Observe behavior means systematically watching people use their environments: individuals, pairs of people, small groups, and large groups. What do they do? How do activities relate to one another spatially? And how do spatial relations affect participants? At the same time, observers of environmental behavior look at how a physical environment supports or interferes with behaviors taking place within it, especially the side effects the setting has on relationships between individuals or groups. In a park, for example, an observer sees a child playing, watched over by her father, who anxiously jumps up every time the child moves out of his sight. The child being hidden from view triggers a reaction by her father. The event tells an observer something about the child's activity and the importance for the relationship of maintaining a visual link between father and child.

Observing behavior in physical settings generates data about people's activities and the relationships needed to sustain them; about regularities of behavior; about expected uses, new uses, and misuses of a place; and about behavioral opportunities and constraints that environments provide.

You do not have to be an expert to observe behavior. Before entering a party or a restaurant, you may survey the scene to see what behavior is appropriate there. An alert new student in a school watches who plays where in the gymnasium, who sits where in class, and who sits with whom in the cafeteria. Designers and environment-behavior researchers systematically make the same types of observations with different ends in mind.

Hall's classic description of how people behave in and use space, The Hidden Dimension (1966), draws heavily on behavior observation in natural set-
tings. Sensitive behavior observation led Hall to discover the important spatial dimension to human communication. He observed, for example, that how far or how close people stand reflects their social relationship—distance generally meaning coldness and closeness generally meaning friendliness. Further behavior observation turned this rather simple conclusion into an exciting insight: The way people from different cultures interpret spatial distances can lead to misunderstanding, even insult. For instance, a westerner might feel he is being friendly by standing several feet from an Arab friend during a casual conversation. The Arab, attributing meaning to space, feels the westerner is cold and distant and moves closer. The westerner takes this move to be aggressive. He steps back. To the Arab, this is clearly an attempt to be unfriendly—an insult.

This chapter presents qualities of the research method for E-B studies, some practical steps observers can take to prepare for observing environmental behavior, and how to organize observations to learn the most about the relationship between settings and what people do in them.

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QUALITIES OF THE METHOD

Observing behavior is empathetic and direct, deals with dynamic phenomena, and allows researchers to vary their intrusiveness in a research setting.

Empathetic

Researchers observing people soon get a feeling for the character of a situation. Observation, especially participant observation, allows researchers to “get into” a setting; to understand nuances that users of that setting feel. When personal quirks of observers influence the recording of observations, their reliability can be questioned. Yet personal feelings may provide essential initial research insights that a study can revise and elaborate.

Jane Jacobs’ Death and Life of Great American Cities (1961) is based largely on behavior observations that she made while a resident in New York’s Greenwich Village. Her perspective enabled her to describe empathetically what it is like to live on a street where people look out their windows at passersby, children play on the sidewalk in view of neighbors and parents, and shopkeepers serve as news outlets and street guardians.

That observing behavior seems so easy and obvious can present problems. It is common for observers to report observations in seductively authentic descriptions that, unfortunately, omit details and transfer unstated feelings. Missing are standardized procedures for observing and a theoretical framework for interpreting observations. Having explicit procedures and theory increases the likelihood that different observers’ descriptions are comparable, enabling readers of observation reports to interpret and evaluate them more easily.

Empathy can be taken too far: Observers may assume that the way they personally feel in a situation is the way everyone else feels. For example, an observer who dislikes being with many people might assume that the high level of contact on Jacobs’ close-knit urban street makes most people anxious and uncomfortable.

Observers also run the risk of overlooking differences between people, unless they formulate their feelings into testable hypotheses. On Greenwich Village streets, how many people choose to look out their windows to participate in a neighborhood life important to them, and how many do so because they have nothing else to do? How many parents talk to other parents while watching children play because it is what is expected of them, and how many do so because they are lonely and want the contact?

Direct

Respondents often hesitate to report that they break formal rules by smoking in school hallways near “No Smoking” signs; or having two families living in an apartment designated for one family. Yet they do not care if they are seen doing such things, because they and their friends or neighbors find such behavior acceptable.
The same can be true for behavior that, although acceptable to a particular group, breaks the informal rules of a larger one. A cross-cultural example of the need for direct observation is evident in Chandigarh, Le Corbusier's modern capital of India's Punjab province. Many residents of this administrative center are aspiring middle-class civil servants who live in buildings that reflect modern norms that some of the more traditional Indians do not follow. For example, some residents reported that they used the kitchen counters to prepare meals, but when Brolin (1972) looked more closely, he found that they followed the traditional Indian practice of cooking on portable stoves on the floor. One resident assured Brolin that, caste distinctions being obsolete, everyone including servants used the front door. Brolin was surprised to observe household servants using the back door. Had Brolin used only interviewing techniques, he might never have observed such rule-breaking activity.

People also tend not to report to interviewees activity they think is trivial and therefore not worth reporting. Nonetheless, a seemingly trivial datum may be central to an environmental research question. For example, if someone asked you now to describe what you had been doing for the last two minutes, you would probably say that you had been reading. You might also describe the position you are in—sitting, or lying down. You probably would not say that you were leaning forward or backward and that you had just turned the page, although to design a comfortable library these details may be important.

Because observing behavior can be intensely personal, trained and sensitive researchers who are able to perceive relevant nuances can use the method more fruitfully. Being on the spot allows researchers to adjust their observations to a particular setting and to a refined understanding of the situation. Whyte's personal research capabilities are evident in his participant-observation study *Street Corner Society* (1955). His day-to-day involvement with a street gang enabled him to uncover more than ordinary evidence. Whyte noticed, for example, that one gang member, Alec, regularly bowled higher scores than gang leaders when bowling alone during the week. But when the whole gang bowed together on Saturday nights, their scores paralleled the gang's hierarchy. The leaders bowled the highest scores, while Alec came in last.

When a "follower" was bowling too well, his companions would heckle him, saying such things as "You're just lucky!" and "You're bowling over your head!" When Doc, the leader, bowled poorly, they would shout encouragement, telling him he could do better. Whyte noticed that gang members exerted subtle—and not so subtle—social pressures on one another to conform to the hierarchy. He was able to make this insightful observation on what sociologists call social control because he had many opportunities to observe general and specific gang behavior and could adjust his observations to each situation.

**Dynamic**

As you look at people doing things, what you see changes: activities affect other activities; episodes take place. You get a glimpse of the role of time in the life of an environment: a mother leaning from her window calling her child to sup-
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per, the child coming. More complex chains of events are exemplified by a hos-
pital emergency room when an ambulance arrives. As the weekly television
drama ER shows, an ambulance arrival can have simultaneous effects on nurs-
es, doctors, other patients, nearby staff members, police officers, and many
others who participate both actively and passively.

In complex situations observers of behavior get a sense of chain reactions:
the effects of effects. No other method gives a researcher such a rich idea of how
people bring places to life. Ellis' (1974) explanation of "occasioning" among
poorer African Americans shows how they manipulate both behavior and time
to cope with limited space. For example, although kitchens are predominantly
associated with cooking and eating, residents might regularly use them for other
occasions such as card parties, sewing bees, or visiting with friends. Although
"occasioning," according to Ellis, is a strategy used by poorer African
Americans in the United States, observing behavior among other groups of
people could test the hypothesis that they use the strategy as well.

When you observe behavior, you soon become aware of repetitive activi-
ties in identifiable places—what Barker calls "standing patterns of behavior"
(1968). Place-specific activities within such a pattern are more closely related to
one another than to patterns of activities in other places. The set of activities in
an old-fashioned drugstore connected to ordering, making, drinking, and pay-
ing for an ice cream soda are more closely related to one another than to those
activities which constitute getting a prescription filled—although there may be
no precise boundary defined between the two places where they occur. Training
helps observers identify sets of activities that are closely related to one another,
to define significant patterns, and distinguish significant patterns from unimpor-
tant ones.

