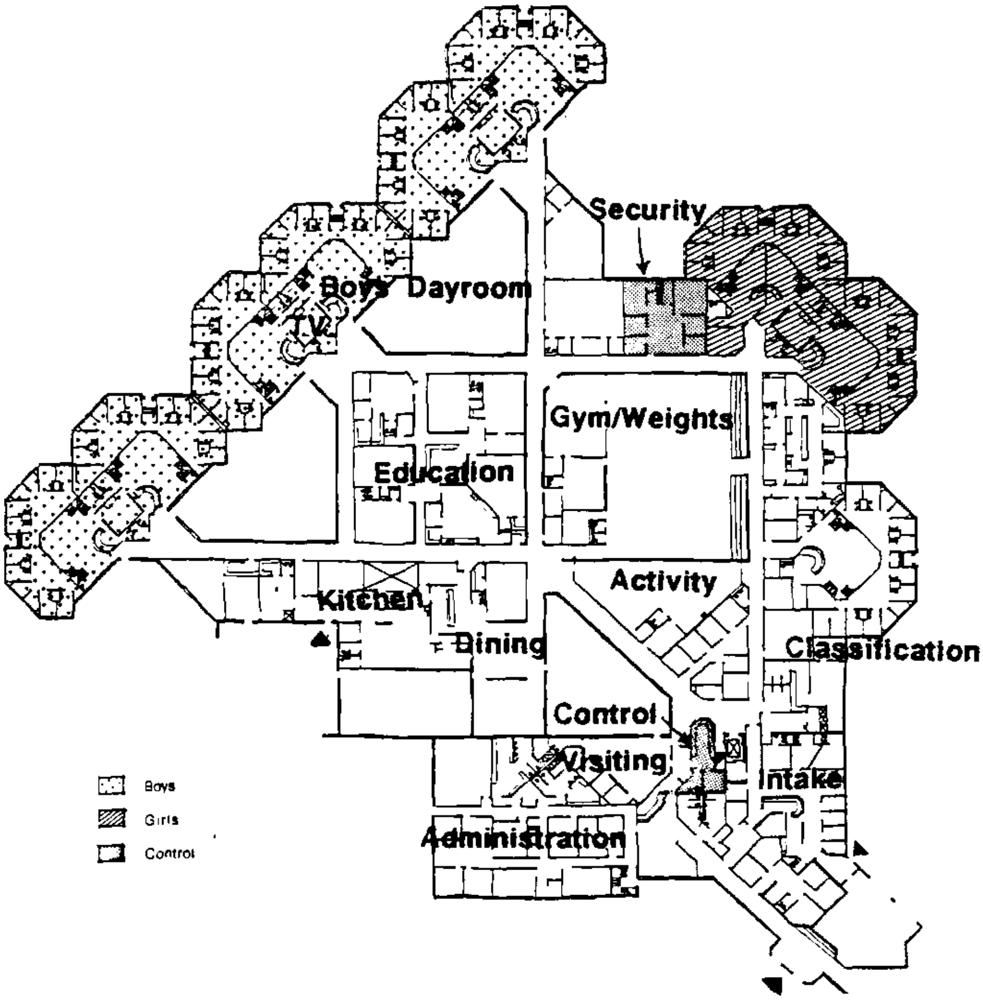


FIGURE 9.13: The IND Center Showing Housing Pods on the Periphery

The program and service spaces, making up the main square of the complex, are separated and quadrated by a grid of corridors. One quadrant of the central square is occupied by the educational classrooms, a second quadrant by the gymnasium and weight room, a third quadrant by the kitchen and dining spaces. The fourth quadrant is again divided by a corridor into an outdoor courtyard for visiting and an activity room and counseling rooms. Thus, while grouped, the major activity spaces are distinct, separated from one another by their location off wide, and indistinguishable, corridors. Although the plan organizes its disparate parts in a logical manner, in actuality only the signage above the doors helps one to locate themselves within this building.

On the other hand, the housing units are a cluster of interlocking activity spaces. All units except one consist of 16 separate resident rooms on two levels: eight rooms on a lower level and eight rooms on a mezzanine level, with the dayroom slicing between levels. Every four rooms are attached to an alcove. A TV room and a detention hallway are sandwiched between the two "buddy" units and shared by both.

Control is split and scattered in the facility. The main control room is located at the bottom of the plan near the public entry to the facility, where it oversees the metal detected entry point to the visiting room and the detention areas beyond. Five CCTV's offer the capability of panning entrances, parking areas, and other critical points within the facility. A secondary security office was improvised after move-in, for proximity to the housing units; it is located at the top of the plan.

<u>Relations of Visibility</u>

Figures 9.14 (a), (b), and (c) show the isovists of the visual field from the main activity areas. As evident in Figure 9.14(a), the isovist from the control room and the security office is restricted. The control room views only the corridor leading into the heart of the building, with further views stopped by a chicane, and has partial views to the metal detected detention entry and the visiting room next door; the security office overlooks a hall. Figure 9.14 (b) shows two isovists simultaneously from key activity areas -- the gym and the dining room. As illustrated, views out of these rooms consist largely of corridors.

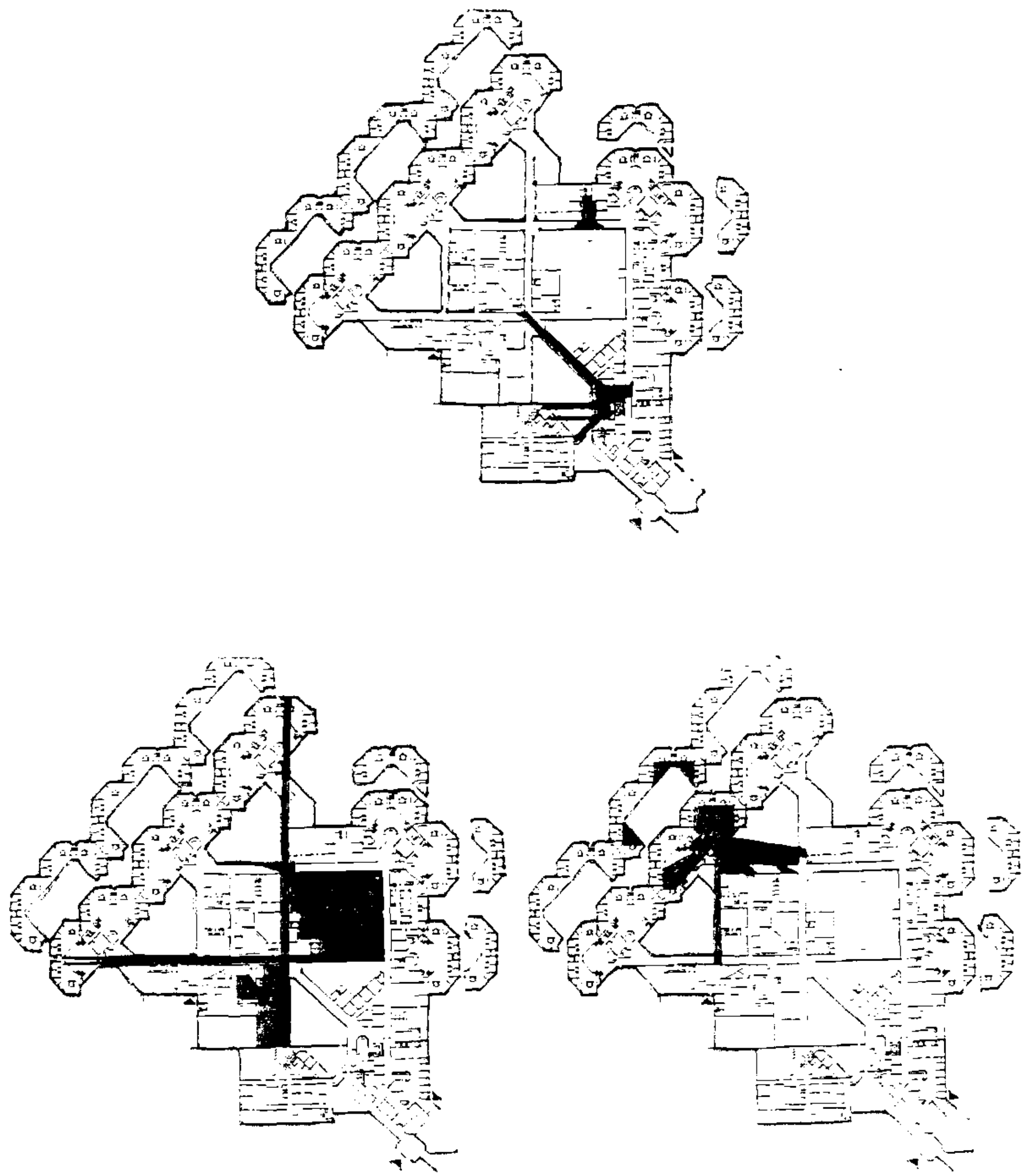


FIGURE 9.14: Isovists of IND Showing Views from (a) the Control and Security Rooms, (b) the Dining Room and Gym, and (c) the Unit F Dayroom

The views from the housing unit studied (the third down from the top, in the second pod) include the public areas of the unit itself, part of the unit next door, and across the enclosed recreation court, to the corridors beyond (see Figure 9.14c). Residents in the alcoves in the lower or upper level have an overview of the dayroom and, from one of the lower alcoves, through the TV room, into the unit next door; residents in the dayroom have views of the residents in the alcoves and the exercise court outside. Residents using the TV room have partial views of the adjacent unit in addition to their own. While visibility of unit areas is excellent from the staff workstation, if the YM goes to any one of the four alcoves, he loses sight of the others.

In summary, IND consists of two different spatial forms joined together. The main building is a grid of corridors with use spaces locked between them. The corridors are dedicated to movement and all use spaces are separately disposed off them. The housing units take another form, that of a cluster of resident use areas. Each area overlooks others and the entire unit partially overlooks another. Thus, while residential spaces are clustered, program spaces are separated. The isovists illustrate this dichotomy -- the isovist of the private spaces is asteriated but contained, while the isovists of the public areas consist of individual fat views with long radial extensions down corridors, which reveal little additional information. There is no comprehensive view from anywhere in the facility.

A Syntactic Analysis of Space

The Differentiation of Categories by Depth . The IND (a) unjustified plan and (b) the justified gamma map, are illustrated in Figure 9.15. IND is deep at a mean depth of 9.97; the deepest rooms are 14 steps from the carrier, again the outside of the building. When average depths are taken of the categorical areas (and only the boys unit under study), the average depths are as follows, moving from shallow to deep:

INT > PROGRAM > C(S) > ADM > BDR > HOUSING

The computed averages indicate that resident program spaces are the shallowest in the system at an average depth of 6.84, with control and security deeper in depth at 8.78, administration being deeper yet at 8.8, and finally, residential and program spaces being the deepest at 9 (all boys units together have an average depth of 8.3).

There is an ongoing alternation between resident/program spaces, and administrative/service spaces. The program spaces themselves, however, are fairly equivalent in depth, with parts of the gym, activity room, education, and visiting located at a depth level of six and seven from the carrier. Dining is the most shallow of the resident use spaces at a depth level of five. While the main control room is fairly deep at 6, the security room is even deeper at levels eight to eleven. In terms of depth, therefore, program spaces are sandwiched between control and security, while residential spaces are deepest. Thus, there is differentiation of categories by depth.

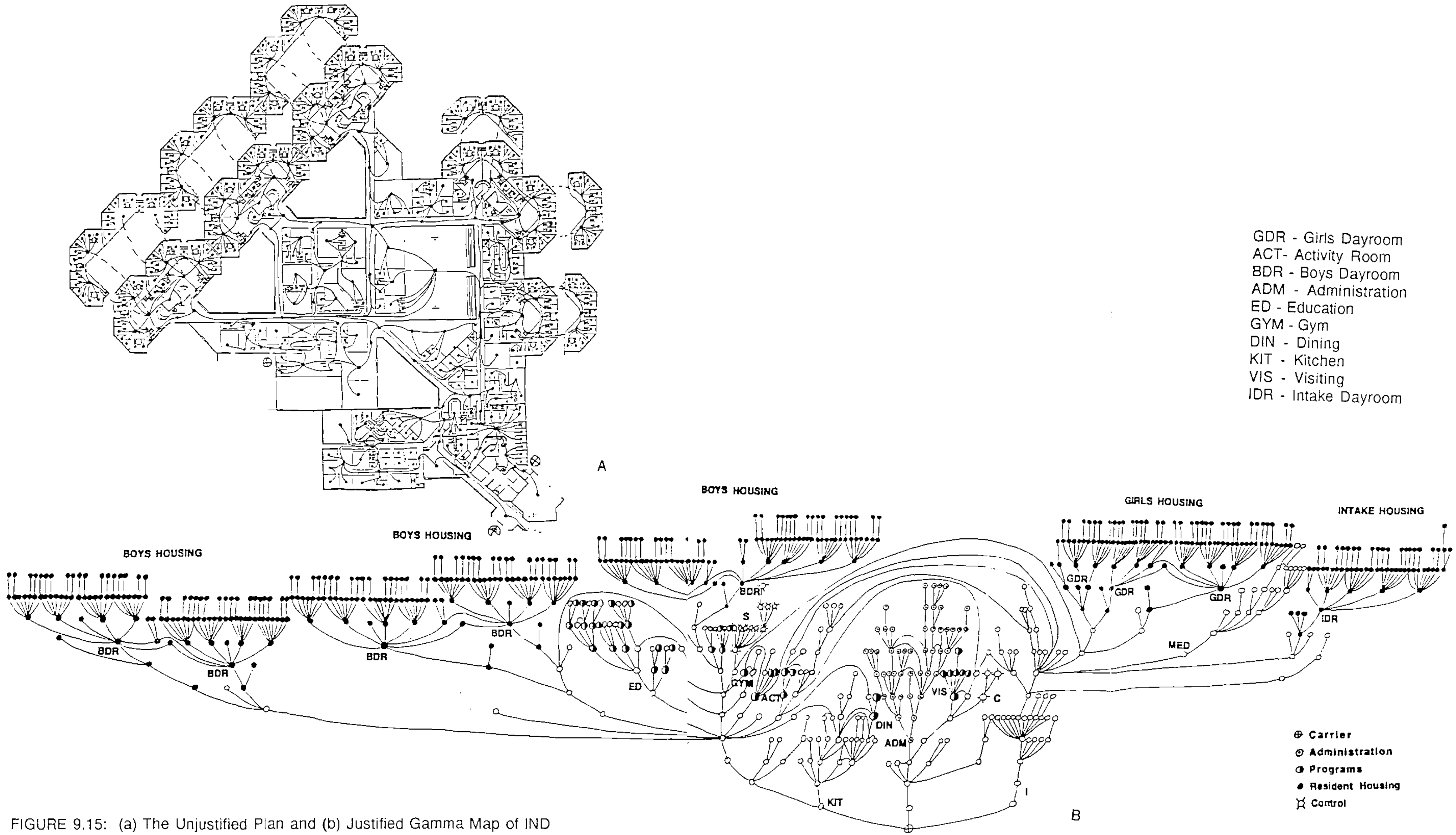


FIGURE 9.15: (a) The Unjustified Plan and (b) Justified Gamma Map of IND

The Differentiation of Categories by Rings. Figure 9.16 shows IND in terms of (a) its distributed and (b) non-distributed subsystems. The non-distributed subsystem is fairly shallow from the distributed system except for the girls housing unit and the security rooms. Girls housing has a tree-like appearance with some of the resident rooms being up to six steps from the distributed system; security is somewhat more shallow with its branching only extending four steps from the distributed system. Overall, depth appears to be more invested in the distributed system than in the non-distributed system. However, since distributed systems must have each space connected to any other space by at least two independent routes, branches that include rings but connect to the main body through a single space are internally distributed but bear a non-distributed relation to the main ring body. The interesting thing about IND, therefore, is the presence of internally distributed branches bearing a non-distributed relation to the main ring body. Girls' housing and two of the boys' housing units are examples.

The distributed subsystem of IND consists of many interconnected rings criss-crossing the main body of the center (as expected with its grid-like circulation zones). These internal rings only extend into two of the housing pods -- the middle boys where the unit under study is located, and the girls unit. All housing units are "ringy" in themselves, but the other pods are entirely independent from the main system of rings. Administration is also distributed, and disconnected from other rings. While two of the rings (the kitchen/dining and the visiting ring) are somewhat externally biased beginning only two steps from the carrier, both of them extend another five to seven steps into the spatial system. The main body of intersecting rings start deeper in the system and are more internally oriented.

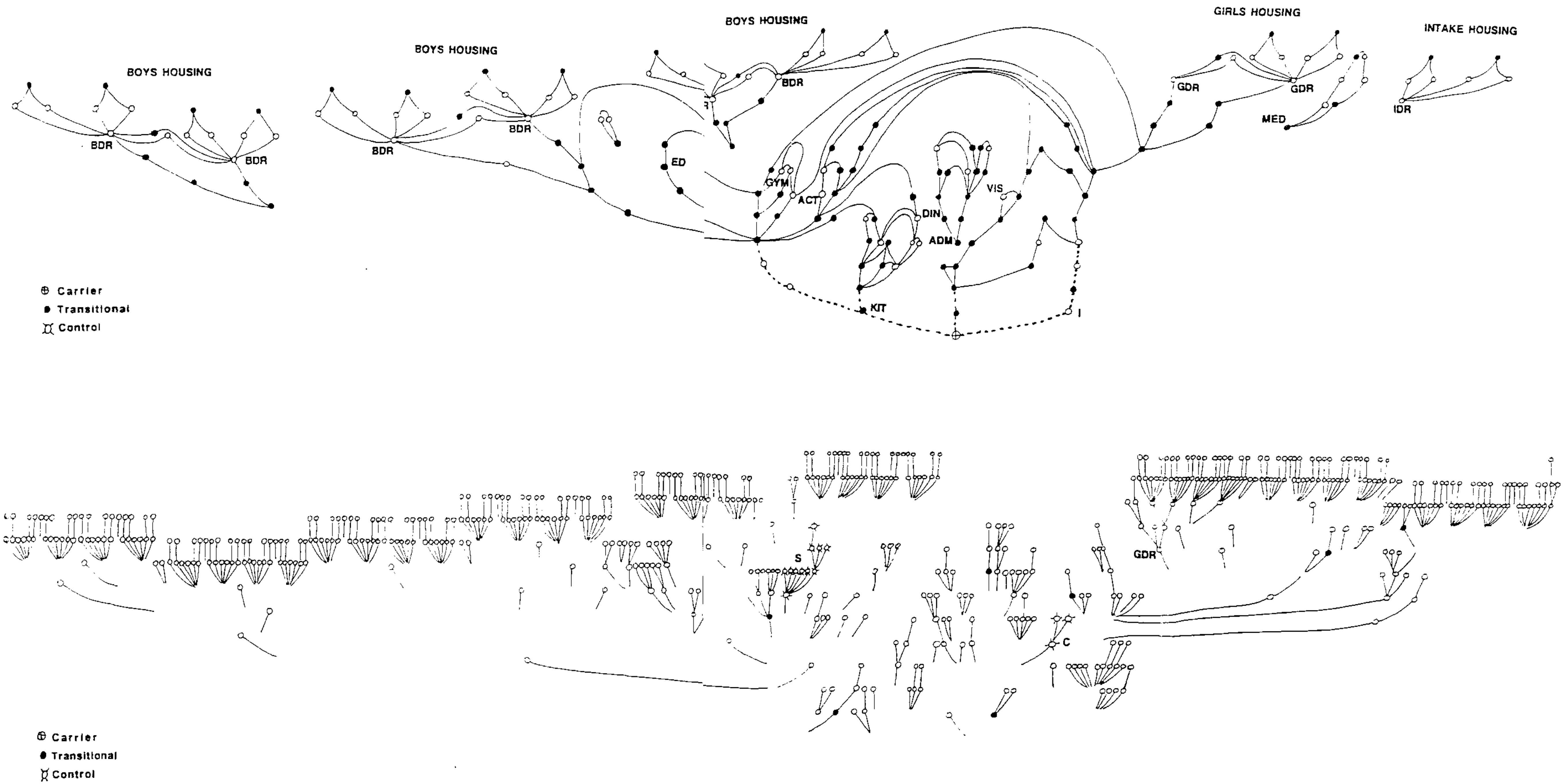


FIGURE 9.16: (a) The Distributed and (b) Non-Distributed Subsystems of IND

Careful examination shows that the rings intersecting the main square of program and service spaces are both shallow and deep, but come together mainly in corridors. The program areas (ED, GYM, ACT) are indirectly connected with one another through several transition spaces, DIN is connected to kitchen areas, and VIS is on another ring indirectly connected to the program rings. Therefore, there are no real focal hubs, except in corridors. It is also evident that rings composed entirely of transition spaces surround shallower, interior rings containing the resident activity spaces. Thus, in the main body of spaces, it is possible for staff to navigate the spatial system without ever entering a resident use area, with the possible exception of the dining room.

Looking at the housing rings separately, it is evident that all the rings intersect in the dayrooms. There are rings linking the alcove spaces with the dayroom and connections through the TV room and detention hallway with the "buddy" housing unit. Thus, the use spaces of each housing unit are themselves interconnected, and each housing unit is connected through rings with another unit.

The investment of rings is clearly in transitional (staff controlled) spaces except in the housing pods. While the non-distributed spaces consist almost completely of use spaces, the distributed system, except for the housing units, is made up primarily of corridors. The program spaces that are on rings are also well protected by entry anterooms. It is also clear that the two control and security areas are not on any rings, existing independently, but they are within one "step" of a ring consisting entirely of staff controlled spaces.

In summary, while resident program spaces are well connected through interior rings, the interior rings they are on are only indirectly connected to the gridlike corridor system. The housing wings exist almost independently of the main body of connections, but each unit is connected to a buddy unit. The rings in housing, however, are the sole domain of staff. The high number of rings and the interior location of program areas within interior rings offers high, but hidden, control. The rings accomodate the complex scheduling of residents as well as keep them separate from one another. Categories are, therefore, distinquished by access to the rings. Additionally, in the main part of the center, the rings, in totality, are not visible to either staff or residents, while in the housing units, the rings are within the visual domain of both. A dichotomy thus exists.

The Convex and Axial Maps. Figure 9.17 shows the convex and axial maps with their integration cores. It is evident that the integrated core follows the distributed system in being linked to most categorical areas, but fails to enter administration, the kitchen areas, the medical clinic, and some housing areas. The core primarily follows the grid-like circulation system with its extensions into the housing pods. The axial integration core focuses on the main block of spaces with a concentration in the square composed of the gym and weightroom; there is a secondary focus, however, in two of the three general general housing pods, including the unit under study.

As shown convexly in Figure 9.17a, the gym and the activity room are on the integration core, while the dining room and the education rooms are not. In terms of the total spatial system, however, the axial integration core passes through or into all of the resident program areas, with the exception of the arts and crafts room and visiting (Figure 9.17b).

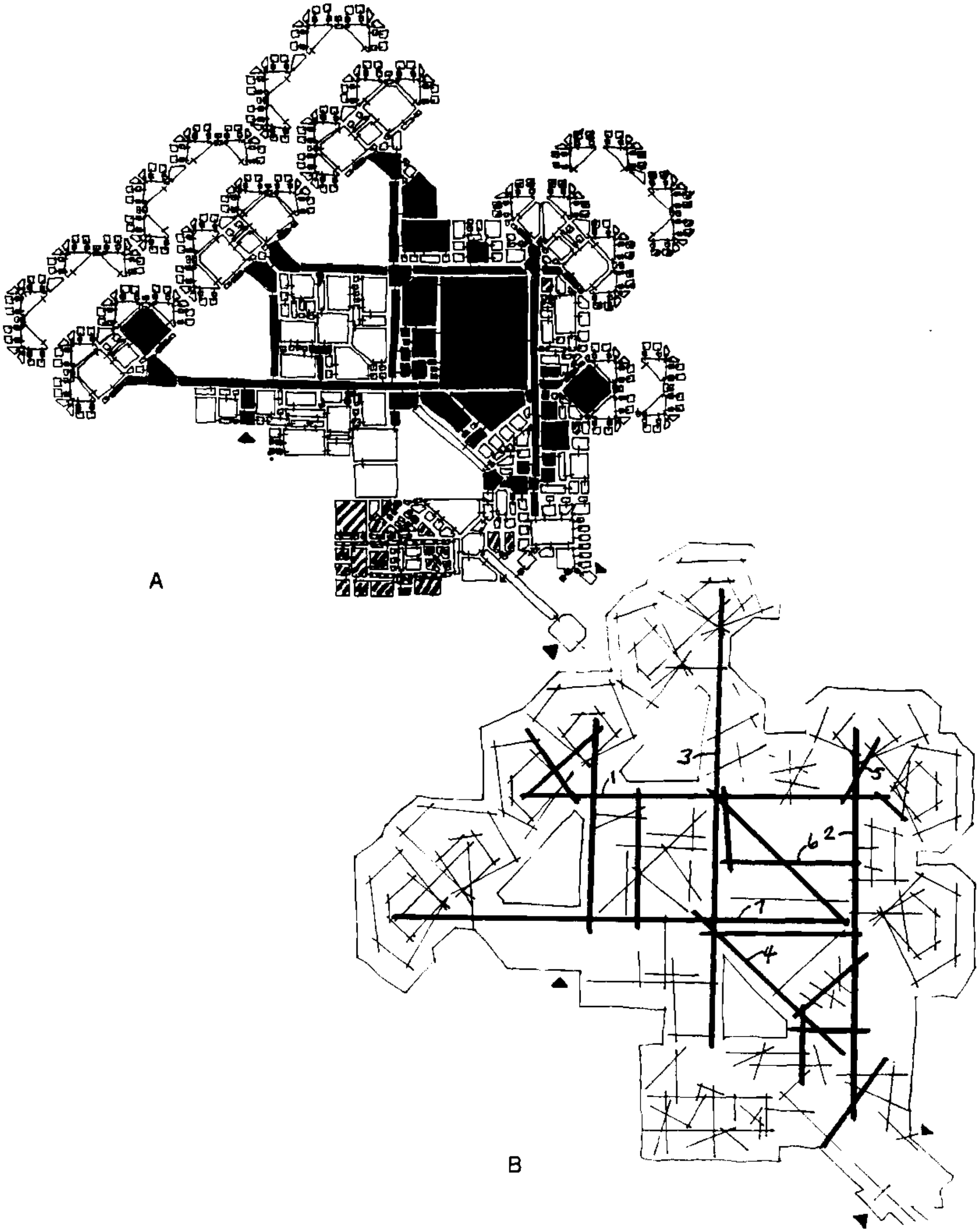


FIGURE 9.17: (a) The Convex and (b) Axial Maps of IND Showing the Integration Cores

Local - Global Relationships. The local system core (Figure 9.18) retains the general shape of the global core, with the most integrated lines still following the grid of circulation, and with the same extensions in and through the housing unit under study. Thus, the cores are similar at both global and local level.

The global system has a mean axial RRA of .964; the local system analyzed alone ismore integrated at .898. The global genotypical order of spaces is:

ACT > GYM > DIN > BDR > INT > S/C > ED > ADM.

When the local level is considered alone, the genotypical order of these spaces shifts to:

GYM > BDR > DIN > ACT > ED > S/C.

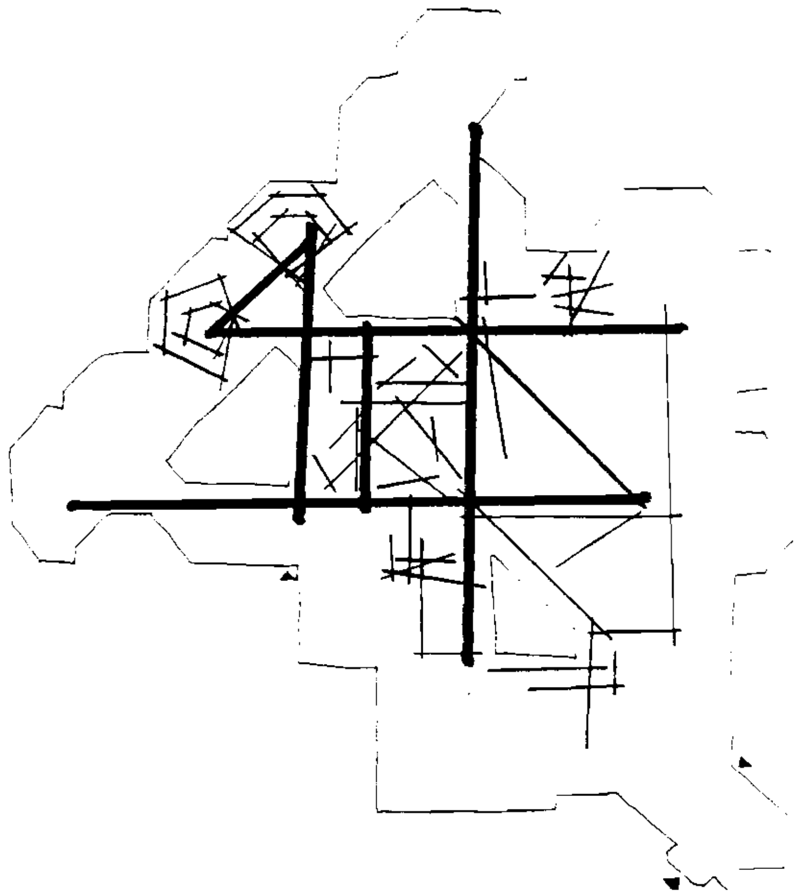


FIGURE 9.18: The 10% Axial Core of the IND Local System Showing a Similar Shape to the Global System

The local RRA values are: GYM = .652, BDR = .705, DIN = .793, ACT = .93, ED = .954, S/C = .977. The boys dayroom and the activity room are the primary variables that flex, with the boys dayroom gaining, and the activity room losing, in value when the analysis moves to the local system alone. These changes indicate that local and global patterns are quite different in terms of rank order of integration, even though the core shape shifts only gradually. The rank order of activity (ACT) shifts from most integrated to fourth in rank (out of 6). Thus, the center is different depending on whether one uses the whole or only a part of it. In terms of daily use pattern and habits, the local order would more closely correspond. Under both analyses, the security/control areas are among the most segregated of the spaces under consideration.

When the circulation areas of both systems are analyzed, which in totality are only available to staff, another shift occurs. In the case of IND, circulation spaces globally are more integrated than all program spaces, while circulation spaces locally are more integrated than all program spaces except for the Gym and the boys dayroom. There is an investment, therefore, in separation rather than in activity, except for the housing pod. It thus appears that while the integration of the security/control rooms is rather low in both analyses, thus detracting from direct control, the integration of the circulation system is rather high, an aid in direct control since the integration system is dominated by staff.

The Nature of the Gym, the Activity Room and the Dining Room. Each of these major resident activity spaces is shallower than the housing unit under study, lies off one or more of the main corridors, and is attached to one or more of the rings forming the distributed sub-system. Each program space is mediated at at least one entry by an anteroom, further separating it from the corridor. None of these spaces are directly overseen by control or security and the isovists from all these spaces fail to include anything outside the room except corridors. Two are spatially well integrated.

The activity room is the most integrated use space in the system with an RRA of .628, and the gym next with an RRA of .653. Comparatively, the dining room has an RRA value of .892 and the entire education square a mean RRA of .892. Oddly, the hub of the building, the main intersection of corridors, is occupied by dining room. If it protruded more into this space, it would oversee most of the intersecting halls far better than does central control.

Thus, while they are fairly equivalent in terms of depth and most are included in the integration core, the program spaces are polarized somewhat in terms of their individual integration into the system of spaces. It is interesting that the two most segregated spaces (education and dining) are spaces used simultaneously by more than one unit, while the most integrated spaces are used at different times by single units. The program spaces are all, however, homogenous in relation to the super-grid of intersecting corridors.

The Nature of the Control and Security Rooms. The control room, in effect, is only the gatekeeper to the detention portion of the center while the security office, deep in the building and closer to the housing wings, is, at most, more proximate to housing. Neither of these spaces, however, oversees much of the building -- central control has a view down only a corridor; through CCTV's it can periodically monitor all housing wings and halls. Security lies off a hall. Security is more integrated into the overall spatial system than is central control (RRA = .803 and RRA = .936, respectively), and only security is convexly and axially on the integrated core. Furthermore, the control value of neither space is particularly high (security = .947, control = .1.17).

Contrarily, however, while not strategically located, these spaces are both independent from the program and resident areas and located directly on the main grid of circulation. They thus have independent connections to the staff controlled circulation zones without going through any resident program or housing areas. Control, in addition, has direct access to the front entry through staff controlled spaces. Thus, these rooms are both separate and independent, but fail to occupy a dominant position of inspection.

The Nature of the Boys Dayroom and Housing Pod. The housing pods lie a good five or six steps away from any program spaces and, in general, are not well integrated into the system of spaces. The unit under study, however, is fairly well integrated into the spatial system as the overlapping of lines shows (Figure 9.17b). The dayroom of F Unit, though metrically distant from the main body of spaces, is axially on the integration core and has an RRA of .734, very close to that of the value of the dining room. The housing unit under study is not visible from the control or security room, but is visible to the unit next door.

A Comment on the Interface

The above analysis suggests that there are many potential poles forresident socialization, but because of the separation of units and scheduling, these poles are only available on an intermittent basis. The resident poles are all separated from one another by the circulation grid controlled by staff. Each public activity room comprises a separate contained pole of socialization but no two activity rooms are connected, nor do they offer views of one another. None of the potential socialization spaces can be surveilled from the control or security room. Additionally, as the RRA values confirm, while internally these spaces are differentiated syntactically, they are homogenous in relation to the circulation super-grid. Only in the boys dayroom are social nodes grouped.

The key property of this system, therefore, is its dichotomy. In the more public parts of the system, the potential resident social nodes are disjointedly located just off of a super-grid which accomodates the complex activity schedule by separating circulation and activities as much as possible. The housing units, on the other hand, group social nodes together with strong visual links to the unit next door. Thus, globally, all communication between residents of different units is through the corridors[5]; locally, the communication is concentrated by units, and tenuously, by pods.

The second key property is the relative lack of interface with other categorical areas. Movement through the halls is highly scheduled and proscribed so units can avoid one another in their passage to the various activity spaces. Movement in all cases is past activity spaces, with little opportunity for views in. Activities of both residents and the various staff are contained in enclosed worlds with the only possible means of accidential exposure to one another available in the halls. The anonymity of the corridors is such that little at all is seen beyond -- one just looks into another environment that is much the same one as the one just come from. One rarely runs into administrative or medical personnel, for example, because each category is segregated in their own spaces off the super-grid. This internalization of activities is broken only by scheduled and unscheduled visits to the housing units by service and security staff (i.e., for pill distribution, staff relief, or security checks). The spaces themselves are internally specialized, but homogenous in relation to the whole. The spatial - social interface at IND is therefore internalized, and bounded by a circulation grid that never points to the outside world.

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5 Except for scheduled activities open to members of all units such as visiting or Level activities like Teen Time.

5. Summary of the Morphological Properties of the Three Layouts

The three detention centers vary from one another as spatial entities even though they perform similar services and activities. Table 9.1 summarizes their key points of difference and similarity which are discussed in the following paragraphs.