In conducting research on bank design, for example, an observer might
watch customers make bank transactions, from filling out slips at the desk to
getting or depositing money at the window. It is easy to overlook parts of the
sequence that occur before clients enter the bank or after they leave the teller's
cage, which includes seeing that documents are in their pockets and that money
is safely put away into a purse. Does the security guard standing watch consid-
er himself to be part of every transaction? To look carefully at events, observers
continually question whether they see the whole event, whether they see all the
participants, and whether something significant has been missed.

Observers in dynamic research situations can test their hunches on the
spot. An observer who believes she has detected a regularity can try to predict
what the next few individuals will do and can revise or refine the hunch right
away, depending on how these people act. Instant feedback like this enables
researchers in the beginning of a study to test many hunches, quickly identi-
fying the more fruitful research ideas.

The more explicit predictions and tests are made in notes and reports, the
more you can use team members to check your interpretation. Writing down
predictions and tests also helps observers avoid the trap of thinking that false
starts have really been well tested and enables them to review their own work
later with a clearer mind.
Variably Intrusive

Researchers have to decide how far they will intrude and from what social and physical vantage point they want to participate in observed events. At one extreme they can choose to record and observe behavior unobtrusively from a distance—for example, with a telephoto lens. In addition to creating ethical problems, observing in this way removes the observer from the scene of action, depriving the method of a large part of its research potential. However, close participation increases the chance of unwittingly affecting the observed situation. Choice of vantage point depends on such things as research problem, available time, and investigator skills.

To offset research bias resulting from their presence, participant observers adopt social positions with which people are familiar. In a hospital, this could mean sitting in the waiting room like a patient; in a restaurant, it could mean working as a waitress or being a customer. In order to take account in data analysis of changes they themselves induce, observers record any incident in which people may be reacting differently because the observers are present in their adopted position. For example, patients in a waiting room may be whispering because another patient (the observer) is waiting too. The more crowded a setting—for example, a rush-hour subway platform—the less the observers’ actions affect the situation.

Of course, intrusion may be part of the research project’s design. For example, the observer has the ability to change situations and watch results, as Lefkowitz et al. (1955) did in their natural experiment, mentioned earlier, on pedestrians’ reactions to differently dressed jaywalkers. Felipe and Sommer (1966) used themselves as both observers and stimuli to test a personal-space hypothesis that people get uncomfortable enough to leave if their personal-space norms are invaded. Observers sat very close to students in a library and compared the time before the students left with the time before another student across the room moved, whose space was not invaded. The same natural-experiment approach to observing behavior can be taken by moving furniture, erecting signs, or changing an environment in some other way. Natural experiments are an example of artificial intervention made possible because observing behavior is such a variably intrusive research method. (The students next to whom Felipe and Sommer sat regularly moved away first.)

In sum, observing behavior is both empathetic and direct, deals with a dynamic subject, and allows observers to be variably intrusive. These qualities make the method useful at the beginning of research to generate hunches, in the middle to document regularities, and late in a research project to locate key explanatory information.

Observers’ Vantage Points

Observers can choose to be outsiders or participants in any situation. As outsiders, they may be secret or recognized observers; as participants, they may be either marginal or full.
Secret Outsider

The distant observer unobserved by participants in a natural setting is a secret outsider. Moore (1973) initially chose this vantage point for a study of children's play at an elementary school in Berkeley, California. School officials replaced half an acre of blacktop with dirt that children could dig in and objects to play with, such as timber, aluminum pipe, and tree stumps. For five months, every week at the same time, before, during, and after the change, Moore climbed to the roof of the school and recorded what the kids did, using time-lapse photography. He chose this vantage point so he would not alter their behavior with his recording equipment until he showed them the film and because he thought this would later enable him to analyze patterns of use. He found, however, that by choosing to record only an overview of the playground, he missed what individual children and adults did over time and any indications of depth of personal involvement in what they did. To catch some of these dynamic attributes of his topic, he took the camera down to the ground, becoming a recognized outside observer.

Recognized Outsider

When Blau (1963, 1964) compared two job-placement offices, he introduced himself as a researcher to those who were to be observed, explained his study, and was given a desk by the department head to work at and observe from.

A pitfall of such a recognized-outside position is what is known as the Hawthorne effect—that subjects who know they are being observed as part of an experiment often change the way they act. The Hawthorne effect derived its name from the now-classic environmental experiments at the Western Electric Company's Hawthorne Plant in Chicago, where Roethlisberger and Dixon (1939) wanted to determine, among other things, how lighting levels affected workers' productivity. They carried out their studies as recognized observers. When they raised light levels, production increased. When they lowered light levels, production also increased. They concluded that consciously being under a microscope changes workers' behavior.

You can try to minimize the Hawthorne effect by spending enough time at your research site that people there get used to you and take you more for granted. Observers can develop tasks to do while observing so that they can blend into the setting more easily. Whatever observers do, there will always be the danger of some Hawthorne effect, which must be recognized and considered during data analysis.

Another problem for recognized observers is that no matter how honestly and convincingly they present themselves, their study, and their ethical commitment to respect privacy, someone may not believe them. Observers can exacerbate this problem by oversight. Blau obtained permission to study the placement offices from the department head. The staff members therefore assumed that Blau would report everything he saw to their boss. This was a mistaken,
but not surprising, interpretation. Observers need to avoid giving off clues that they are partisan watchdogs. They must remain as unaffiliated as possible by being careful about who introduces them, where they sit, whom they have lunch with, whose office they use to make phone calls, and generally from whom they accept favors.

Sometimes you cannot help being a victim of natural institutional mistrust, particularly when you are interested in informal uses of physical settings. Recipients of public assistance with relatives staying over in the living room, students smoking in the school bathroom, teachers making private calls from an office phone, and patrolmen resting in coffee shops between emergencies are worried about being caught by an authority figure. In such situations, subjects tend to fear that researchers are spies—perhaps tax inspectors or school administrators. Subjects normally play along with the "spy," feeding him harmless information but not admitting the mistrust they feel. The more researchers explain their harmlessness, the guiltier they seem. To reduce the effects of mistrust on the validity of the research, observers must sensitively record situations in which mistrust is likely to have changed behavior. They can also make a special point not to ask questions about rule-breaking activities that are clearly irrelevant to the study problem.

Secret- and recognized-outsider vantage points both have disadvantages along with their advantages. Secret observers are by definition distant and removed from the action, and their position raises ethical questions. Recognized observers may affect action in unknown ways.

Marginal Participant

Researchers who adopt the vantage point of a commonly accepted and unimportant participant want to be seen by actual participants as just another patient in a hospital waiting room, another subway rider, or another art student drawing in a park. A marginal-participant vantage point is a comfortable one for E-B researchers to adopt because observant professionals and laypersons adopt it naturally in daily situations.

Marginal positions that observers choose are likely to be somewhat familiar. We have all been bus passengers, members of the audience at a street concert, restaurant patrons, and tourists at a national monument. Familiarity, however, can prevent observers from looking carefully at what is actually going on. It is tempting to assume that a quick glance will tell you everything because, after all, you have seen it all before. Such an attitude dulls the observer's ability to be surprised by what she sees—a crucial ability if research is not merely to record the obvious.

An observer who is familiar with her vantage point can also be misled into assuming that she knows how others in a setting feel about being watched. For example, the marginal observer assumes when watching an informal football game in the park that he is taken to be a casual spectator. Meanwhile, the football players may think he is a park attendant about to tell them to stop playing on the grass. To increase the validity of their research, observers must
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tator. Meanwhile, the t to tell them to stop earch, observers must
test their assumptions about how they are perceived by others. For example, observers can slightly change their natural behavior to see how people in the situation respond.

Ways to control unwanted side effects include deliberate choice of clothing, physical posture, and objects one is carrying. Researchers observing in Harvard Yard will be seen very differently if they carry green book bags than if they carry leather attaché cases. One useful trick is to use one's behavior-records as a prop to indicate a familiar, yet inconsequential, participant position: a camera for tourist, a notebook for student, or a sketchbook for an amateur artist.

In general, being a marginal participant observer requires the least amount of research preparation time. But precisely for this reason it requires that observers be introspective and self-aware.

**Full Participant**

To observe behavior, researchers can use positions they are already in and positions they adopt central to the situation they are studying. Full participants in a study of housing design might be residents of a neighborhood. A study to plan an office might be helped by researchers taking jobs as office clerks and typists.

Participant observation by a waitress would have been appropriate in an E-B situation described by Whyte (1949). In twelve restaurants where tension was high between dining-room and kitchen staff members, he observed that when waitresses gave orders to the cooks in the kitchen, the cooks resented it. They were higher-paid and resented taking orders from less-skilled waitresses. Although they could not avoid communication flow in this direction, they could avoid taking orders directly. Tension was reduced in some restaurants where a clipboard was installed on the counter between the dining room and kitchen. Waitresses put order slips on the clipboard, and whenever a cook decided to take the next order, he went to the board and picked up a slip. He put the plate back on the separating counter. He no longer took orders directly; the environmental change gave him control over his own actions.

In some cases researchers may not be able to choose full participation, as when all participants are highly skilled professionals (doctors in a hospital) or when membership in the setting being studied is restricted (men's athletic clubs). Gaining full participant-observer status by taking up residence, taking a job, or joining an organization usually means making a long-term commitment. Return on such an investment potentially comes in the form of an insightful and empathetic position from which to gather behavioral data.

**Recording Devices**

Devices suited to recording behavior observations include verbal descriptions and diagrams, pre-coded checklists or handheld PDA computers for counting, floor plans or maps, still photographs, and videotape. What devices to choose
depends mainly on how much detailed information the problem demands and how much the observer already knows about the behaviors to be observed.

**Notation**

Recording behavior in verbal and diagrammatic notes demands that observers decide what to describe and what to overlook on the spot. For example, in describing how people use a hotel lounge, the observer must decide whether to record how people meet each other and move around, how people sit and watch others, how they hold their newspapers and shift their weight, or how they move their eyes and twitch their noses. Each level of analysis is useful to design researchers for solving different problems. Each individual observer decides on and then isolates the level of analysis that is particularly relevant to his or her own study or design project. If multiple observers work on the same research project, they must be trained and sensitized together, comparing their observations so that each knows what types of behaviors to note. That well-trained observers make decisions about levels of analysis can be an opportunity to see richness in a situation and catch that richness in discrete notes.

Procedures for descriptive behavioral notation are relatively simple. Notes are recorded by researchers working alone or by one team member when the other member is conducting an interview. As with notes of physical traces, it is useful to create a note page, creating a wide right-hand margin. When observations are written in the left-hand column, the right side is open for individual or group analysis. Table 9-1 shows a sample of field notes.

Several small tricks help avoid embarrassing mistakes in descriptive behavior notes: always include yourself in observations to avoid finding out that a crucial observed behavior was actually a response to your presence; when sitting and taking notes in public, make a drawing on the top page of the notepad so that anyone who looks over your shoulder will find an acceptable sketch; never leave notes around. What are harmless descriptions of the obvious to a researcher can be highly insulting snooping to participants.

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**Table 9-1. Sample field notes from site visit to hospital emergency room. (Observations made from nurse’s station at 1:00 p.m.)**

<table>
<thead>
<tr>
<th>Observation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman waiting in wheelchair has been waiting in corridor between nurse and row of examining rooms since at least 10:30. She is watching all the activity.</td>
<td>Does watching emergency activity make waiting easier?</td>
</tr>
</tbody>
</table>
Table 9.1. (continued)

<table>
<thead>
<tr>
<th>Police arrive with stretcher.</th>
<th>Why do they announce it? For nurses to clear a path?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announce in loud voices that they have a woman who fell down and passed out. She is lying still on stretcher with eyes closed, covered. All other patients sitting in corridor lean forward in chairs to look. The stretcher will not fit through corridor where patients are sitting. Police struggle to maneuver stretcher through the crowd of nurses and doctors in the nursing station to get to uncrowded corridor on other side. Patient is put in examining room. Curtain pulled part-way closed by last policeman to leave. Patients waiting in corridor have full view of patient in exam room.</td>
<td></td>
</tr>
<tr>
<td>A policeman wheels stretcher out back door into middle of waiting area, while another tells a nurse the details about the woman they brought in, leaning over counter at nurse’s station. Nurse leaves nurse’s station, walks around counter into corridor, scans all patients waiting there. She walks up to one man who is seated, stands three feet away and tells him the results of lab tests and what they mean. Doctor walks over and asks same patient to go into exam room with him. Doctor’s voice, shouting angrily, comes from an exam room. Doctor leaves nurse’s station, approaches woman waiting in wheelchair, pulls up a chair, sits down beside her, and talks in low tones. Other patients sitting nearby watch and occasionally speak to each other. Sound of friendly chatter, laughing from one exam room.</td>
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Pre-coded Checklists

Descriptive notes provide a qualitative understanding of what is going on: what types of behavior patterns exist, what characteristics of participants are salient, and what level of descriptive abstraction is appropriate to solve a problem. If researchers want to know in greater detail how often an activity takes place, they can use qualitative observation data to develop a pre-coded checklist for counting. Pre-coded checklists can either be used in a paper-and-pencil format or data can be input directly to a handheld personal digital assistant (PDA) computer. The qualitative approach serves in such situations as the diagnostic phase of the research project.

In their study of behavior on a psychiatric ward, Itelson, Rivlin, and Proshansky (1970) recorded over 300 descriptions of behaviors during extended periods of time. For example: “patient reclines on bench, hand over face, but not asleep; patient cleans table with sponge; patient plays soccer in corridor; patient sits on cans in hall watching people go by.” For counting purposes, they coded the descriptions into categories representing types of activities observed, such as lying awake, housekeeping, games, and watching an activity.

For each activity on a checklist, observers record characteristics of participants (alone or in groups), place, time, and other relevant conditions, such as the weather. When a PDA (personal digital assistant) is used, time can be noted automatically by programming a time function into the data collection program. Perhaps the most significant task in developing a checklist is specifying the descriptive level of abstraction to record. Itelson et al. decided, for example, that activity types (housekeeping, personal hygiene) were more relevant to their problem than activities (cleaning a table with a sponge, setting one’s hair). Rather than describe subjects in terms of approximate age, sex, weight, and height, which might be relevant to a study of children’s play equipment, observers in the psychiatric ward coded the gender of the subject, whether he or she was acting alone or in a group, and, if in a group, the group size and mix of genders.

To set up a checklist demands previous diagnostic observation, a thorough understanding of how the data will be used, and an understanding of how to develop coding categories. Once a pre-coded checklist is set up, it provides relatively comparable quantifiable data with only a moderate amount of training for observers.

Maps and Plans

Recording activities on floor plans, diagrams, or maps is particularly convenient if researchers want to observe and analyze several people in one general area at the same time, such as groups at a cocktail party, patients in a waiting room, or office workers eating in an open-air plaza. Looking at behavior recorded on a plan gives investigators a better sense of how a whole place is used at once than they would get looking at statistical tables.

Maps are also useful to record sequences of behavior in settings where people have a choice of several paths: from home to bus stop, or from desk to
It is going on: what participants are salient, solve a problem. If activity takes place, coded checklist for hand-pencil format assistant (PDA) is as the diagnostic oneself, Rivlin, and others during extending hand over face, but soccer in corridor; ting purposes, they activities observed, activity, characteristics of partic- conditions, such as time can be noted collection program, it is specifying the I, for example, that want to their prob- one's hair. Rather weight, and height, it, observers in the or she was acting x of genders, observation, a thorp- erstanding of how set up, it provides amount of train-

Photographs

Still photographs can capture subtleties that other methods may not record, such as the way someone sits on a chair or leans against a column; or the way two people avoid looking at each other by adjusting their body postures. In addition, as presented in Chapter 9, photographs are useful throughout a research project because of their illustrative quality. The same procedures hold for deciding on photographs to record behavior as were described for using photographs to record physical traces.