Table 9.1: Summary of Detention Space Characteristics

	DEK	MAR	IND
Overall Shape	Cluster/radial	Pavilion/Radial	Grid/Cluster
Depth from Carrier	4.87	5.05	9.97
Depth Inequalities	INT>ADM>PROG> C:DAYRM>HSNG	INT>ADM>C:DAYRM> HSNG>PROG	INT>PROG>C> ADM>DAYRM> HSNG
Mean RRA (Global)	.773	1.17	.964
(Local)	.925	1.79	.898
RRA Inequalities (Global)	MP>DIN>BDR>C>ED> ADM>INT	BDR>C>ACT>MP/D> INT>ADM>ED	ACT>GYM>DIN> BDR>INT>S/C> ED>ADM
(Local)	MP>BDR>DIN>C>ED	BDR>ACT>C>MP/D	GYM>BDR>DIN> ACT>ED>S/C
Subsystems	Distributed	Distributed	Distributed
Location of Control	Panoptical	Views One Space	Views Corridor
Circulation	Through	Through/By	By/ Through

In the first place, the three centers differ in general shape. DEK offers a nucleated courtyard combined with a radial system, clustering all spaces around a centralized hub comprised of activity space. MAR is more elongated and disjointed with spaces dispersed and separated by corridors and floors. While having some aspects of a radial system, like DEK, in its housing wings, the public spaces are sequential, feeding into one another, and forming two poles of activity (three if the classrooms in the basement are included). IND, on the other hand, offers a dichotomy with a square overlayed by a separating grid, and clustered housing pods tenuously attached to the square.

The three centers also differ in their syntax. DEK and MAR are similarly shallow in terms of their depth from the carrier, with DEK having a mean depth of 4.87 and MAR a mean depth of 5.05. IND, however, is relatively deep with a mean depth of 9.97. This is in part attributable to its sheer size but also to its syntax. In terms of the overall integration of the global system, however, DEK is the shallowest with a mean RRA of .773. IND is deeper with a mean of .964 and MAR is the deepest with a mean of 1.17. Thus, Marietta's spaces, though shallow to the carrier, are in fact not well integrated in terms of their syntax. They become even less well integrated on the local level, the region of the unit under study. Locally, MAR spaces become even more segregated (mean of 1.79), while IND and DEK become only slightly more (IND mean of .898; DEK mean of .925).

In DEK, both the convex and axial integration core cluster around the control room; axially, the core extends into every major activity space -- the dayrooms, the multipurpose, the dining and the classrooms -- and wraps around the control room. The visual linkages follow the core, with all activity spaces exposed at least partially to all others. Most importantly, while the core isolates the control room, its purview of all these areas reintegrates it.

MAR, on the other hand, has an elongated integration core with two foci -- the boys dayroom next to control and the distant activity room; the connecting link between these runs through the girls units, not the boys. On the local level, the core centers in the boys dayroom and control, extends to the activity room, but fails to reach into the dining/multipurpose room. In IND, the core is comprised primarily of circulation spaces on both the convex and the axial analysis, with only the local axial core penetrating the housing unit under study. Thus, the real difference among the three lies between IND and the other two facilities. While the core penetrates major use spaces mostly in DEK but somewhat in MAR, in IND it is concentrated in circulation space. This suggests that DEK is spatially about linking activity, while IND is spatially about separation; MAR lies between the two.

In both MAR and IND, however, spaces are clearly defined and, physically and visually bounded, more so in IND than in MAR, while in DEK spaces tend to flow more into one another, either physically as in the case of the dining room or visually through the large expanses of glazing. In DEK, spaces most integrated into the spatial system are the resident areas clustered around, and under visual purview of, the control room. The multipurpose room is the most strategic space, being the hub of the distributed system, having the highest integrating value, and having the largest isovist. In MAR, the control room is the most integrated space in the system, and thus the most strategic, but it has complete purview over only one resident program area -- the one which is most segregated and bounded. In IND, the grid takes precedence, with the circulation system being more integrated than the use spaces themselves. None of the resident program spaces are visible to one another, or indeed from either control or security.

In DEK, the control room is segregated, but occupies an independent position and has complete purview over the flow of activity revolving around it, as noted above. More importantly, it has its own connection to the carrier through the intake area. An opposing situation exists in MAR: the control room is the most integrated space but is totally surrounded by resident areas, has no link to the carrier without passing through a resident activity area, and has clear purview over only one program space. It is thus captive with little view. In IND, the control room and security are separated and off the grid of circulation,but have visual purview only of corridors. Only the control room near the entry has an independent outlet to the carrier. However, in IND, the grid of circulation becomes a silent partner to control in that it controls all global communication, and separates and isolates the various categories in their own domains.

The spatial depth of categories, and their separation or integration with one another through a distributed subsystem, has much to do with their social interface, as will be explored in the next chapter. While all three facilities are similar in putting intake shallowest and resident housing among the deepest of spaces, real differences occur in the location of program spaces. In both DEK and IND program spaces (on average) are shallower to the external world (the carrier), and shallower even than control, while in MAR program spaces are placed deepest in the building, even deeper than resident rooms. Thus, a resident not only lives, but also recreates, in very contained spaces with limited exposure to the rest of the system. The only relief, however, is in the boys dayroom, which like DeK's, is equivalent to control, and is similarly locked internally.

In DEK, circulation is primarily through spaces closely linked with one another through rings which intersect in the key resident program space -- the multipurpose room. Because of the comprehensive views in this area, all categories are thus not only linked physically, but also visually. Circulation is primarily through these use spaces except in the linear housing wings. In MAR, because of the sequential linking of major spaces, the circulation is also primarily through use spaces. Here, however, the distributed system diverges and creates two hubs in the detention area but other categories, such as administration, are on independent rings or no rings at all. Thus, there is no central point of convergence as at DEK, and no linking of categories through rings. Therefore, the circulation through use spaces offers little exposure to others. Because of the segmented visibilities in this center, the points on the rings are also not visible to either staff or to residents.

IND is very different. Circulation in the public areas is past spaces. Units, however, are much like DEK with a nucleated center around which spaces are disposed. Also like DEK, the pods are distinguished by visual overlap of areas with every space under the purview of at least one other; one unit even looks into another unit. IND, however, while being far more distributed than either previous case, uses it differently. Its distributed subsystem links all categorical areas, but also serves to further separate them. Big rings, composed only of circulation spaces, indirectly link to smaller program and service rings, but because it is possible to use the larger links and totally avoid the smaller ones, invites avoidance. Whereas in DEK and MAR, it is impossible to navigate the spatial system without eventually passing through a resident area on every ring (except the totally independent rings at MAR), in IND it is very simple to by-pass the discrete activity spaces. It is also impossible for staff or residents to see all the points on the rings -- not only because of the large size of IND, but also because what is to be seen is carefully located slightly off the main highways. The only visible rings are those in housing.

Thus, in terms of the spatial system and its relation to control, it seems that a continuum exists. DEK and IND are at the polar ends with MAR in the middle, leaning in both directions. DEK offers a spatial system where categories are somewhat mixed through the distributed system and through the integration core extending into every area. The most strategic space is contained but has visual penetrations beyond it, even to the carrier. Detention spaces are thus not only exposed to one another, but also exposed to other categorical areas. Boundaries between spaces are weakened by the rings, by the visual links between spaces, and by the hub quality of the core. There are several layers of possibility for resident socialization, all under the purview of an independent but visually pervasive control room. In terms of control, therefore, DEK offers several possibilities through its internal and external relations.

IND, on the other hand, offers a dichotomous spatial system. In the public areas, categorical spaces are strongly separated but also strongly linked by a circulation system that is more globally integrating than the categorical spaces themselves, which, in effect, are homogenous discrete events occurring off the circulation zone. The integrating and distributed grid is also internally oriented, never pointing to the outside world. Control is implicit and carried best by the circulation zones which make possible the separation of residents. The only relief from the analogy and isolation in the public areas occurs in the clustered housing units, which in isolation with their buddy unit, are spatially similar to the public areas of DEK. IND thus leans toward a global model of control in its public spaces where all communication occurs through the corridors, and toward a local mode of control in its private spaces where communication occurs through adjoining spaces. IND may be said, then, to publicly offer a transpatial system, dependent on relations across spaces, enclosing private podular spatial systems, where relations are more dependent on spatial contact.

MAR is in the middle with its disjointed spatial system. Like IND, it offers categorical distinctions through non-intersecting rings and an integrated core that fails to reach into all areas. Also, resident program spaces are dispersed from one another, but unlike IND, are not discrete, acting instead as passageways to other areas. Thus, resident spaces are not contained from one another but are strongly bounded from non-detention spaces. Further, while the most integrating room in the spatial system is the control room, it is landlocked in a sea of resident spaces with no independent outlet and total purview of only one resident area. The interface is, therefore, disjointed between resident areas and, with the strong boundary, circumstantial between detention and the outer world. It is a disjointed model with conflicting tendancies.

PART II: CHAPTER X

DESCRIPTION OF SPACE USE IN DETENTION CENTERS

1. Introduction

The last chapter offered a description of the spatial configurations of the detention centers under study. This chapter, like its earlier match in the Alzheimer's chapter, is more qualitative than quantitative, looking at the relationship between space and behaviors; i.e., how the building is actually used by the organization occupying it. This descriptive picture of space use is based on observations during the visits, and on the evidence of staff and resident interviews. The next chapter will deal with the analytical findings from the behavior mappings and staff trackings.

The focus is on the relationship between the architecture and the organization, and the ways in which the configuration of spaces helps structure the patterns of movement, encounter and avoidance which are the material realization of social relations (Hillier and Hanson, 1984). This chapter again describes the use of the various areas of resident and staff activity. Its purpose is to demonstrate that spatial and social dimensions of organization are interrelated and that alternative modes of space use and behavior are devised for dealing with specific spatial configurations.

2. The DEK Center

The intuitive "feel" of the DEK detention center is that of "friendly activity" . The residents seem unusually open, often moving to greet the Director and other staff who enter their areas, and the administration does not hesitate to take visitors into the detention portions of the building -- the multipurpose room, the dining room and the dayrooms -- located directly behind the administrative corridor. A study of the activity spaces and use patterns may help clarify why this is so.

The Dayrooms and Housing Wings

The most obvious feature which reveals a spatial dimension to social organization is the division of the residential accommodations into three separate wings (see Figure 10.1). The girls have the lower wing in the plan, culminating in a dayroom, the only end room actually used for that purpose. The boys have the other two wings.

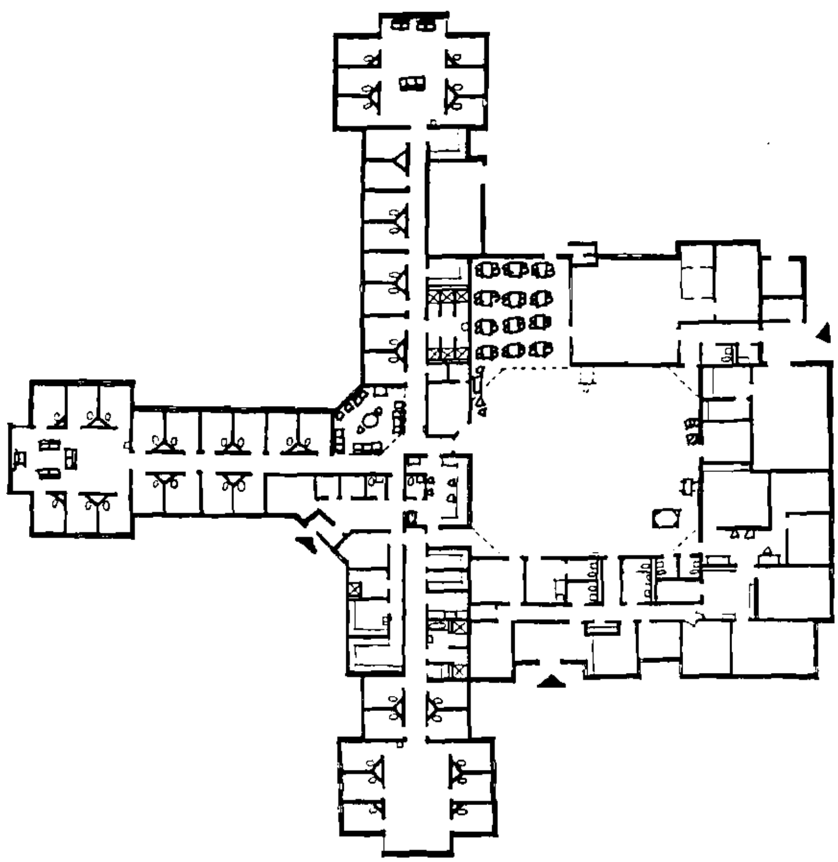

FIGURE 10.1: The DEK Center Showing the Furniture Arrangements in the Unit

The boys living quarters are divided between the two wings radiating from a centralized dayroom; actually a widening of the meeting point of the two hallways. As related by staff, the original purpose behind the two wings was to provide two smaller unit dayrooms, with the central dayroom to be used as a staff workroom. Practically, however, the plan was found to have two disadvantages. The single set of showers located on the top housing wing means that boys on one wing must enter the other wing to take showers, thereby moving one unit in another units hallway. The second disadvantage is that the end dayrooms have to be constantly staffed because they are not fully visible from the control room or from the corridors leading to them. Located deepest in the building, they are also among the most segregated spaces in the center, and there have been several staff jumpings in these end rooms. Therefore, they now function primarily as a wide hallway to the adjacent end rooms, and are used only occasionally for small Bible study groups manned by volunteers from outside and by Level I boys (best behavior level) for special TV privileges. Thus, while the premise behind the two wings was smaller, more personalized groupings characteristic of the unitization concept, in practice the two wings now function more or less together. Even widening the corridor at the far end still leaves problems from the point of view of surveillance, if the creation of convex portions off it are not visible from the control room.

The male residents in DEK are somewhat loosely housed by behavioral level. The worst behaved boys, and sexual deviants, are housed in the rooms closest to the centralized dayroom and to control, while the Level I boys are housed in the end rooms around the unit dayroom, farthest from staff. Each room contains its own toilet and sink so residents do not have to be moved to the toilets and so forth. Good behavior thus results not only in more time out of ones room, but also in placement farthest from the presence of staff.

The dayroom at the crux of the two boys wings functions as the boys TV room, the gathering point for drying off after showers, and the staff workstation. The higher level residents use the dayroom more often than the lower level youth as they spend more time out of their rooms. The TV in this room goes night and day and the various groupings of kids either sit on the sofas to watch TV or crowd around the staff table in the middle of the room, peering over the shoulders of staff to see what they are writing in their log. Staff are very open about what they are doing (staff say "the kids know everything anyway, so why try and hide it?" Residents sit in what a visitor would consider to be staff chairs at the staff table, and staff often sit on the sofas with the youth. Little distinction is made here, or elsewhere in this center, between so-called "staff" and "resident" areas, except for the sanctity of the separate control room, in which no resident is ever allowed. Everything in the control room, however, is visually available to all youth through its fully glazed walls.

During showers, boys are grouped in sixes with Level I boys stationed at the shower room door to supervise activities; staff constantly move between the showers and the dayroom where the deodorant and hair products are distributed by staff. Kids thus move from the showers to the dayroom where they "kibitz" with one another or staff or catch a little TV while the next group goes into the showers. This is the time when the lower levels get time in the boys dayroom. It seems to be a relaxed, social time for all level boys and for staff; it is one of the favorite times of the boys day.

All resident rooms and storage closets are kept locked. The resident rooms are manually keyed rather than electronically controlled in the control room, although the capability exists. Staff feel that the act of manually locking and unlocking resident rooms both reinforces the residents notion of their control as well as provides valuable opportunities for staff/resident interaction. An interesting phenomenon occurs at DEK during staff shift change. All youth are "locked down", that is, locked into their rooms, during shift changes, while staff confer with one another about the events on their shift. Once the new shift is on duty, however, the shift captain, who also functions as the control room officer, manually unlocks each resident room door and greets the boy(s) within, asking them how their day is going and so forth. Level I boys are let out to go the dayroom, and shortly thereafter one whole wing is unlocked for its youth to move to the dining room.

The centralized arrangement of the dayroom, its locus at the crux of the two hallways, and its proximity to, and visibility from, the control room, makes visual supervision of this area fairly easy. Youth, therefore, when in the unit, are largely restricted to this area. The dayroom is also contained, with only two ways out -- one leading to the intake hallway which is always locked, and one leading to the multipurpose room which is always open, but which passes directly by the control room. Perhaps because of this containment, and because of the intermittent visual checks from staff in the control room, and from those in the multipurpose room through the control room, the dayroom is often left unmanned while staff chek on things elsewhere. There is thus an easy sociability to this room, with little sense of "guardedness". Both residents and staff use it in a similar, and casual, fashion and there is much movement between it and the multipurpose room beyond. The control room officer also moves into this room fairly often, from his position nearby. As the reader will recall, the boys dayroom is among the most integrated of the use spaces in DEK, second behind the multipurpose room.

The Multipurpose and Dining Room

The multipurpose room is the most strategic space in the DEK center, the crux of the distributed system, and the most visually pervasive of all activity spaces. This room and the adjacent dining alcove are used simultaneously and interchangeably as the centers "dayroom" and youth spend more time in this area than anywhere else. The dining room is thus regularly used between meals, for conversation, reading, table games, TV and so forth, and, with the adjacent multipurpose room, functions as an all-purpose, all-youth dayroom.

Girls and boys, and all behavior levels, as well as staff, mix together in the multipurpose and dining room. Because of the relationship of these spaces to the kitchen, the classrooms, and the administrative areas, personnel from these areas also move often into, and through, it on their way to other parts of the center.

Generally, the Level I boys and one of the boys wings (levels intermixed in both wings) are brought out at a time, to join the girls in the dining area. With staff permission (and often, in practice, without it) youth drift between the dining room to the multipurpose room to play basketball, pool, or just pull up a chair to watch one of these activities. The centralized location of this room, and its general pervasiveness, also allows the intermittent observance of events in other parts of the center, for example, in the administrative and intake areas[1]. As well as functioning as a basketball court, the multipurpose room contains a pool table which can be used by two residents at a time, but there are always some kids sitting on the chairs nearby to watch, and a sitting or playing staff member. Staff generally allow ten or twelve youth in the multipurpose room at a time, except when this room is being used for exercises, or some school event, in which all youth participate simultaneously.

[1] Whenever the intake doorbell rings, or the residents see someone enter the administrative conference room, there is a sudden urge to go to the restroom or water fountain on the far side of the multipurpose room. In their travel across the room, residents get an excellent view of whoever enters the intake hall, or the events in the adjacent conference room.

As mentioned previously, the door to the boys dayroom is left open and there is often staff and/or Level I movement between the multipurpose room and dayroom. Sometimes one male YDW will sit in the dayroom and watch TV with five to eight boys while the other YDW is in the multipurpose or dining room with the rest of the boys on that wing. The girls, however, cannot come and go as easily to their wing. The door to their hall must be electronically or manually unlocked and any girl returning to their area must be accompanied by a staff member. Because of the shortage of female staff (generally only one on duty at a time), and because the entirety of their dayroom cannot be seen from control, the girls are either "batched" in the dining room or "batched" in their housing wing.

Backed up to the wall shared by the dining and multipurpose room, and overlooking both rooms, is a table designated for staff purview of the area. Staff sometimes sit on the table or pull chairs up against it, but one or two kids often perch themselves on the same table and casually chat with staff. Staff also sit at the fixed dining tables in the dining area, chatting or playing table games with youth.

During meals, one boys wing and the girls dine together, and then the second wing is brought out after the first boys wing is locked down. The only distinction made is that girls at most times are requested to sit together at predesignated tables on the edge closest to the multipurpose room, but after meals are allowed to sit at the boys tables. All detention staff are present during meals which can be a very volatile time, but do not act in a guarded way. The kitchen serving window is opened, as is the door to the kitchen, and those working within are visible to those in the dining area. Two or three youth assist kitchen staff with meal preparation, serving and clean-up. Detention staff usually sit and dine with the youth during meals, dispersing themselves around the room but often sitting deep in the dining area. The control room officer either remains in the control room or stands and chats with youth or staff on the edge of the dining area. Other staff often join the grouping at this time, implicitly adding to the level of control.

The dining room also functions as the visiting room. Detainee visitors first check in at intake and then are brought through the multipurpose room to the dining tables. All youth, except occasionally some Level I boys who remain in the boys dayroom, are locked down during visiting. Those receiving visitors are unlocked from their rooms and allowed to move to the dining room. Staff at DEK are very discreet about visiting, purposely avoiding giving the youth, or their visitors, the feeling that they are being watched during this very personal time. Generally, the control room officer will also schedule a visitor, who sits in the control room with the officer, allowing him to casually chat while still surreptitiously overlooking the visiting area. A second staff member greets and escorts each visitor to the dining area, chatting amiably for a moment with another youth and his family, before moving on to the next. This staff member "floats" around the dining area or moves into the kitchen or education rooms as if intent on some other task while still keeping an eye on events in the visiting area.

The Education Classrooms

The wide entry hall in the educational area adjacent to the multipurpose room is generally kept open when youth are in the multipurpose/dining area. Staff rooms and classrooms deeper within, however, are kept locked except during school hours. While the wide hall in this area is fully visible from the control room, parts of the classrooms are not, even though they are glazed. Staff on duty often move in and out of the education hall to a locked staff room which holds the staff coffee pot; access is easier if the hall is open. The proximity of this space to the multipurpose room and its visibility from the control room allows its use as a secondary, privileged, activity space to the multipurpose and dining room. Thus, part of the school rooms are separate enough to conduct classes while groups are still using the multipurpose room, but connected enough to function as an adjunct activity area to the multipurpose room when school is not in session.

A Comment on the Interface

The environmental strategy devised at DEK is the simultaneous and shared use of the activity spaces grouped around the centralized control room. These rooms comprise the integrated core at DEK and the resident links to the distributed subsystem. Those rooms not completely visible from the control room, and those not directly connected to the most strategic space in the system -- the multipurpose room-- are clearly used as little as possible; i.e., the girls dayroom, the boys end unit rooms, and the not fully visible classrooms. The grouped arrangement of the residential activity rooms is such that the rooms are simultaneously visible to the control room staff and at least partially to staff in any one of the other spaces. Relations are thereby not "paired" but "triangulated"; i.e. the creation of a triangle with two or more controllers instead of a pair such as controller-controlled. This phenomena occurs simultaneously for several groupings of controlled, thereby introducing a control "lattice" /"network" rather than control hierarchy.

At the same time, the spaces are sufficiently separated from one another to allow slightly different activities to take place without disruption to one another. The other areas of the center, such as the kitchen, administration areas, and intake, are sufficiently shielded from this centralized meeting ground to allow their separate activities to take place uninterrupted, yet are easily accessible, and partially visible, so as to still exercise some, almost implicit, control over the detention spaces. There is enough separation so that activities do not overlap, and so that youth are not unnecessarily reminded of the institutional nature of the center through constant supervision, but enough visual and physical contact through the distributed system so that both residents and staff are aware that there is a discreet, but ever-present background of other personnel in the center.

Thus, the different potential levels of interface noted in the last chapter on space are fully exploited in behavioral practice. The clustered spatial arrangement allows a logical organization of activities, and a common area at the center of the building, to which all groups of users have equal access. Somewhat unusually for a detention center, all youth in residence are often allowed out of their rooms, *en masse*, to meet together in the dining/multipurpose room, rather than separated into smaller, more easily manageable, groupings as is the practice in many other centers. Thus, different sexes, different levels of residents, different groupings of staff (detention, kitchen, educational, administrative), democratically mix together, or pass through, the multipurpose/dining area. Staff still can also segregate themselves in their own dedicated spaces without losing connection to this common heart. Administrative personnel move often from their wing to the control room to confer with the officer on duty. Teachers move from the education areas to the counseling room in the intake area. All must pass through the multipurpose room which is both the major activity area and the focus of the spatial system. Parallel activities by various groups in different spaces are visible to those in control, and because of the isovists from the main use spaces, to both residents and care staff alike in other areas. The strategic and centralized location of the multipurpose room also allows both residents and staff visual access to most other areas of the center when in this room, through glazed doors to the administrative conference room and hallway, and to intake. Perhaps because of this spatial and behavioral centrality, staff said during the interviews: "There is nothing the kids don't know about what goes on here!"

In summary, DEK has an integration core which is used by all but is not controlled by all; it has a central control room which is independently linked to the outside; it has an isovist pattern which allows the triangulation of surveillance; and, it has permeabilities that form rings. These spatial characteristics seem to help moderate the relations between the other functional areas of the plan as well as to accommodate fairly unstructured and informal encounters between the various groupings of youth and the various levels of staff attached to the center. The informality of behaviors between staff and residents seems to be an environmental offshoot of the visual and physical openness of the clustered spaces. Encounters are both a matter of chance and of choice, and they help to cut across the formal structure of the institution. They allow both staff and residents at DEK to experience a broader social horizon than is normally expected in such a restricted environment as a detention center.

3. The MAR Center

Initially, the MAR center offers a rather somber aspect and one first wonders if it is not because the interior environment, though painted with bright graphics, is relatively dark and closed in. With extended observation, however, one realizes that there is little movement at MAR and events occur in a rather structured way. While the administration evidences genuine concern with resident life, the residents themselves and the detention staff seem to be somewhat guarded. An observer soon realizes that while there are some instances of real interaction between residents and some staff, for the most part the spatial division between the two categories is clear, with staff on one side and residents on the other.

The Dayrooms and Housing Wings

MAR residents are divided into several different groups based on gender and behavior. Girls and boys are separately housed with the girls on one side of the central spine of the building and the boys on the other side (see Figure 10.2). While the girls used to be completely separated from the boys, using the dayroom in their wing, the shortage of staff has resulted in the small number of girls, regardless of behavioral level, being assigned to the dining/multipurpose room, a space originally designated for use by the small number of Level I boys.

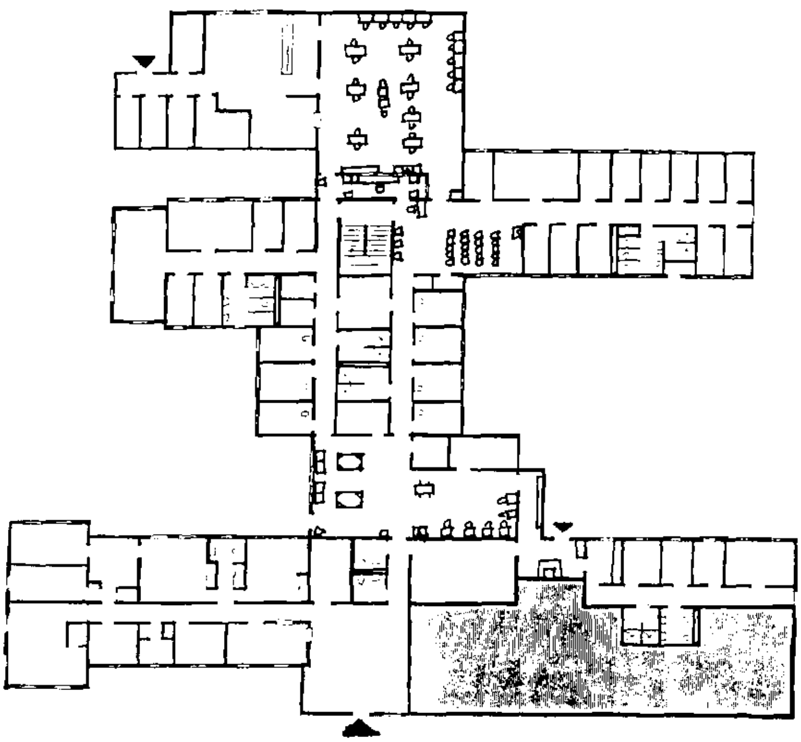

FIGURE 10.2: The MAR Center Showing the Furniture Arrangements in the Unit

The girls wing (to the left of the plan) has a large dayroom at the end of one of its halls. The boys are housed in two different wings, by behavioral level. Level I boys, the best behaved, have the rooms in the administrative wing, isolated from the detention areas and farthest from control (lower right of plan). Their segregated housing requires that a staff member be detailed to the intake area next to them at night. These boys, however, shower and dine with the lower level boys. Higher level boys receive more time out of room, but there is no place to put them while still segregating them from the lower level boys other than in the dining/multipurpose room with the girls. Thus, one officer in the control room watches both the Level I boys and the girls in the adjoining dining/multipurpose room. This staff member is most often female and also the girls YDW, thus handling two jobs, another reason why the girls have to be put in the dining/multipurpose room with the boys.

The lower level boys are also subdivided and housed and recreated correspondingly. Lower level boys, who number in the majority, spend most of their time either in their rooms or in the boys dayroom. This larger group, however, is further split into the "percentage boys" and the "non-percentage" boys, a secondary behavioral level based on their completion of tasks, such as cleaning their room, going to school, etc. The percentage boys receive slightly more time out of their room, yet not as much as Level I boys, while the non-percentage boys spend most time in their room.

The worst behaved boys are assigned to the four "wet" rooms on the short corridor in the boys wing; considered the most secure because they are on a hallway visible from control (by CCTV mostly), they have a combo toilet/sink, thus negating the need to move the occupants. The rest of the lower level boys (regardless of percentage) are housed in the longer wing of the boys side.

The boys dayroom is used most of the time by one of the two lower level boys groups -- the percentage boys and the non-percentage boys -- who are never mixed. These sub-groupings are felt by staff to allow more manageable groups than if all the boys are mixed together. When one of the lower level boys groups has dayroom time, one or two of the boys are unlocked beforehand to unstack the plastic chairs on one wall of this room and set them up in four even rows of five chairs each, all facing the elevated TV at one end of the room, and away from the global structure. The selected group are then unlocked from their rooms to file into one row of chairs at a time. Staff sit behind the boys, in the corner closest to the control room, where they can see both corridors in the boys wing. Usually, the boys are allowed to talk very quietly while they watch TV, but are not allowed to move without permission. Occasionally, a noisier resident is told to sit along the staff wall, or to move his chair in a new row behind the others. The boys raise their hand to go to the toilet, and a staff member accompanies them to stand in the hallway outside. The behaviors in this room are very structured.

Shower time is slightly more relaxed[2]. Six boys at a time are unlocked from their room to go to the dayroom. One staff member stands at the desk near the control room and dispenses shampoo, deodorant, and so forth while another staff member stands at the doors to the shower room. The desk staff member hands two of the boys a towel and escorts them to the shower, then returns to the desk. When those two boys finish, another two go to the showers. The YDW sprays the showered boys with deodorant, lets them dry off a bit, then escorts them to their room and unlocks the next couple of boys. The TV is not on, and the showers are strictly business.

There is always a staff member present in the boys dayroom when the boys are in it. When asked why they did not use the larger activity room as a dayroom, the researcher was told it was too isolated from control. There is thus a feeling among the

[2]The researcher was never allowed to witness the showering process from either the dayroom or the control room, as was the practice in other centers. The staff in the control room cuts off the CCTV to the hallway during showers for fear of exposure, and the door to the dayroom is kept shut. The account, therefore, is from verbal interviews with the male staff.

staff that they need to be near control, even though staff in the boys dayroom cannot always see the staff person in the control room because the door is usually shut. Because the boys dayroom is behind the control room, the control room officer cannot move from his perch overseeing the dining/multipurpose room in order to see the boys dayroom. The boys dayroom also has several openings off it -- one leading to the stairs and the school rooms below as well as across the spine to the girls quarters, one to the control room itself, one to the dining/multipurpose room, and one at the end of the hall to the activity room. For this reason, the room is spatially strategic but not well contained by adjacent staffed areas. It is also not possible for staff in this room to see anyone coming from any direction until one of the doors is opened. For this reason, staff are as surprised as residents to hear a door open, but staff at least see any visitor before the residents do. Rarely does anyone enter from any direction other than the activity room hallway, however. Predictably, if the boys hall is used, the visitor is male. Female visitors and staff use the girls hallway.

It seems fairly safe to say that, in the case of MAR, the resident divisions are accompanied by clear spatial separations and segregations and there is some level of predictability about life within the residential spaces.

The Multipurpose/Dining Room

The multipurpose/dining room at the rear of the building is used between meals for conversation, cards, table games, and so forth, by the girls and Level I boys. It is the largest room in the center, is the most well lighted, and formerly functioned as a recreation/basketball court. There is rarely a staff member in the room when in use as the dayroom, but always a staff member manning the control room overlooking this area. Being higher level, the dayroom residents may sit where they like as long as it is in the tables close to the control room, and judiciously move about the room to control the TV, or play cards at another table. However, the control staff do not allow much movement and severely moderate the level of noise allowed here.

Mealtimes are orderly. First, all lower level boys are locked down. The Level I boys are then moved to the boys dayroom while the girls eat. Once the girls are finished, they are moved to their rooms and the Level I boys file through line and sit at a designated table. Then, either the percentage or non-percentage boys are lined up in the boys dayroom, escorted to the dining room and kitchen where they get their tray, to return to the dining room where they are motioned to a table. A maximum of three persons is allowed at each table. Staff stand around the perimeter of the room and watch the youth eat, sometimes talking to them. No talking is allowed by the youth, however; when questioned, staff say that if the kids talk, they take too long to eat. Thus, meals are a quick and quiet affair. When one group finishes, they are locked down; then the other group eats. Only one staff member during the site visits was seen to eat with the residents; it looked like a fairly uncomfortable affair. Staff generally take their meals to the dayroom after all lower level residents are locked down and the Level I boys are cleaning the kitchen, under the supervision of kitchen staff.

The dining/multipurpose room is also used as the visiting room. Visitors check in at the intake area, are led through the activity room and, depending on sex, down one of the hallways, into the dining room. Residents are unlocked from their rooms and escorted to the dining room. The control room officer oversees the room, while the other staff members either guide visitors in and out, or escort residents to and from.

The Activity Room

The activity room, located behind the administrative wing, is used on a scheduled basis. Youth generally are allowed one or two hours a day in this room, depending on the general social climate existing that day. While both staff and residents wish this room could be used more often, staff report its distance from the control room poses a security risk. It is the one room, however, where youth and staff "let their hair down", moving and conversing at will. Residents can play pool or foosball, video games, watch TV or sit and talk with staff. Backing up to the administrative wing and Intake, increases the chances of seeing other social categories; during daytime activity hours, administrative and educational staff pass through this room on their way to the schoolrooms or the control room. Sometimes, a new person is brought to the intake area and led through this room to the control room in the rear. The fenced, outdoor recreation area is located directly off it; in good weather, the door is left open so kids move freely between the outdoor basketball tarmac and the interior game room.

The girls and the Level I boys recreate together, then the percentages, and then the non-percentages. There are always at least two staff members present -- a male and female when the girls and Level I boys are present, and two males when the lower level boys recreate. It is also apparent that the maintenance man frequents this room during the scheduled activity hours, thus adding more security personnel, and a new face.

The Education Classrooms

Classrooms are located on the lower level, and, reportedly because of this, are only used during scheduled class times by the girls and the Level I and percentage boys. The two open and light classrooms are well equipped with individual desks and a number of computers. The non-percentage boys attend school in the dining/multipurpose room, sitting at the carrels lining the two end walls, facing away from the control room.

A Comment on the Interface

MAR's segmented spatial plan appears to be to mirrored socially. Each room is used separately and dedicated to a particular social grouping. Social groupings are kept apart from one another, to the extent possible given the necessity to walk through activity spaces to get to other use spaces. Control seems to be tightest, however, in the boys dayroom. It will be recalled that the boys dayroom has great command over the distributed spaces and over the axial system, but that the control room next to it is the single most strategic space in MAR in terms of integration. The boys dayroom is perceived by staff as poorly controllable since it is not visible from any other areas without effort and is "polluted" by residents and staff passing through it. Indeed, the rigid structuring of behavior and the overt control exercised in this room may be recompensation for its spatial integration and its potential for a social richness with its distributed connections to other resident and staff spaces.

The various resident groupings are thus spatially disconnected from one another as are the categories of staff. There is no single spatial hub, control is paired between controller-controlled, and the spatial segmentation of areas seems to effectively isolate the categorical groupings from one another. There is little drifting of administrative personnel, for example, into the far reaches of this center. Detention staff seem more comfortable when near the control room, where they are close to other staff, and only seem to relax in the shallower activity room that offers the possibility for unplanned and informal encounters with staff from other areas. Their concern with their isolation is evident in the fact that they carry hand-held radios whenever they leave the boys dayroom, maintaining radio contact with staff in the control room. There are clear resident and staff territories in terms of spatial location and, as observed, they do not overlap. This suggests a disparity between staff and residents which seems to evidence itself in relatively little interaction between them. The territorialization of staff and residents seemingly links to the poor control potential of the spatial interface.

It appears that each activity space is not only spatially distinct, but also functions separately with little overlap into other areas. Other than the activity room which receives relatively little use because of it poor control potential, there are no other areas in the center where "natural" encounters can help informalize relations between staff and residents. Both groups are locked in a restricted and bounded environment, with no easy way out and no background of personnel beyond. Staff response to their isolation seems to be to tighten control over those they are confining. It seems that the segmented and visually obscure environment is accompanied by a rather restricted and ritualized life within it.

4. The IND Center

The IND center is far larger than either of the two other centers, both physically and in terms of population. The housing units, however, are smaller, being comprised of only sixteen boys as opposed to the 35-45 boys in the two earlier cases. A visitor to IND walks through monotonous and empty corridors, to open the door on lively activity in the housing units and scheduled activity spaces. These experiential moments seem somehow discontinuous, however, because they are paced and regulated by the building grid itself (see Figure 10.3).

The Dayroom and Housing Unit

Life in the housing units of IND seems relatively informal and flexible. Boys and girls are separated in different units; the boys are further subdivided into units on the basis of maturity level and size. There is a separate classification unit for all new male arrivals awaiting unit placement. The classification unit and the girls unit are directly attached to the centralized program/service areas while the other housing units, for regular boys, are more indirectly attached through longer corridors radiating from the central block of spaces. As noted earlier, there are three pods for the regular boys; two housing units comprise a housing pod. The housing units are identical, their only distinction is the color of railings and doors.

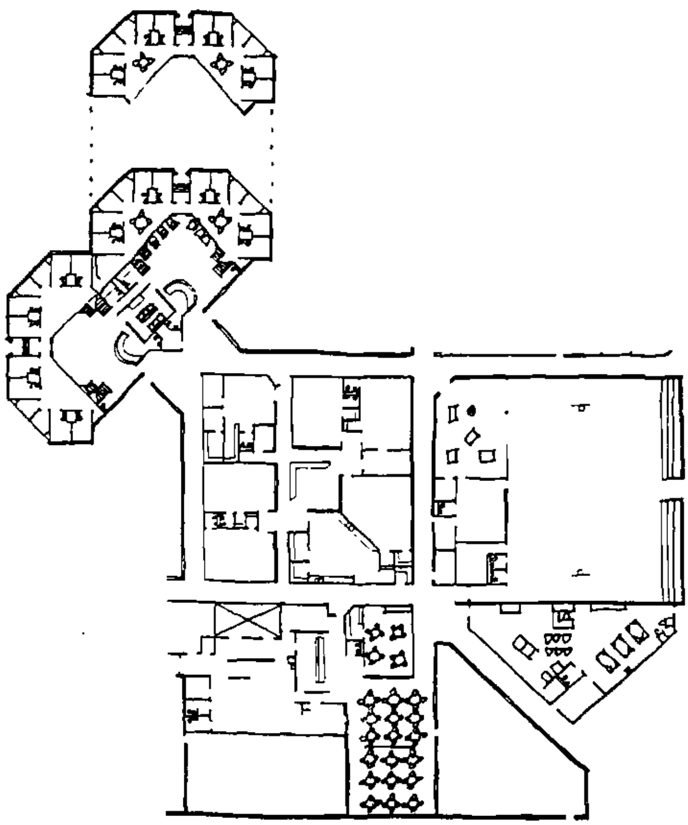

FIGURE 10.3: The IND Center - The Local Unit Only Showing Furniture Arrangements

The housing units were specifically planned for direct supervision, the management principle which encourages close staff/resident interaction through smaller groupings. (While this is the guiding principle in all three centers observed, this newer unit was purposely "designed" to support it). Staff are encouraged by the administration to mix with residents rather than sit behind the staff workstation but in practice, some staff accomplish this better than others. Plastic chairs are stacked in each dayroom along the railings when not in use, but can be placed anywhere in the dayroom when in use. Most of the residents loosely arrange themselves in front of the elevated TV in the dayroom or place their chairs in smaller circular groupings for conversation. Each alcove contains a "McDonald's"-type table with attached chairs, bolted to the floor.

The distant location of the regular boys housing units from the central mass of activity spaces isolates them from the mainstream of activity. Each unit, however, has visibility of its "buddy" unit next door, which provides an ever-present accompaniment of activity. Residents, for example, in one unit see not only their own staff member, but often the staff member across the shared TV room at the workstation in the other unit. The centralized location of the dayroom, sandwiched between the alcoves and shared TV room, allow residents to see into the other unit through the glazed TV room, and see across the interior courtyard to the hallway beyond; they can thus see when relief staff or others may be approaching the unit. Thus, the housing units are separated from the main block of activity, but integrated through the distributed sub-system, with a similar unit. As noted in the last chapter, the unit under study is better integrated into the total system of spaces than some of the other housing units.

The IND residents are very vocal in their units, arguing with staff, and even demanding to have the shift supervisor come to the unit to mediate disagreements between staff and resident. The youth managers do not like this aspect of the management concept, feeling that much of their autonomy is superseded by their superiors.

Residents are also free to chat with one another, chat at will with the staff, move in and out of the four alcoves as long as only four youth are together, and move chairs around the dayroom. They can check out radios or table games at the staff workstation. No resident is ever allowed behind the workstation and they must line up near the phone to check items out. Generally, there is always some resident with his chair pulled up to the telephone near the workstation and there are a great many arguments about whose turn it is for the phone, or the fact that one person gets more time than another. Phone calls are tied to levels, with higher levels allowed more.

All sixteen residents are generally out of their rooms together, spending the majority of their time in the alcoves or dayroom. The higher level boys have additional access to the quiet TV room where they get a first-hand view of events in the adjacent unit. In this way, while the total complement of unit spaces are visually available to all, space is also used to distinguish levels. Higher level youth are also allowed to stay up later and to attend coed youth activities such as Teen Time, or Friday Activity Night, out of the unit. Because of the configuration of the housing unit, staff in the dayroom can see not only each activity node in the unit, but also the door to each resident room. Because the entry is visible, boys are allowed at times to stay in their room with the door open. The nodal configuration of each housing unit thus allows residents a limited series of places, increasingly private, to go.

Most of the staff observed move often and quickly around and through the housing units, up to the higher level and then down to the lower level, then through the dayroom and so forth. One youth manager stated he moves through spaces in a different way each time, for control, so that residents never know where or when he will appear. The ringy configuration in the units makes this circular movement possible, but it also has a disadvantage. If there is only one staff member on duty, as there often is, when he is in one of the alcoves, he loses sight of the other three alcoves. Staff movement, therefore, has to be fast in order to not lose control of the other areas of the unit.

Staff often pull a chair onto the edge of the resident grouping to chat or watch TV with the boys. The only time any real structure is imposed in the unit is during snacktime, when an activity is scheduled, or for showers. For snacktime, the boys are all called into the dayroom, chairs are neatly lined against the balcony railing, and each resident must sit and eat his snack. Once all are finished, they are free to go about their usual activities. When scheduled to leave the unit, all residents are called together in the dayroom, all chairs are stacked against the railing, the residents line up in front of the workstation, and then count off. No talking is allowed at this time.

Shower time is also all business. All residents are locked down except one or two upper level residents who assist the YM in getting clean uniforms from the linen closet in the mezzanine. These youth select clothing from the closet and move around the four alcoves, dropping new clothing in front of each resident door[3]. As the plan shows, showers are located in the corner of each alcove. Their scattered location requires that the YM unlock one resident door in one alcove, escort the boy to the shower, lock him in, and then race to the next alcove to repeat the procedure. Once all four showers are in use, he races back to the first shower, shouts for the boy to finish up, then goes to the next. He then returns to the first, unlocks the door, escorts the boy to his room, locks him in, and goes to the next door to let the next boy out and into the shower. He races from alcove to alcove repeating this process until all boys are showered. This process creates a flurry of movement rarely seen anywhere else. Some YM's pride themselves that they can do showers in ten minutes or less and YM's in different units often compete

[3]This has hilarious consequences sometimes, with residents getting too large or too small sets of clothing which, if they are greatly over- or undersized, are changed.

to see who can do it the quickest. The boys seem to participate in this competition. Under conditions of such shared restricted space, this is a good example of inventing a show which includes competition in order to make life more interesting, release tension, focus attention and overcome the stress of incarceration. Routines may thus be invented and changed in order to create a viable regime.

Staff never leave the unit unattended. Relief staff come in once during each eight hour shift to allow the unit YM to take a break. Security staff also pass through the units intermittently to check with staff on how things are going. Nursing staff enter the units at night for pill distribution. Rarely does one see other staff in the units, however.

The majority of time is spent in the relaxed atmosphere of the housing unit, but with scheduled breaks during the day to the planned activity areas and the dining hall.

The Gym and Activity Room

All scheduled activities take place outside the housing units. After school hours, residents recreate an hour a day in the gym or outdoor recreation court and the activity room, and of course go to the dining room three times a day. Visiting occurs at night and takes place in the large visiting room near the entry and the main control room. Visitors are limited to the shallower areas of the facility.

Youth are escorted *en masse* to dining, to school, to the gym, arts and crafts and other activities on a rigid schedule. The grid of corridors helps to maintain the separation of units as different corridors can be used by different units. Rarely is another unit seen in the same corridor[4]. Youth from different units do mix, however, in the dining room and in level related, after hours, activities.

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[4]Only once during the four day visit was another unit passed in the corridor. This rather surprised the YM and created quite a stir as a "gang threat" was made by a boy in the other unit to one of the residents in the F unit. Both residents denied the threat but staff members say this is one reason why different corridors are used by different units.

Residents traverse the corridors in file, and in total silence with violations resulting in a loss of level. Once in an activity space, however, youth are fairly free to sit where they please, and talk to whomever they choose -- staff or resident. The activity room contains pool tables, video games, computers, a TV, table games and so forth. In the gym, most of the residents play basketball, sometimes with the instructor or one of their own YM's, while some youth sit on the bleachers and talk. Each recreation area is staffed by a utility staff member, in addition to the unit's youth manager. Security staff also casually wander in and out of these areas, but because of the boundedness of each room, they cannot be seen coming. Residents are often seen conversing with the utility staff or staff who wander in, while their own YM generally takes this opportunity to decompress.

The Dining Room

The dining area, along with the corridors, is characterized by more restricted behavior. The dining room, like other activity spaces, is located off a corridor and not directly related to any other activity area. It is contained and not viewable from either the control room or security room, nor from the corridors themselves. In the dining room, each unit moves quietly through the serving line and sits together, with many of the youth managers sitting and dining with the residents. Staff also have their own dining area with a large window overlooking the sub-divided dining room. If two staff are on duty in a unit, one will sometimes eat with other YM's in this room. Shift managers and utility staff are always on hand during meals, standing around the perimeter of the room, keeping a stern eye on things. Meals are orderly and quiet. Residents cannot move without permission, and all youth rise together, line up to empty their tray, and in file, quietly leave the dining area. The dining room has two openings to the corridor; one way is designated entry and the other is designated exit. In this way, two units cannot accidentally mix.

The Education Classrooms

The educational area occupies one of the central blocks in the activity/service core, separated from other areas by the grid-like corridor system. A central hallway pierces it, connecting it to two of the exterior corridors; the hallway widens to form an open lounge in the middle. The classrooms are disposed off this lounge and glazed to overlook it. The educational rooms are only used during the weekdays for school. Because the school comprises a contained block, it can be locked off when not in use. Thus, these classrooms are used only for one purpose, and only on a scheduled basis.

A Comment on the Interface

The strategy used at IND to deal with their segmented and dispersed spaces involves the separate use of each shared space by a unit on a rigidly scheduled basis. On the other hand, the housing units function rather autonomously, and informally. While the activity spaces are integrated spatially into the total system of spaces, they neither overlap one another nor are they visible from the control rooms or from the interlocking grid of hallways. They are spatially offset from the main circulation grids so it takes some purpose to move into them. Just as these rooms are spatially bounded, the activities which occur in them are temporally bounded. The scheduling insures that there is no overlapping of either activities or of social groupings in these spaces.

While this is the use pattern in the activity/service areas of the center, the use pattern of the housing units differs dramatically. There, the nodal spaces open off one another, gradually decreasing in size and privacy -- from the dayroom to the alcove to the individual room. Within these spaces and the shared TV room, different activities can occur simultaneously without impinging on one another. The residents thus have different levels, both physically and psychologically, to which they can repair without losing visible contact with others. This contact is in itself a safety measure.

The grouped arrangement of spaces around the centralized dayroom insures that staff in that general area can adequately supervise all separate activities. While this spatial arrangement works well with two staff persons on duty, because one can survey all areas from the workstation if the other moves through it, it works less well with one staff member. One staff member loses sight of other alcoves as he moves to one, and the dispersal of linen closets, laundry, showers, and so forth means that much movement on his part is necessary in order to maintain the unit. While it would be possible to keep the boys locked down more in their rooms, the practice seems to be for a staff member to instead move quickly and erratically up and down, in and around, so that the boys in any of the spaces do not know when and where he will be next.

The potential isolation of the housing units from the main activity points in the center is mediated somewhat by the placement of two units together. This spatial arrangement offers some triangulation of control, but because of scheduling, there are only a few times during the day that the units are both there. Thus, the IND housing units also offer an intermittent control lattice.

Potential social groupings beyond the unit, however, are discouraged by the spatial arrangement. The multiplicity of hallways means it is possible for several units to navigate the halls simultaneously without meeting one another. The separation of the activity rooms allows several units to recreate simultaneously, without ever mixing. The configuration, therefore, accommodates the large number of residents at IND, who for obvious reasons cannot all be grouped together. Residential social categories are therefore kept intact, with the only real mixing of youth from different units accorded to the best behaved youth. At the same time, however, relations with other social categories are also somewhat limited by the segmentation of the spaces and their rigid separation by the grid of corridors. Informal encounters with others are rare.

Thus, residents and staff share the same fate in IND. The spatial dichotomy noted in the last chapter seems mirrored socially. The social interface appears to be both internalized and polarized -- informal in the contained but internally open and visible housing units, more formal in the bounded and separated public areas. The spatial alternatives offered in the unit allows a variety of behaviors to both occur, and be seen to occur, simultaneously and seems to be accompanied by more informal and natural behaviors. On the other hand, in the spaces where encounters with others would most likely occur -- the public portions of the building -- rather overt measures are taken to control possible mixing. Movement and interaction is severely curtailed and activities are both contained and separated from one another.

5. Summary of Space Use

This chapter has looked at the relationship between space and behavior in the three detention centers under study. The three centers differ in their general usage of space. DEK mixes all residents and staff together in activity areas clustered under the purview of the control room. The spatial and visual overlap of these areas, and the fact that they are all under the general purview of the control room staff, seems to allow simultaneous activities and the mixing of genders and behavior levels to occur. Activities are, however, disproportionately spread between the spaces with more residents at one time in the dining and multipurpose rooms than anywhere else; most probably this is a function of size. Residents and staff move often between the clustered, but visually connected spaces, and often direct care staff are not even seen in resident occupied spaces. Spaces not under the purview of the control room are rarely used, however, except for the girls dayroom.

MAR, on the other hand, separates residents by several behavioral levels and dedicates separate spaces for their sole use. It also, however, centrally clusters use as much as its plan will allow. The two spaces adjacent to the control room are regularly used, albeit by separate groups with no overlap between them; the more distant spaces such as the activity room and the schoolrooms are used only intermittently by different groupings at different times. The dispersion of these spaces, and the separation of residents by gender or behavior levels, requires the scheduling of rooms for use.

IND offers a third option: a mixture of space use. Activities occur simultaneously in the clustered housing unit (like DEK) but the dispersed activity spaces in the public portions of the building are scheduled for use (like MAR). DEK and the IND housing units both offer a layering of activity spaces, albeit in different configurations, which allow smaller groupings to occur simultaneously, but all residents are still within the general purview of the total group and of staff. Generally, then, it might be said that space at DEK, and in the IND housing unit, is used to bring residents together, while still allowing them some separation, while space at MAR, and in the public portions of IND, seems to be used to separate residents into more heterogeneous social groupings.

These spatial groupings appear to impact the liveliness of the centers. DEK seems to be a boisterous hive of activity with residents and staff casually moving between the clustered activity areas. The visually connected spaces at DEK seem to actually hinder separation into small groups. Personnel from other categorical areas must pass through the main activity space, and residents have glimpses into non-detention areas through glazed windows and doors. Staff do not adopt a guarding role, holding themselves apart, but seem to move in and amongst the residents with great freedom. Indeed, DEK seems to truly practice direct supervision. There are few rules or enforcements about talking, mixture of groups, interactions with staff and so forth. There is also a great deal of equanimity about where staff or residents position themselves.

The exact opposite social situation exists at MAR where residents and staff are less active, occupy spaces more territorially, and are far more routine regarding movement and speech. Staff are more careful about guarding their back, rarely sitting within resident areas (except in the activity room), but grouping themselves as close to one another and the control room as the separation of spaces will allow. Staff intentionally place themselves in the most visibly advantageous position in the boys dayroom, and behind them, and place the residents in front and facing away from them where they can easily be seen but where residents can see the least. MAR separates their resident groups from one another, and from other areas such as administration and education. Only in the activity room is there some semblance of social mixture with staff and residents, and visiting personnel, interacting more freely over the variety of activities available there. Others presence and involvement adds to the interest and liveliness of this space.

IND again offers a mix. Staff, for example, move and sit with the boys in their dayroom and, occasionally, in the dining room for meals but residents never sit in staff areas. Life is rather informal in the housing unit, but more ritualized and prescribed in the more public portions of the building. Staff behavior also seems to change slightly with locale. In the housing unit, staff are generally moving in and around the boys, chatting while they go, while in the shared activity rooms they take the opportunity to hand their charges over to utility staff and take a break. The segmentation of spaces and scheduling does not offer a lot of opportunity for comradery among staff as it does at DEK and somewhat less at MAR. Thus, simplistically, a spatial equality of staff and residents seems to exist at DEK, a partial equality at IND, and a spatial inequality at MAR.

Staff movement also seems to be more comprehensive at DEK and IND than in MAR. Staff move often and quickly between the clustered activity areas, and sometimes no staff member is present in a space at all. Staff move far less often at MAR and mostly when required by the schedule to move to the dining or activity room. What movement there is, is between the adjacent control room or dining/multipurpose room.

Space seems to play a vital role in this pattern of movement. In both DEK and IND, the several layers of space, with residents simultaneously spread among them, requires the constant movement of staff to break any pattern of predictability and to assess the local situations. Staff in both these centers also say they intentionally move often, so residents never know where they will show up. This suggests that effective control under some conditions requires unpredictability rather than predictability. This is, for example, recognized in the Army, where controls over guards on duty are similarly randomized. The distributedness of the housing unit at IND, and the activity spaces at DEK, and their visual accessibility to staff in adjacent areas, make this type of movement possible. At MAR, however, there is no place to move while still keeping an eye on residents, even though the center itself is fairly distributed. Rings therefore seem to play a role in where and how often staff move.

Thus DEK, and to a lesser degree, IND physically contain residents in a major activity space while offering a "control lattice" through visibility of, and by, others. This offers another layer of control, rendering unnecessary the constant presence of staff within each space. The DEK rings also link every major category of user, any one of whom offers some potential for protection. In MAR, the situation is much less easy. MAR can neither truly contain residents except in the dining/multipurpose room nor does it offer visibility of others from any vantage points. Staff in the control room cannot fully survey the area they are responsible for (the multipurpose room) without turning their back completely on the other adjacent room. Each room therefore has its own controller with little visual overlap to other areas. Thus, an uneasy juxtaposition between space and society seems to exist in this center.

Detention spaces need a high level of supervision and control. The extended use of spaces seems tied to the perceived ease of control of those spaces, to the distributedness of the space, and, at least in DEK and IND, to the presence of a control "lattice" or network with other areas. As noted earlier, distributed spaces offer more than one way in and out of them. This can be a double-edged sword in detention space, however, in the sense that distributed spaces not only offer more avenues for resident elopement, but they also support more opportunities for surprise entry by staff and others. This applies even when visibility of rings is high -- staff can see residents on the points of the ring, and residents can see that staff are there. In DEK, the distributedness of the high use areas increases the opportunity for unscheduled encounters with the categorical groups surrounding them, while in MAR the distributedness of the dining/multipurpose room is contained by both the kitchen and the control room, while that of the boys dayroom offers avenues only into non-controlled spaces such as the girls corridor and the unoccupied activity room. Thus, the perceived need for more overt forms of control on the part of staff and the routineness of rules and regulations.

Control might be said to be a function of staff numbers. It is suggested, however, that numbers do not guarantee control. Both DEK and MAR have similar staff/inmate ratios per shift but use their staff in different ways based on their perception of control needs. Whereas DEK moves their two boys staff between the visually connected rooms overseen by one staff in control, MAR pairs the same number of staff together in the boys dayroom, while the staff member in control guards a separate room. IND has an even lower ratio than the above two facilities, often with only one staff in a unit. However, because the triangulation control effect applies, that one person gets some help from the staff in the adjoining and visible unit.

Thus, a clearer environmental picture begins to emerge. DEK and MAR seem to be at the far ends of a social and spatial continuum with IND fluctuating between them. Where space is structured to provide a discreet and triangulated form of supervision and control in terms of visibility, containment, distributedness, and the presence of a "control lattice", there seems to be a more informal life within. The connected layers of spaces can support simultaneous activities under the general purview of others. Spaces more understructured in these terms seems to be associated with a more formal prescription for behavior, with staff taking a more active role. Behavior seems to be over-proscribed in configurations offering restricted isovists, clear boundedness and separation from other activity spaces, and from other detention staff, as is the case in MAR and in the public portions of IND.

It is the function of space to act as a mechanism for regulating people and activities; the three different configurations seem to be associated with three different modes of space use and control. Space use is also not as deterministic as one would suppose from the literature on correctional facilities. While the configurations are planned to support a certain regimentation, in actuality life in juvenile detention centers offers more of a medium ground. The institutions studied fail to offer the clarity of use one would expect of detention centers and, in some cases, betray a level of activity and interaction that might be considered almost "normal". Some spaces seem to get used differently from expectations, while others go almost entirely unused. Regardless of design, some amount of informality seems to be acceptable and even wanted in these detention environments.

In summary, the description of space use suggests that where space is understructured in terms of its connections and visibility and fails to accommodate organizational requirements, behavior becomes more rigid because the pattern of space use has to enact spatial relationships not built into the fabric. Thus, if the boys dayroom is really spatially uncontrolled, the boys behavior in the room must be restricted and controlled. More to the point, staff will assume positions at points with strong isovists while boys will be faced away and inward. These "moves" establish relations of control otherwise not provided by the built fabric. Where space is well structured and readily accommodates basic organizational requirements, behavior seems to be somewhat more relaxed and normalized. Space provides a proscriptive role which would otherwise be the domain of staff. While these statements may seem to be an oversimplification at this point, they should be more clarified in the next chapter when space use is quantified and analyzed more systematically.

PART II: CHAPTER XI

ANALYSIS OF SPACE AND SPACE USE IN DETENTION CENTERS

1. Introduction

This chapter offers a quantitative, analytical description of each of the detention centers, following the same format as Chapter VII, the analytical chapter on the Alzheimer's unit. Data is derived from the behavior mappings and trackings conducted during the site visits to each center.

The same themes are raised as in the earlier, matching chapter: 1) the spread of movement and interaction and its relation to the interface between people; 2) the equality or inequality of staff and residents as a dimension of control; 3) the animation and continuity of foreground and background as a means of assessing awareness; and, 4) the practice of control as assessed through movement tracking of staff. While brief explanations are offered in this chapter, those already given in the earlier chapter are still applicable. Again, each facility is separately described; a final section summarizes and compares the findings for the three detention centers.

2. The DEK Unit

The Spatial Distribution of Behaviors

As with the Alzheimer's units in previous chapters, the following description of behaviors is based on behavior mappings of all persons visible to the observer within the public portions of the unit. The following chart tabulates the numbers of total persons and behaviors mapped over the four days of observation in DEK and then breaks them out by category.

Table 11.1: Behavior Mapping in DEK Showing More Sitting than Moving

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	3671	1534	2137	1202	467	735
Percentage of Total	*100.*	*.42*	*.58*	*.33*	*.39*	*.61*
Residents	2969	1119	1850	956	336	620
Percentage of Total	*100.*	*.38*	*.62*	*.32*	*.35*	*.65*
Staff	577	314	263	205	102	103
Percentage of Total	*100.*	*.54*	*.46*	*.36*	*.50*	*.50*
Others	125	101	24	41	29	12
Percentage of Total	*100.*	*.81*	*.19*	*.33*	*.71*	*.29*

In order to assess the general liveliness of the facility, the first issue examined is how much animation (movement over stasis) is there and how much talking? Overall, of the 3,671 total persons mapped and aggregated, more than a third were moving (42 percent) in this detention center. Looking at the categories, 38 percent of the residents move. Staff, somewhat naturally, move more (54 percent) than they sit, but not much more, while others move even more (81 percent). Thus, residents move almost as much as the aggregate while staff and others move more.

DEK is also fairly interactive with a third of all persons (33 percent) engaged in talking. This time, residents, staff , and others are fairly similar with 32 percent of all residents talking, 36 percent of all staff, and 33 percent of all others. Thus, in comparison with the earlier Alzheimer's units, there is not a great deal of difference in talking between staff and residents. Whether residents talk more because they are more restricted in terms of movement, or because they are teenagers, is not ascertainable. The fact is, they seem to talk almost as much as anyone else.

Talking overall is more associated with sitting than with moving (61 percent); in fact, it is about proportionate. Residents follow this trend by talking in about the same proportion as they sit (65 percent), which is somewhat expected since residents are not allowed to move around on their own. Staff and others go against the overall trend, however, with talk equally divided between movement and sitting; others talk far more while moving (71 percent). Talking, however, is fairly proportionate to moving and sitting for all groups; thus, talking seems to be fairly pervasive no matter what activity one is engaged in.

Though inequalities between residents and staff are expected in a detention center, the evidence so far is that residents sit more while staff move and talk more. The following figures, however, better illustrate the spread of movement and stasis.

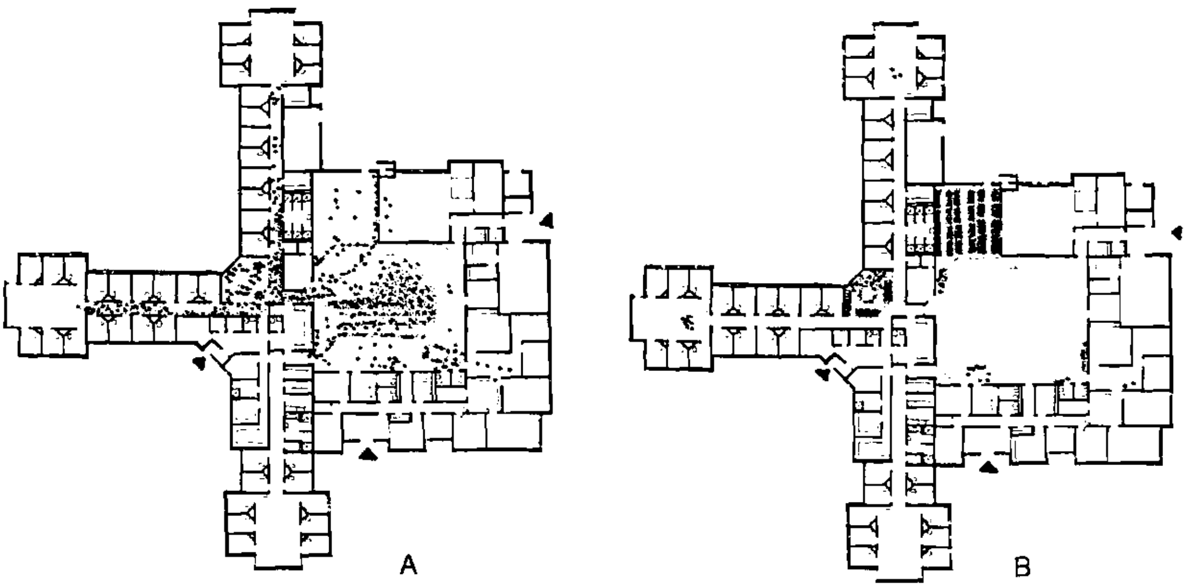


FIGURE 11.1: (a) Resident Movement and (b) Sitting at DEK in Areas Around Control

As Figure 11.1a illustrates, residents move all over the main activity areas, with the highest densities clustered in the areas immediately around the control room where visibility by control staff is highest. There is less movement in the dining area and in the educational rooms, and practically none in the poorly visible dayrooms at the far end of the housing wings. Figure 11.1b shows that sitting is largely confined to certain areas such as the dining room and the dayroom -- the only rooms which actually have furniture to sit in. Where there is sitting in the multipurpose room, it is around the perimeter of the room and in relation to staff position points. This may be because of the size of the room and the fact that it functions primarily as an indoor exercise area for the youth.

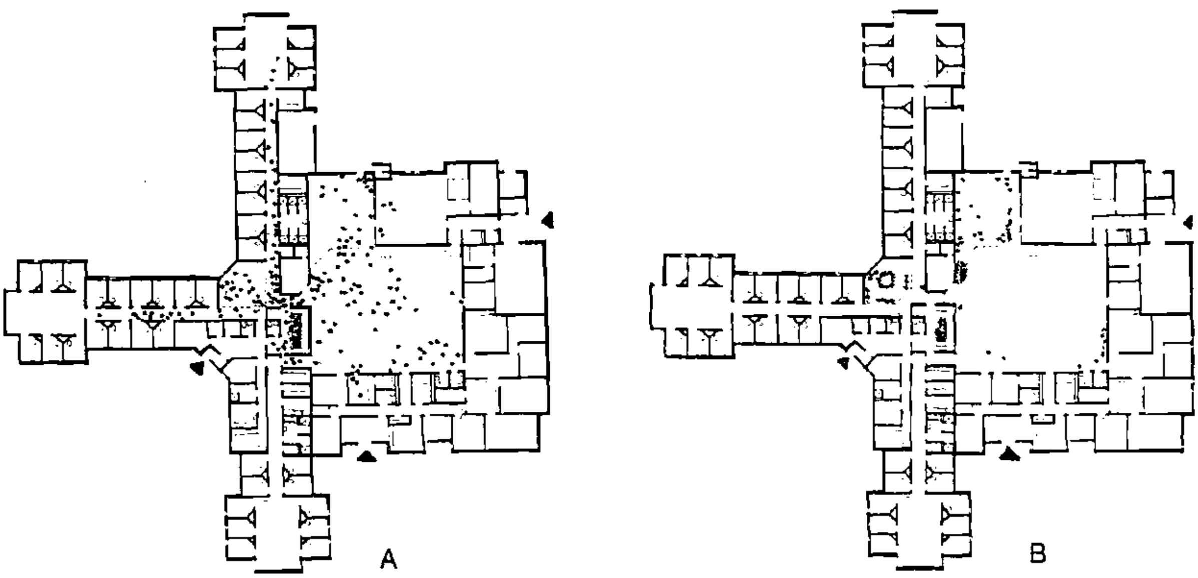
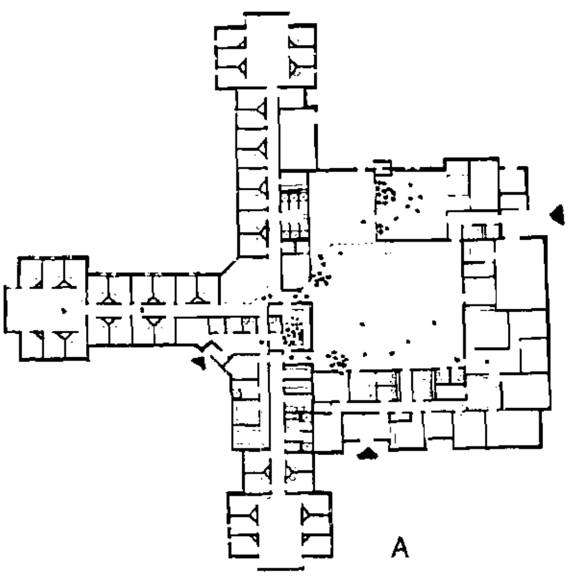


FIGURE 11.2: (a) Staff Movement and (b) Sitting in DEK Evenly Spread

The range of staff movements are similar to those of residents with a fairly even spread over the detention areas (Figure 11.2a). While there is much staff movement and sitting in the control room, this is because this post is generally manned by the supervising YDW. Otherwise, there is no standing group of staff anywhere, which suggests that they are on the move most of the time. There is much movement between the multipurpose room and the boys dayroom which further suggests the reciprocal use of those areas.

A comparison between resident and staff mappings shows that residents tend to occupy the center of rooms more than do staff, who show some tendency to hug the walls. The comparison also shows, however, that residents freely occupy staff areas such as the staff tables in both the dayroom and the multipurpose room and that staff often occupy resident areas, both in the dining room and in the dayroom. This phenomenon underscores the relative balance of use of areas similar to the balance of views in this center noted in an earlier chapter.


A

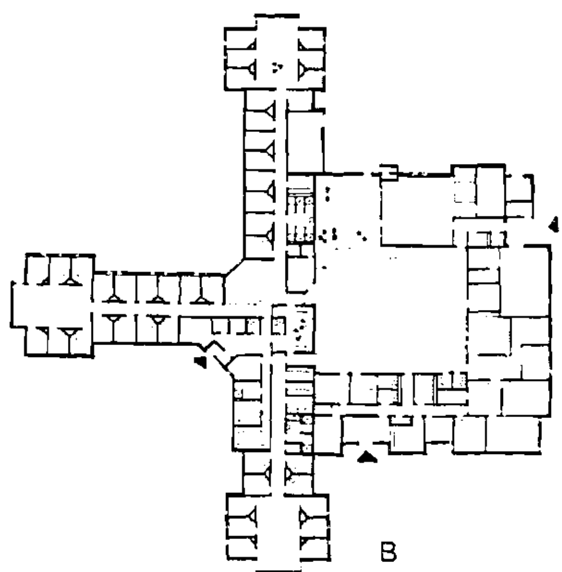

B

FIGURE 11.3: (a) Other Movement and (b) Sitting in DEK

Since scheduled visiting hours were not recorded in any of the centers, others densities are attributable to service and administrative personnel and the occasional volunteer. Other movement is not only less dense than staff and residents but also more restricted, with movement mostly in the control room, around the periphery of the multipurpose room, in the kitchen, and sometimes in the boys housing wing. The high degree of movement over stasis is indicative of the relatively short time visitors and others spend in the detention areas.

Overall, these timed mappings of the use of spaces illustrate the relatively even density patterns intuitively sensed in this center, and the clustering of use in the areas immediately surrounding the centralized control room, and under its purview.

The Animated Isovists

Detention centers largely proscribe behavior and control movement, so residents cannot move as much or as freely as they would like. Their spaces are also expected to be more bounded than those in the Alzheimer's units in order to better contain the movement of the detainees. Therefore, "background" would be expected to be more critical in terms of awareness of activities or others beyond.

As with the Alzheimer's facilities, an animation quotient was determined for both the behaviors in spaces and behaviors seen in the isovists from those spaces. The ratio of moving to sitting quickly gives a sense of the proportion of foreground and background and the proportion of one behavior over another. The following table illustrates two data points: 1) how much background there is (the proportion of people IN to OUT), and 2) the animation of foreground and background. Again, the closer the ratio is to "1", the more balanced; the farther away from "1" , the less balanced.

As the table shows, the background is more populated than the foreground with exactly twice as many people seen beyond as within a space (ratio = .50). The animation (moving to static) ratio, however, is higher for foreground than background, meaning that the background is less animated. Both foreground and background have more sitting.

Looking at the categories, the background is similarly populated for residents, staff and others (.50, .49 and .48). Thus, residents and staff both have similar proportions of their own category seen in the background so to residents it does not look overpoweringly full of staff in relation to residents and to staff it offers a reassurance of cover beyond.