Videotapes and Movies

Whenever time is a significant element in an E-B problem, videotape should be considered as a data-recording tool. For example, universal urban design of streets for people with disabilities and older people, among others, demands understanding the pace of these special users: How fast do they move? How long can they move before resting? How fast can they move out of other people's way? To design a safe escalator, it is essential to know how different types of people approach it, prepare to get onto it, and embark (Davis and Ayers, 1975).

WHAT TO OBSERVE

Observing behavior looks like a simple E-B research technique. Everyone watches people every day. Doesn't everyone know how to do it? In a way, yes; but few know what to look for and how to analyze what they see so that it is useful to design.

Designers make places for people to do things in—either alone or with other people. A structure for looking at environmental behavior that is useful to designers results in data that help them make decisions that improve places for people. The better information designers have about how the people they design for behave in physical settings and how those people relate to or exclude other people, the better they can control the behavioral side effects of the design decisions they make.

But that is not enough. Designers must also know how the contexts of observed activities affect those activities, because in different socio-cultural and physical settings the same behavior can have different design implications. For example, children may do homework at the kitchen table for different reasons in
a house with several available rooms to study than in a one-bedroom apartment shared by four people. In some groups people react to neighbors sitting on the front stoop with disdain, while for others the front is where everyone sits.

When you structure the way you look at something, you replace complex reality with a simpler version to guide your reactions and action. To increase our control over the behavioral side effects of design decisions, we can describe behavior in terms of actor, act, significant others, relationships, context, and setting.

<table>
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<tr>
<th>Elements in Environmental Behavior Observation</th>
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<tr>
<td><strong>Who is</strong></td>
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<td>doing <strong>what</strong></td>
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<td>with <strong>whom?</strong></td>
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<td>In what <strong>relationship</strong>,</td>
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<tr>
<td>aural, visual, tactile, olfactory, symbolic</td>
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<td>in what <strong>context</strong>,</td>
</tr>
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<td>situation</td>
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<td>and <strong>where?</strong></td>
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<td>props</td>
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<td>spatial relations</td>
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The following illustrations are verbally annotated to show how you can use these observation categories to describe environmental behavior in actual situations.

Each observation comprises a relationship between an actor and a significant other to which the physical setting contributes in some way.

**Who:** **Actor**

The subject of a behavioral observation, the “actor,” may be described in numerous ways, depending on the purpose of the description. Designers use research in large projects to better understand similarities and variations among types of people. For example, instead of designing a school for 273 unique individuals, designers use research to differentiate the needs of students, teachers,
...one-bedroom apartment
neighbors sitting on the
where everyone sits.
ning, you replace complex
and action. To increase
icisions, we can describe
ationships, context, and

Swimming pool and sitting area on roof of LeCorbusier's
Marseille Block Housing, Marseille, France.

Children watching girl play ball on roof of LeCorbusier's
Marseille Block Housing, Marseille, France.
principals, and maintenance workers. Assisted living residences are planned for residents, resident assistants, administrators, nurses, doctors, maintenance crews, and visitors; furniture and space are planned for the range of people who work in offices. In a sense, individuals in observations are treated as representatives of a social group.

We can use individuals as representatives by describing a person’s social position or status: age status, marital status, educational status, professional status, and so on. It helps to be complete in observations if we describe both a person’s ascribed statuses (the characteristics that a person has automatically, such as gender and age) and his or her achieved statuses (those that the person had to do something to get, such as finding a job, graduating from college, getting married, or inviting people to a party). Many positions are defined as part of a relationship to others: party hostess (guests), wife (husband), teacher (student), nurse (patient), salesperson (customer).

An observer unable to describe statuses accurately in field notes can describe clues from which he and other researchers reading the notes may be able to infer status. For example, when Snyder and Ostrander (1974), observed patients, family members, visitors, and staff members in their Oxford nursing-home study, they knew most individuals personally after a few days or could infer their status from such things as dress (uniform means nurse; street clothes mean visitor) and tools (stethoscope means doctor; sitting in a wheelchair means patient). But when they were not sure, they described in their field notes whatever clues they had and whether they were guessing about the person’s status. It is better to record “It could be a nurse’s aide resting in the wheelchair” than to write “It is a patient asleep in the corner,” so that other researchers can help evaluate the data.

Sometimes relevant descriptions of actors in behavioral observations are names of groups—teens, teachers, and girls—not individuals. In Zeisel’s property-damage study (1976a) researchers observed groups of boys playing street hockey and stickball in open spaces around schools. It was not important for their research and design problem to identify each street-hockey participant as an actor in a separate act. Researchers treated the group as the actor, describing the group’s size and composition. Groups can be described in the same status terms as individuals. For example, the psychiatric ward study by Itelson et al. (1970) identified groups by the number of male and female patients, doctors, and visitors they contained.

One pitfall for observers to avoid is subsuming significant individuals under general group descriptions. If four teenagers are shooting a hockey puck at the front doors of a school while five others look on from a bench nearby and one gets ready under a tree to play, it would be misleading to write in one’s field notes: “A group of ten boys are playing street hockey at the school entrance.” To design a place to play street hockey, the relationship among players, spectators, and reserve players is relevant.

A group of two also raises problems for observers: are they a group acting together with common significant others, or do they themselves represent actor and significant other for each other? If they are very similar and are doing
ences are planned for doctors, maintenance workers, and a range of people who are treated as representa-
ting a person's social status, professionals' and students' notes are filled in by the person being observed, focusing on the person's actions and traits. Other researchers can review these notes and identify patterns or trends in the behavior of the person being observed.

In field notes, the observer's role is crucial. The observer must be able to describe the behavior of the person being observed accurately and precisely. This requires careful observation and an understanding of the context in which the behavior occurs. The observer must be able to identify the person being observed and describe their actions, thoughts, and feelings accurately. The observer must also be able to describe the environment in which the person is behaving, including the physical setting, the social context, and any other relevant factors.

As described by Zeisel (1974), observers need to be able to identify and describe the person's actions, thoughts, and feelings. This requires an understanding of the person's behavior and an ability to observe and describe it accurately. The observer must be able to identify the person's actions and describe them in detail, including the time, place, and context of the behavior. The observer must also be able to describe the person's thoughts and feelings, including their motivation and intentions.

Table 9.2: Behavior descriptions and corresponding questions for a shopping-center design, by level of detail

| Behavior Observation          | Design Question                                                                 |
|------------------------------|---------------------------------------------------------------------------------
| "Shopping" as opposed to "hanging around" | In a shopping-center plan, how many places are needed for people to hang around, and how can they be designed to augment rather than interfere with shopping? |
| Shoppers browsing as opposed to buying something | How should items be displayed so that browsers and buyers can see them but buyers have greater access to them? |
| Where and how often shoppers stop in supermarket aisles | How can flooring materials, lighting, and aisle length be designed for maximum convenience to customers, maximum exposure of sales items, and minimum maintenance? |
| How high patrons will reach and how low they will stoop | What shelf design and what product placement (what size container on what shelf) will ensure that customers have the easiest time reaching items? |

The people you observe will be doing something. An observer needs to decide the level of abstraction he will use to describe behavior and how he will distinguish individual acts from a connected sequence of acts.
The level of description observers choose depends mainly on the design and research problem facing them. Let us take as an example an observational study to write a design program for a supermarket. Observers could describe very generally that some people there are “shopping” and others are just hanging around. More precisely, they can describe that some shoppers browse, while others buy something. Or observers might record where and count how often a supermarket patron stops in the aisles. They might record how high patrons reach and how low they stoop when getting items off the shelves. Or observers might go to the trouble to observe and record in what direction patrons turn their heads and focus their eyes while walking down the aisle. Each observation is either interesting or useless, depending on the problem researchers are trying to solve. The series of design questions in Table 9-2 shows how each level of described activity might be useful.