Table 11.2: IN/OUT and Animation Ratios for DEK Showing More Populated Background and Animation Balanced IN and OUT

	All Persons	*Residents*	*Staff*	*Other*
IN/OUT	.50	.50	.49	.48
	3671/7367	2969/5937	577/1170	125/260
Moving or Standing/Static				
IN	.72	.60	1.19	4.2
	1534/2137	1119/1850	314/263	101/24
OUT	.64	.51	1.26	4.7
	2863/4504	1996/3941	653/517	214/46

In terms of animation, the background is less animated for residents but more animated for staff (.51 to .60 in for residents and 1.26 to 1.19 in for staff). Residents, however, are characterized by sitting IN and OUT, while staff are characterized by moving IN and OUT. Thus, because their foregrounds are relatively more animated, residents would not feel overly restricted being in the space they are in, while staff see a moving, and active, cover beyond them. Others are more balanced IN to OUT but show a bias to OUT, like staff.

Put simply, for all categories in DEK, the background is about twice as populated as the foreground, and slightly more animated for staff and others; for residents the background is slightly less animated. Overall, while residents sit more and staff and others move more, the animation level IN and OUT is relatively balanced for all (rounded off to .70 and .65). Thus, one would experience no great feelings of restriction in being inside a space -- there is a background of animation inside and outside.

The Animation of Activity Spaces

While the composite of spaces in DEK are fairly animated, how well animated are the individual activity spaces and where are the people? As with the earlier Alzheimer's units, the animation both within the activity spaces and within their isovists are represented by ratio for a quick assessment of the animation of these spaces and for the continuity of IN and OUT (see Table 11.3). As before, the closer to "1" the ratio is, the more balanced are moving and stasis; the farther from "1", the more imbalanced.

In terms of the IN/OUT ratio, there is no single space that offers even populations IN and OUT. Dining and Boys Dayroom have more people in than out with ratios over 1.0 while the multipurpose and halls have more people out. In terms of animation, there is another split. While the dining room and the boys dayroom have more sitting in, more moving is seen beyond. The multipurpose room is characterized by moving in and sitting beyond. The boys halls are moving in and moving out. Finally, the control room shows the experience of moving in it but views of sitting out.

The chart illustrates that different experiences are available from different rooms; one might even say there is some variety of experiences especially given the movement patterns shown previously which show high, and largely reciprocal, use of the dining and multipurpose room. Thus, sitting in the dining area is balanced by views out of moving, and vice versa. While balance between movement and stasis is not generated within any space or within any isovist, it is achievable in the visual linking of foreground and background possible because of the overlapping of these spaces.

Table 11.3: The Ratio of Animation in Activity Spaces in DEK

	Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Multipurpose					
IN	*3.2*	808	252	1060	*.59*
OUT	*.22*	325	1481	1806	
Dining					
IN	*.07*	96	1381	1477	*1.51*
OUT	*3.01*	736	244	980	
Boys Dayroom					
IN	*.40*	179	444	623	*1.4*
OUT	*3.66*	351	96	447	
All Boys Halls					
IN	*143.*	286	2	288	*.36*
OUT	*1.27*	442	349	791	
Control Room					
IN	*1.71*	84	49	133	*.07*
OUT	*.52*	661	1270	1931	

If spaces are viewed as residents and halls as staff, then halls view moving while only one of the three resident spaces views sitting -- the multipurpose room. However, because the multipurpose and dining room are really one continuous space, used reciprocally, both residents and staff share similar views of moving. Views beyond, therefore, help to balance experiences within spaces which are in themselves imbalanced. Not only is a full spectrum of behaviors visible in the background but the different experiences to be gained in the different spaces lend variety to detention. Were there no views beyond, life would be quite one dimensional in any of these spaces.

Correlations Between Behavioral Variables

The same correlations were run for the detention centers as for the Alzheimer's units (see composite table of all correlations in APPENDIX K). In DEK, 18 public spaces comprise the data base for the correlations. Locked closets, bathrooms, and resident rooms are not included. Again, scattergrams were checked for pattern (APPENDIX L).

Density and Liveliness. Again, as gross indicators of liveliness, it is asked if movement and interaction vary in proportion to the numbers of people in a unit.

Correlations for density and TALK are equally strong for TOTAL, OUT, and IN (.99 at .0001 for all). While MOVE TOTAL is also strongly correlated (.99 at .0001), MOVE OUT and MOVE IN are slightly less so (.81 and .63 at .0001 and .0055). Correlations for TALK are thus stronger than for MOVE, which seems logical in a detention setting where the majority of people do not have free movement but do talk. Correlations for external (OUT and TOTAL) variables are stronger than internal for MOVE but the same for TALK. Thus, movement correlates with talk everywhere but is stronger in larger isovists.

Table 11.4: Correlations Between DENSITY of ALL PEOPLE and ALL MOVING PEOPLE and ALL TALKING PEOPLE in DEK: Density is Correlated More Strongly With Talking and Then with Moving

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN-DENSITY	.63	.99
ALL PEOPLE	*.0055*	*.0001*
OUT-DENSITY	.81	.99
ALL PEOPLE	*.0001*	*.0001*
TOTAL-DENSITY	.99	.99
ALL PEOPLE	*.0001*	*.0001*

Movement and Talking. The densities of movement and talking in DEK are correlated for ALL PERSONS IN, OUT and TOTAL to see if these are related.

MOVE and TALK densities are most strongly correlated in TOTAL (.95 at .0001), then for OUT (.79 at .0002), and then for IN (.75 at .0006). Movement in general, therefore, generates talking, and the correspondence is slightly stronger in spaces showing more people in the background.

Table 11.5: Correlations Between MOVE and TALK in DEK (*Excluding One High Outlier): Movement is Associated with Talking

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL-ALL MOVE
IN-ALL TALK	.75* *.0006*		
OUT-ALL TALK		.79 *.0002*	
TOTAL-ALL TALK			.95 *.0001*

Foreground and Background. The foreground is more animated, overall, than the background in DEK. A simple measure of the critical margin that background offers is how well behaviors inside spaces relate to behaviors in the isovists.

There are no correlations in DEK for the density of ALL PEOPLE IN and OUT, nor any correspondence between the densities of moving, sitting and talking in foreground and background. Thus, in DEK, moving, sitting and talking seem to occur independently of background.

Table 11.6: Correlations Between IN and OUT Behaviors in DEK: No Correlations

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN-MOVE	.14 *.6038*			
IN-SIT		.08 *.7598*		
IN-TALK			.08 *.8425*	
IN-ALL PEOPLE				.1 *.7028*

This suggests that behaviors are so arranged that there is little distinction between background and foreground and thus an almost complete openness between spaces. As shown by the animation of key activity spaces, activities proscribed in one space are different from what happens in another space.

Correlations Between Configurational Variables and Space Use

Square Footage/Isovist and Density. As with the Alzheimer's units, the size of spaces and the size of isovists (SQFT) is correlated with densities IN, OUT and TOTAL to see if larger spaces (and their isovists) are more densely occupied and more interactive.

There are no significant correlations between size of space or isovists and densities on the first test where all spaces are included. Only SIT in TOTAL is weakly correlated on the second test. Thus, it appears that people in DEK have no accelerated preference for larger spaces or spaces more viewable from others, or are not allowed to exercise this preference.

Table 11.7: (a) Correlations Between SQFT and SQRT DENSITY in DEK and (b) Excluding O's on SQRT: No Correlations

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.22	.16	.26	.24	.04	.009	.04	.06
	.371	*.5192*	*.2986*	*.331*	*.9061*	*.9775*	*.9222*	*.9068*
OUT-SQFT	.29	.34	.3	.16	.02	.12	.004	.19
	.2559	*.1783*	*.2436*	*.551*	*.9607*	*.7374*	*.9988*	*.6033*
TOTAL-SQFT	.19	.12	.19	.27	.4	.04	.41	.58
	.459	*.6473*	*.4463*	*.2762*	*.1952*	*.9038*	*.1852*	*.0496*

Connectivity and Density. The local syntactic measure of connectivity (CON) was correlated with densities to determine if more spatially connected spaces are associated with more movement, stasis, or interactions in them or in their isovists.

Correlations between CON and densities are strong for ALL PERSONS TOTAL, and OUT (.58 and .55 at .0116, and .0228), strengthening on the second test. The correlation of CON for densities IN is weaker, falling apart on second analysis. Thus, there is only a tendency between CON and the density of people overall, with correlations stronger for external than internal densities.

Correlations for MOVE TOTAL and MOVE IN with connectivity are also strong (.67 and .62 at .0024 and .006), surviving the removal of highest outlier and unused spaces in all three tests. The correlation of CON with MOVE OUT is weaker, losing significance on the second test. Correlations between TALK and connectivity are also strong for IN, OUT, and TOTAL (.58, .56, and .59 at .0109, .0205, and .0094); with values getting stronger on the second test. Correlations for SIT OUT and SIT TOTAL and CON are also strong (.56 and .55 at .0185 and .0174), again strengthening on the second test.

Table 11.8: (a) Correlations Between CON and SQRT DENSITY in DEK and (b) Excluding O's on SQRT: Connectivity is Correlated with Talking, Moving, and Sitting

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.59	.67	.58	.38	.54	.64	.68	.33
	.0108	*.0024*	*.0109*	*.1238*	*.0697*	*.024*	*.0156*	*.4682*
OUT-CON	.55	.48	.56	.56	.86	.56	.88	.9
	.0228	*.0535*	*.0205*	*.0185*	*.0003*	*.0591*	*.0002*	*.0004*
TOTAL-CON	.58	.62	.59	.55	.72	.68	.74	.70
	.0116	*.006*	*.0094*	*.0174*	*.0081*	*.0161*	*.0057*	*.0156*

The correlations are strongest and most consistent for the measure of TALK, followed by MOVE, and then by SIT. Correlations for external densities are stronger than for internal densities. In DEK, more connected spaces predict more dense talking, moving and sitting in their isovists than in the spaces alone. Even though behaviors are programmatically directed for the most part, they show some consistent correspondence with this attribute of space.

Integration and Density. The integration of spaces (1/RRA), the global variable expressed most through movement, is correlated with behavioral densities in order to see if more integrated spaces (and their isovists) are more densely occupied and generate more movement, talking or sitting.

In DEK, integration and density of ALL PERSONS IN are moderately correlated (.49 at .0377), improving on second analysis. Integration is also correlated with MOVE IN (.63 at .0052), again increasing on the second test; there is a weaker tendency with TALK IN, showing a significant correlation only on the second test.

Table 11.9: (a) Correlations Between 1/RRA and SQRT DENSITY in DEK and (b) Excluding O's on SQRT: Integration is Associated with Moving and Talking, the More Interactive Variables (* See APPENDIX L for Scattergrams)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.49	.63*	.46	.26	.77	.79*	.74	.16
	.0377	*.0052*	*.0572*	*.2908*	*.0032*	*.0013*	*.0086*	*.7249*
OUT-1/RRA	.14	.07	.15	.22	.43	.18	.44	.43
	.5896	*.7876*	*.5708*	*.3872*	*.1611*	*.5771*	*.1482*	*.2112*
TOTAL-1/RRA	.19	.19	.20	.22	.36	.009	.23	.36
	.4624	*.4602*	*.4377*	*.3722*	*.25*	*.979*	*.4909*	*.2736*

Thus, whereas local connectivity is correlated more strongly for external densities, integration, the more discriminating spatial variable, is significantly correlated only for the more interactive behaviors (MOVE and TALK) inside spaces. Spaces which are well integrated are denser overall, and generate more moving and talking, an exhibit of the probabilistic aspects of space. Movement and interaction are driven, therefore, by local connectivity and global integration, but not by the size of the space or the isovist. Sitting does not appear to be related to integration which is understandable in a restricted environment where sitting is perhaps the most programmatically driven behavior.

The Practice of Control

The pilot study suggested that staff movement seemed to generate more staff interactions with residents and *vice versa*. Therefore, as with the Alzheimer's units, staff were tracked in conjunction with the behavior mappings and a record was made of the number and kind of interactions occurring between staff and residents during six minutes of each fifteen minute mapping segment. The Table 11.10 illustrates the mean interactions and their correlations with the average linear feet walked by the staff tracked over the tracking periods.

DEK has approximately 160 linear feet of corridor space in the two boys housing wings, including the passage through the dayroom to the multipurpose room. On average, staff walked 201 linear feet per six minute tracking segment, or a ratio of 1.26 if taken as a proportion of total available corridor length; staff walk on average more, then, than the available corridor length during each segment. As the table shows, staff averaged more initiations to residents than residents to staff but overall, the average of 9.6 interactions per tracking segment is higher than any of the Alzheimer's units. It seems somewhat surprising that there are more general comments than directives in a detention setting (both for staff and residents), but talk in general is seen as an aid in reducing potential frictions, as was indicated by the emphasis on the expressiveness dimension in the Moos measurement of social climate. Staff and residents talk far more than staff talk to others. All staff to resident interactions are correlated (at .396, .217, and .381 at .0001, .0111, and .0001), and resident to staff directives and total interactions are more weakly, but also significantly, correlated (.321 and .199 at .0001 and .0204). All resident/staff interactions together are correlated (.34 at .0001), as are all interactions of any kind (.344 at .0001).

These correlations, though moderate, suggest that staff movement in DEK is positively associated with an ongoing exchange from staff and residents and, reciprocally, from residents to staff. Thus, staff movement, as well as movement in general, is associated with interaction. In this center, particularly, residents seem to talk freely with staff and the correlations in this direction suggests that residents may actually be seeking out interactions rather than waiting for staff to talk to them in their peripatetic control mode. Peripatetic control may direct "business" related interactions but it also seems to open opportunities for more interactions in general.

Table 11.10: Means and Correlations between Linear Feet Staff Walk and Interactions: Showing Correlation Between Staff Movement and Interactions with Residents and All

	Mean	r Value	Significance
Linear Feet Walked	201		
Staff to Resident			
Directive/Question	2.5	.396	.0001
Comment	3.1	.217	.0111
Total Interactions	5.6	.381	.0001
Resident to Staff			
Directive/Question	1.7	.321	.0001
Comment	2.3	.023	.7872
Total Interactions	4.0	.199	.0204
All Resident/Staff Interactions	9.6	.34	.0001
Staff to Staff	.82	.078	.3696
Staff to Others	.15	.033	.705
All Interactions	10.6	.344	.0001

Summary

To summarize the findings in DEK, there is a clustering of use in spaces under the purview of control, the background is more populated than the foreground, and while the animation is fairly balanced, on average, between IN and OUT, it is also differentiated by space. There is a fairly high degree of talking with residents talking almost as much as staff. There also seems to be a balance of behaviors within with views of opposite behaviors out which offers some behavioral differences between spaces, and animates the background. Relations seem to be more informal than formal, as exhibited by the homogeneous use of space by residents and staff, and the higher number of casual contacts over maintenance contacts as found on the trackings. There is a clear correlation between movement and interaction, established first through the correlations and then through the tracking of staff. In general, greater density also generates more movement and interaction.

The variable for direct visual access, the size of space and isovists, shows no correlation with densities. However, the local and global variables best understood through movement, connectivity and integration, are correlated with densities. Connectivity is more correlated with external densities, and more particularly with densities of TALK, then MOVE, and then SIT, while integration is only correlated with internal densities, more particularly with densities of MOVE, and more weakly with TALK. Talking is more consistently correlated with connectivity, while walking is more strongly correlated with spatial integration. Sitting is the least spatially dependent behavior.

2. The MAR Unit

The Spatial Distribution of Behaviors

The following table summarizes the numbers of total persons and behaviors mapped over the four days of observation in MAR and then breaks them out by category. Of the 3,015 persons mapped and aggregated, over two-thirds sit (69 percent). When the categories are distinguished, it appears that both residents and staff follow this trend. While residents sit even more than the aggregate (74 percent), staff sit almost as much as they move (49 percent). Others, predictably, sit far less than they move

(26 percent), generally just passing through spaces on their way elsewhere or, as described earlier, standing as additional cover for staff during activity periods.

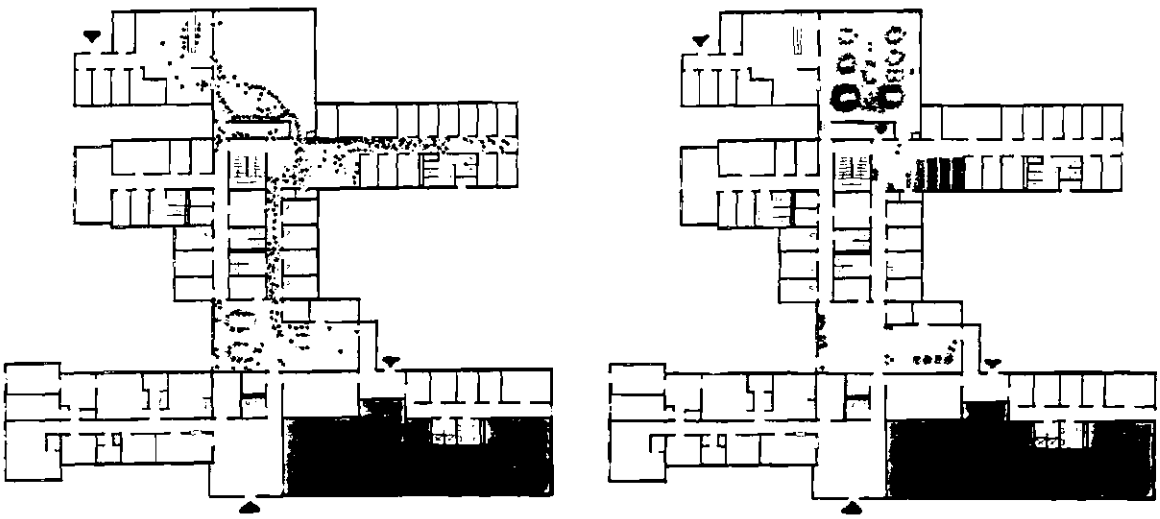
Table 11.11: Behavior Mapping in MAR Showing Far More Sitting than Moving

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	3015	939	2076	740	213	527
Percentage of Total	*100.*	*.31*	*.69*	*.25*	*.29*	*.71*
Residents	2470	641	1829	610	141	469
Percentage of Total	*100.*	*.26*	*.74*	*.25*	*.23*	*.77*
Staff	468	241	227	108	56	52
Percentage of Total	*100.*	*.51*	*.49*	*.23*	*.52*	*.48*
Others	77	57	20	22	16	6
Percentage of Total	*100.*	*.74*	*.26*	*.29*	*.73*	*.27*

How interactive in MAR? Relatively little, as only a fourth of all persons are talking (25 percent). However, residents and staff talk about the same amount as the aggregate, while others talk a bit more. Thus, in terms of inequalities, while staff move more than residents and therefore may have the overview, they talk in the same proportion as residents. Others talk slightly more. Talking occurs in almost balanced proportions to sitting (71 percent), with a similar trend for residents, staff, and others.

Thus, in MAR, sitting predominates overall, with only others going against this trend; talking is neither the prerogative of staff or residents, but occurs rather in proportion to behavior.

How are these behaviors spread? Figure 11.4a and b illustrate the density and spread of resident movement and stasis. Residents are shown to move mostly in the corridors or in a line on the periphery of the dining/multipurpose room. There is little free movement into the interior of the room. There is a tendency toward a denser, occupational use of the dining/multipurpose room, the dayroom and the activity room, rather than toward any freedom of movement on the part of residents.



A B

FIGURE 11.4: (a) Resident Movement and (b) Sitting at MAR: Movement and Sitting Proscribed

The stasis map shows the rigid location of seating in the three main areas, but especially the dayroom, and the fact that the residents in the multipurpose room sit at the tables closest to the control room (where they can be watched more closely from the control room). There is also a small cluster of residents in the control room using the telephone under the eyes (and ears) of the control officer. Comparing these two mappings, it is evident that movement is almost totally restricted to corridors and both moving and sitting are rigidly proscribed in more open areas.

Staff movement and stasis is shown in Figure 11.5a and b. Except for the activity room, staff move around the edges of rooms and cluster near the control room (against the walls rather than out in the open in large spaces). The static mapping is even more revealing, showing the clustering of staff near control in the dayroom and the relatively small presence of seated staff in the dining/multipurpose room. Residents, instead, are mainly watched from the control room.

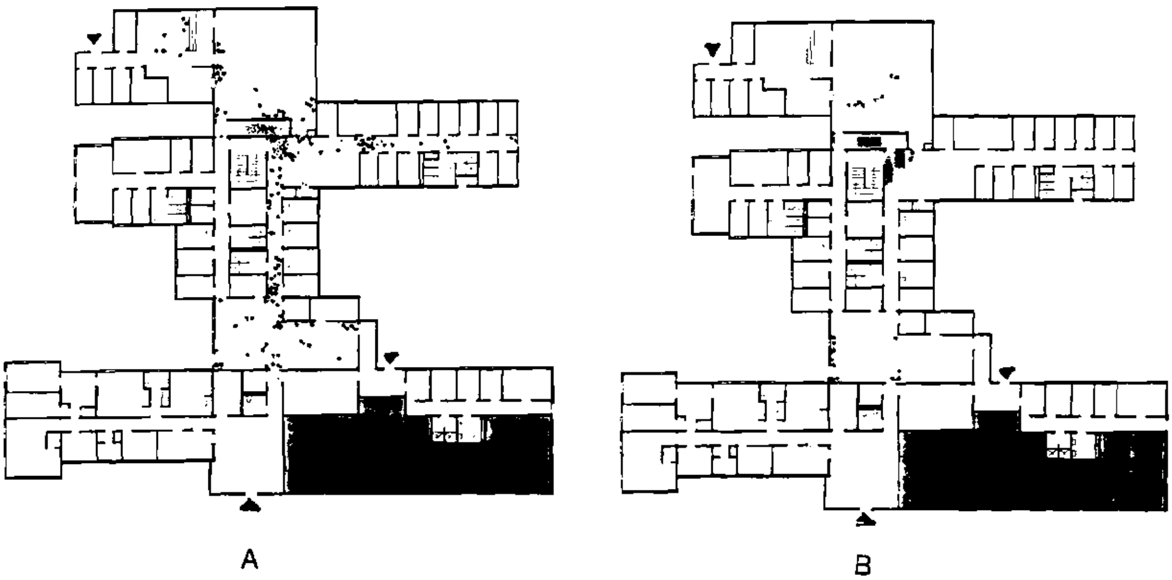


FIGURE 11.5: (a) Staff Movement and (b) Staff Sitting in MAR: On the Edges

Comparing the staff mappings with those of the residents, it is evident that there is little mixing of residents and staff in sitting areas, except in the control room where residents use the only phone in the area. Staff sit in dedicated spaces as do residents, and they always sit in the same areas -- suggesting a social separation between residents and staff and an inequality of use.

Other movement (Figure 11.6a) tends to be through spaces with only occasional sitting occurring within spaces. Movement is concentrated in the activity room (where others "back up" the staff when this room is in use) and the dining and control room. Very few others sit in resident areas (those shown are primarily case workers meeting with their charges in the dining room under the purview of staff in control). Very few administrative personnel are seen in the detention part of this facility.

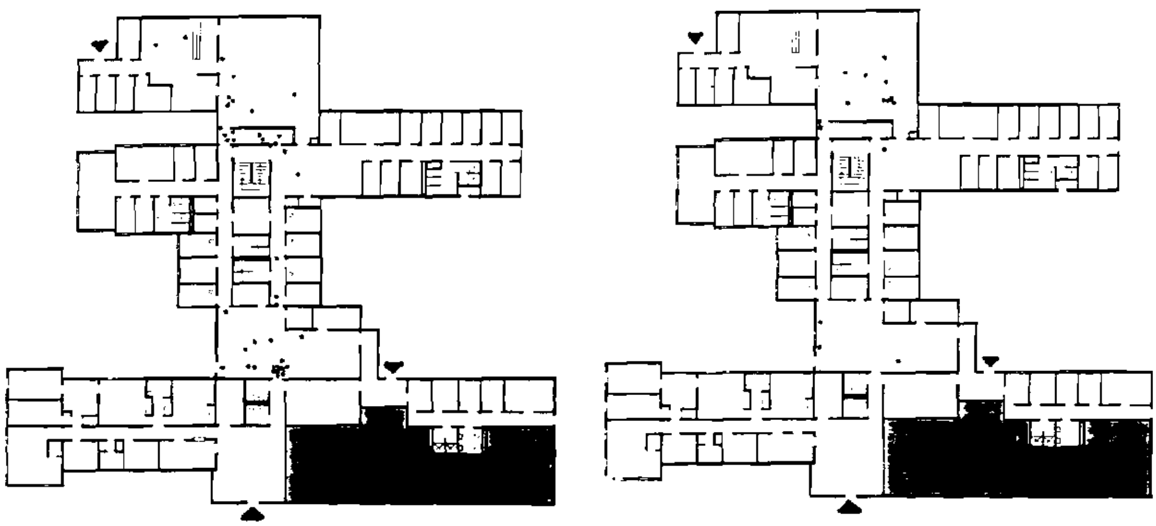


FIGURE 11.6: (a) Other Movement and (b) Other Sitting in MAR

These mappings illustrate the separation between staff and residents, the territorialized use of areas, and the regulation of behaviors noted in the last chapter. Staff areas are clearly different from resident areas, but there is no single, protected space strictly dedicated to staff; the control room is largely a place of passage and the location of the resident phone. Thus, in the absence of a dedicated, bounded space for staff, territorialization occurs in the open which seems to involve some behavioral tensions.

The dining/multipurpose room and the dayroom are clearly biased toward sitting, with movement in them based on the dining hour. Staff sit almost as much as they move and indeed, in this floor plan they do not need to move to survey the residents they are in charge of. Overall, the concentration of movement and stasis is near the spatial center of the unit which is also the hub of activity and the intersection of the integrated core.

The Animated Isovists

Again, the IN/OUT and animation quotients are given for foreground and background. The closer the ratio is to "1", the more balanced are the behaviors; the farther away from "1" , the less balanced.

In this center, the foreground is more populated than the background; the ratio of 1.25 means that for every one person in the background there are 1.25 persons in the foreground. The animation ratio for all persons shows more moving in the background than in the foreground (.63 to .45), even though overall there is more sitting. Given a general proportion of moving/static, if the OUT component is more animated than the IN, then the isovist extends to cover the more "lively" areas beyond at the expense of the less lively. Inn MAR, the "critical margin" is indeed "critical"; the isovist "picks" the external activity rather than merely the external "presence".

Table 11.12: IN/OUT and Animation Ratios for MAR Showing More Populated Foreground and More Animated Background

	All Persons	*Residents*	*Staff*	*Other*
IN/OUT	1.25	1.40	.81	1.12
	3015/2408	2470/1759	468/580	77/69
Moving and Standing/Static				
IN	.45	.35	1.06	2.85
	939/2076	641/1829	241/227	57/20
OUT	.63	.50	1.01	3.1
	930/1478	586/1173	292/288	52/17

In terms of the three categories of users, background is different for residents and others than it is for staff, a fact expected by the strategic positions in which staff place themselves. Residents see fewer residents in the background than they do in the spaces they are in (1.40 in to every 1 out), while staff see more staff in the background than than do in the foreground. Others, in this case, are similar to residents, seeing fewer of themselves beyond than IN. Thus, proportionately, residents are more disadvantaged than staff.

In terms of animation, however, the background and foreground are similar for staff (ratios of 1.01 and 1.06) with both having more moving. Residents, however, though they see fewer residents in the background, see more animation, even though the overall preponderance in foreground and background is with sitting. This suggests an imbalance in use between spaces that could contribute to a sense of separation. Others see more animation in the background, like staff.

Overall, MAR can be characterized as having a more populated foreground but a more animated background, but still with an overall preponderance toward stasis. Residents and others have more populated foregrounds while only staff see more of their own category beyond. For residents, neither foreground nor background are very animated, although the background is more so, while for staff and others the opposite is true. There is thus a difference in views, a difference in continuity of IN and OUT, and a difference in behaviors with sitting, for residents, far outweighing movement. Talking throughout is proportionately similar in degree for all categories.

The Animation of Activity Spaces

Again, one must ask how well used and animated are the individual activity spaces. The animation and IN/OUT ratios for MAR are shown in Table 11.13. As before, the closer to "1" the ratio is, the more balanced or continuous.

It is clear from the IN/OUT ratios (all over 1.0) that all resident activity spaces show more foreground, while halls and the control room (staff controlled) show more background. Thus, there is no critical margin for residents until they move in the halls, or go to the control room to use the phone. Sitting predominates in the two main resident areas of multipurpose room and the boys dayroom, while only the halls and the little used activity room, have more moving. The isovists, as noted before, are different for different categories of residents with the higher level boys and girls in the multipurpose room looking out to more moving (in the control room and kitchen), while the lower level boys in the dayroom, when the control room door is open, see only more sitting by those in the multipurpose room. Thus, isovists differentiate behavior levels and well as categorical groupings, but overall it is more of the same.

Table 11.13: The Ratio of Animation in Activity Spaces in MAR

	Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Multipurpose/Dining					
IN	*.16*	147	912	1059	*5.27*
OUT	*1.48*	120	81	201	
Boys Dayroom					
IN	*.25*	222	885	1107	*6.29*
OUT	*.40*	50	126	176	
Activity Room					
IN	*1.58*	281	178	459	*459.*
OUT	*0*	0	0	0	
All Boys Halls					
IN	*195*	195	1	196	*.63*
OUT	*.77*	134	175	309	
Control Room					
IN	*.66*	66	100	166	*.16*
OUT	*.20*	173	879	1052	

MAR's activity spaces are bounded spaces severely constricting the level of experience to life within them -- life which , except for the activity room which is only in use one or two hours a day, is heavily weighted toward stasis. It seems fair to surmise that life is fairly tepid here and very much limited to the space one is in. There is not much background available to expand the range of experience, and what is there belongs largely to staff.

Correlations Between Behavioral Variables

In MAR, 16 public spaces comprise the data base for the correlations. As with DEK, locked closets, bathroom and residents rooms are not included.

Density and Liveliness. As a gross indicator of liveliness, it is asked if movement and interaction vary in proportion to the numbers of people in spaces.

TALK is more strongly correlated with TOTAL DENSITY than is MOVE, but correlations are equally strong for TOTAL, OUT and IN (.98, .99, and .97 at .0001). MOVE is also strong and correlated with density for TOTAL, then IN, and then OUT (.87, .77, and .72 at .0001, .0005, and .0016). In general, greater density generates more talking and then more moving in MAR.

Table 11.14: Correlations Between DENSITY of ALL PEOPLE and ALL MOVING PEOPLE and ALL TALKING PEOPLE in MAR: Density of People is Correlated with More Talking and More Moving

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN-DENSITY	.77	.97
ALL PEOPLE	*.0005*	*.0001*
OUT-DENSITY	.72	.99
ALL PEOPLE	*.0016*	*.0001*
TOTAL-DENSITY	.87	.98
ALL PEOPLE	*.0001*	*.0001*

Movement and Talking. For further corroboration, movement and talking IN, OUT and TOTAL at MAR are correlated to see if movement, in general, relates to talking.

As Table 11.15 shows, MOVE and TALK are more strongly correlated for OUT, then TOTAL, and then IN (.86, .81, and .63 at .0001, .0001, and .0093). Movement, in general, therefore predicts interactions with others, but particularly so in large isovists.

Table 11.15: Correlations Between ALL PEOPLE MOVING and ALL PEOPLE TALKING in MAR: Movement Predicts Talking

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL - ALL MOVE
IN-ALL TALK	.63 *.0093*		
OUT-ALL TALK		.86 *.0001*	
TOTAL-ALL TALK			.81 *.0001*

Foreground and Background. The background in MAR is more animated than the foreground. This correlation generally asks if densities in the background are associated with densities in the foreground.

There are strong correlations for the density IN and OUT of ALL PERSONS, and of SIT (.79 and .81 at .0004 and .0003). While the correlation for MOVE IN and OUT is also significant (.57 at .0267), the scattergram looks bad.

Table 11.16: Correlations Between IN and OUT Behaviors in MAR: Sitting In Spaces is Associated with Sitting Seen Beyond Spaces

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN-MOVE	.57 *.0267*			
IN-SIT		.81 *.0003*		
IN-TALK			.46 *.0864*	
IN-ALL PERSONS				.79 *.0004*

These correlations suggest that total density and, more especially, sitting in spaces corresponds with total density and sitting seen beyond spaces. While this seems to be counterintuitive because of the lack of isovists to other areas, it may be explained by the fact that in MAR people everywhere predominantly sit, so naturally there is correspondence between IN and OUT.

Correlations Between Configurational Variables and Space Use

Square Footage/Isovist and Density. Again, the question is asked if size of spaces and their isovists (SQFT) has any relation to denser behaviors.

There are weak tendencies only for size of spaces and isovists to be more dense. Size is significantly correlated with the density of ALL PERSONS for TOTAL and IN; with TALK TOTAL and TALK IN; and with SIT TOTAL and SIT IN, but the correlations all lose significance on the second test. Thus, there are only mild tendencies for larger spaces or isovists to have greater densities and greater densities of TALK and SIT, in that order.

Table 11.17: (a) Correlations Between SQFT and SQRT DENSITY in MAR and (b) Excluding O's on SQRT: Weak Tendency for Size of Space of Isovist to Correlate with Density

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.55	.35	.66	.58	.41	.48	.40	.43
	.028	*.1801*	*.0057*	*.0181*	*.3567*	*.271*	*.3687*	*.4716*
OUT-SQFT	.24	.06	.29	.35	.03	.49	.12	.53
	.3976	*.8338*	*.2988*	*.196*	*.9478*	*.2677*	*.8028*	*.2191*
TOTAL-SQFT	.56	.41	.60	.62	.09	.52	.26	.53
	.0254	*.1161*	*.0136*	*.0106*	*.8459*	*.2364*	*.5805*	*.2217*

Connectivity and Density. The local measure of connectivity (CON) is correlated with density of behaviors to determine if more connected spaces generate more movement, stasis, or interactions per square foot.

As Table 11.18 shows, connectivity and density are strongly correlated for ALL PERSONS TOTAL and OUT (.76 and .68 at .0007 and .0058), but are weaker for ALL PERSONS IN, which collapses on second test. MOVE TOTAL is also strongly correlated with connectivity (.67 at .0044); MOVE is more tentatively correlated on OUT and IN, collapsing on the second test. TALK fares much better, being most strongly correlated for IN, then TOTAL, and then OUT (.78, .73 and .65 at .0004, .0012, and .0094). Finally, SIT is more tentatively correlated with connectivity for TOTAL, IN and OUT, but again, collapses on the second test.

Thus, TALK is the only variable solidly correlated with connectivity but connectivity is also predictive of external densities overall, and with external densities of moving.

Table 11.18: (a) Correlations Between CON and SQRT DENSITY in MAR and (b) Excluding O's on SQRT: Connectivity is Solidly Correlated with Talking and Overall Densities Seen in Isovists

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.75	.58	.78	.76	.63	.41	.8	.49
	.0008	*.0197*	*.0004*	*.0007*	*.1326*	*.3631*	*.0306*	*.4081*
OUT-CON	.68	.70	.65	.61	.8	.62	.78	.49
	.0058	*.0037*	*.0094*	*.0164*	*.0304*	*.1351*	*.04*	*.269*
TOTAL-CON	.76	.67	.73	.78	.89	.8	.84	.71
	.0007	*.0044*	*.0012*	*.0003*	*.008*	*.0305*	*.0173*	*.0747*

Integration and Density. Finally, the integration of spaces (1/RRA) is correlated with densities to determine if integration predicts more density in behaviors. As Table 11.19 shows, 1/RRA and ALL PERSONS in TOTAL, OUT, and IN are tentatively correlated, losing significance on the second test. The densities of MOVE TOTAL and MOVE IN are strongly correlated with integration (.73 and .71 at .0015 and .0021); MOVE OUT shows more tentative correlations collapsing on the second test. TALK and SIT are also more tentatively correlated for OUT and TOTAL, and TALK for IN, but these correlations also collapse on second test. Oddly, while the density of SIT IN is not significantly correlated on the initial analysis, it is strong and significant when the highest outlier and unused spaces are removed from analysis. Thus, there is a weak tendency for SIT to also correlate with integration.

Table 11.19: (a) Correlations Between 1/RRA and SQRT DENSITY and (b) Excluding O's on SQRT: Moving is Strongly Correlated with Integration (*See APPENDIX L for Scattergrams)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.63	.71	.63	.42	.41	.82	.41	.96
	.009	*.0021*	*.0091*	*.1027*	*.3553*	*.0165*	*.3556*	*.0112*
OUT-1/RRA	.60	.57	.60	.59	.54	.36	.66	.41
	.017	*.0268*	*.019*	*.02*	*.2093*	*.4298*	*.1081*	*.3634*
TOTAL1/RRA	.65	.73*	.62	.56	.56	.91*	.44	.15
	.0065	*.0015*	*.0102*	*.023*	*.192*	*.0014*	*.3264*	*.7484*

Overall, however, in MAR, only densities of MOVE show a strong correlation with integration, and then only for TOTAL (IN and OUT) and IN. There is only a tendency for overall density, and for the density of talking and sitting, to be associated with spatial integration.

<u>The Practice of Control</u>

Table 11.20 illustrates the results of the tracking of staff in MAR. The MAR unit has approximately 130 linear feet of corridor space in the regular boys housing wing, including the passage through the boys dayroom to the control room or dining/multipurpose room. On average, staff walk 109 linear feet per tracking segment, or a ratio of .84 if taken as a proportion of total available corridor length. This seems somewhat high given that staff sit almost as much as they move, and the limited movement across activity spaces, but may be accounted for by the fact that dayroom staff (mostly followed because they are the only ones who move) are not moving so much within the activity space, as up and down the halls to check on that portion of

the boys locked down. It must be remembered that in this unit, generally, only half the boys are out at a time.

As the table shows, staff average more directives and comments to residents than are returned, but both staff and resident initiated interactions are correlated. Staff directives, comments and total interactions with residents are moderately correlated at .451, .309 and .492 at .0001, .0002 and .0001. Resident directives or questions and their total comments are correlated with staff movement at a weaker .339 and .252 at .0001 and .0027, even though residents talk less to staff than staff talk to residents. All resident/staff interactions and all interactions total are also moderately correlated (.447 and .441 at .0001).

Table 11.20: Means and Correlations Between Linear Feet Staff Walk and Interactions: Staff Movement is Associated with Staff-Resident Interactions and with Interactions in General

	Mean	r Value	Significance
Linear Feet Walked	109		
Staff to Resident			
Directive/Question	2.7	.451	.0001
Comment	1.9	.309	.0002
Total Interactions	4.6	.492	.0001
Resident to Staff			
Directive/Question	1.1	.339	.0001
Comment	1.2	.086	.3123
Total Interactions	2.3	.252	.0027
All Resident/Staff Interactions	6.9	.447	.0001
Staff to Staff	1.2	.04	.6431
Staff to Others	.02	.045	.5949
All Interactions	8.2	.441	.0001

These correlations suggest that staff movement is positively correlated with interactions with residents and generates questions and comments back. During the observations, residents were seen to talk far more freely to staff in the activity room than anywhere else; there was little talking between staff and residents in the dayroom or multipurpose room. As the staff note, the activity room is where everyone relaxes and this may account for the freedom suggested here. At any rate, staff movement is associated with business related and other interactions.

Summary

To briefly summarize the findings in MAR, there is a clustering of use in spaces around the control room but not necessarily under its purview. Movement is contained deep in the facility with residents, during the observation periods, moving only between the multipurpose and dayroom and activity room. MAR is characterized overall by far more sitting than moving, but residents of course sitting more, but staff surprisingly sitting almost as much as they move. About a quarter of the people are talking. Staff and residents territorially occupy areas within spaces, except in the activity room, and rarely mix, again except in the activity room. Spaces are bounded and visually constricted rather than flowing into one another, and spaces are largely characterized by sitting in, with limited views out -- and then only of more sitting. The foreground is more populated than the background, illustrating the paucity of the isovists, but the background shows slightly more animation than the foreground, even though sitting predominates in both. Staff exercise a panoptical mode of control, rarely leaving their post except when covered, rather than a peripatetic mode.

In terms of the correlations, overall densities of people are strongly correlated with densities of moving and talking persons, moving and talking densities are strongly correlated, and oddly enough, foreground and background densities of all people and sitting are strongly correlated. The size of spaces or isovists are only tentatively correlated with densities of people and with talking and sitting. The local connectivity of spaces is associated with overall external densities, and with the densities of talking in spaces and in the isovists, and then for moving in spaces with larger isovists. Finally, integration is strongly correlated with moving densities with external variables stronger than internal.

3. The IND Unit

The Spatial Distribution of Behaviors

The table below summarizes the numbers of total persons and behaviors mapped over the four days of observation in IND and then breaks them out by category.

As the table shows, almost two-thirds of the total 2737 persons mapped at IND were sitting (63 percent) while over a third were moving (37 percent). Looking at the categories, one sees that while residents follow this trend, staff and others reverse it. Residents move less than the aggregate (31 percent), while staff and others move more (78 and 82 percent).

Over a third (35 percent) of the people mapped are talking. Residents, staff, and others talk in similar proportions to the aggregate with residents talking proportionately the same (35 percent), staff talking only slightly less (33 percent) and others only slightly more (37 percent). Talking also seems to occur in proportion to behavior, with overall talking following the proportion of sitting and moving exactly (63 to 37 percent); residents talk in proportion to their degree of sitting (70 percent) while staff talk proportionately to their degree of moving (81 percent). There is no particular propensity to only talk while moving, as there was in the Alzheimer's units.

Inequalities therefore, between staff and residents thus far are that staff move far more than do residents, but talk slightly less.

Table 11.21: Behavior Mapping in IND Showing More Sitting than Moving

	Total Persons	Moving/ Standing	Sitting	Total Talking	Moving/ Talking	Sitting/ Talking
ALL PERSONS	2737	1019	1718	950	349	601
Percentage of Total	*100.*	*.37*	*.63*	*.35*	*.37*	*.63*
Residents	2388	737	1651	831	251	580
Percentage of Total	*100.*	*.31*	*.69*	*.35*	*.30*	*.70*
Staff	257	200	57	85	69	16
Percentage of Total	*100.*	*.78*	*.22*	*.33*	*.81*	*.19*
Others	92	82	10	34	29	5
Percentage of Total	*100.*	*.89*	*.11*	*.37*	*.85*	*.15*

Figure 11.7, 11.8 and 11.9 illustrate the spread and density of resident, staff and others movement and stasis in IND. (Because of the size of IND, only the local area used by the unit is shown). As shown in Figure 11.7a, there is little movement of residents in corridors of the public portion of the facility, due to the very brief time spent in movement between activities. During the site visit, only one other housing unit was encountered in the corridors or in an activity space. As the mappings show, resident movement in the gym and activity room is mostly activity oriented, with clusters in the activity room around the pool tables. Movement in the housing units looks fairly free however, with residents moving in all parts of the dayroom and clustering at the staff workstation (to pick up headphones, see their Level listings, and so forth).

The static mapping for residents shows more rigidity with seating largely dictated by the location of furniture, except for the free placement of chairs in the dayroom (all other furniture is immobile). As shown, residents must keep a clear path open from the station to the stairs up and down to the alcoves. The lower alcoves are more heavily used than the upper ones (perhaps because they seem slightly more sheltered from sight by the overhanging mezzanine which creates a deeper shadow than on the upper level) .

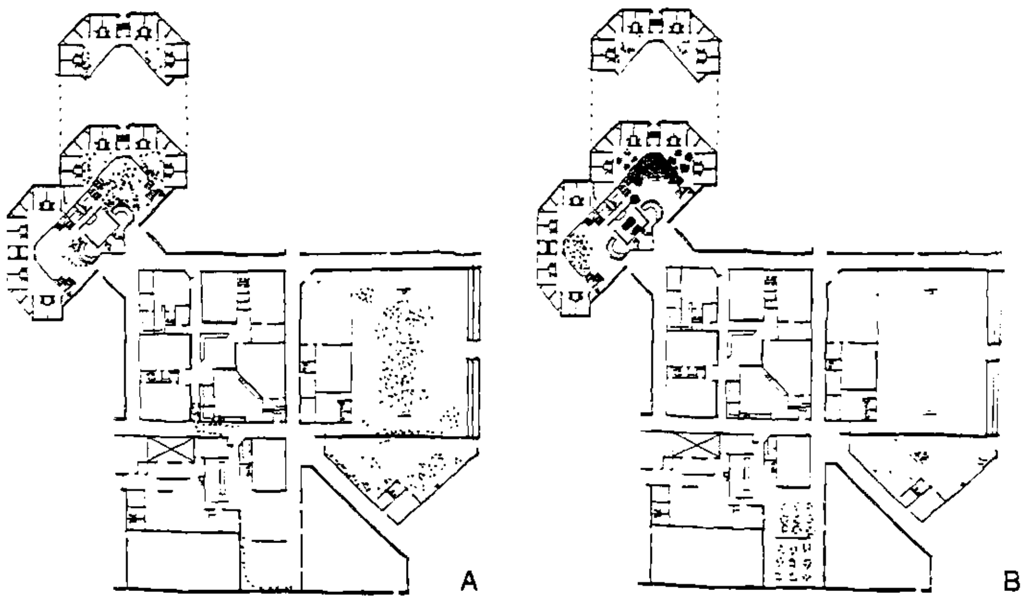


FIGURE 11.7: (a) Resident Movement and (b) Resident Sitting at IND: Fairly Free in Housing Unit

Mappings for staff movement and stasis, shown in Figure 11.7a and b, indicate that staff move on the periphery of the activity rooms (gym, dining, and activity) but freely move in resident areas in the housing unit. There is a slight clustering within the workstation for both standing and seated staff. The static mapping also shows some mixing of staff with residents in the resident seating area of the dayroom but on the periphery of the mass of seating. (Staff are always careful not to let too many residents get behind them). Residents do not share staff areas. Staff move more freely than they sit, and move through resident areas more than they sit in them.

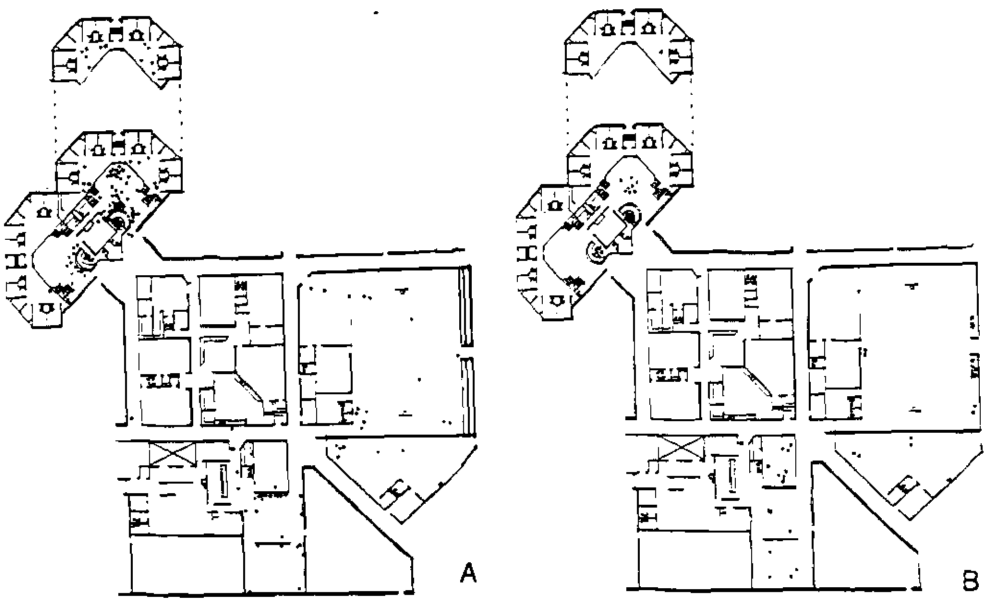


FIGURE 11.9: (a) Staff Movement and (b) Sitting in IND: Staff Move on Periphery of Rooms

The mapping for others, shown below, shows them mostly on the move in the activity rooms and in the unit dayroom with few staying to sit in resident areas. As the clustering around the staff workstation in the dayroom shows, utility staff and others check with the staff member at the workstation and then move on through the TV room to the next unit, without bothering to stay long enough to sit. As evident from these maps, it is fairly rare to see someone in the detention area other than those who are assigned to be there; those who do visit, do not stay long.

On the whole, these mappings illustrate some disparity between staff and resident use of spaces with staff moving through spaces more freely than sitting in them. The maps also show the heavy use of the housing unit as opposed to the sporadic use of other areas. This, of course, is a function of the schedule.

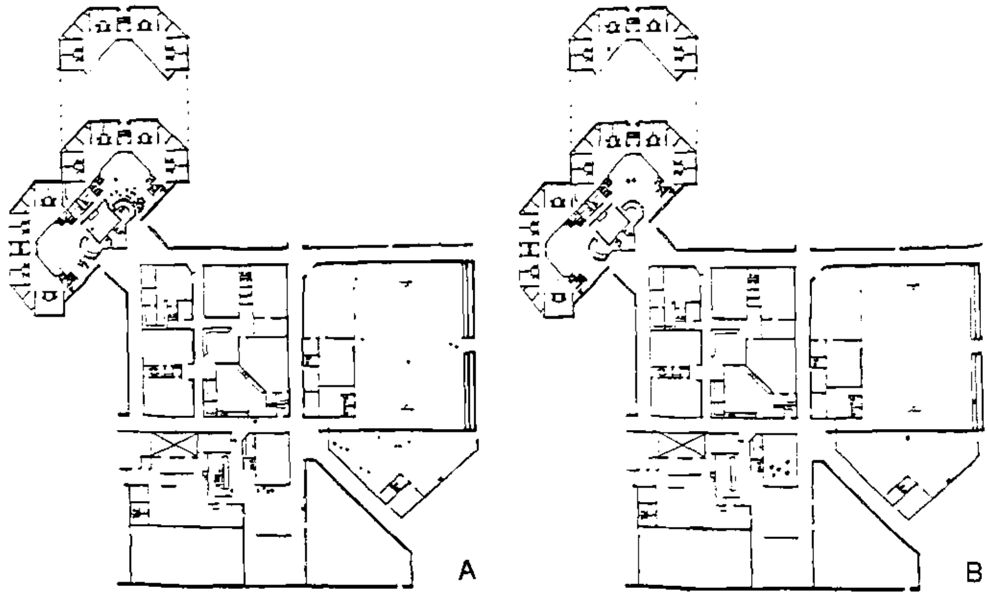


FIGURE 11.9: (a) Other Movement and (b) Sitting in IND

The Animated Isovists

These numerical ratios are again represented to clarify differences between foreground and background and movement to stasis in both. The closer the ratio is to "1", the more balanced.

As Table 11.22 shows, the background is more populated than the foreground, but this time with only a third more persons seen out than in. The animation ratio is higher for foreground than background, meaning that the background is less animated than the foreground. In both, there is more sitting than moving.

As to the categories, staff see more staff, proportionately, out than in (ratio of .58) while residents see fewer residents, proportionately (.78). Thus, to residents, the background looks heavier with staff.

However, both residents and staff have a more animated foreground than background; for staff, both are dominated by moving while for residents, both are dominated by sitting. Others are far more animated in the background than the foreground.

Table 11.22: IN/OUT and Animation Ratios for IND Showing More Populated Background but More Animated Foreground

	All Persons	Residents	Staff	Other
IN/OUT	.75	.78	.58	.72
	2737/3631	2388/3061	257/442	92/128
Moving or Standing/Static				
IN	.59	.45	3.5	8.2
	1019/1718	737/1651	200/57	82/10
OUT	.37	.20	3.1	17.3
	972/2659	518/2543	333/109	121/7

Overall, IND can be characterized as having a more populated background than foreground, but a more animated foreground for residents and staff. Background and foreground both are dominated by sitting, but staff move far more in relation to residents who mostly sit. Perhaps the relatively high level of talking, and the high degree of staff movement, adds to the liveliness sensed in the unit.

The Animation of Activity Spaces

Table 11.23 presents the animation and IN/OUT ratios for key activity spaces. As before, the closer to "1" the ratio is, the more balanced.

It is clear that the quality of the experience differs dramatically between the housing unit and the public portions of IND. As the ratio for IN/OUT shows, public spaces are grossly weighted toward foreground over background, except for halls which shows more background. In the housing unit, however, the dayroom has more foreground, but the alcoves and TV room have more background. Thus, it is possible to have a change of venue by moving amongst these spaces.

It is also clear that the activity in public activity rooms is weighted toward moving, except for dining where it is naturally weighted toward sitting. Views out in the public activity rooms and halls are also of moving, so both the foreground and the background in these areas is animated. Again, there is a shift in the housing unit. Each of the three available areas has more sitting in the foreground and in the background.

Table 11.23: The Ratio of Animation in Activity Spaces in IND

		Ratio M/S	Moving/ Standing	Sitting	Total People	*Ratio IN/OUT*
Gymnasium						
	IN	*3.79*	330	87	417	*10.79*
	OUT	*38.*	38	0	38	
Activity Room						
	IN	*3.39*	248	73	321	*64.2*
	OUT	*.0*	5	0	5	
Dining						
	IN	*.15*	61	395	456	*13.82*
	OUT	*1.2*	18	15	33	
Unit Halls						
	IN	*27.*	27	0	27	*.84*
	OUT	*0*	32	0	32	
Unit Dayroom						
	IN	*.39*	306	776	1082	*1.38*
	OUT	*.22*	144	641	785	
Unit Alcoves						
	IN	*.29*	107	367	474	*.43*
	OUT	*.40*	314	793	1107	
Unit TV/Quiet Room						
	IN	*.02*	6	237	243	*.32*
	OUT	*.26*	159	603	762	

Thus, there is no space where moving/stasis or IN/OUT, are balanced either within the space or beyond it. A real dichotomy in experience occurs, according to whether one is in public, or private, space. Public, and scheduled, spaces are internally oriented but animated IN and OUT, while unit spaces vary in foreground and background population, depending on locale, but overall are dominated by views of sitting, in spaces and in views. More importantly, while there is some balance within the unit itself, because of views to the unit next door, the pod itself is very sheltered from the external world beyond.

Correlations Between Behavioral Variables

In IND, 25 spaces comprise the data base for the correlations. Again, locked closets, showers, and resident rooms are not included in the analysis.

Density and Liveliness. To test general liveliness, movement and interaction are correlated.

As Table 11.24 shows, the density of ALL PERSONS is correlated equally strongly for TALK TOTAL, OUT, IN (.99 at .0001 for all) and only slightly less strongly with MOVE OUT, TOTAL and IN (.94, .86, and .84 at .0001). Thus, the correlations for TALK are stronger than for MOVE. Values for external variables are slightly stronger than for internal. In general, then, density of people is associated with densities of talking and walking.

Table 11.24: Correlations Between DENSITY of ALL PEOPLE and ALL MOVING PEOPLE and ALL TALKING PEOPLE in IND: Density is Associated with Talking and Moving

	ALL MOVING PEOPLE	ALL TALKING PEOPLE
IN-DENSITY	.84	.99
ALL PEOPLE	*.0001*	*.0001*
OUT-DENSITY	.94	.99
ALL PEOPLE	*.0001*	*.0001*
TOTAL-DENSITY	.86	.99
ALL PEOPLE	*.0001*	*.0001*

Movement and Talking. Movement and interaction IN, OUT and TOTAL are correlated to see if movement, in general, is associated with interaction in IND.

As Table 11.25 below shows, MOVE is strongly correlated with TALK, for TOTAL, OUT, and then IN, in that order (.94, .83 and .70, all at .0001). Movement, in general, therefore generates talking in spaces, in isovists, and in spaces and isovists combined.

Table 11.25: Correlations Between ALL PEOPLE MOVING and ALL PEOPLE TALKING in IND: Movement is Associated with Talking

	IN-ALL MOVE	OUT-ALL MOVE	TOTAL-ALL MOVE
IN- ALL TALK	.70 *.0001*		
OUT-ALL TALK		.83 *.0001*	
TOTAL-ALL TALK			.94 *.0001*

Foreground and Background. The foreground in IND is more animated than the background. As a measure of the critical margin, behaviors inside spaces are correlated with behaviors outside spaces.

There are strong correlations between density IN and density OUT for ALL PERSONS, for SIT and for TALK, in that order (.88, .88 and .87 at .0001). There is a less strong correlation for density of MOVE IN with MOVE OUT (.504 at .0103), but it is still significant. (.88 at .0001).

Thus, there is a finding that the overall density of people in spaces, and the densities of sitting , talking and more weakly, moving in spaces, corresponds with overall densities of these behaviors in the isovists. It suggests that people place themselves where they can see others.

Table 11.26: Correlations Between IN and OUT Behaviors in IND: Density of Behaviors In Spaces Corresponds the with Density of Behaviors Seen in Isovists

	OUT-MOVE	OUT-SIT	OUT-TALK	OUT-ALL PEOPLE
IN-MOVE	.504 *.0103*			
IN-SIT		.88 *.0001*		
IN-TALK			.87 *.0001*	
IN-ALL PERSONS				.88 *.0001*

Correlations Between Configurational Variables and Space Use

Square Footage/Isovist and Density. The size of spaces and their isovists (SQFT) is correlated with densities of behaviors IN, OUT and TOTAL. As Table 11.27 shows, there is a weak tendency for the densities of ALL PERSONS to correlate with the size of the isovist (OUT) and the size of the space and isovist (TOTAL), but only when the high outlier and unused spaces are removed. This same tendency applies with MOVE TOTAL and OUT and TALK and SIT OUT, only significantly correlating on the second analysis.

Table 11.27: (a) Correlations Between SQFT and SQRT Density in IND and (b) Excluding O's on SQRT: Weak Tendencies Between Size and Densities

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-SQFT	.05 *.8211*	.10 *.6396*	.006 *.9778*	.05 *.8237*	.35 *.2061*	.26 *.3595*	.30 *.3391*	.28 *.3822*
OUT-SQFT	.40 *.0512*	.34 *.1085*	.43 *.0371*	.39 *.0617*	.69 *.0043*	.7 *.0035*	.53 *.0609*	.52 *.0859*
TOTAL-SQFT	.27 *.2051*	.14 *.5162*	.30 *.1502*	.35 *.1898*	.69 *.0046*	.59 *.0203*	.56 *.046*	.60 *.0296*

Thus, there are only mild tendencies in IND between size of isovists and densities of all persons, and densities of moving, talking and sitting persons.

Connectivity and Density. The local variable of connectivity (CON) is correlated with behavioral densities to determine if the connectivity of spaces is associated with more movement, stasis, or interactions per square foot.

There is a moderate correlation only between the density of MOVE OUT and connectivity (.42 at .0403), gaining strength on the second analysis. There is also some tendency for MOVE TOTAL and TALK OUT to correlate with connectivity, but they both collapse on one of the tests. Thus, there is a trend only for external densities of movement and connectivity.

Table 11.28: (a) Correlations Between CON and SQRT DENSITY in IND and (b) Excluding O's on SQRT: Tendency for Movement to be Associated with Connectivity

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-CON	.33	.23	.33	.32	.41	.32	.37	.45
	.1174	*.2779*	*.114*	*.1336*	*.1368*	*.248*	*.2164*	*.1935*
OUT-CON	.39	.42	.42	.36	.54	.62	.5	.31
	.0574	*.0403*	*.0389*	*.0892*	*.0396*	*.0136*	*.0851*	*.3285*
TOTAL-CON	.36	.37	.39	.34	.49	.6	.36	.24
	.0843	*.0795*	*.0619*	*.1064*	*.0614*	*.0193*	*.2303*	*.4324*

Integration and Density. Finally, the integration of spaces (1/RRA) is correlated with densities of behaviors to see if more integrated spaces are more densely occupied and generate more movement, talking or sitting.

Taking the grossest measure first, there is a strong correspondence between integration and densities TOTAL, OUT and IN (.68, .76 and .65 at .0002, .0001, and .0005). Thus, integrated spaces have more people per square foot in them and in their isovists.

As shown in Table 11.29, integration is strongly correlated with MOVE TOTAL and OUT(.76 and .81 at .0001); there is a tendency for MOVE IN to also correlate, but it collapses on the second test. Integration is strongly correlated with TALK TOTAL and OUT(.77 and .79 at .0001); again, the tendency is less strong for IN, losing significance on the second test. There is even a tendency for integration to associate with SIT TOTAL and OUT, but it is weak, collapsing on second analysis.

Table 11.29: (a) Correlations Between 1/RRA and SQRT DENSITY in IND and (b) Excluding O's on SQRT: Integration is Strongly Correlated with Moving and Talking Densities (*See APPENDIX L for Scattergram)

	DENS ALL	DENS MOVE	DENS TALK	DENS SIT	DENS ALL	DENS MOVE	DENS TALK	DENS SIT
IN-1/RRA	.65 *.0005*	.58 *.0028*	.61 *.0016*	.55 *.0058*	.58 *.0223*	.44 *.1053*	.36 *.2332*	.27 *.4449*
OUT-1/RRA	.76 *.0001*	.81* *.0001*	.79 *.0001*	.71 *.0001*	.78 *.0007*	.82* *.0001*	.72 *.0051*	.55 *.0618*
TOTAL-1/RRA	.68 *.0002*	.76 *.0001*	.77 *.0001*	.70 *.0001*	.75 *.0014*	.83 *.0001*	.66 *.0146*	.54 *.059*

Thus, integration is strongly correlated with MOVE and TALK, for external densities of people. These findings suggest that moving and talking densities, and more tentatively sitting, are driven by configuration, and show a preference for spaces with strong backgrounds.

The Practice of Control

The following table summarizes the results of the tracking of staff in IND. Interactions are correlated with the average linear feet walked by the staff tracked over the tracking periods.

As Table 11.30 shows, IND has approximately 220 linear feet of corridor space in use by this particular unit, including the corridors the unit traverses in the main block of spaces. On average, staff walk approximately 157 linear feet per tracking segment, or a ratio of .71 if taken as a proportion of total available corridor length. What is of interest, however, is that most of this movement occurs in the housing unit which is quite compact and contains no linear corridors. On average, staff were only tracked eight times in the public corridors, but 112 times in the unit. This shows the relatively brief use of the corridors -- just enough time to get the group from one activity space to the next.

Table 11.30: Means and Correlations between Linear Feet Staff Walk and Interactions - Showing Weak but Significant Relationship Between Staff Movement and Interactions with Residents

	Mean	r Value	Significance
Linear Feet Walked	157		
Staff to Resident			
Directive/Question	2.9	.138	.132
Comment	1.4	.101	.271
Total Interactions	4.2	.204	.0257
Resident to Staff			
Directive/Question	2.6	.085	.3583
Comment	2.1	.053	.569
Total Interactions	4.7	.098	.2877
All Resident/Staff Interactions	8.9	.18	.0485
Staff to Staff	.33	.085	.3573
Staff to Others	.23	.111	.2265
All Interactions	9.5	.179	.0506

IND staff initiated interactions to residents show an average of 4.25 interactions per segment, while residents generate an average of 4.7 interactions back to staff per segment. Only the resident to staff direction is weakly correlated, however (.204 at .0257). All resident/staff interactions are also correlated, albeit weakly also (.18 at .0485). The relatively low mean of .33 interactions per segment with other staff suggests a relative lack of staff solidarity in IND, perhaps because of their relative isolation from their colleagues.

The tracking show that, in IND, there is only a weak relationship between staff movement and interactions with residents, even though there is a good amount of talking going on, and the residents, in particular, are very vocal.

Summary

In brief, IND clusters use in its housing unit with only intermittent, and scheduled, use of its public activity areas. The background is more populated than the foreground but the foreground is more animated overall, and for residents and staff, even though there is more sitting than moving in both foreground and background, on average. Talking is relatively high, and in similar proportions, for all groups. There is a clear dichotomy between public and unit spaces. Public spaces are internally oriented, but have more animated background, while unit spaces offer variety between spaces, but have more static foregrounds and backgrounds. Staff movement is only weakly correlated with interactions, and staff use a peripatetic mode of control, depending on fast movement and surprise appearance in the ringy spaces of the unit. Interactions are informal in the unit, with the residents very vocal, and more formal elsewhere.

On the correlations, IND shows strong correlations between density of people and moving and talking densities, between moving and talking densities, and between total densities IN and OUT, and more particularly, densities of talking, sitting, and more weakly, moving densities IN and OUT. Integration is the spatial variable more consistently correlated with densities, and more particularly with moving and talking, and then more consistently for external than internal densities. Connectivity is correlated with moving densities in isovists, while the size of isovists are only tentatively correlated with densities of all persons, and with densities of moving and talking. In IND, therefore, integration is the only consistently correlated spatial variable.

5. Summary of Findings

The analyses of space and space use show several dimensions of variability and similarity among the three detention centers. This summary aims to clarify the underlying dimensions of space and space use as well as to identify the genotypical dimensions of the organizations.

Spatial Distribution of Behaviors

The intuitive sense that DEK and IND are livelier than MAR are confirmed by the behavior mappings. DEK and IND have more movement than MAR, even though sitting predominates, overall, in all three units. DEK and IND also have more talking. Talking, over the three, appears to be constant, and proportionate to behaviors. Staff move more in DEK and IND and share, to a greater extent, the same spatial domains as residents; in MAR staff are more polarized and territorial.

Movement in all facilities takes a definite spatial pattern. DEK is distinctly different from the other two facilities, not only in its higher proportion of moving to stasis but because residents move more here than in the other two units. Movement in DEK is also bipolarized -- with one pole in the multipurpose/dining area and a second pole in the boys dayroom; because of the visibility of spaces to one another, and because all three use areas are under the purview of control, movement is continuous between the poles. Contrastingly, movement in MAR is restricted and contained within spaces, rather than between them, except for scheduled events. Little free movement occurs within any use space other than the activity room. Movement in IND functions similarly to that of DEK in the housing unit, with a spread between the various interlocking spaces; it is more like MAR's in the public areas. Thus, the spread and the amount of moving and talking varies between facilities, with DEK and IND being more similar in the housing units.

Movement and the Practice of Control

Movement is associated with talking in all detention centers as shown in the strong correlations between the densities of MOVE and TALK, in that order, and between the density of ALL PERSONS. Also, in all three facilities, there is a marked preference for moving and talking, and densities in general, to occur in spaces with large isovists. This attests to the importance of a background for increasing awareness, as well as providing a critical margin.

Whereas in all units, staff movement is correlated with staff directed interactions with residents, the peripatetic mode of control in DEK and IND is also associated with higher levels of resident to staff interactions. The table below compares the three facilities in terms of staff movement and interactions as tracked during the six minutes of each mapping segment.

As Table 11.31 shows, DEK stands out for having more staff movement overall while MAR has the least. Staff movement in detention centers is different from that in Alzheimer's units because it is more purposely related to a peripatetic mode of supervision rather than purview. Staff move in an unpredictable, rather than systematic fashion, as a means of protection; residents never know when and where they will appear. This mode of control is possible in DEK and IND (housing unit) because of the ringiness of the plans, and the visibility of contiguous spaces from one another. DEK allows this even more than IND because of the triangulation of control potential: movement is under the eyes of control and staff in the contiguous areas. This may account for the extremely high rate, and relative freedom, of staff movement in DEK, comparatively. In MAR, the segmentation of the plan, and because movement carries staff out of the purview of residents, makes this all but impossible. Thus, MAR differs from the other two units in the stasis of its staff, and their "ownership" of viewing vantage points.

Table 11.31: Linear Feet Walked by Staff and Average Interactions: Staff Movement is Associated with Staff - Resident Interactions

	DEK	MAR	IND
Ft. Walked/segment	201	109	157
Staff/Resident Interactions	5.6	4.6	4.2
All Interactions	9.6	6.9	8.9
Ft. Walked as Proportion of Total Corridor Length	1.25	.84	.71

At the level of interactions, movement seems to make a difference in resident/staff interactions. Staff and residents are more interactive in DEK than in MAR and IND, as both the staff/resident and all interaction averages show. Predictably, because of the solidarity of staff noted in MAR, there is a rather high average of staff to staff interactions, compared to the other two units. Thus, the units are similar in that in staff movement correlates with staff/resident interactions; they vary in how much.

The Interface Between Staff and Residents

The theme of inequality, as a dimension of control, goes back to who has the overview and how much overlap there is between staff and resident domains. Like movement, inequalities are spatially induced. Whereas in all facilities, staff distinguish themselves by more movement, talk is surprisingly egalitarian, with residents talking as much as staff and the aggregate, except in DEK where residents talk slightly less. The allowance of talk seems to be a means of defusing tensions in all centers, since movement is reduced. As the earlier Moos scores indicated, however, DEK stands out from the others in emphasizing interaction as a means of expressiveness. The fact that residents in DEK talk less than staff and the aggregate may be because of the increased ability to move in that center.

In detention centers, it seems expected that staff would tend to be somewhat separate from residents; perhaps that is why it is surprising to see so little of this in DEK where residents overlap into staff areas, and staff overlap into resident areas with equanimity. Contrastingly, MAR shows territorialization and bipolarity between staff and residents, with resultant formalities.

What residents and staff see in the background also underscores their roles in the unit. Whereas DEK's residents and staff see similar proportions of their own category in the background, staff in MAR and IND see more of themselves beyond, proportionately, than do residents. Thus, in MAR, not only is the background more animated than the foreground, it proportionately has more staff in it than residents, an additional reminder of their liminality.

Furthermore, there is a marked difference between the resident activity areas of DEK and those of MAR and IND. Whereas, overall, DEK and IND have more populated backgrounds while MAR has a more populated foreground, what is visible in that background differs. The spaces in DEK where boys spend the most time, the dining room and the dayroom, look onto moving. Contrastingly, in MAR and IND, the boys dayroom where residents spend the most time, look onto sitting. Thus, residents in DEK have a background that includes not only more people, but use spaces that also pick up more animation in the background, adding to the vitality of this center. Residents in MAR may feel even more restricted because life beyond them seems more active.

Foreground and Background

As stated earlier, the copresence of moving and static densities is one aspect of normalized liveliness, as is the creation of a direct interface between local and global awareness, or as known by now, foreground and background. To reiterate, continuity of behaviors across spaces suggests a modulation of space use as opposed to a more-segmented use, suggestive of boundaries and their control. It has already been shown that MAR has a segmented use of space, reinforced by the relative containment of people and the sanctity of the boundaries, whereas DEK has a continuous use of space, and little control of the boundaries between these spaces, as evidenced by the cross-traffic between them. Continuity shows the form of the critical margin, or the awareness of others, which appears to have much to do with the normalization of behaviors in these facilities.

It was demonstrated that internal and external densities, and more importantly, moving densities IN and OUT, are correlated in MAR and IND; sitting IN and OUT also correlated in these two facilities. These correlations suggest continuity and modulations of space use in terms of the density of all people, and moving people. As with the Alzheimer's units, however, it is important to look at where foreground and background are evened out, and where moving and sitting are balanced, when density is high. The same calculations given in Chapter VII for the Alzheimer's units were computed for the detention centers. The figures below show where these qualities occur in each facility.