Along with deciding on appropriate levels of analysis, researchers must explain how the acts they describe relate to one another. In the sequence of acts called “shopping,” a person prepares a shopping list, leaves home, goes to the store, looks at items in the store, reaches for them, examines them, places them in the cart, walks down the aisle, pays at the cash register, returns home, and unpacks. Each of these can be seen as a discrete act linked to the others as part of a larger “shopping” sequence. If researchers observing behavior maintain clarity of descriptive level and completeness in describing related acts, they will be able to analyze their data more easily.

Even more critical than having the skill to decide how and what to describe, is describing what you see with minimum interpretation. If observers try to interpret what they see before writing it down, they run the risk of recording interpretations rather than description, losing the data for good. The data cannot be retrieved for analysis by others or later review. Well-recorded observations leave ample time and space for analysis after data have been collected. If data on behavior are to be sharable, it is vital that observers record “a smiling person,” not “a happy person,” because a smile can mean many things.

**With Whom: Significant Others**

Acts people engage in are partly defined by how other people are or are not included. Other people whose presence or absence is significant in this way can be seen as participants in the act itself. Girls for whom boys playing street hockey show off make the activity what it is. If the girls were not present, the situation would be different. This is true even for studying alone in the library. Those who are not there—friends, roommates, and strangers—contribute to the situation by their absence. To understand and present what is going on, descriptions of girls watching the boys and of absent roommates must be included in research observations of behavior. The latter requires the skill to see who is not there.

“Significant others” are especially important in environmental design research because so many design decisions about adjacencies, connections, and
separations have side effects for relationships. To continue one of our earlier examples, boys playing street hockey need a hard, flat surface to play on. If this surface is provided for them in the middle of a deserted field far from other activity, it is unlikely to be used because the “significant others,” the girls and passersby, have not been taken into account. A lot of lot without places for parents to sit and watch may go unused in favor of a more convenient one or may be used in a different way than the designer had hoped.

The positions or statuses by which actors are described often have standard role relationships associated with them. In a family, for example, one finds role relationships between parent and child, sister and brother, husband and wife, and grandparent and grandchild. In hospitals there are role relationships between doctor and patient, doctor and nurse, patient and nurse, patient and visitor, nurse and visitor, and between patients. A sensitive researcher observing a doctor making notes in a hospital will use the concept of significant other to direct attention to the relationship the doctor making notes has set up between herself and the patients, nurses, and other doctors. Does she sit among patients in the waiting room, or does she retire to a private lounge? Does she discuss notes with nurses or just hand them in? To design appropriately for medical note taking in hospitals, the answers to these relational questions can be important.

Relationships

Between actors and significant others in a situation there will be specific relationships for observers to describe. In extreme cases relationships can be described simply: “together” (two lovers on a park bench at night) or “apart” (a person in isolation after a bone marrow transplant).

Most E-B relationships, however, are not so simple. Are two people talking to each other through a fence together or apart? What about two people sit-

Simultaneous connections and separations
Left: Urinal dividers separate visually, and that’s about all, Liberty International Airport, Newark, New Jersey.
Right: Manchester United football fans isolated in a pub before a match, Manchester, United Kingdom.
ting back-to-back in adjacent restaurant booths? The problem researchers face is to describe relationships like these systematically so that differences and similarities between two situations are clear. Researchers and designers can then use the information to develop broader strategies for design rather than continually approaching each situation as totally new. To gather such information, researchers need to agree on a set of categories to describe connections and separations between people, and they must understand how the effects of relationships on activities differ in different behavior settings.

Hall (1966) shows us that behavioral connections and separations between people in environments can be conveniently and efficiently described in terms of seeing (visual), hearing (aural), touching (tactile), smelling (olfactory), and perceiving (symbolic).

Describing two people as completely together, or “co-present” (Goffman, 1963, p. 17), means that, like two children in the bathtub, they can see, hear, touch, and smell each other and they feel that they are “in the same place.”

When we move away from extreme relationships, the sensory terms we have for describing relationships enable us to discriminate among and compare various types and to begin to identify the role that the physical environment plays in relationships between people. A mother on the third floor calling to her child playing on the street is connected visually and aurally but is separated in terms of touch, smell, and perception. Two students studying at opposite ends of a long library table are separated symbolically and in terms of smell and touch but are connected visually and aurally. Persons in an L-shaped living room, around the corner from someone cooking in the kitchen, are separated by sight, touch, and perception but are connected in terms of food smells and sound.

Once observers see and describe relationships like these, they try to find out what the relationships mean to participants. Although they must also use other research methods to determine meaning, behavior observation provides clues to meaning. The clues are the ways people react when other people talk to them, touch them, and so on.

**Context**

People react to others differently in one situation than in another and in one culture than in another. It is as if they filter what they see through a series of screens—situational and cultural. The screens are usually used unconsciously, as Sommer (1969) and Hall (1966) have pointed out. People assume that other people see things the same way they do. It is the observer’s job to identify how people’s situational and cultural screens are constructed—how they interpret their own and others’ behavior.

This is particularly important in environmental design research because the meanings people attribute to relationships determine how they react to environmental features, such as walls, doors, and lights, that affect those relationships.

- **Situations.** A person sitting alone and apart from others, or facing a wall in a library probably indicates that she wants to be left alone to read or study. In a bar, this same physical behavior can be interpreted as an invitation for con-
The problem researchers face is that differences and simi-
larities among designers and developers can then lead to a design rather than continua-
tion of such information, creation of connections and sepa-
ration of the effects of relation-
ships, tasks, and separations among the sensory terms we
associate with the physical environment. For example, Hall (1966) reports that in England, sitting alone reading in a room, the door open means, "Do not disturb; do not even knock." In the United States, you would close the door to indicate you wanted to be alone; an open door means you are available. It would not be inappropriate for people to knock on an open door and ask whether they might come in. A designer laying out open-plan offices in these two cultures needs to be aware of these differences if she wants to control the behavioral side effects of his physical design decisions.

It is particularly important to record cultural contexts for behavior when carrying out observational studies in another country or in parts of your own country with strong regional differences. Otherwise, designers using the data will be making decisions that are irrelevant to users. As in Le Corbusier's Chandigarh, people may end up cooking on stoves on the floor in efficiency kitchens and establishing illegal street markets in the plazas in front of modern government buildings (Bronin, 1972). To see behavior from a cultural perspective other than one's own requires general observation and study of another culture, awareness of one's own cultural biases, and at times requesting the help of members of or experts on another culture in interpreting behavioral data once they are collected. As the basis for this interpretation, it is necessary to describe as fully as possible people's reactions to relationships in which they find themselves.

**Setting**

The meaning of behavior in a particular setting depends on the potential of the setting for use—the options it provides (Gans, 1968). If people in an airport lounge are sitting on the floor surrounded by empty seats, their behavior may have a different meaning than if no seats are available. Understanding participants' choices and possibilities to act helps you interpret what they finally choose to do.

- **Behavior potentials of settings.** Objects imply obvious options for use: Seats in telephone booths are for sitting down when calling; bathroom sinks are for washing hands. At the same time they have a host of less obvious latent
implications limited only by users' physical capabilities, daring, and imagination. The telephone seat provides tired non-callers a place to rest. Sinks in school bathrooms may fall off the wall when teenagers sit on them during cigarette breaks between classes. On a hot summer day urban fountains turn into swimming pools. These objects can be seen as props for behavior.

Elements that divide and connect places organize potentials for behavioral relationships. The glass divider, acoustic paneling, and corner placement of a phone booth provide users with the option for limited acoustical privacy but neither physical nor visual privacy. The visual privacy school bathrooms provide enhances their suitability for taking cigarette breaks.

- **Relational design decisions.** Barriers clearly determine potentials for relationships between people in settings. Barriers include walls of various materials and consistencies, screens in different sizes and materials, objects used to mark the edges of places, and symbols ranging from color changes to verbal signs. Design decisions defining fields in space influence behavior relationships less obviously. Field definitions include such characteristics as shape, orientation, size, and environmental conditions—sound, light, and air.

To define the ways these physical characteristics affect relationships between people, we can use the simple relational scheme developed earlier: seeing, hearing, touching, smelling, and perceiving.