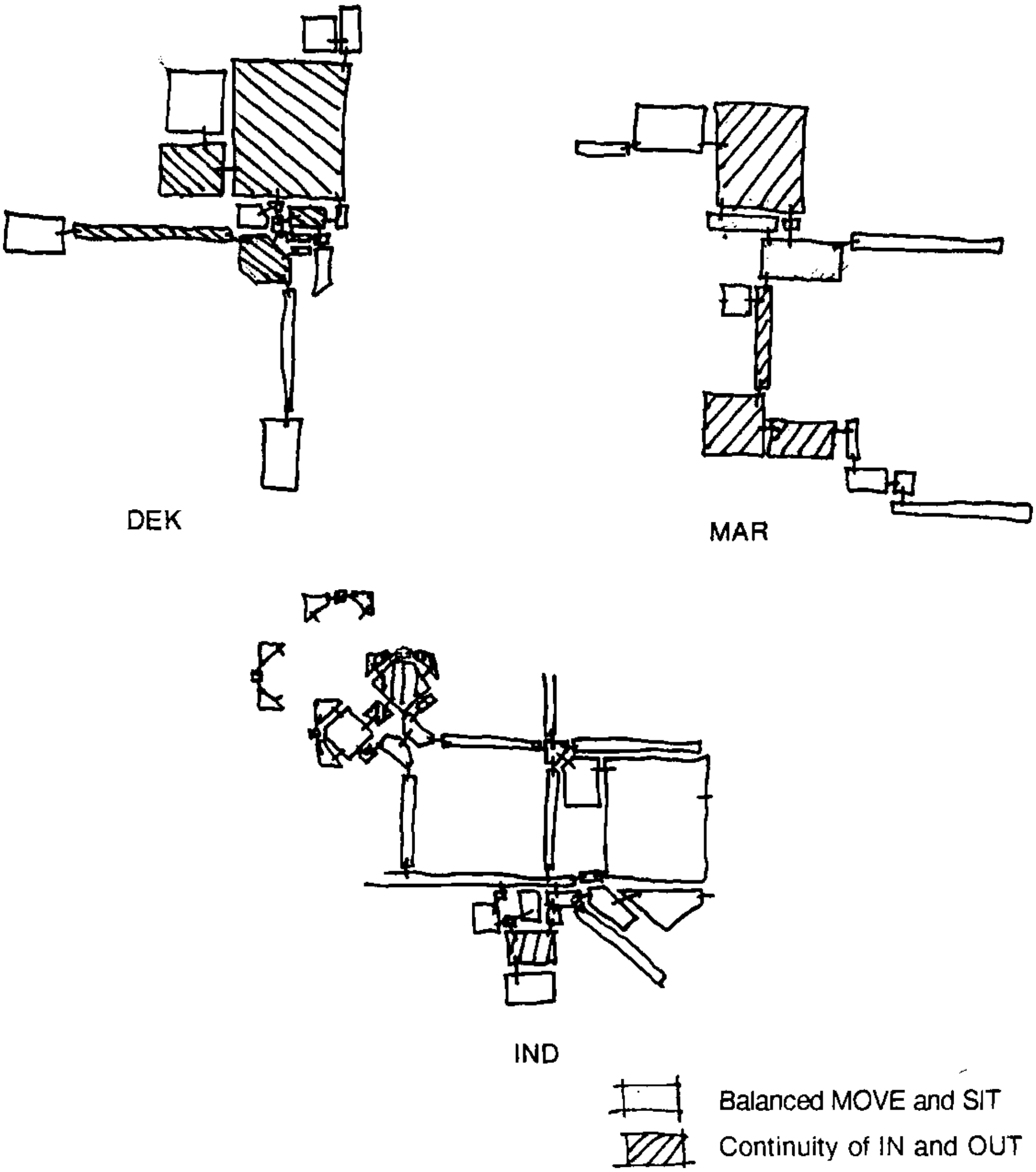


FIGURE 11.10: The Overlap of Balanced MOVE and SIT and Continuity of IN and OUT, Weighted for Density

As the three figures show, a balance of moving and static (weighted for density) is seen mostly in larger and integrated activity spaces. Continuity appears to be related more to the integration core in all facilities except IND, where both balance and continuity overlap in the housing unit. When balance of moving and sitting and continuity of IN and OUT, weighted for density, are themselves correlated, there are no genotypical trends. Only in MAR are these properties correlated when one outlier is removed (.67 at .0176). Thus, there is no trend for correlation between these two properties in detention centers.

Correlations Between Space and Space Use

One must then look at the correlations between space and space use for genotypical trends. Table 11.32 summarizes the numbers of significant correlations when the density of ALL PERSONS is correlated with size of space and isovist (SQFT), and with connectivity (CON) and integration (1/RRA). The ratio in the tables below is the number of significant correlations surviving the first and second analysis, out of the number possible. A level of .05 significance is considered reasonable because of the small numbers involved.

On the grossest level of analysis, the density of ALL PERSONS is most correlated with the variables of integration and connectivity (11/18 each) and least with the size of space or isovist (4/18). MAR is the most spatially sustained environment with 10/18 significant correlations for configuration, followed by IND at 9/18; density is least spatially related in DEK (7/18). In IND, the largest facility, density is most predicted by integration, while densities in DEK and MAR are more predicted by local connectivity, understandable in smaller, more localized, plans. Integration is most consistently predictive of overall density across the three, however.

Table 11.32: Significant Correlations Out of Total Number Possible for Density and Configurational Variables

	DENSITY ALL PERSONS			TOTAL
	DAY	MAR	IND	
SQFT	0/6	2/6	2/6	4/18
CON	5/6	5/6	1/6	11/18
1/RRA	2/6	3/6	6/6	11/18
TOTAL	7/18	10/18	9/18	

Table 11.33 summarizes the number of significant correlations out of all possible when the density of behaviors is correlated with spatial variables. As shown, connectivity, the local variable, is most correlated with the densities of walking, talking and sitting across all three facilities (31/54). There are more consistent correlations of these behaviors in DEK and MAR (14/18 and 13/18) than in IND (4/18). Integration is the next most significantly correlated spatial variable (26/54), with IND showing the most correlations (13/18), MAR the next (10/18), and DEK the least (3/18). Size (of space and isovist) is the least correlated variable (10/18) with IND, again, being the most correlated facility (5/18), MAR the next (4/18) and DEK the least (1/6).

Table 11.33: Significant Correlations Out of All Possible for Density of Moving, Talking and Sitting with Configurational Variables

	MOVE			TALK			SIT			TOTAL
	D	M	I	D	M	I	D	M	I	
SQFT	0/6	0/6	2/6	0/6	2/6	2/6	1/6	2/6	1/6	10/54
CON	4/6	4/6	3/6	6/6	6/6	1/6	4/6	3/6	0/6	31/54
1/RRA	2/6	4/6	5/6	1/6	3/6	5/6	0/6	3/6	3/6	26/54
TOTAL	6	8	10	7	11	8	5	8	4	

Thus, behavioral densities in MAR and DEK are driven first by connectivity and then by integration. DEK is the least predictable building, with 18/54 correlations, MAR is the most predictable with 27/54 correlations; IND lies between (21/54).

TALK (26/54), across this sample, produces more consistent correlations with spatial variables, in general, than does MOVE (24/54) or SIT (17/54). However, while TALK produces more consistent correlations with connectivity (13/18), MOVE produces more consistent correlations with integration (11/18). Going back to the values previously reported under each facility, there is also a tendency for the r values to be stronger for moving than for talking. Integration, then, as in the Alzheimer's sample, is consistent with expectations from less restrictive buildings -- movement is better predicted by integration, even though in these settings, it is more restricted.

Table 11.34 summarizes the significant correspondences between spatial variables and internal and external densities (MOVE, TALK, and SIT) in the three facilities, out of all possible, to see where there are more correlations: in spaces (foreground), in isovists (background), or spread across them (combined).

Table 11.34: Significant Correlations Between Spatial Variables and Internal and External Densities in the Three Units

	SQFT			CON			1/RRA			TOTAL
	D	M	I	D	M	I	D	M	I	
IN	4/6	4/6	0/6	0/6	2/6	0/6	3/6	3/6	3/6	19/54
OUT	4/6	4/6	3/6	0/6	0/6	2/6	0/6	3/6	5/6	21/54
TOTAL	6/6	5/6	1/6	1/6	2/6	3/6	0/6	4/6	5/6	27/54

Correlations for TOTAL densities (27/54) outnumber densities IN and OUT, and OUT densities (21/54) outnumber IN densities (19/54). There are more correlations of density with spatial variables in spaces with larger backgrounds. Thus, even in the restrictive environments of detention centers, ranges of awareness in the form of a background (OUT and TOTAL) are spatially predictable.

Finally, Table 11.35 shows the correlations of balanced moving and static and continuity of IN and OUT, weighted for density with size of space and isovist and with integration, to see if balance and evenness of behaviors, weighted for density, are related to configurational variables. (Additional means and correlations of Difference Factors derived to compute weighted densities are given in Appendix J).

Table 11.35: Correlations of Balance of Moving and Static and Continuity of IN and OUT, Weighted for Density, with Size of Areas and With Integration

	DEK		MAR		IND	
	M/S	Cont.	M/S	Cont.	M/S	Cont.
IN AREA	.14	.75*	.18	.36	.13	.06
	.5813	*.0008*	*.5059*	*.1827*	*.5358*	*.7663*
OUT AREA	.33	.11	.68	.02	.24	.29
	.1857	*.6684*	*.0037*	*.9498*	*.2522*	*.1665*
TOTAL AREA	.39	.4	.7	.19	.27	.27
	.1133	*.1191*	*.0026*	*.4983*	*.1867*	*.1016*
1/RRA	.43	.46	.58*	.65*	.57*	.59*
	.0759	*.0634*	*.0232*	*.0125*	*.0038*	*.0026*

MAR is the only facility to show significant correlations of size of isovist (OUT) and size of space and isovist combined (TOTAL) with balance of moving and static, weighted for density; DEK is the only facility to correlate evenness of IN and OUT with the size of the spaces themselves. Looking for consistency, however, across the three, one finds it only for integration. MAR and IND show solid correlations of integration with both balance of moving and static and, with continuity of IN and OUT. More interestingly, if the significance level is raised to .10, a not unreasonable requirement given the small sample, DEK joins the group, for both variables. Thus, even in the restricted environments of detention centers, integration influences the extent to which high density is balanced locally in terms of moving and sitting, and, more importantly, influences the extent to which high density is evenly distributed across foreground and background; both normalization requisites.

Thus, while the local variable of connectivity is the most predictive variable in the detention centers, being more predictive of moving and talking and sitting densities, integration is equally predictive of total densities, and second to local connectivity in predicting moving, talking and sitting densities. Furthermore, integration is predictive of balanced and even densities in regard to moving and sitting and local and global awareness.

CHAPTER XII

DISCUSSION AND CONCLUSION: HOW CAN PROGRAMMATIC CONTROL REGIMES BE SPATIALLY SUSTAINED?

1. Introduction

The aim of the thesis is to assist the formulation of criteria and strategic choices that can be used to design custodial buildings intended for more normalized control regimes. Normalization of behaviors as an organizational aim is neither developed nor criticized in this work; it is simply drawn from a review of the literature. Since normalization concerns the moral assumptions and underlying aims of the institution, it is not entirely clear how it should or could translate into building design, other than in the incorporation of isolated concerns as noted in the review of literature. Whether the goal of normalizing behaviors can inform design depends on whether some connection can be established to the properties of buildings, and their functional implications.

In the absence of commonly accepted hypotheses about the spatial organization of buildings that addresses both the control and the allowance aspects of custodial institutions, the aim of the thesis cannot be solely to test the ideas that guide current practice. The thesis instead asks what aspects of building design and building function can be linked to normalized behaviors. Formulation, therefore, refers to the attempt to identify properties of the spatial organization of buildings that have implications, either directly or through their effect on patterns of space use, that are relevant to the aims of normalizing behaviors.

As discussed, by subdividing and conditionally reuniting space, layouts create patterns of copresence or avoidance, encounter or isolation which, taken all together, constitute a spatial field of awareness of other people. The range of possible awareness is, of course, regulated by the activities and patterns of space use that are allowed by the organization. At the same time, movement and space occupancy can probabilistically generate encounter and copresence over and above that condoned or allowed by organizational rules or schedules. Indeed, the spatial dimensions of control regimes seem linked to the limitation or elimination of such probabilistic effects of space. Conversely, it has been suggested that the creation of a balance between spatially generated awareness and organizationally proscribed space use may be an essential element in normalizing these environments. Exploring how this is possible has provided the focus of the thesis. The use and development of "space syntax" as the central methodology has itself been determined by the previous success of this method to clarify, quantify, and interpret the way in which spatial layouts affect the patterns of awareness and encounter that characterize buildings as social artifacts.

2. Summarizing Findings

The method followed in this thesis can perhaps be described as a three-level comparison. First, both the Alzheimer's units and the detention centers were selected as building types that lie between the extremes of strong control buildings such as prisons, on the one hand, and normal environments like workplaces, on the other. Selecting these building types was aimed at addressing the question of the spatial dimensions of control in cases where control practices cannot be reduced to a direct and strict imposition of a regime. The first question, therefore, is whether there are any trends that the six cases studied have in common, and how these trends allow one to establish the basis on which more specific control practices are built.

Second, a comparison between the Alzheimer's units and the detention centers should help to clarify how the role of space may change as control becomes a tighter and more overriding consideration. The question is whether the two building types can be shown to arise from the same foundation of underlying principles, with detention centers using these principles toward just tighter control aims.

Third, the comparison of individual cases against the background of underlying trends should help to further clarify the realistic options available for organizational and spatial design to extend and better channel the underlying principles toward more specific effects.

The interaction between the analysis of common patterns and the analysis of individual characteristics is not directed toward even further classification of buildings into types. The idea of "type", in the context of morphological studies, seems to refer to some set of properties that are expected to occur simultaneously; for example, as the classification of space, the radial centralization of surveillance, and the elimination of contact through cellularization were seen to concur in nineteenth century custodial institutions. Here, however, the aim is to identify the lawful relationships underlying spatial organization and space use. Rather than expecting a set of properties to occur simultaneously and give rise to a type, it is more likely that different buildings or classes of buildings will be seen to incorporate the same underlying issues and work according to the same parameters, even though the way in which they resolve the issues and bring together the parameters may differ.

The emphasis on the idea of a "genotypical dimension" over a more holistic idea of type is aimed at allowing a more open-ended exploration of new design possibilities. Indeed, one of the problems seen in the design of both Alzheimer's units and detention or correctional centers has been the wholesale adoption of the latest types; i.e., the Weiss Institute and direct supervision units, without necessarily exploring alternative principles of organization and their functional implications. However, some typological considerations will also be raised in order to indicate particular directions for design exploration consistent with the findings in this study.

The findings are bulleted for conciseness and clarity. Discussion is limited, given that the findings have already been summarized and discussed previously in their respective chapters. It is hoped that by presenting them in this way, they can be more easily followed.

First Level Comparison: General Trends Across the Six

How far is there movement and interaction?

- There is significant movement in all settings ranging from 30 -50 percent of all people present (pp. 174, 195, 210, 356, 372, 387).
- There is talking across the six ranging from 20-35 percent of all people present (pp. 174, 195, 210, 356, 372, 387).
- MOVE and TALK are correlated to the density of all people present in all settings. The presence of more people per square foot generates significantly more movement and more talking. Correlations are stronger for people seen beyond than within settings *suggesting that people gather in spaces with large isovists* (pp. 185, 202, 216, 364, 379, 393).
- MOVING densities are correlated with TALKING densities in all settings, with values ranging from .63 to .98, suggesting that the more people move, the more they interact. Again, values are stronger for densities seen beyond than within settings (pp. 186, 203, 217, 364, 380, 394).

How much background is there and where is the animation?

- There are more people seen beyond than in spaces in 5 of the 6 cases. Ratios of IN to OUT in the five cases range from .40 to .75; *this suggests that the breadth of the background varies among facilities but offers a* *margin of awareness above and beyond that of the space itself* (pp. 181, 199, 214, 361, 376, 391).

- There is a tendency for correlation in 5 of the 6 cases between the numbers of people seen inside and outside, with r values ranging from .47 to .88, *suggesting that space occupancy is continuous, rather than segmented, at least regarding a space and its immediate neighbors* (pp. 187, 204, 217, 365, 380, 395).

<u>Equalities and inequalities: What is the difference between residents and staff?</u>

- Staff in all six facilities move, proportionately, more than do residents (pp. 174, 195, 210, 356, 372, 387).
- Resident spaces are characterized by sitting, overall, while halls (staff zones)are characterized by moving, suggesting a difference in experience between residents and staff, indicative of control (pp. 183, 210, 215, 363, 378, 392).

<u>What are the control practices of staff?</u>

- Staff move roughly the same proportion of the available corridor system in both Alzheimer's units and detention centers. However, since there is more corridor length available in Alzheimer's units, staff there move more over greater distances (pp. 191, 207,220, 368, 383, 397).
- Staff movement is correlated with increased staff to resident interactions and with all staff/resident interactions in all units; it is correlated with all interactions in 5 of the 6 centers (pp. 193, 208, 221, 370, 384, 392). *The more staff move, the more they interact.*

The spatial predictability of behaviors

- Integration (1/RRA) predicts the density of ALL PEOPLE, and MOVE and TALK densities, more than any other spatial variable. Integration (1/RRA) is predictive in all 6 facilities, with CON predictive in 5 of 6 cases (pp. 191, 206, 219, 368, 383, 397; also see summary tables on pp. 230 and 407). *Thus, global interconnections are better predictors than the local or immediate connection of spaces.*
- MOVE and TALK are equally predicted, over all (pp. 231, 407).
- Integration (1/RRA), more than any other variable, predicts where space occupancy will be continuous (rather than segmented), when densities are high in 5 of the 6, and where moving and static densities will be balanced, when densities are high, in 4 of the 6. (If the significance level is raised to .10, it is 6 of 6 and 5 of 6, respectively) (pp. 233, 409).
- The size of spaces or isovists (SQFT/ISO) are poor predictors of behavioral densities as compared to integration or connectivity (pp. 188, 205, 218, 366, 381, 395; also 231, 407).
- External components of density correlate better than internal components *suggesting that use is dense in spaces with large isovists* (pp. 232, 408).

These findings illustrate that there are trends across the two types of custodial settings, no matter whether they are weak of strong program buildings.

Second Level Comparison: Systematic Differences

How far is there movement and interaction?

- There is more movement in Alzheimer's than in detention centers (45 - 36.6 percent), *to be expected, given the stronger control regimes in detention centers* (pp. 174, 195, 210, 356, 372, 387).

- There is less talking in Alzheimer's than in detention centers (23 to 31.6 percent) (pp. 174, 195, 210, 356, 372, 387). *This may be because talking becomes an outlet for releasing tension in settings where movement is restricted. It may also be a factor of the reduced mental capacities of the Alzheimer's patients.*
- In Alzheimer's units, staff talk proportionately more than residents, while in detention centers staff and residents are more egalitarian in this respect (pp. 174, 195, 210, 356, 372, 387).
- In Alzheimer's units, talking, overall, is biased more toward movement, while in detention centers it is split proportionately between those who move and those who sit (pp. 174, 195, 210, 356, 372, 387). *Where sitting predominates, talking may take the place of moving as a form of release.*

<u>How much background is there and where is the animation?</u>

- In Alzheimer's units, there are more people, proportionately, in the background than in detention centers (ranging from 2.27 to 2.5 persons out for every one in in Alzheimer's units versus .80 to 2.0 persons out for every one in in detention center) (pp. 181, 199, 214, 361, 376, 391). *Freedom of movement would naturally expand the background available by allowing access to more than the program spaces; curtailment of movement is a measure of stronger control.*
- On average, Alzheimer's units have more animated backgrounds than do detention centers (.84 to .55) (pp. 181, 199, 214, 361, 376, 391); *suggesting that residents see more people moving in the background than do those in detention centers. This may give the perception of less*

control. Again, a difference between strong and weak control programs, but also a function of the ability to move and expand awareness .

Equalities and inequalities: What is the difference between residents and staff?

- In Alzheimer's units, the ratio of animation is in the same direction for staff and residents (both have more animated backgrounds or both have more animated foregrounds) whereas in detention centers they are reversed in two of the three cases (pp. 181, 199, 214, 361, 376, 391) *This suggests that staff see something difference than do residents in detention centers, thereby underscoring the inequalities between them.*
- All staff/resident interactions are higher in detention centers than in Alzheimer's units (8.5 to 4.6, average mean) (pp. 191, 207, 220, 368, 383, 397); *perhaps a diffusing mechanism as noted earlier, but also because of the reduced mental capabilities of Alzheimer's units.*
- Residents in detention centers interact with staff more reciprocally than do those in Alzheimer's units (pp. 181, 199, 214, 361, 376, 391), *often arguing vociferously with staff or carrying on an extended conversation about sports, or so forth.*

What are the control practices of staff?

- There is a more purposeful peripatetic mode of control exercised in detention centers than in Alzheimer's (pp. 181, 199, 214, 361, 376, 398). *This finding is derived from the proportions of staff movement recorded in the facilities and from interviews with staff. Whereas staff in Alzheimer's units move more for general purview of residents and to perform resident-related tasks, staff in detention centers say that they* *purposely move erratically and unpredictably so residents cannot predict a particular pattern.*

- Staff in detention centers rarely allow residents to get behind them, whereas in Alzheimer's centers this is not of concern.
- Staff in detention centers direct more interactions to residents and receive more, than do staff in Alzheimer's units (pp. 181, 199, 214, 361, 376, 398). *Again, this could be because of the reduced mental capabilities of Alzheimer's patients, or because staff in detention settings use interaction as a diffusing mechanism. In DEK, general comments outweigh staff directive or questions.*

<u>The spatial predictability of behaviors</u>

- In detention centers, local connectivity (CON) (31/54) is the most predictive variable, whereas in Alzheimer's units integration (1/RRA) is the most predictive (33/54) (pp. 231, 407). *This shows that even though spatial variables are predictive of behaviors in both building types, detention centers are more localized in intensified control with increasing restrictions against movement between spaces. Integration is far enough behind to clarify a difference between the two building types (26 significant correlations as opposed to 31 in Alzheimer's units).*
- MOVE is the most consistently correlated variable in Alzheimer's units, while TALK is in detention centers (pp. 231, 407).
- Alzheimer's units are more spatially sustained environments than detention centers in terms of numbers of significant correlations (pp. 231, 407).

Third Level Comparison: Individual Characteristics

How far is there movement and interaction?

- The settings differ more as individuals than as subsets. DAY and ORM have the most moving (50 percent each), while MAR and ATL have the least (25 and 30 percent each) (pp. 174, 195, 210, 372).

How much background is there and where is the animation?

Figure 12.1 below illustrates where each facility falls in regard to this question.

- The six settings seem to differ as individuals rather than as two sub-sets with respect to the question of whether the background or the foreground is more animated (pp. 181, 199, 214, 361, 376, 391).
- As Table 12.1 below shows, MAR is the only facility whose foreground is more populated than its background, and MAR and ATL are the only facilities with more animated backgrounds. *The margin in these two facilities , both of which are more formalized in terms of staff/resident interface, is thus less than available elsewhere.*
- DAY and DEK are the only facilities with balanced moving and sitting in their backgrounds, and are in opposite quadrants from MAR which not only restricts the background available but also animates it more; *thereby underscoring the restriction one might feel looking out on more freedom of movement than is available in the space one is in.*
- DAY stands out as the only facility to have an evenly animated background and foreground.

Table 12.1: Background Map Depicting Animation in the Six Units

	BACKGROUND Smaller	BACKGROUND Larger
BACKGROUND More Animated	MAR	ATL
Less Animated		ORM IND
Same		DAY DEK

Equalities and inequalities: What is the difference between residents and staff?

If one associates staff with halls and residents with activity spaces, then one can ask how animated are foreground and background from each of these two poles. Again, the settings seem to differ by individual rather than by group.

- As Table 12.2 shows, MAR and DAY are at opposite poles, with MAR looking out on sitting from both lounge and halls while DAY looks out on relative balance of moving and sitting. *ORM and ATL, in the middle between the two poles of MAR and DAY, typify the opposition of activities expected and often found in custodial environments; for example, that sitting spaces, like lounges, look out onto moving, and moving spaces, like halls, look onto sitting. MAR, DEK, DAY and IND depart from this expectation, with MAR being more restrictive (sitting and sitting) and DAY offering an almost normalized co-presence of moving and sitting. DEK is even more active than one would expect with views from both resident and staff, or sitting and moving, spaces looking onto moving. IND is slightly different from all because it offers views to a parallel life on the other side of the TV room.*

- Staff in ATL and MAR tend to territorialize spaces or areas of spaces. (see Chapters 6 and 10).

  This suggests a separation or bipolarity between staff and resident roles that has been termed "institutional" (Rivlin and Wolfe, 1971).

Table 12.2: Background Map Illustrating Behaviors Seen From Halls and from the Most Frequently Used Resident Activity Space (Lounge in Alzheimer's Units and Dayroom in Detention Centers Except DEK Where it is Dining Room[1])

		See From Halls		
		Sit	Move	Balance
See From Resident Space	Sit	MAR	IND	
	Move	ORM ATL	DEK	
	Balance			DAY

<u>What are the control practices of staff?</u>

- In ORM and DEK staff move more, as a proportion of total hall length, than other units (pp. 193, 208, 221, 370, 384, 392).
- ORM and DEK have the highest number of resident/staff and total interactions, in all, and each, respectively, in their building types (pp. 193, 208, 221, 370, 384, 392).
- Staff in DEK and IND (in the unit) show the most erratic movement patterns evidenced in the six units, with little predictability. *Based on the behavior trackings, these two institutions stand out in the unpredictability of movement as determined by repetitiveness of path.*

[1]The same property exists in the boys dayroom of DEK also.

The spatial predictability of behaviors

- DAY is the most spatially sustained environment, having more significant correlations out of all possible, while ORM is the least (pp. 231, 407).
- ORM is the least spatially predictable environment in Alzheimer's units, while DEK is the least in detention centers (pp. 231, 407).

These summaries show that there are trends across the six cases; there are differences between Alzheimer's units and detention centers clarifying how the role of spaces changes as control becomes a more overriding decision; and, there are individual cases which stand out against the underlying trends both across and between building types.

These characteristics, and their implications for a spatial account of control that can span both types of buildings are discussed below.

3. A Spatial Account of Control

Based on the above summary, the central findings of this study are two-fold. On the one hand, middle range control settings such as Alzheimer's units and juvenile detention centers are not only characterized by considerable degrees of movement and interaction, but they also display a correlation between these behaviors, particularly in respect to communication between staff and residents. Staff movement is correlated with staff directed communications to residents, and in three of the cases (two detention centers and one Alzheimer's unit), reciprocity from residents. The more staff movement there is, the higher the numbers of all interactions, in general, and the higher the number of all staff to resident interactions.

On the other hand, activity in general is denser; more particularly, moving and talking are denser; and, movement is more balanced with sitting and more continuous to neighboring spaces where integration is stronger. This suggests that spatial layout contributes to a probabilistic spatial patterning of movement, and through this, of interaction.

The importance of these findings is to suggest that middle range control settings are, in this respect, no different from other environments where the generative effects of space have previously been identified. Surprisingly, they may even appear subject to the probabilistic effects of space to a greater degree. For example, in museums (Choi, 1991), or schools (Peatross and Peponis, 1994), one can establish correlations between movement and integration, but not correlations between the overall presence of people and integration. This is due to the fact that the overall presence of people is affected by the distribution of art, in the first case, and by study or studio spaces in the second place; i.e., the program at hand. Both these distributions spread across the buildings studied from more integrated to less integrated spaces. In the control settings studied, however, not only is the overall presence of people correlated with integration, but, additionally, there are tendencies for the density of interacting people to also be correlated.

How can the pattern of correlation between integration and behaviors, particularly movement, be interpreted in the context of custodial settings? Since the control and limitation of movement is among the aims of custody, the hypothesis that the correlation may result from a lack of organizational constraint is to be rejected. It would seem that in the case of custodial settings, the correlation between spatial and behavioral variables has to be interpreted by taking organizational constraints into account, rather than by treating them as marginal. But how is the idea of the organizational imposition of constraint to be reconciled with the idea that behavior, and particularly the informality of behaviors, seems to be correlated with spatial variables?

This question leads back to the issues raised by the theory of the inverted spatial logic of custodial buildings. If one supposes that the integration core of buildings would tend to be associated with denser movement and increased exposure to information, people and potential interaction, then it seems perfectly understandable that strong control regimes, such as those advocated in the nineteenth century, would aim to totally exclude the inmates from the integration core and give it over to custodial staff and their practices of surveillance. The buildings studied here, however, indicate that in weaker control regimes, the exclusion of inmates or residents from the integration core is not practiced, may not be viable, and perhaps should not even be desirable. In all cases studied, residents had a least some access to the integration core, albeit more conditional, more limited and more transient in detention centers, and perhaps more permissive and continuous in the Alzheimer's units.

In all cases, however, the core was not conceded to the residents but was quite systematically occupied by staff. At DAY and ATL, the association of staff surveillance with the integration core was indicated by the central position of the nurses station. Similarly, in DEK and MAR, the control room either overlooks or is one of the most integrated spaces. In ORM, staff leave the remotely placed nurses office in order to simultaneously survey the most integrated corridor and the central living area. Finally, in IND, staff occupy the central position in the residential units and dominate the main corridor system. In other words, in these institutional settings, integration is not only claimed by the general patterns of movement and copresence but also by the deliberate and strategic implantation of positions of surveillance.

In conditions of weak control, this pattern of cohabitation of the integration core seems to reinforce the correlation between densities of space occupancy and the degrees of integration. This is because staff tend to be the focus of at least part of the interaction and also of part of the attention and interest. This is clearly indicated in ATL where the residents place chairs in the nurses hall in order to maximize their exposure to the ongoing activities of the center; i.e., the nurses zone and the entry.

The outline of the spatial dimensions of control can thus be clarified, and with it, a spatial account of custodial buildings can also be formulated. At one extreme, movement and copresence can be restricted, or perhaps excluded, from the integration core. At the other extreme, the integration core may sustain patterns of awareness, communication and encounter over and above those proscribed by the organization. Between the two extremes, the core acts simultaneously as a domain of probabilistic encounter and as a domain of surveillance. In general, the effects of control can be identified in the deviation of movement and copresence from their underlying association with integration. This is quite evident from the overall pattern whereby integration is more predictive of behaviors in Alzheimer's units than in detention centers. It is also evident in the way in which residents in MAR are turned away from the integration core and activities are curtailed in spaces, like the activity room and dayroom, which cannot be brought under the purview of the control room. What seems to lead to greater restriction in MAR as compared to DEK is the fact that the layout does not facilitate the simultaneous use of the core to survey and also to sustain some contained level of movement, awareness and exposure.

The design problem, therefore, seems to be how to simultaneously satisfy the requirements of control and surveillance and those of some limited spatially sustained socialization. While in Alzheimer's units the cohabitation of the integration core can be direct, as demonstrated in DAY, in the more restricted detention settings a more sophisticated articulation between surveillance and movement seems to be called for, as in DEK.

The attending design dilemmas can thus be clarified. The problem, from the point of view of organizational design, seems to be how to sustain enough density of everyday events to be able to absorb and redirect the tensions and boredom which are implicit in confinement and containment. Normalization of behaviors, stripped of its claims to moral reform, seems to be about the pragmatics of custodial buildings, more than about the illusions of "home". Any attempt to impose strong restrictions on behavior under confinement is naturally linked to social and behavioral tensions, as evidenced more strongly in the youthful explosions in detention centers, but also in the plaintive cries of Alzheimer's patients "waiting for the bus". If, for whatever reason, locking people up cannot be the central means for managing these tensions, the alternative seems to be to engineer sufficient ranges of normalized activity that can remain discretely controlled, while also providing for as incident-free a time as possible.

The creation and management of movement, without compromising its continuous monitoring and potential suppression, seems, therefore, to be the central problem of design. From the point of view of this study, the problem translates into the way in which the integration core is configured, invested with space use, and managed subject to the dual aims of enabling or allowing on the one hand, and surveilling and containing, on the other.

As an abstract model of control, the "panopticon" proposes the complete elimination of movement and encounter under the purview of an intensely manifest and visually integrating center. The panopticon was in some sense an attempt to de-socialize the center. It suggested that between the seeing eye and the inmates there was no social exchange. The very presence of the inspector was to be doubted by the inmates; the tower was purposely in shadow so that inmates could not check whether they were being inspected or not, and thus had to assume that they were.

While the panopticon principle has been associated with regimes of strict control, it is not immediately obvious, beyond a distaste for the image it connotes, why regimes that are aimed at weaker control and a more normalized institutional life cannot use parts of it successfully. Certain aspects of the panopticon, such as the strategic implantation of a control point, or the provision for the maximum scope of visual surveillance, are already present in the design of most custodial environments -- usually at the expense, however, of socialization. This study suggests that at least two commonly accepted practices of control environments, one of which relates directly to the surveillance possibilities of the panopticon, are called into question. First, as exemplified by DEK, direct surveillance, in the form of a strategically placed, but spatially separated, control room, can be consistent with normalized behaviors. Where the background properties are normalized as they are in DEK, the effect of central control overlooking them need not be intrusive. Indeed, the constant presence of an officer in a separated and overlooking control room actually seems to free the direct supervision staff to interact more informally with residents and move more freely among them, with the attendant ease and socialization noted. Used in conjunction with direct supervision, a centrally placed control room seems to actually enhance rather than detract from socialization.

Secondly, the issue of unit size in terms of numbers of residents seems to make little difference in the control of residents; small numbers may not necessarily be a good idea. This study shows that the high densities in DEK actually improve the scene socially. Staff move and interact more freely in DEK than anywhere else despite the large size of the group. The informality evidenced there cannot be said to be a function of a higher staff/resident ratio than elsewhere. It seems to be due to the fact that residents and staff simultaneously occupy the integrated core which also contains movement, but activity and movement are under the purview of control room staff.

The analysis presented above suggests that in weaker control environments, the integration core need not be fully taken over by the functions of control as it is in the panopticon, but can also be conceded to the functions of socialization. It would therefore seem that the aim of design is to reconcile surveillance and socialization; in other words, to create a viable and pragmatic pattern of cohabitation between the functions and requirements of control and those of socialization.

4. From a Spatial Account of Control Regimes to Strategic Choices of Spatial Design

The spatial account of control provided here is based on a syntactic description of the pattern of layout and space use. This has a fundamental implication. While the account is precise and even quantitative, it is at the same time abstract. From the point of view of the development of theory, abstraction is an advantage because it allows conclusions to be drawn from a precise comparison of settings that are different in many particular respects. From the point of view of a designer, however, abstraction is a mixed blessing. While the research findings help to understand how layouts function in relation to practices of control, they do not automatically suggest particular design strategies. It might even be said that the research contributes towards a better understanding of the fundamental spatial relationships that a designer manipulates without simultaneously suggesting how these relationships are to be manipulated. At a practical level, any building design will require that syntactic ideas are confronted with geometrical constraints, requirements for repetitive accommodation, structural, technical and economic considerations, site conditions and so on. At a more theoretical level, some amount of work needs to be done in order to harness syntactic relationships towards particular design aims.

The aim of this thesis is to assist the formulation of criteria and strategic choices that can be used to design custodial buildings intended for more normalized control regimes. This section addresses some of these problems by asking how the general idea of "reconciling surveillance and socialization" can be explored in greater detail with respect to the six cases under consideration. If the above theory is valid, one must ask how useful it is in design. The aim, however, is <u>not to provide particular design solutions</u>, or propose a particular geometry, much less to provide design guidelines. The aim is to <u>illustrate how the knowledge of principles might help the exploration of strategic design choices in particular cases</u>. The discussion will first focus on DAY, ATL, ORM and DEK, all of which have clear potential to reconcile surveillance and socialization.

It has been argued that the qualities of DAY derive from the creation of a bipolar system of activity arranged along the integration core, with the inner pole dominated by the nurses station and the outer pole dominated by activity rooms. The manner in which the major paths cut through spaces, and the visual exposure of spaces to their neighbors create a uniquely lively and animated background as well as foreground as people move along this integrated and exposed spine. The layout, however, has a clear disadvantage. The entrance cannot be directly supervised from the nurses control point and this leads to risks of elopement. Staff cope with this by positioning themselves in the activity spaces near the entry, thus occupying both poles.

How can this design be reorganized so as to retain, as much as possible, the advantages that it offers while limiting the disadvantages? It would seem that one modification, represented in Figure 12.1a as DAY-A, could entail re-shaping the nurses station so that it can look straight down the main path of movement and survey the entrance. Because of egress requirements, it is quite possible that this may require relocating the nurses station across the other side of the corridor. This modification still allows for the stretch of movement the original plan does so well. This alternative would also allow the nurses station to survey the entrance (even better if the entry to the lounge is widened) but would not, in itself, prevent elopement, since staff would still have to decide whether to act every time they see a patient near the door. Given the proximity of the entry to activity areas, the intentions of patients or the danger of elopement may not become obvious until the last moment.

Alternatively, the entrance could be relocated near the center of the pinwheel, at the emergency exit near the mechanical room (M on the plan). If the nurses station were relocated to the activity room overlooking this entry, this would bring the entrance not only under the surveillance of, but also under the direct control of, the nurses station. However, activity areas will find themselves deprived of their present exposure to through movement from the entrance to the rest of the building and would thus be less lively/animated/populated. This alternative, therefore, may not be fully acceptable without some further modification.

Figure 12.1b shows DAY-B, where an entrance path has been created along the east (looking at the plan as if north is at the top) side of the activity wing. If rooms are open to a raised verandah, or if they are sufficiently glazed, patients can thus have a full view of movement, even if movement is no longer through their areas. The nurses station is relocated in the center so that it faces directly onto the entrance, but is more directly visible from and to the activity wing, while still acting as the midpoint to the rooms and the exterior walking path. Thus, full control is achieved without totally sacrificing the exposure of inmates to movement, or to movement itself.

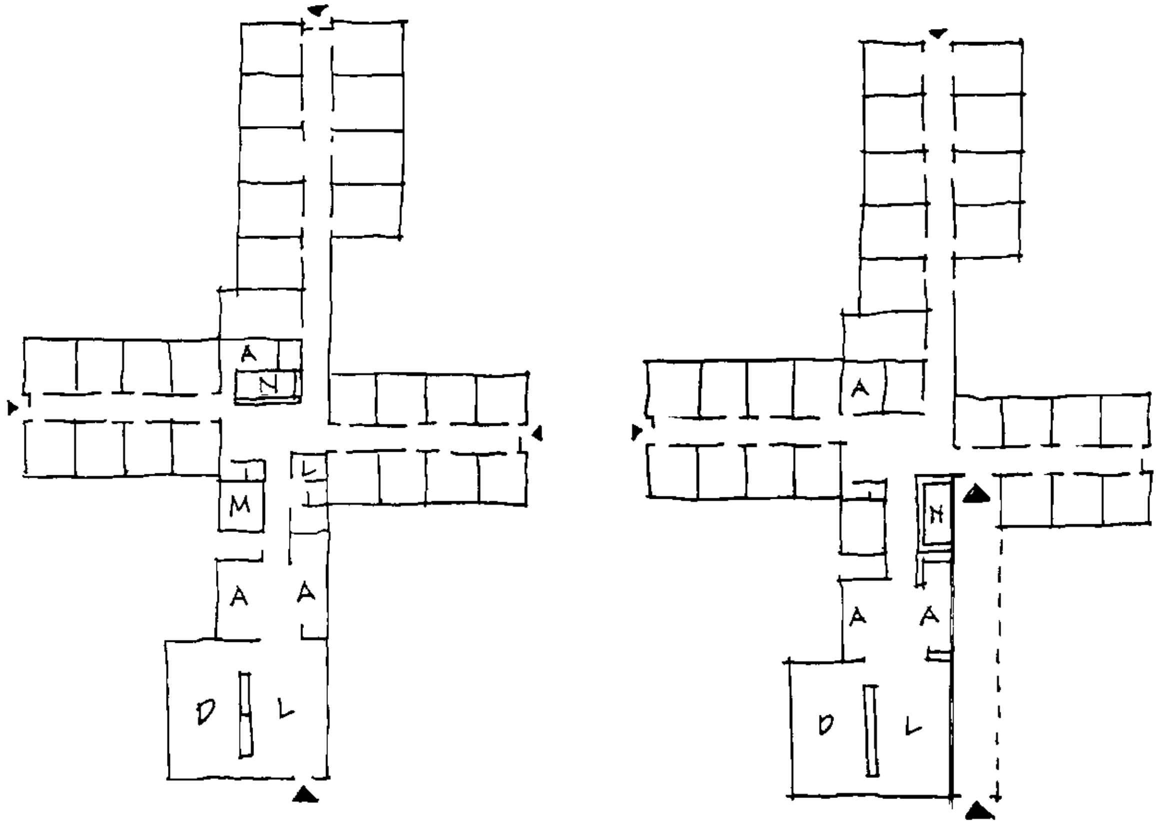


FIGURE 12.1: DAY-A and DAY-B - Relocating the Nurses Station to Maintain Bipolarity of Movement While Directly Controlling the Entry

ORM, a cluster rather than a radial plan, exhibits the same bipolarity of activity and task areas as at DAY but the inner pole is dominated by residents, while the outer pole is dominated by entry. Like DAY, the integration core is highly used, but, unlike DAY, it fails to visually link the two poles. This lack of visual link creates a dilemma for staff who must move from the segregated nurses office to resident areas to oversee residents, but must constantly re-check the offset entry. Although this plan best exemplifies the therapeutic elements stressed in the literature -- a central space surrounded by resident rooms, a looping path, and a "homelike" environment -- the looping path is unused, while the integrated core is overused. Because the core runs past, not through, the primary staff and resident use spaces, it creates clear spatial distinctions between moving and sitting densities with no place for spillover.

ORM seems to function well socially because of its compactness and the fact that staff, out of necessity, are closely mixed with residents out of expediency. The evidence of spatial tension, however, is the cluster of animation on the core in and near the entry and the nurses station, and not spread into the larger and more gracious interior lounge. Thus, in ORM, with a similar and even shorter bipolarity of activity hubs, the core fails to integrate use spaces, it is not visually well exposed to the activity spaces, and the spaces themselves are not well connected. Furthermore, control (in the form of nurses station) fails to command the core.

One modification for ORM is represented by Figure 12.2a (ORM-A). Moving the entry to the extended porch, and placing the nurses station, with open access counters, in the dining alcove opposite, would allow residents to be effectively exposed to both poles. They could maintain visual exposure from the lounge to the entry and the nurses station. However, the problem with this alternative is that the entry, being distant from the nurses station, still allows the potential for accidental or purposeful elopement.

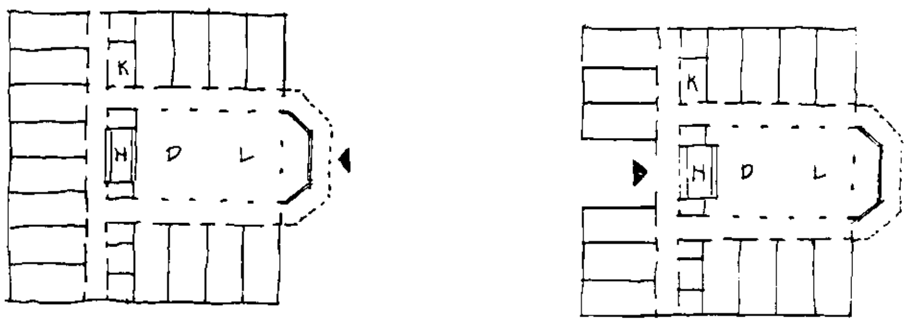


FIGURE 12.2: ORM-A - Moving the Entry to the Porch; ORM-B - Moving the Entry to the Integrated Corridor

Perhaps a better modification is shown in Figure 12.2b (ORM-B) by again placing the nurses station in the dining loggia, but relocating the entry to replace the two middle rooms on the integrated core. If the nurses station has open access counters to dining/lounge and to the entry, it would allow residents in the lounge/dining area, and wanderers, to be simultaneously exposed to both nurses and the entry beyond while still being largely contained in the resident lounge/dining area. The entry would both be more directly controlled by staff as well as more visually available to residents as they wander through the facility. In terms of economy, however, two resident rooms are lost with this scheme.

Interestingly, despite their geometrical differences, it has been possible to redesign ORM and DAY to achieve almost identical syntactic alternatives. In designs DAY-A and ORM-A, the nurses station is located deep in the building but has direct views of the entrance. Activity areas are located along the route from the entrance to the station, thus enjoying through movement. The systems still work in a bipolar manner, thus creating movement. However, the risk of elopement is not fully eliminated in these schemes which are weaker control versions of the interface.

On the other hand, in DAY-B and ORM-B, the activity areas are visible from and to the entrance so residents can have a visual sense of the background movement related to the entrance. However, their activity areas are situated past the nurses station which has direct control of the entrance instead of merely visual surveillance over it. This is a stronger control version of the interface. In both cases, however, movement, and the inherent interest in the entrance is made visible to those occupying the activity ares; and, in both cases, the pole of activity is physically linked to the core as well as visually linked to the nurses station. Thus, these designs help to maximize the sense of movement and awareness through the creation of a bipolar system associated with the integration core and with visual links from one pole to the other. The difference lies in the rigor of control that can be exercised over the entrance and the slight curtailment of movement that could potentially be exercised with more dispersed activity areas.

In ATL, the precise syntax of the plan allows the combination of centralized surveillance with the containment of socialization, except that one resident pole is completely closed off because of lack of surveillance from the center. This plan, however, most readily echoes the themes of the conventional literature on custodial control. The centralized nurses station allows staff to have simultaneous visual control over the entry and over the lounge. Because the core fails to spatially and visually include the lounge, however, there is not enough visual exposure from the lounge to maintain a local and global interface with other use spaces. Thus, while the core in ATL integrates activity at the center, a tension exists, evidenced by the fact that residents jockey for exposure by congesting the entry and nurses hall. This is a case where the touted adage of corridors going "past" activity spaces fails to work, if they are not spatially and visually well integrated. Summarily, the dilemma for staff is how to command the core while containing the residents from congesting the center.

The fixed location of the elevators in ATL makes it a bit more difficult to modify. One option that would allow less congestion at the center while opening both the nurses station and the entry more to residents purview is illustrated in Figure 12.3 (ATL-A). Moving dining up to the lounge and expanding it by one resident room, and moving the lounge into the north two rooms and opening it up to the hallway exposes both areas to the core and entry and allows their simultaneous use. Nurses at the station can oversee both rooms and the entry and residents could see those entering as well as the activity at the nurses station.

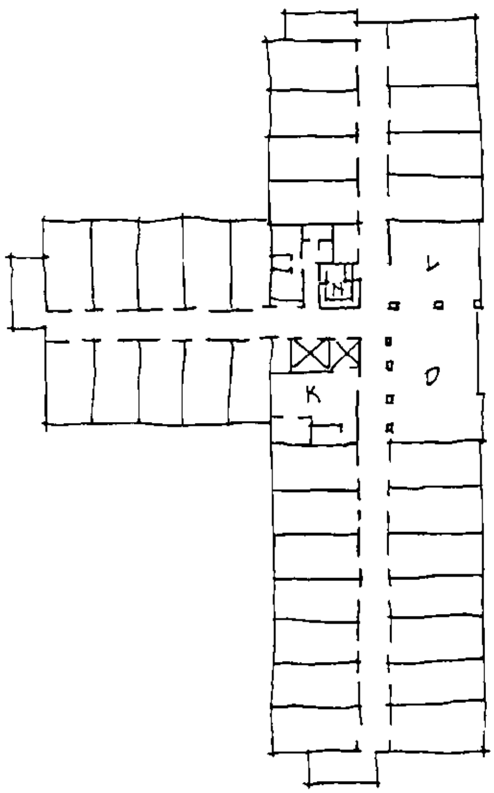


FIGURE 12.35: ATL-A - Moving the Lounge and Dining Space

One problem, however, that arises in all three of these modifications is that the provision of a centralized nurses station overseeing both resident areas and the entry solves two problems but creates a third. While it allows an overview of entry and resident activity areas, it creates a space for staff to congregate while requiring less movement of staff to oversee residents. One of the nice things about DAY and ORM is the socialization between residents and staff generated by the movement and enforced proximity that is required in order for staff to survey both entry and residents. Contrarily, the centrally placed station in ATL, while seemingly increasing staff solidarity, seemed to also decrease the presence of staff amongst the residents with the resultant formality. The modifications proposed above, therefore, create a nurses station which would very likely decrease the amount of movement required to supervise the residents and the entry, possibly resulting in the bipolarity of residents and staff seen in ATL and discussed in the literature.

It seems then that strategic choices must be made. One can either directly control the entry and the resident areas, a stronger control option, or choose a weaker option as in DAY-A or ORM-A which removes staff from a station but also raises the possibility of resident elopement. One can also somewhat amend the latter options and thereby "create" opportunities for staff movement by disposing staff service spaces at various points in the plan. While this may be uneconomical in terms of staff time and movement, it would create more possibilities for casual interaction as staff carry out their tasks at dispersed locations.

The most interesting morphology arises in DEK which stands out from the others in clustering movement and activity under the purview of a separate control room. It seems that one aspect of design that makes this possible is that the center, the multipurpose room, is "fat", rather than a mere intersection as in ATL, thus allowing activities occuring directly off it to overlap through the modulation of the isovists. This helps create a continuous and animated foreground and background. The core steriates from the multipurpose room, entering every categorical grouping off this large area. The centralization and shallowness of this active central space, nucleated by quieter alcoves off it, allows sitting to be interfaced with movement, residents to interface with staff, local to interface with global, and a regular alternation in use, and views, to occur. Spaces, and the people in them are thus exposed through triangularity, rather than bipolarity, to the surveillance of others, creating a lattice of control. Because of this, and because control has an independent access to outside, staff can move in an unconstrained manner, as can residents. Spaces are well connected, but far enough distant to require some movement, and the core integrates all the major use spaces.

The fact that DEK is the least spatially predictable detention building, with integration correlating only with densities of all persons and with moving IN spaces, suggests that DEK combines high levels of activity with something that includes an element of surprise. It is suggested that this is a relatively unpredictable set of events taking place within the scheduled parameters of activity. Often in DEK, during the time-out after school or dinner, a YDW will suddenly decide it is a good time for everyone to exercise in the multipurpose room, or practice for a school event coming up; another YDW may decide to take a set of Level 1 boys to the dayroom to watch something different on television. Suddenly, the pace changes, activities change, and residents scatter in all directions. It is suggested that this relative unpredictability of activity, enlivening life in this center, is a function of having a more predictable center.

In effect, DEK is like DAY-B, ATL-A, and ORM-B already, but for the fact that the relationship of activity areas to the entrance cannot be used as a means for enhancing liveliness since by definition the boundary to the carrier cannot be routinely crossed in detention centers. DEK offers the best substitute for that by providing some visual exposure to the activities of intake (detention entry) and to the administrative staff areas.

DEK thus exhibits the most subtle regime of coexistence studied; its use of integration and visual access to other categorical areas brings with it some relaxation of rule and degree of informality. The only modification that seems possible while still maintaining the informality here is to move the existing unit dayrooms to the top of the radial wings where they would replace the current small dayroom and could be used simultaneously for unit activities. This would in effect expand the offerings of the dayroom while allowing simultaneous occupancy by two different groups.

The way in which MAR fits into all this is quite straightforward. Superficially, it is similar to DAY in that its control room is deep, its resident activity room shallow, and both are linked by an integrating core. Unlike DAY, however, MAR fails to use the core. It is suggested that the poor exposure of use spaces to the core, the fact that the control room fails to visually command it, and the dilemma it poses for staff who cannot see the spaces transposed off it, triggers more overt control over movement on it; this lack of movement and exposure generates the tension exhibited in this center. Spaces are too segmented and bounded to allow much view of life between them, or beyond them, and an unexposed core fails to generate vitality in linked spaces. The main problem, therefore, is MAR's inability to resolve the issue of simultaneous surveillance and socialization.

MAR cannot be readily altered to fit this idea. The spread of activity areas is such that they cannot be brought under the surveillance potential of any single room. Circulation options are so restricted that the necessary connections cannot be made without turning the control room into an isolated island. Thus, the layout of MAR seems to perpetrate a tension between the option of strong imposition which enforces control only, at the expense of probabilistic behaviors, or greater behavioral freedom at the expense of the minimum acceptable level of control.

IND cannot be brought under the purview of the same family of issues as the other institutions. In order to keep the primary interface of staff and residents informalized in the podular units, one ends up with a very decentralized and formal structure in the public activity area. Life in the unit is much like that of DEK because, spatially, it offers the same centralization of control, contained movement between parts, and even the effects of triangulation in its relationship with the unit next door. However, where getting out of bed in the morning in ORM, DAY, ATL, and DEK, and even in MAR, takes one into a corridor at whose end lies if not a center as in DEK, then at least one center of activity. In IND, one is more disembodied. In the other centers studied, the building acts as more or less a single spatial interface, between one pole (the inhabitants) represented by a control room and conditionally available activity room or gym, and another (the inmates) who are identified with the cellular component of the layout, however many checks and balances are built into it. With IND, the center is not an intersection as in ATL and DAY, nor a control point or activity hub, as it is in DEK, but rather a distributive grid. The corridors are controlled by the inhabitants but do not mark in any specific way the inhabitant identity. The grid layout, even in ordinary buildings inhabited by free people moving about, coupled with the visual separation of key activity points from the corridors, would still make this a very alienating building. It is different not merely due to its size (which is obviously an overriding consideration), but also as a paradigm of an institution. While it allows for additional spread of housing units (by adding more pods), the corridors required to connect these units to the whole act instead as very powerful means of separation. While there are pockets of relaxed and informal life in the pods, the connection to the rest is tenuous. IND represents another type of institutional building altogether.

IND also raises the question of how the principle of simultaneity of control and socialization can be extended to buildings of larger size. While the principle seems to operate at the level of the individual units, its potential applicability to the overall circulation system is not readily obvious.

Again, these notes are not meant to provide particular solutions, but rather aspire to demonstrate that the findings of this thesis can illuminate design manipulations and give rise to certain viable strategic design choices. Further work is, however, needed in order to translate the findings of this thesis into design guidance that takes into account the whole set of relevant parameters.

5. From a Spatial Account of Control Regimes to Organizational Culture

This thesis has demonstrated that custodial organizations are characterized by consistent patterns of space use. It has further demonstrated that building layout has an effect on the pattern of space use. The patterns of integration, connectivity and visual exposure are correlated to the patterns of movement, awareness, encounter and interaction. The way in which layout affects space use is, of course, interesting in its own right. However, this thesis suggests that the effects of layout on patterns of space occupancy and space use are particularly interesting in the context of current organizational explorations aimed at creating environments in which control is balanced against some margins of freedom. Whether such developments are seen as responses to the pragmatics of everyday control practices in restrictive settings, or whether they are seen as an outcome of a more ambitious program of behavioral "normalization", they clearly raise the question of whether the patterns of spatial organization and space use are further correlated to the psycho-social climates of environments.

Answering this question has not been a central aim of this thesis. The idea that normalization of behaviors may entail some margins of less restricted movement, encounter, awareness and interaction was drawn from the literature. However, the use of the Social Climate scales to provide a "personality" profile of the six organizations as perceived by staff allows a tentative exploration of the issue that should be of interest to those researching issues of organizational culture against the background of space.

To tentatively explore this issue, the Moos social climate scores were correlated with the basic variables describing layout, space use, and the predictability of space use from the properties of layout. Because only six cases are involved, a significance level of .10 is considered reasonable as a point of departure for future exploration. One of the personal growth subscales, anger and aggression, is dropped from analysis because it is only measured in the WAS scale used in the three Alzheimer's units and does not feature in the CIES scale given in the three detention centers. Although the questions vary between the two scales, they tap the same three dimensions. (The parentheses indicate that a high outlier has been dropped, and indicate which unit the outlier represents).

As shown in the following table, the relationship variables of INVOLVEMENT, SUPPORT, AND SPONTANEITY are most consistently correlated with the layout variables of integration (local CONVEX RRA and global AXIAL RRA), the DENSITY of MOVING PEOPLE, and the ratio of BACKGROUND to FOREGROUND. Personal growth variables of AUTONOMY, or how self-sufficient and independent residents are, and PRACTICAL ORIENTATION, or the extent to which residents learn practical skills, are correlated with AXIAL RRA and more populated BACKGROUNDS. Practical orientation is also associated with one predictability variable (DENSITY OF MOVING).

Contrastingly, system maintenance variables are less consistently correlated. ORDER AND ORGANIZATION are perceived by staff as more emphasized in layouts where integration is predictive of MOVING DENSITIES in foreground and background, and TALKING DENSITIES in the background; PROGRAM CLARITY is correlated with axial RRA, with DENSITY OF TALKING, and with DENSITY OF MOVING as predicted by integration; STAFF CONTROL, or the extent to which staff use measures to keep residents under control, is associated with convex and axial RRA, with DENSITY OF ALL PEOPLE, MOVING PEOPLE, with more populated BACKGROUNDS, and with layouts predictive of TALKING.

In summary, many of the variables associated with the subjective experience and perception of organizational conditions are associated both with variables describing layout and with variables describing space use. Thus, more integrated environments and environments more dense with people, and with moving people are associated with staff perceptions of more involved, supportive and spontaneous environments, and with perceptions of greater resident autonomy and practice of pragmatic skills. Layout and space use variables are also rather consistently correlated with staff perceptions of a need for control with more integrated and more dense environments associated with a perception of less need for control measures.

On the other hand, variables dealing with the staff's sense of the system properties of the organization are correlated not only with the properties of layouts but also with the degree to which space use is predictable from these properties. Thus, environments where background movement and interaction are more predictable from integration are associated with a perception of less emphasis on order and organization, or more informality. Layouts where foreground movement is more predictable from integration are associated with staff perceptions of how clear the environment is in terms of what is expected. Finally, layouts where foreground interaction is more predictable from integration are associated with a staff perception of less need for active control of residents.

The limited number of cases under review can only allow the formulation of hypotheses for further research. It would seem, however, that the variables which describe the properties of layout and space use are associated with the way in which users perceive and experience their own conditions in the organization, while variables which describe the predictability of behavior from the properties of layout are associated with the way in which users experience and perceive the systemic properties of the organization. This is a rather strong hypothesis that merits further research.

CLIMATE SCALE DIMENSIONS

	Relationship			Personal Growth			System Maintenance		
	Involvement	Support	Spontaneity	Autonomy	Practical Orientation	Personal Problem Orientation	Order and Organization	Program Clarity	Staff Controls
LAYOUT									
Unit Convex RRA	.886 (-DAY)	.949 (-DAY)	0.799	0.543	0.577	0.111	0.134	0.365	0.822
	0.0457	*0.0136*	*0.0565*	*0.2658*	*0.2303*	*0.8341*	*0.8001*	*0.4764*	*0.0448*
Center Axial RRA	0.966 (-DEK)	.818 (-DEK)	0.768	0.896	0.734	0.379	0.102	0.879	0.778
	0.0074	*0.0903*	*0.0746*	*0.0155*	*0.0967*	*0.4591*	*0.8476*	*0.0498*	*0.0686*
SPACE USE									
Density All People	0.579	0.83	0.645	0.104	0.045	0.558	0.05	0.481	.943(-MAR)
	0.2287	*0.0408*	*0.0408*	*0.8451*	*0.9332*	*0.2496*	*0.9257*	*0.3343*	*0.0164*
Density Moving People	0.821 (-DEK)	0.826	0.988	0.584	0.502	0.414	0.339	0.245	0.78
	0.0887	*0.0429*	*0.0016*	*0.2234*	*0.3101*	*0.4142*	*0.5112*	*0.6402*	*0.067*
Density Talking People	0.438	0.585	0.461	0.164	0.106	0.515	0.161	.839(-MAR)	0.454
	0.3845	*0.2228*	*0.3574*	*0.7566*	*0.8411*	*0.2959*	*0.761*	*0.076*	*0.3663*
Ratio of Background to Foreground	0.831	0.77	0.937	0.823	0.83	0.497	0.388	0.52	0.925
	0.0402	*0.0732*	*0.0058*	*0.0443*	*0.041*	*0.3164*	*0.4471*	*0.2904*	*0.0082*
PREDICTABILITY OF SPACE USE									
Density of Moving as Predicted by 1/RRA	0.361	0.213	0.22	0.555	0.75	0.005	.908(-MAR)	0.733	0.185
	0.4819	*0.686*	*0.6754*	*0.2527*	*0.0862*	*0.9927*	*0.0329*	*0.0977*	*0.7262*
Density of Moving in Background as Predicted by 1/RRA	0.088	0.179	0.2	0.44	0.017	0.04	0.744	0.411	0.247
	0.7211	*0.7337*	*0.704*	*0.3829*	*0.9738*	*0.9402*	*0.0902*	*0.4188*	*0.6371*
Density of Talking as Predicted by 1/RRA	0.531	0.597	0.523	0.373	0.221	0.029	0.01	0.17	.903(-ATL)
	0.2783	*0.2108*	*0.2872*	*0.4669*	*0.6744*	*0.9571*	*0.9853*	*0.7473*	*0.0357*
Density of Talking in Background as Predicted by 1/RRA	0.264	0.216	0.242	0.519	0.024	0.336	0.757	0.394	0.227
	0.6127	*0.6509*	*0.6439*	*0.2916*	*0.9642*	*0.5147*	*0.0815*	*0.4391*	*0.6659*

TABLE 12.3: Correlation of Climate Scale Dimensions and Layout, Space Use and Variables Predictive of Space Use - Showing Correlations Between Psycho-Social Variables and Spatial Variables

Also in terms of future research, it is felt that the methods used allow a far better understanding of the morphological relationships underlying spatial organization and space use which can be applied to future design of these building types. The use of space syntax as the central methodology allows a description of space that is often sadly lacking in behavioral studies of institutions. Furthermore, it eases correlation with behavioral and, as suggested by the social climate scales, psycho-social variables. The addition of isovists also proved beneficial in distinguishing between foreground and background and identification of the critical margin supplied by an extended background.

As mentioned previously, however, one of the limitations of the present study is the small number of cases studied. An obvious first step in subjecting the methods to a broader range of cases would be to apply them in a similar study of a wider range of direct supervision correctional facilities or treatment facilities in order to ascertain associations between these spatially distinct facilities and social behaviors in them.

In summary, this thesis was aimed at assisting in the formulation of strategic choices that could be used to design custodial buildings intended for control organizations who also emphasize behavioral normalization. Middle range control settings of the type studied can be characterized by a considerable degree of movement and interaction. Like other environments, they are also subject to the probabilistic effects of space. The dilemma for design and planning lies in reconciling the organizational impositions of constraint with a more behaviorally normalizing environment. Understanding the spatial dimensions of control, therefore, leads to clarification of design alternatives. This study suggests that layout can be a powerful tool in creating and managing movement and interaction, while simultaneously creating opportunities for surveillance and containment. The functions and requirements of control can be bridged with those of socialization.

APPENDIX A

CODING SHEET - BEHAVIOR MAPPING (Record ISOVIST and ANIMATE)

Place/Unit____________________ Date____________ Time of Day__________

Category:

W = Youth Development Worker
C = Counselor
Co = Control Officer
K = Kitchen Worker
A = Administration
T = Teacher
O = Other

Behavior:

Sit = Underline initial
Stand = Initial as is
Talk = Line through initial

PLAN OF FACILITY

APPENDIX B

CODING SHEET - BEHAVIOR MAPPING (Record ISOVIST and ANIMATE)

Place/Unit____________________Date____________ Time of Day____________

Category:		Behavior:	
N	= Nurse on duty	Sit	= Underline initial
D	= Doctor	Stand	= Initial as is
A	= Administrator	Talk	= Circle
O	= Other		

PLAN OF FACILITY

APPENDIX C

CODING SHEET - BEHAVIOR TRACKING

Place/Unit____________________ Date____________ Time of Day__________

Track YDW or Nurse on Duty ONLY -- Code Interactions with everyone

Category:
- R = Resident
- O = Other Staff

Initiator: = --->

Content:
- D = Directive (order)
- G = Greetings or comment

PLAN OF FACILITY

APPENDIX D

Please provide the following information:

Your Age: _____ Sex: M F (circle)

How long have you been or worked on this ward? ___________ years ___________ months

In your lifetime, how long have you spent or worked in treatment settings? ___________ years ___________ months

What is your exact job title?_________________________

- -

Please read each statement below and circle True (T) if the statement is true of your unit most of the time or False (F) if the statement is not true of your unit most of the time. If you are unsure, just guess.

T F 1. Patients put a lot of energy into what they do around here.

T F 2. Doctors have very little time to encourage patients.

T F 3. Patients tend to hid their feelings from each other.

T F 4. The staff act on patient suggestions.

T F 5. New treatment approaches are often tried on this ward.

T F 6. Patients hardly ever discuss their sexual lives.

T F 7. Patients often gripe.

T F 8. Patients' activities are carefully planned.

T F 9. The patients know when doctors will be on the ward.

T F 10. The staff very rarely punish patients by restricting them.

T F 11. This is a lively ward.

T F 12. The staff know what the patients want.

T F 13. Patients say anything they want to the doctors.

T F 14. Very few patients have any responsibility on the ward.

T F 15. There is very little emphasis on making patients more practical.

T F 16. Patients tell each other about their personal problems.

T F 17. Patients often criticize or joke about the ward staff.

T F 18. This is a very well organized ward.

T F 19. Doctors don't explain what treatment is about to patients.

T F 20. Patients may interrupt a doctor when he is talking.

T F 21. The patients are proud of this ward.

T F 22. Staff are interested in following up patients once they leave the hospital.

T F 23. It is hard to tell how patients are feeling on this ward.

T F 24. Patients are expected to take leadership on the ward.

T F 25. Patients are encouraged to plan for the future.

T F 26. Personal problems are openly talked about.

T F 27. Patients on this ward rarely argue.

T F 28. The staff make sure that the ward is always neat.

T F 29. If a patient's medicine is changed, a nurse or doctor always tells him/her why.

T F 30. Patients who break the ward rules are punished for it.

T F 31. There is very little group spirit on this ward.

T F 32. Nurses have very little time to encourage patients.

T F 33. Patients are careful about what they say when staff are around.

T F 34. Patients here are encouraged to be independent.

T F 35. There is very little emphasis on what patients will be doing after they leave.

T F 36. Patients are expected to share their personal problems with each other.

T F 37. Staff sometimes argue with each other.

T F 38. The ward sometimes gets very messy.

T F 39. Ward rules are clearly understood by the patients.

T F 40. If a patient argues with another patient, he/she will get into trouble with the staff.

APPENDIX E

Please provide the following information:

Your Age: _____ Sex: M F (circle)

How long have you been or worked on this unit? ____________ years ____________ months

In your lifetime, how long have you spent or worked in correctional institutions? ____________ years ____________ months

What is your exact job title? ____________________________

- -

Please read each statement below and circle True (T) if the statement is true of your unit most of the time or False (F) if the statement is not true of your unit most of the time. If you are unsure, just guess.

T	F	1.	The residents are proud of this unit.
T	F	2.	Staff have very little time to encourage residents.
T	F	3.	Residents are encouraged to show their feelings.
T	F	4.	The staff act on residents suggestions.
T	F	5.	There is very little emphasis on making plans for getting out of here.
T	F	6.	Residents are expected to share their personal problems with each other.
T	F	7.	The staff make sure that the unit is always neat.
T	F	8.	Staff sometimes argue with each other.
T	F	9.	Once a schedule is arranged for a resident, he/she must follow it.
T	F	10.	Residents here really try to improve and get better.
T	F	11.	Staff are interested in following up residents once they leave.
T	F	12.	Residents tend to hide their feelings from the staff.
T	F	13.	Residents are expected to take leadership on the unit.
T	F	14.	Residents are encouraged to plan for the future.
T	F	15.	Residents rarely talk about their personal problems with other residents.

T F 16. The day room is often messy.

T F 17. If a residents program is changed, someone on the staff always tell him/her why.

T F 18. Residents may criticize staff members to their faces.

T F 19. Residents on this unit care about each other.

T F 20. The staff help new residents get acquainted on the unit.

T F 21. Staff and residents say how they feel about each other.

T F 22. The staff give residents very little responsibility.

T F 23. Residents are encouraged to learn new ways of doing things.

T F 24. Personal problems are openly talked about.

T F 25. The unit usually looks a little messy.

T F 26. When residents first arrive on the unit, someone shows them around and explains how the unit operates.

T F 27. Residents will be transferred from this unit if they don't obey the rules.

T F 28. There is very little group spirit on this unit.

T F 29. The more mature residents on this unit help take care of the less mature ones.

T F 30. People say what they really think around here.

T F 31. Residents have a say about what goes on here.

T F 32. There is very little emphasis on what residents will be doing after they leave the unit.

T F 33. Discussions on the unit emphasize understanding personal problems.

T F 34. This is a very well organized unit.

T F 35. Staff are always changing their minds here.

T F 36. All decisions about the unit are made by the staff and not by the residents.

APPENDIX F

INTERVIEW FORMAT - ADMINISTRATION AND LINE STAFF

1. How many years have you worked here? in settings like this?

2. What is the goal of this institution?

3. Are the YDW's (nurses) committed to this goal?

4. Are residents committed to this goal?

5. What is your personal goal?

6. How is communication between YDW's (nurses) and residents?

7. How is communication between the unit staff and administration?

8. How do you maintain control?

9. What do you do when someone acts out?

10. When do problems mostly occur? Specific places of occurrence?

11. (Correctional only) Can the average resident make it when released - if he wants to?

12. Can you name six <u>positive or negative</u> incidents of resident behavior that happened in the last month? (then rank the six in order of severity). Place?

APPENDIX G

GLOSSARY OF TERMS

Terms used throughout the text are briefly defined below. A more complete description is available in the text as the terms are introduced.

Animation - Ratio of moving over sitting. Spaces are considered animated when the proportion of moving people is higher than that of sitting people.

Background - Isovists of convex spaces; number of people visible in isovists of convex spaces.

Balanced Moving and Static - Variable which measures the difference between moving and sitting people, when density is high.

CON - Spatial variable; syntactic measure of number of direct permeabilities of space; local measure of spatial connection.

Continuity of IN and OUT- Variable which measures the continuous as opposed to segmented use of space, when density is high.

Density - Number of people in space or isovists divided by square footage (area) of space or isovist. Tells one whether spaces have more people per square foot, not just more people.

Depth - Minimum number of other spaces that must be traversed to go from one to another.

Foreground - Convex spaces; number of people in convex spaces.

IN - Foreground; number of people in convex spaces.

Integration - Global measure of connection; variable denoting a function of depth mathematically adjusted to allow comparisons (RRA). A space which is shallow from all other spaces is integrated to the system, while a space which is deep from other spaces is segregated.

OUT - Background; number of people in isovists visible from spaces.

Ratio of Moving/Sitting - Measure of animation; number of moving persons in space or isovist over number of sitting persons in space or isovist.

SQFT - Spatial variable; area of space; area of isovist of space; area of space plus isovist combined.

SQRT Density - Space use variable; adjusted measure of density of all people, or moving, talking and sitting people.

TOTAL - Foreground and background combined; number of people in spaces plus the number visible from spaces.