- **Barriers.** Barriers are physical elements that keep people apart or join them together on one or more of the five dimensions—seeing, hearing, and so on. As one progresses from walls to symbols, barriers become more permeable.
- **Walls** separate people in places. The absence of walls allows people to be connected. The thickness, consistency, and materials of walls influence the quality of separation. For example, walls with no soundproofing between bedrooms provide neighbors with aural opportunities (and inhibitions) that denser walls do not.

- **Screen.** Glass panels, garden hedges, shower curtains, doors, counters, and windows—separate and connect people more selectively than complete

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*Screens*

Left: Architect buys a burrito through a glass screen, Venice, California. Right: Glass blocks visually screen showering partner from bathing partner; but they can still talk, Santa Barbara, California.
abilities, daring, and imagina-
tive place to rest. Sinks in school
rooms sit on them during cigarette
time; fountains turn into swim-
mills.

Organize potentials for behav-
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for limited acoustical privacy areas, school bathroom
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tore selectively than complete

walls. Glass enables visual connection but tactile separation; a shower curtain
does the opposite. Materials can be combined to provide different degrees of
connection and separation along any mix of dimensions. Screens can also be
designed to give selective control over the screen to users. For example, the lock
doorknob on a glass-paneled house door provide a range of permeability
options for family members, friends, and thieves (Hoogdalem, 1977).

- Objects form another class of barriers. Things placed in space may be
perceived as space dividers or connectors: a piece of sculpture on a public plaza
may be a separator or a place to meet; a couch in a living room is either a place
for two people to sit or an object separating two areas; a tree in a garden can
separate two garden areas or provide a place for two people to chat together in
the shade.

An object, here a column in a shared interior porch, can help people divide space
perceptually. (Congregate House for Older People. Design-research team: Barry
Korobkin, John Zeisel, and Eric Jahan. Donham & Sweeney, associated architects.)

Finally, symbols can be barriers. Color changes in the rug around a public
telephone and change in ceiling height in a room signal that someone con-
siders this space to be two separate places, perceptually.

Depending how people interpret spatial symbols, they may change their
behavior by not walking too close to the phone caller because of the floor color, or
calling one part of a room by another name because of the shift in ceiling height.

Symbols that separate and connect include overt signs such as, “Do Not
Walk on the Grass” potentially keeping people off; or “Open for Business”
potentially bringing people in. Sitting on the grass near a “Keep Off” sign con-
vveys another impression to observers than if there is no such separator.

- Fields. Field characteristics of an entire place can alter people's ability to
be together or apart. Field characteristics do this not by standing between
people, like barriers, but by altering the physical context within which visual, aural,
tactile, olfactory, and perceptual relationships take place. Field characteristics of
places include their shape, orientation, size, and environmental condition.
Effects of shapes.

- The *shape* of a setting affects primarily visual and perceptual relationships. If people want to, they can use the cues that shapes provide to consider areas within one space as separate places. Corners in a square area, for example, can be more easily seen as separate from one another than parts of a round place can. In a study of children playing in different rooms, groups of children quickly claimed as distinct territories the places in the leaves of clover-shaped rooms (Hutt, 1969).

- *Orientation* of one place to another influences the behavioral relationship between people in them. Two places oriented so that people using them have a higher chance of casually seeing or meeting one another may be considered “functionally” closer than two equidistant places oriented to minimize chance encounters (Festinger et al., 1950).

Effects of functional distance.

Schematic diagram of a building in Festinger’s dormitory study. (Reprinted from *Social Pressures in Informal Groups*, by Leon Festinger, Stanley Schachter, and Kurt Back, with the permission of the publishers, Stanford University Press. Copyright 1950, renewed 1978 by the Board of Trustees of the Leland Stanford Junior University.)
Festinger et al. found that this concept helped explain why certain pairs of neighbors regularly liked each other better than other pairs, although the two sets of apartments studied were the same distance apart. Apartments 1 and 6 and apartments 2 and 7 (see diagram facing page) are exactly 53 feet apart. The location of the left-hand stairway forces residents of apartment 6 to pass apartment 1 whenever they come or go. But people living in apartments 2 and 7 can leave home and return without ever running into one another. As the hypothesis of Festinger et al. leads us to expect, residents in the functionally closer pair, 1 and 6, selected one another more often as friends than did residents in apartments 2 and 7.

Possible distance between people is a major determinant of potential behavior relationships. The size of a setting offers opportunities for people to put distance between themselves or limits their options. A 4-meter-square conference room does not offer any of seven participants at a meeting the option to separate from the rest of the group. In the main hall of Washington D.C.'s Union Station, the same people could easily be dispersed.

Loudness, light intensity, and air flow are environmental conditions that directly affect possibilities for behavior relationships by limiting and augmenting people's ability to hear, see, and smell other people and activities. For example, light turned low in a restaurant effectively separates people at different tables as if there were a physical screen between them. A single worker in an open-plan office listening to a radio at high volume acoustically invades the space of other workers and separates himself from them aurally. Machines that emit high-pitched sound and mask background noise without participants' awareness protect acoustical privacy as a closed door might. An exhaust hood and fan over a kitchen stove keep kitchen smells out of adjacent rooms—olfactorily separating people cooking in the kitchen from others.
OBSERVING BEHAVIOR UPDATE

Given the fact that observing behavior is such a basic E-B research method, it is not surprising that many researchers and designers have refined and expanded the method. Among these changes are the use of behavioral observation as a fine-scale precise method (Moser and Corroyer, 2001; Passini et al., 1999), recording behaviors in situ with tape recorded commentaries (Naser and Jones, 1997; Passini et al., 1999), handheld pre-coded PDAs (Olsen et al., 2000), or computers (Devlin and Bernstein, 1997), and applying behavior observation in commercial settings (Underhill, 2000).

*Fine-scale observation.* Moser and Corroyer's analysis of door opening behavior as an indicator of politeness in Paris and Nantes provides an excellent example of a fine-tuned behavioral observation method. These French researchers precisely define the behavior they are studying and then carefully use observation data gathering techniques in three parallel real-world settings—two sets of doors in Paris, one at the BHV department store near the Place de Beaubourg a second at a Galleries Lafayette department store in Montparnasse, and a third at a Galleries Lafayette in the provincial city of Nantes. After recording descriptive demographics of each subject, the researchers observed whether the previous person within a precise time span held open the door for the next person (the situational context), and then whether or not the actual subject held open the door for the next person entering the store. When the initial politeness led to a second similar polite act, they considered politeness to be contagious, like a virus.

Moser and Corroyer's precise observation protocol began with the observer standing in front of the entrance to the store and selecting distance and ideal angle to ensure that nothing would be missed in observing the target behavior. Each time a participant corresponding to a pre-set operational definition approached the door, his or her behavior with respect to the person following was noted if at least one other person was four to six steps behind.

The research team recorded 880 observations in this careful and precise way, 480 in Paris—an urban setting—and 400 in provincial Nantes. In Paris they found that if the person before you holds the door open for you—is polite—you tend more often to do the same thing for the person following you whether that person is a man or a woman. Politeness may be contagious in the city. On the other hand, in the provincial town, people are more polite in general—holding the door open whether or not the person preceding them did so. Not surprisingly, when the density of shoppers rises, everyone is less polite and the contagious nature of civility breaks down in both Paris and Nantes.

On-the-spot tape recording during behavioral observation was employed by both Naser and Jones in their study of landscapes of fear and stress on the Ohio State University campus (1997) and Passini in his study of people living with Alzheimer's finding their way in a Montreal Hospital (1999). Both studies focus on subjects' reactions to moving through a planned sequence of spaces—a campus walk in one case and a series of hospital wayfinding tasks in the other.
The recordings made by an accompanying observer recorded subjects’ momentary feelings and thoughts.