1/RRA - Spatial variable; adjusted measure of integration

TABLES OF CORRELATIONS - ALZHEIMER'S UNITS

DAY

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.77	0.95
	0.0001	*0.0001*
OUT-ALL PEOP.	0.98	0.98
	0.0001	*0.0001*
TOTAL-ALL PEOP	0.95	0.99
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.93		
	0.0001		
OUT-ALL TALK		0.98	
		0.0001	
TOTAL-ALL TALK			0.96
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.57			
	0.005			
IN-SIT		0.29		
		0.1776		
IN-TALK			0.39	
			0.0644	
IN-ALL PEOPLE (MOVE + SIT)				0.58
				0.0036

DAY

SIZE (SQFT) Correlated with

SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.46	0.28	0.41	0.4	0.22	0.06	0.04	0.14
	0.0291	*0.1937*	*0.0497*	*0.0578*	*0.4056*	*0.8363*	*0.8969*	*0.7609*
OUT-SQFT	0.86	0.81	0.8	0.88	0.76	0.67	0.64	0.61
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0011*	*0.0063*	*0.0104*	*0.0355*
TOTAL-SQFT	0.82	0.74	0.77	0.86	0.76	0.62	0.66	0.67
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0005*	*0.0076*	*0.0038*	*0.0129*

CON (Connectivity) Correlated with

SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.56	0.63	0.52	0.23	0.43	0.54	0.25	0.28
	0.0052	*0.0012*	*0.0105*	*0.2856*	*0.0993*	*0.0302*	*0.3882*	*0.5429*
OUT-CON	0.69	0.7	0.64	0.65	0.58	0.6	0.48	0.56
	0.0002	*0.0002*	*0.0009*	*0.0008*	*0.0243*	*0.0185*	*0.0674*	*0.0584*
TOTAL-CON	0.65	0.68	0.61	0.55	0.55	0.61	0.49	0.46
	0.0008	*0.0003*	*0.0021*	*0.0062*	*0.0215*	*0.0087*	*0.0487*	*0.1167*

1/RRA (INTEGRATION) Correlated with

SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.48	0.61	0.46	0.04	0.25	0.49	0.1	0.52
	0.0221	*0.0016*	*0.0257*	*0.8517*	*0.3511*	*0.0564*	*0.7389*	*0.2305*
OUT-1/RRA	0.73	0.77	0.74	0.64	0.62	0.7	0.64	0.51
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0139*	*0.0035*	*0.0103*	*0.0914*
TOTAL-1/RRA	0.64	0.74	0.66	0.49	0.53	0.71	0.56	0.27
	0.001	*0.0001*	*0.0007*	*0.0181*	*0.0291*	*0.0015*	*0.0202*	*0.3815*

NOTE:

IN = Correlation of Spatial Variable with Density in Convex Spaces

OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces

TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist

ATL

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.67	0.88
	0.0001	*0.0001*
OUT-ALL PEOP.	0.93	0.97
	0.0001	*0.0001*
TOTAL-ALL PEOP	0.97	0.99
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.92		
	0.0001		
OUT-ALL TALK		0.98	
		0.0001	
TOTAL-ALL TALK			0.96
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.25			
	0.2088			
IN-SIT		0.29		
		0.1382		
IN-TALK			0.33	
			0.0907	
IN-ALL PEOPLE (MOVE + SIT)				0.47
				0.0128

ATL

SIZE (SQFT) Correlated with
SQRT DENSITY (a) including all variables and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.56	0.56	0.56	0.53	0.45	0.21	0.24	0.52
	0.0025	*0.0028*	*0.0028*	*0.0143*	*0.0695*	*0.4298*	*0.4598*	*0.1211*
OUT-SQFT	0.74	0.72	0.75	0.71	0.51	0.46	0.37	0.25
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0614*	*0.0963*	*0.2356*	*0.4381*
TOTAL-SQFT	0.78	0.81	0.82	0.72	0.66	0.83	0.7	0.53
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0042*	*0.0001*	*0.0051*	*0.0496*

CON (Connectivity) Correlated with
SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.58	0.7	0.68	0.38	0.61	0.54	0.26	0.47
	0.0017	*0.0001*	*0.0001*	*0.1495*	*0.0069*	*0.0318*	*0.4081*	*0.169*
OUT-CON	0.56	0.56	0.55	0.52	0.34	0.36	0.29	0.21
	0.0031	*0.003*	*0.0038*	*0.0066*	*0.2346*	*0.2105*	*0.3672*	*0.5183*
TOTAL-CON	0.6	0.65	0.6	0.5	0.54	0.67	0.58	0.37
	0.0012	*0.0003*	*0.0012*	*0.0098*	*0.0262*	*0.0032*	*0.0284*	*0.19*

1/RRA (INTEGRATION) Correlated with
SQRT DENSITY (a) including all variables and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.49	0.67	0.6	0.28	0.23	0.52	0.27	0.27
	0.0099	*0.0001*	*0.0011*	*0.1519*	*0.3747*	*0.0317*	*0.3913*	*0.4523*
OUT-1/RRA	0.45	0.5	0.44	0.42	0.37	0.42	0.43	0.33
	0.0197	*0.0098*	*0.0208*	*0.0284*	*0.1887*	*0.1321*	*0.1644*	*0.292*
TOTAL-1/RRA	0.42	0.54	0.49	0.33	0.48	0.64	0.51	0.18
	0.0299	*0.0034*	*0.0095*	*0.0936*	*0.0527*	*0.0061*	*0.0629*	*0.534*

NOTE:
IN = Correlation of Spatial Variable with Density in Convex Spaces
OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces
TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist

ORM

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.7	0.99
	0.0023	*0.0001*
OUT-ALL PEOP.	0.89	0.99
	0.0001	*0.0001*
TOTAL-ALL PEOP.	0.96	0.99
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.81		
	0.0001		
OUT-ALL TALK		0.86	
		0.0001	
TOTAL-ALL TALK			0.92
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.58			
	0.0186			
IN-SIT		0.33		
		0.2107		
IN-TALK			0.63	
			0.0092	
IN-ALL PEOPLE				0.58
(MOVE + SIT)				*0.0194*

ORM

SIZE (SQFT) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.39	0.2	0.32	0.4	0.52	0.27	0.33	0.42
	0.1332	*0.4629*	*0.2234*	*0.1281*	*0.0586*	*0.3487*	*0.326*	*0.0555*
OUT-SQFT	0.07	0.37	0.1	0.62	0.12	0.44	0.01	0.24
	0.7853	*0.1639*	*0.7107*	*0.0104*	*0.6718*	*0.1149*	*0.9644*	*0.5075*
TOTAL-SQFT	0.07	0.18	0.02	0.45	0.13	0.31	0.11	0.53
	0.7911	*0.5037*	*0.9512*	*0.0819*	*0.6693*	*0.3049*	*0.1507*	*0.0768*

CON (Connectivity) Correlated with

SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.23	0.34	0.17	0.14	0.36	0.53	0.14	0.7
	0.3967	*0.1955*	*0.5383*	*0.6087*	*0.2102*	*0.0531*	*0.6919*	*0.0801*
OUT-CON	0.24	0.001	0.24	0.63	0.29	0.05	0.3	0.47
	0.3756	*0.9957*	*0.3774*	*0.0091*	*0.3095*	*0.8585*	*0.3137*	*0.1711*
TOTAL-CON	0.29	0.14	0.25	0.47	0.41	0.23	0.42	0.34
	0.2689	*0.6101*	*0.3503*	*0.0645*	*0.1444*	*0.4287*	*0.1502*	*0.2747*

1/RRA (INTEGRATION) Correlated with

SQRT DENSITY (a) excluding high outlier and (b) excluding high outlier and 0's on SQRT)

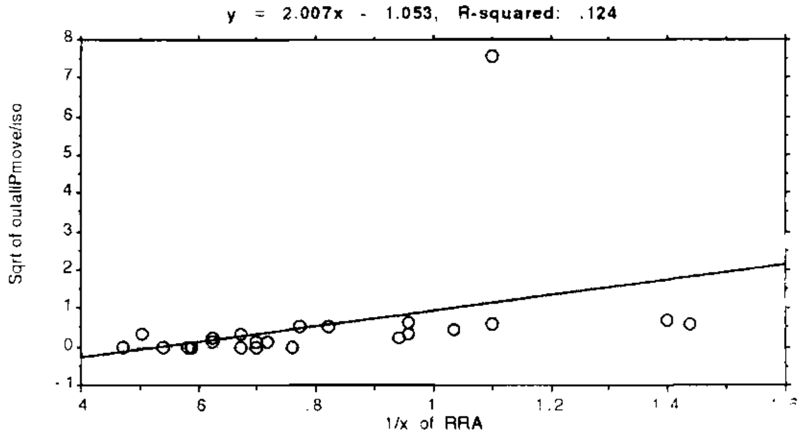
	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.4	0.65	0.3	0.3	0.41	0.67	0.16	0.61
	0.1556	*0.0084*	*0.2987*	*0.2987*	*0.1472*	*0.0092*	*0.6337*	*0.1448*
OUT-1/RRA	0.6	0.36	0.62	0.65	0.61	0.34	0.62	0.76
	0.0189	*0.1944*	*0.0147*	*0.0086*	*0.0212*	*0.2408*	*0.0321*	*0.0063*
TOTAL-1/RRA	0.65	0.76	0.65	0.57	0.51	0.79	0.63	0.62
	0.0094	*0.0015*	*0.0089*	*0.0277*	*0.0532*	*0.0013*	*0.0206*	*0.0303*

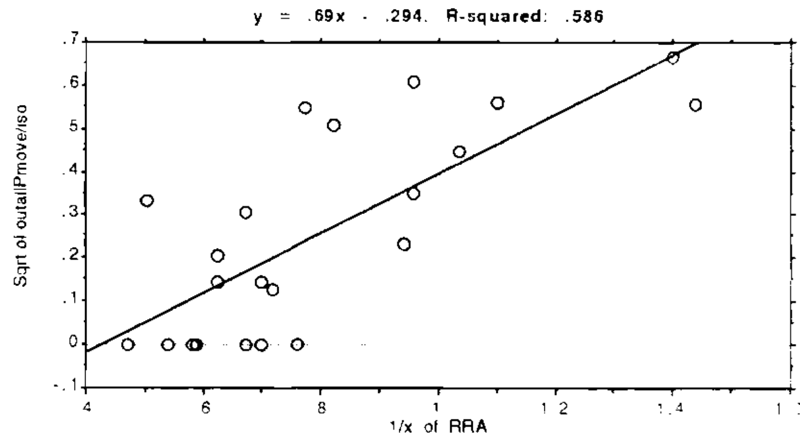
NOTE:

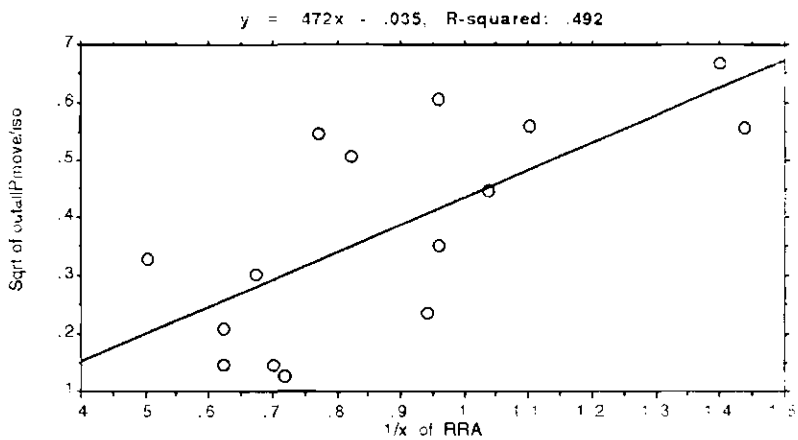
IN = Correlation of Spatial Variable with Density in Convex Spaces

OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces

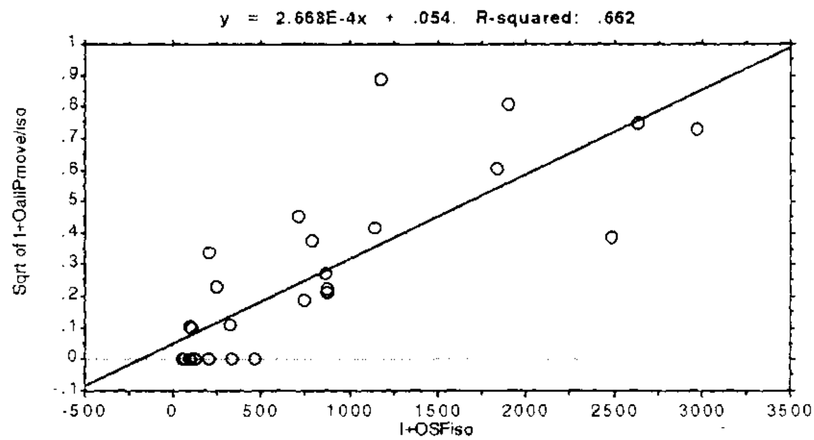
TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist

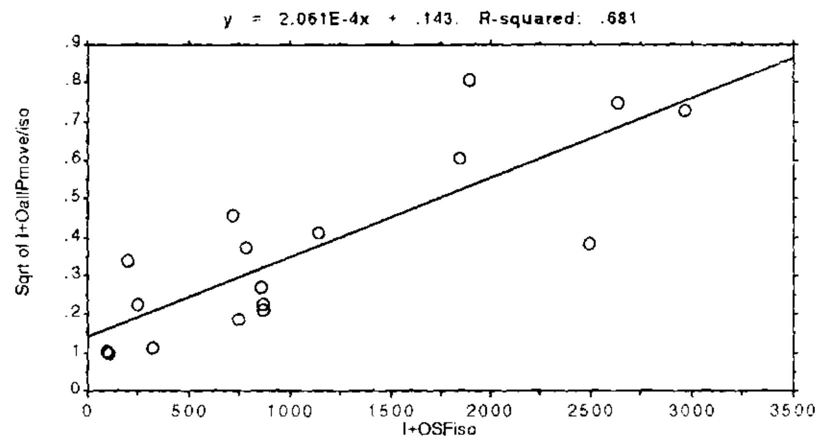




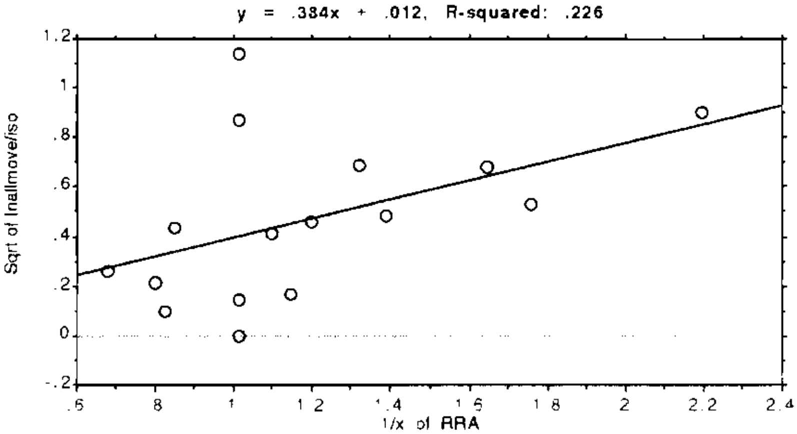


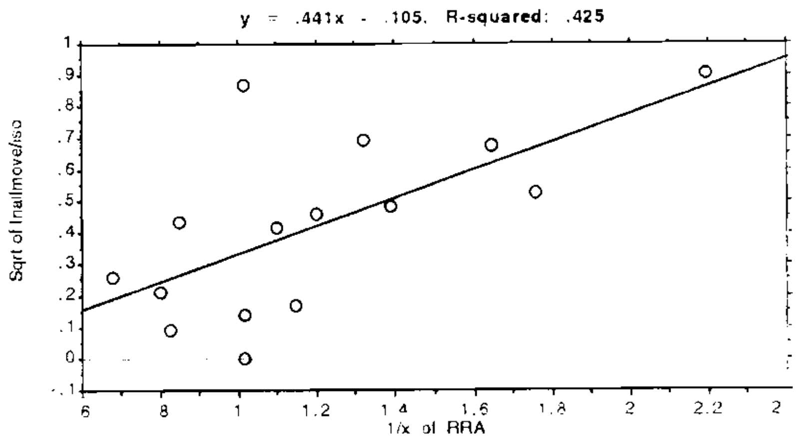
DAY: Scattergrams Showing the Correlation of Integration (1/RRA) and Density of All People Moving OUT - 1) All Spaces Included, 2) With Highest Outlier Removed, and 3) With Highest Outlier and All 0's Removed

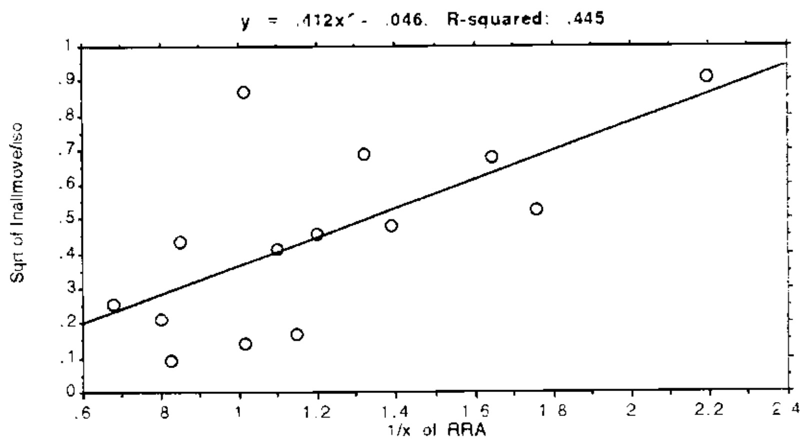




ATL: Scattergrams Showing the Correlation of Size of Space and Isovist (IN+OUT) and Density of AllPeople Moving IN + OUT - 1) All Spaces Included, 2) With Highest Outlier and 0's Removed







ORM: Scattergrams Showing the Correlation of Integration (1/RRA) and Density of AllPeople Moving IN - 1) All Spaces Included, 2) With Highest Outlier and 0's Removed

	DAY	ATL	ORM	DEK	MAR	IND
IN	.24	.32	.01	.2	.82*	.014
	.3612	*.1965*	*.9697*	*.5093*	*.0002*	*.9598*
OUT	.32	.39	.05	.04	.62	.47
	.2157	*.1087*	*.85*	*.8942*	*.1037*	*.0679*
TOTAL	.32	.44	.01	.63*	.71*	.59
	.2166	*.0662*	*.9697*	*.0277*	*.0031*	*.0025*
1/RRA	.05	.56	.36	.12	.18	.53
	.847	*.0154*	*.1826*	*.6937*	*.6793*	*.0081*

* Highest outlier removed

Difference Factors for Moving/Static Correlated to Size (IN, OUT and TOTAL) and to 1/RRA

	DAY	ATL	ORM	DEK	MAR	IND
IN	.48	.004	.09	.25	.16	.02
	.0435	*.9864*	*.7316*	*.4167*	*.7005*	*.9482*
OUT	.47	.27	.13	.26	.4	.21
	.0485	*.2708*	*.6334*	*.3949*	*.322*	*.4326*
TOTAL	.43	.23	.09	.15	.32	.15
	.0727	*.3518*	*.74*	*.6312*	*.4397*	*.5826*
1/RRA	.31	.19	.26	.23	.31	.17
	.203	*.4414*	*.3578*	*.4422*	*.4594*	*.5365*

Difference Factors for Continuity (IN/OUT) Correlated with Size of Space and Isovists (IN, OUT and TOTAL) and to 1/RRA

	DAY	ATL	ORM	DEK	MAR	IND
IN	.38	.66	.07	.14	.18	.13
	.0774	*.0002*	*.7985*	*.5813*	*.5059*	*.5358*
OUT	.57	.71	.34	.33	.68	.24
	.0004	*.0001*	*.1915*	*.1857*	*.0037*	*.2522*
TOTAL	.59	.79	.33	.39	.7	.27
	.0029	*.0001*	*.2171*	*.1133*	*.0026*	*.1867*
1/RRA	.46	.71	.14	.43	.58*	.57*
	.0287	*.0001*	*.6162*	*.0759*	*.0232*	*.0038*

* Highest outlier removed

Weighted Densities for Balanced Moving and-Static Correlated to Size (IN, OUT and TOTAL) and to 1/RRA

TABLES OF CORRELATIONS - DETENTION CENTERS

DEK

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.63	0.99
	0.0055	*0.0001*
OUT-ALL PEOP.	0.81	0.99
	0.0001	*0.0001*
TOTAL-ALL PEOP	0.99	0.99
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.75		
	0.0006		
OUT-ALL TALK		0.79	
		0.0002	
TOTAL-ALL TALK			0.95
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.14			
	0.6038			
IN-SIT		0.08		
		0.7598		
IN-TALK			0.08	
			0.8425	
IN-ALL PEOPLE (MOVE + SIT)				0.1
				0.7028

DEK

SIZE (SQFT) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.22	0.16	0.26	0.24	0.04	0.009	0.04	0.06
	0.371	*0.5192*	*0.2986*	*0.331*	*0.9061*	*0.9775*	*0.9222*	*0.9068*
OUT-SQFT	0.29	0.34	0.3	0.16	0.02	0.12	0.004	0.19
	0.2559	*0.1783*	*0.2436*	*0.551*	*0.9607*	*0.7374*	*0.9988*	*0.6033*
TOTAL-SQFT	0.19	0.12	0.19	0.27	0.4	0.04	0.41	0.58
	0.459	*0.6473*	*0.4463*	*0.2762*	*0.1952*	*0.9038*	*0.1852*	*0.0496*

CON (Connectivity) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.59	0.67	0.58	0.38	0.54	0.64	0.68	0.33
	0.0108	*0.0024*	*0.0109*	*0.1238*	*0.0697*	*0.024*	*0.0156*	*0.4682*
OUT-CON	0.55	0.48	0.56	0.56	0.86	0.56	0.88	0.9
	0.0228	*0.0535*	*0.0205*	*0.0185*	*0.0003*	*0.0591*	*0.0002*	*0.0004*
TOTAL-CON	0.58	0.62	0.59	0.55	0.72	0.68	0.74	0.7
	0.0116	*0.006*	*0.0094*	*0.0174*	*0.0081*	*0.0161*	*0.0057*	*0.0156*

1/RRA (INTEGRATION) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.49	0.63	0.46	0.26	0.77	0.79	0.74	0.16
	0.0377	*0.0052*	*0.0572*	*0.2908*	*0.0032*	*0.0013*	*0.0086*	*0.7249*
OUT-1/RRA	0.14	0.07	0.15	0.22	0.43	0.18	0.44	0.43
	0.5896	*0.7876*	*0.5708*	*0.3872*	*0.1611*	*0.5771*	*0.1482*	*0.2112*
TOTAL-1/RRA	0.19	0.19	0.2	0.22	0.36	0.009	0.23	0.36
	0.4624	*0.4602*	*0.4377*	*0.3722*	*0.25*	*0.979*	*0.4909*	*0.2736*

NOTE:

IN = Correlation of Spatial Variable with Density in Convex Spaces

OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces

TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist

MAR

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.77	0.97
	0.0005	*0.0001*
OUT-ALL PEOP.	0.72	0.99
	0.0016	*0.0001*
TOTAL-ALL PEOP	0.87	0.98
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.63		
	0.0093		
OUT-ALL TALK		0.86	
		0.0001	
TOTAL-ALL TALK			0.81
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.57			
	0.0267			
IN-SIT		0.81		
		0.0003		
IN-TALK			0.46	
			0.0864	
IN-ALL PEOPLE (MOVE + SIT)				0.79
				0.0004

MAR

SIZE (SQFT) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.55	0.35	0.66	0.58	0.41	0.48	0.4	0.43
	0.028	*0.1801*	*0.0057*	*0.0181*	*0.3567*	*0.271*	*0.3687*	*0.4716*
OUT-SQFT	0.24	0.06	0.29	0.35	0.03	0.49	0.12	0.53
	0.3976	*0.8338*	*0.2988*	*0.196*	*0.9478*	*0.2677*	*0.8028*	*0.2191*
TOTAL-SQFT	0.56	0.41	0.6	0.62	0.09	0.52	0.26	0.53
	0.0254	*0.1161*	*0.0136*	*0.0106*	*0.8459*	*0.2364*	*0.5805*	*0.2217*

CON (Connectivity) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.75	0.58	0.78	0.76	0.63	0.41	0.8	0.49
	0.0008	*0.0197*	*0.0004*	*0.0007*	*0.1326*	*0.3631*	*0.0306*	*0.4081*
OUT-CON	0.68	0.7	0.65	0.61	0.8	0.62	0.78	0.49
	0.0058	*0.0037*	*0.0094*	*0.0164*	*0.0304*	*0.1351*	*0.04*	*0.269*
TOTAL-CON	0.76	0.67	0.73	0.78	0.89	0.8	0.84	0.71
	0.0007	*0.0044*	*0.0012*	*0.0003*	*0.008*	*0.0305*	*0.0173*	*0.0747*

1/RRA (INTEGRATION) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.63	0.71	0.63	0.42	0.41	0.82	0.41	0.96
	0.009	*0.0021*	*0.0091*	*0.1027*	*0.3553*	*0.0165*	*0.3556*	*0.0112*
OUT-1/RRA	0.6	0.57	0.6	0.59	0.54	0.36	0.66	0.41
	0.017	*0.0268*	*0.019*	*0.02*	*0.2093*	*0.4298*	*0.1081*	*0.3634*
TOTAL-1/RRA	0.65	0.73	0.62	0.56	0.56	0.91	0.44	0.15
	0.0065	*0.0015*	*0.0102*	*0.023*	*0.192*	*0.0014*	*0.3264*	*0.7484*

NOTE:

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OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces

TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist

IND

DENSITY OF ALL PEOPLE Correlated with
ALL MOVING PEOPLE AND ALL TALKING PEOPLE

	ALL MOVE	ALL TALK
IN- ALL PEOP.	0.84	0.99
	0.0001	*0.0001*
OUT-ALL PEOP.	0.94	0.99
	0.0001	*0.0001*
TOTAL-ALL PEOP.	0.86	0.99
	0.0001	*0.0001*

ALL PEOPLE MOVING Correlated with
ALL PEOPLE TALKING

	IN ALL MOVE	OUT ALL MOVE	TOTAL ALL MOVE
IN- ALL TALK	0.7		
	0.0001		
OUT-ALL TALK		0.83	
		0.0001	
TOTAL-ALL TALK			0.94
			0.0001

IN BEHAVIORS Correlated with
OUT BEHAVIORS

	OUT MOVE	OUT SIT	OUT TALK	OUT ALL P
IN- MOVE	0.5			
	0.0103			
IN-SIT		0.88		
		0.0001		
IN-TALK			0.87	
			0.0001	
IN-ALL PEOPLE (MOVE + SIT)				0.88
				0.0001

IND

SIZE (SQFT) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-SQFT	0.05	0.1	0.006	0.05	0.35	0.26	0.3	0.28
	0.8211	*0.6396*	*0.9778*	*0.8237*	*0.2061*	*0.3595*	*0.3391*	*0.3822*
OUT-SQFT	0.4	0.34	0.43	0.39	0.69	0.7	0.53	0.52
	0.0512	*0.1085*	*0.0371*	*0.0617*	*0.0043*	*0.0035*	*0.0609*	*0.0859*
TOTAL-SQFT	0.27	0.14	0.3	0.35	0.69	0.59	0.56	0.6
	0.2051	*0.5162*	*0.1502*	*0.1898*	*0.0046*	*0.0203*	*0.046*	*0.0296*

CON (Connectivity) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-CON	0.33	0.23	0.33	0.32	0.41	0.32	0.67	0.45
	0.1174	*0.2779*	*0.114*	*0.1336*	*0.1368*	*0.248*	*0.2164*	*0.1935*
OUT-CON	0.39	0.42	0.42	0.36	0.54	0.62	0.5	0.31
	0.0574	*0.0403*	*0.0389*	*0.0892*	*0.0396*	*0.0136*	*0.0851*	*0.3285*
TOTAL-CON	0.36	0.37	0.39	0.34	0.49	0.6	0.36	0.24
	0.0843	*0.0795*	*0.0619*	*0.1064*	*0.0614*	*0.0193*	*0.2303*	*0.4324*

1/RRA (INTEGRATION) Correlated with

SQRT DENSITY (a) including all variables and (b) excluding 0's on SQRT)

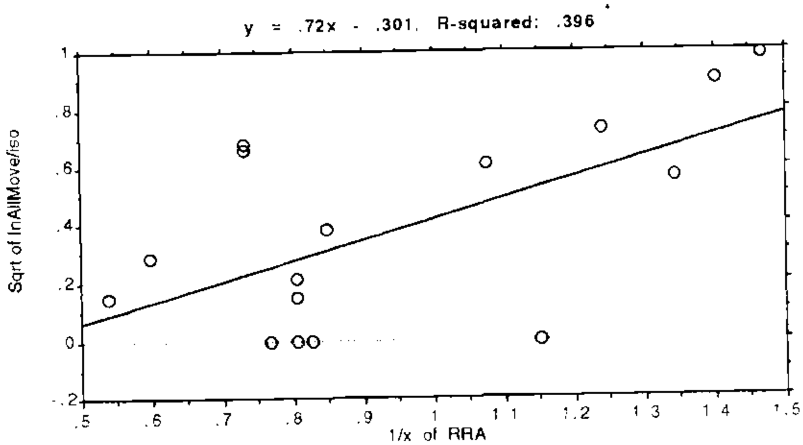
	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT	DENSITY ALL P	DENSITY MOVE	DENSITY TALK	DENSITY SIT
IN-1/RRA	0.65	0.58	0.61	0.55	0.58	0.44	0.36	0.27
	0.0005	*0.0028*	*0.0016*	*0.0058*	*0.0223*	*0.1053*	*0.2332*	*0.4449*
OUT-1/RRA	0.76	0.81	0.79	0.71	0.78	0.82	0.72	0.55
	0.0001	*0.0001*	*0.0001*	*0.0001*	*0.0007*	*0.0001*	*0.0051*	*0.0618*
TOTAL-1/RRA	0.68	0.76	0.77	0.7	0.75	0.83	0.66	0.54
	0.0002	*0.0001*	*0.0001*	*0.0001*	*0.0014*	*0.0001*	*0.0146*	*0.059*

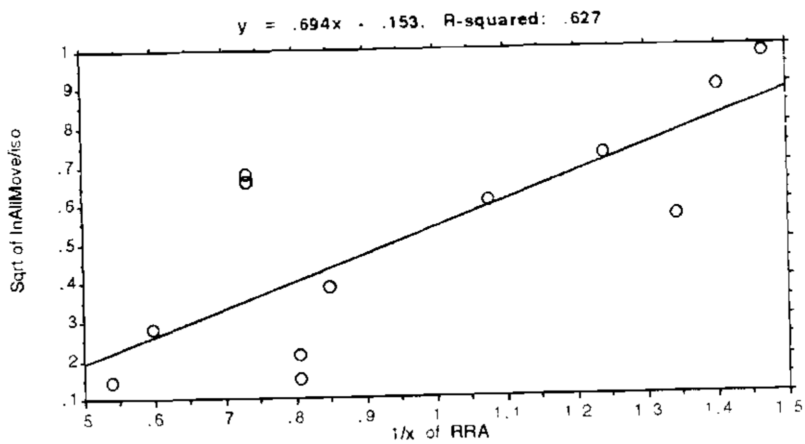
NOTE:

IN = Correlation of Spatial Variable with Density in Convex Spaces

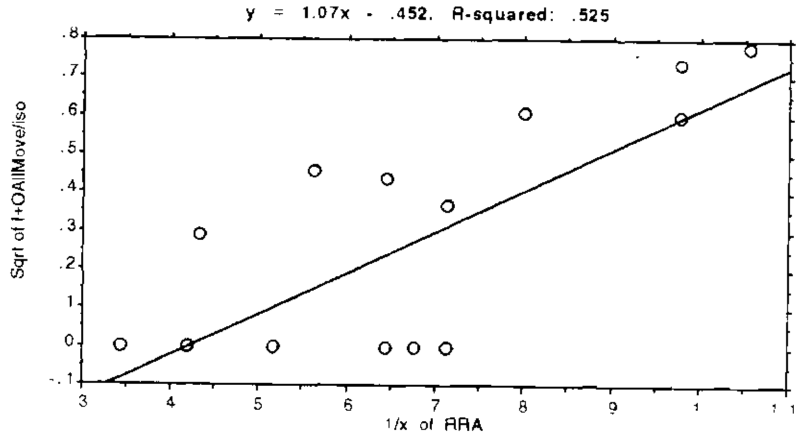
OUT = Correlation of Spatial Variable with Density Seen in Isovists of Convex Spaces

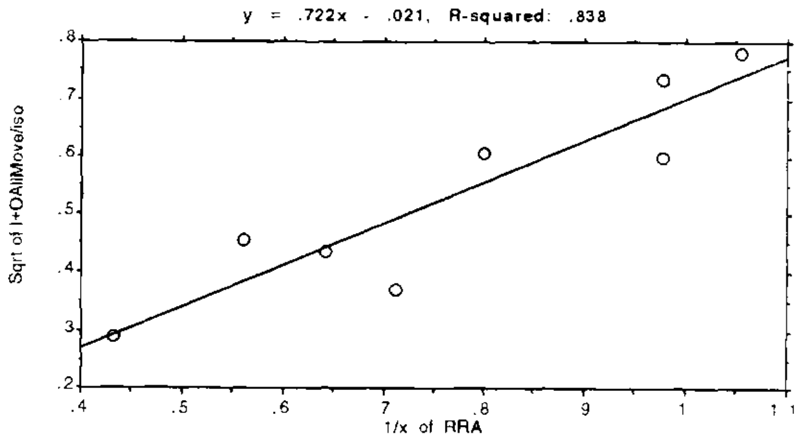
TOTAL = Correlation of Spatial Variable with Density Seen in Space + Isovist



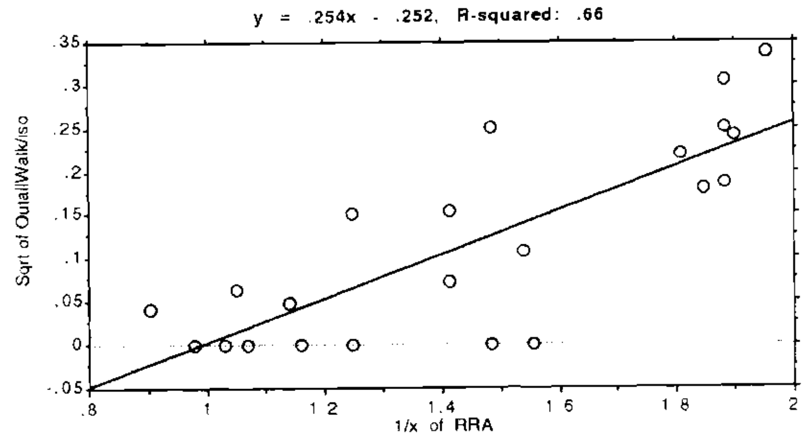


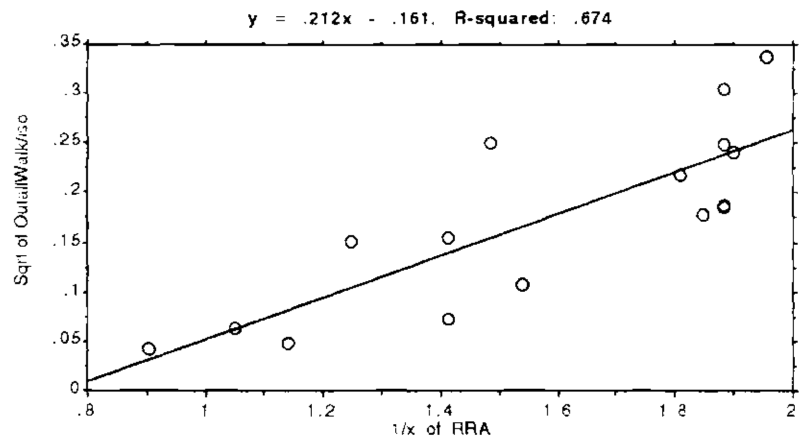
DEK: Scattergrams Showing the Correlation of Integration (1/RRA) and Density of All People Moving IN - 1) All Spaces Included, 2) With All 0's Removed





MAR: Scattergrams Showing the Correlation of Integration (1/RRA) and Density of AllPeople Moving IN + OUT - 1) All Spaces Included, 2) With 0's Removed





IND: Scattergrams Showing the Correlation of Integration (1/RRA) and Density of AllPeople Moving OUT - 1) All Spaces Included, 2) With 0's Removed

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