Because the validity of an entire research effort is only as strong as the study’s weakest link, care and precision in defining and implementing every research step is as important as which specific method is employed. After recruiting female letter by letter for a study about fear of crime, Naser and Jones (1997) asked volunteers to take a fifteen-minute walk along a potentially frightening path between 8:15 and 10:00 PM. Each volunteer was given a handheld tape recorder to “record what it is about the landscape and surrounding environment that makes you feel safe and unsafe, and indicate any emotional reactions and feelings generated as a result of particular elements or as a result of the situation in general.” On the basis of content analysis of the 591 comments transcribed onto a written log, the following categories emerged to code settings that feel unsafe: blocked prospect, concealment, entrapment, and generally fearsome settings. The inverse—extensive view, exposure, access, and other safety settings—were classifications for places that felt safe. Each female volunteer was assured in advance that a researcher and a member of the campus security police would follow at a distance during the walk to ensure that she was “never out of sight.”

The most frequently mentioned features associated with fear included darkness (35%), trees and bushes (18.7%), parked cars (11.2%), building enclosure (8.4%), strangers (7.9%), and being alone (6.1%). The most frequently mentioned features associated with safety included lights (40.6%), large numbers of other people (32.7%), seeing across an open area (14.7%), and trees and shrubs not obstructing the view (5.9%). All relate to reducing concealment (improving surveillance) and entrapment (p. 316).

It is important that the authors do not use these data to suggest that all fear of the night be “designed out.” In a creative turnabout they urge respect for both deflected vistas and mystery in park design—essential elements for appreciating the outdoors in daytime. “Although eliminating all such features may create places feeling safer after dark,” the authors write, “it may deaden places during the day” (p. 319). They do suggest, however, “designing out concealment” by providing diffuse and uniform lighting behind shrubs on a curved path, lighting on the path itself, and developing daytime activity-generators to bring people into the park to reduce fear and increase safety.

Passini et al. (1999) employed a similar recording methodology in their study of “residual wayfinding abilities” of people living through the early and middle stages of Alzheimer’s disease, aimed at developing a hospital and wayfinding design that diminishes “the extraneous weight on cognitive functioning while still providing an acceptable level of stimulation” (p. 175). The team pre-coded wayfinding decisions into lower order ones that lead directly to a behavioral action such as passing through a door opening, and higher order decisions that require further choices in order to be executed, such as locating a specific wing within a hospital. The accompanying researcher in this study served a different purpose than in the park safety study:
[Subjects, after being given a card with the name of the destination in the hospital,] were asked to express verbally and aloud everything that went through their mind while reaching the destination. In order to assure full verbalization, an observer accompanied the subject. If the verbalization was not forthcoming, the observer inquired what the subject was doing (to identify decisions) and why the subject was taking a given action (to identify the underlying information). The conversation was taped and then transcribed (wayfinding protocol) (p. 180).

The observer’s intervention was included in the wayfinding performance classification scheme. Subjects who found their way with no backtracking or observer intervention were classified as high performers, those that made errors but then corrected themselves were classified as moderate performers, and subjects who needed one or more observer interventions to complete the task were classified as low performers. The observer’s intervention or non-intervention became part of the experimental condition.

The finding that most subjects, even those with advanced dementia, respond correctly to lower order environmental decisions supports Donald Norman’s concept of “naturally mapped” environments—designs in which all the information you need to use the environment is embedded in the environment itself (1990). Another finding, that people living with dementia have particular difficulty distinguishing between relevant and irrelevant information on the same sign, highlights that “extra” information on a directional sign (e.g. the luncheon specials written on the direction sign to the cafeteria) can thoroughly devalue the directional information of the sign for this group (p. 192). A resulting study recommendation: “Clean up cluttering information on circulation routes” if you want to help people with dementia use signs to find their way (p. 196).

PDAs are also emerging as useful behavior-observation recorders. Olsen, Hutchings, and Ehrenkranz (2000) developed a “Media Memory Lane” machine to provide residents in Alzheimer’s long-term care units access to music (Musical Memory Lane) and clips from old movies and television shows (Video Memory Lane). They placed Memory Lane consoles in the hallway of a social day center for seniors, 75 percent of whom had some form of dementia. The researchers then observed clients as they participated in various planned activities—physical games, bingo, arts and crafts, live musical entertainment—and later when they could choose their own activity among those that included using the Memory Lane console.

To record their observations during either forty-five- or ninety-minute continuous observation periods:

Data were collected on handheld computers and tabulated with a custom designed software program that converted the continuous observational data into discreet, one-minute observation segments. Each segment contained an engagement score and the frequencies of specific behaviors observed during that minute. . . . The computers beeped softly every 15 seconds to remind observers to record any continuous or ongoing behavior (p. 165).

Data from the handheld PDA computers were downloaded during the study onto larger computers for analysis focused on choices clients made and
the destination in the hospital that went through their ssure full verbalization, an m was not forthcoming, the rնly decisions) and why the nderlying information). The ding protocol) (p. 180).

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ovation recording. Olsen, “Media Memory Lane” a care units access to music nd television shows (Video i the hallway of a social me form of dementia. The d in various planned activ-usual entertainment—and mong those that included forty-five- or ninety-minute ulated with a custom designed eservational data into discreet, tained an engagement score during that minute. . . . The obervers to record any con-

were downloaded during the n choices clients made and specific behaviors such as smiling, laughing, talking, fidgeting, and complaining. One test was carried out during “free time” when clients themselves chose what they wanted to do—use the Memory Lane console, engage in physical activity, work on puzzles, or read magazines. Clients chose the Memory Lane significantly more frequently and engaged with the music and videos significantly longer than the other activities. An unintended finding the observational data reveal is that activities in general dampen negative behaviors, such as agitation, wandering, complaining and exhibiting negative affect, underscoring the importance of keeping people with dementia as engaged and active as possible (p. 174).

In Devlin and Bernstein’s study for design of computer-based maps to help people find their way in new environments (1997), the team installed a Map Kiosk with a continuously running “attract loop” inviting passersby to test their wayfinding skills. Passersby thought they were testing themselves, but were actually testing different map formats. The study aimed to determine differential impacts of color vs. black and white maps, maps that had more or less detail, and maps in which labels were either placed on the side of the map or in the map itself near the object being labeled. The computer program contained instructions related to the maps shown and a timer to determine whether participants actually found their way on a map, and how fast.

Map labeling made a large difference in wayfinding performance, while neither color nor detail in the map had any effect. With labels located off the map and keyed by number to landmarks, the average length of time to find the way to a particular building on the computer was 50 percent longer than when the labels were immediately adjacent to the landmarks on the map itself. Called an “intact map,” this latter type of labeling means fewer cognitive steps must be taken when using the map. Devlin and Bernstein link their findings to Schwartz and Kulhavy (1981) and Kulhavy et al.’s (1989) “conjoint retention hypothesis,” an extension of Paivio’s neuroscience dual coding theory (1986) that holds:

Spatial/perceptual information and linguistic/verbal information are coded separately but that the codes lead to connected representations that can be used simultaneously when retrieval cues are provided for each (p. 101).

These studies demonstrate not only two innovative ways to capture behavioral observation data, but also how such data can build on others’ theories and inform practical applications.

Underhill describes a commercial application of behavior observation to help stores, banks, restaurants and other retail environments better serve their clients (2000). Underhill finds that paper-and-pencil “track sheets” work best to record observations in these settings because the sheets combine observation, recording, counting, and analysis in a single tool. Underhill starts each observa-

with a detailed map depicting the premises we’re about to study, whether it’s a store, a bank branch, a parking lot (for a drive-thru project) or just a single section or even just one aisle of a store. The map shows every doorway and aisle, every display, every shelf and rack and table and counter (p. 15).
“Trackers” who follow selected shoppers from the moment they enter an establishment until they leave, have identified nearly 900 different dimensions of “shopper-store interaction,” among them the “butt-brush effect” and the “dog treat” misplacement problem. At the large New York department store Bloomingdale’s, video recordings revealed many shoppers looking at neckties hanging on a rack at the side of the main aisle leading into and out of the store—a favorite location among display designers for such impulse purchases. Standing in a busy aisle, shoppers looking at ties were often bumped by passers-by, and after a few such jostlings, both genders, but more women than men, abandoned their necktie shopping at this particular location. When store designers moved the tie rack away from the aisle, sales increased substantially.

The research team also studied placement and purchase of dog treats, such as liver-flavored biscuits, with surprising results in a study for a dog food manufacturer. Older shoppers who spoil their pets—as they probably also spoil their grandchildren—and young children who beg their parents for such pet treats buy treats more often than adults who buy regular dog food. Dog treats are not a supermarket staple and are therefore often stocked on the top shelf of the pet food aisle—out of the reach of their most frequent purchasers, elders and children. Placing the dog treats within reach led quickly to increased sales. While this applied finding may be trivial, and the observation obvious after the fact, the structure of the method is critical, as is the fact that decisions were based on repeated systematic observation, not off-the-cuff suggestions.

Underhill initially hired “graduate environmental psychology students” as behavior trackers but found they often observed through the lens of theories that obscured the simple behaviors they were meant to observe and record. Most effective were artists, actors, writers, and even a puppeteer, who could be totally empirical—recording what they saw without the burden of theory.

In sum, the observation of external behavior has evolved into a subtle, sophisticated, and complex environment-behavior method. Observing and measuring internal behavioral states is the topic of the next section.

The research and design case study that follows was carried out for the United States Postal Service. The multi-method iterative research and design project draws heavily on behavioral observation employing a PDA as well as photos and video recording, and integrates these data with individual and group focused interviews.

**DESIGN CASE STUDY**

**POST-OCCUPANCY EVALUATION OF INNOVATIVE RETAIL SPACE DESIGN FOR THE UNITED STATES POSTAL SERVICE**

*Albuquerque, New Mexico*

With about 35,000 post offices in the United States and a $1 billion annual building and renovation budget, the United States Postal Service (USPS) is one of the largest organizations in the world with a long-term commitment to
When store size increased substantially, purchase of dog treats, in a study for a dog food company, probably also spoil heir parents for such peculiar dog food. Dog treats stock on the top shelf of frequent purchasers, elders quickly to increased sales. Elevation obvious after the fact that decisions were not made suggestions.

Retail psychology students though the lens of theories at to observe and record a puppeteer, who could become a burden of theory has evolved into a subtle, method. Observing and the next section.

As was carried out for the active research and design involving a PDA as well as data with individual and "design research. Since 1985, the environment-behavior team of architect Jay Farbstein and psychologist Min Kantrowitz has conducted a series of design research projects for the USPS. The research results applied and leveraged over this large a building program have had significant impacts on successive generations of design and management (Farbstein and Kantrowitz, 1992).

Small-scale design research studies the team carried out include assessing prototype automated postal teller machines and testing durability of alternative counter top materials. Large-scale studies have evaluated mail-processing plants of up to a million square feet and assessed the USPS design image nationally. At a mid-scale, the E-B consultants examined system-wide design issues such as image policy and maintenance procedures, very small post offices, standard plan post office design, a so-called "kit of parts" computer-based modular design system, vehicle maintenance facilities, bulk/business mail centers, and several generations of "retail" post office designs.

As the USPS has become increasingly customer service oriented, retail space design in post offices has changed significantly. This case study describes research carried out to test new retail design concepts.

Introduction

In 1995 and 1996, the USPS renovated customer lobbies in seventeen Albuquerque-area post offices to develop and test new design concepts supporting a retail and customer-oriented approach to providing postal products and services. To learn from the test and improve the design and operation of future post offices, the USPS commissioned a comparative post-occupancy evaluation (POE) of ten renovated post offices. While the individual post offices selected had...
many similarities, they presented systematic variations on design approaches to addressing customer service issues. These included: how queuing is handled, the presence of a "take-a-number" system, whether customers are offered the opportunity to select their own merchandise—including stamps—from open displays, several types of self-service arrangements, new site and interior signage, and alternative color schemes. Two of the post offices represented a new prototype "Post Office Express"—a smaller post office retail space located in supermarkets.

The study's goals were to learn how customers and employees used the new design features; to determine which features worked well and which did not; and to suggest design modifications for future facilities and improvements in the evaluated facilities.

To decide which data were needed, the team conducted telephone interviews, analyzed plans, and examined post office policies. Each data gathering team of architects and researchers spent approximately 60 person hours per post office employing a wide range of data gathering techniques to collect the following data:

- Approximately 30 customer interviews (for a total of nearly 300 at the ten post offices)
- Focus group interviews with about 10 customers recruited by an independent market research firm (for a total of about 100 individuals at the ten post offices)
- Structured interviews with facility managers and postal clerks
- "Tracking" five to seven hours of customer activities and behaviors using a PDA with a customized program (for a total of over 60 hours of tracking, with over 600 customers tracked at the ten post offices)
- "Snapshot observations" recording the number and location of customers and staff on a plan of the post office at 10-minute intervals
- Inspecting and documenting the physical conditions in the facilities (such as materials, equipment, lighting, and temperature)
- Photographic documentation of the alternative designs in-use
- Video-recording customer activities and behaviors (to illustrate findings)

Customer interview and tracking study data were analyzed quantitatively. Other data, such as clerk interviews and focus groups, were systematically reviewed using qualitative data analysis techniques. Overall, this excellent data set—both sample sizes and variety of sources—allowed the research team to draw sound conclusions about each post office as well as make comparisons among them.

Data were analyzed and reported separately for issues such as image, circulation, and wayfinding that are general to post office facilities and for issues such as site, self-service area, full service area, and post office box area that are specific to Full Service Lobby Design.

**POE General Design Findings**

Customers were generally positive about the changes at all ten post offices, reporting that the changes in layout, color, and other design features made vis-
design approaches to using is handled. The offered the opportunity from open displays, store signage, and alternative prototype "Post supermarkets. employees used the well and which did not and improvements

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all ten post offices, features made vis-

iting the post office more agreeable experience. One said "I think it's nice because they obviously care about us, that we have a pleasant place." Many customers reported that their overall image of the USPS was more positive because of facility and service improvements.

Most important for customers in facility identification is exterior signage. While many customers liked the exterior signage, they complained that signs identifying the post office often were not clearly visible from main vehicular and pedestrian approaches. However, once in the post office parking area the main entrance of most facilities is highly visible.

Interior signage, the research found, was generally well coordinated and well executed, but not always well placed or appropriately sized. Customers as a whole reported that the signs and notices effectively conveyed information, but some described the interior image as "cluttered" with too many signs and "confusing." Raspberry, gray, and white, and white, blue, and red color schemes were tested at the ten post offices. Most customers liked both, generally preferring the scheme at the post office they frequented. Customers were enthusiastic about post offices located inside a supermarket or other large store.

Retail Service Lobby POE Findings

Almost all the lobbies gave customers the opportunity to select merchandise, including prepackaged stamps from an open display—and often to pay for such merchandise at a centrally located cashier, rather than at a full service clerk counter where they might stand behind another customer for some time. Most customers embraced this concept enthusiastically. However, in lobbies with
open displays that were difficult to see or get to, researchers recorded fewer customers making use of them. Merchandise displays that are easily seen on the customer's way into the facility are most likely to be noticed and used, much like any retail store.

The tracking study determined actual waiting times, enabling the team to compare these times to customer perceptions. Overall, customers were very satisfied with waiting times, being more satisfied at post offices with the shortest actual waiting times—a mean of forty seconds versus about two minutes at the rest. Customers in post offices where take-a-number systems were added—where customers are served according to a paper number they receive from a dispenser—tended to believe that the wait had become shorter even though tracking data revealed that average wait times were significantly longer than at facilities without them.

The take-a-number system was intended to make shopping easier for customers in store-like post offices where browsing and self-service are encouraged. With customers' numbers being called out when it was their turn, the system was intended to liberate customers from having to stand in a queue. However, some customers took a number and then stood in a queue, reluctant to leave it to shop, lest they lose their place. A strong link was found between the layout of furnishings and the success of the take-a-number system. In particular, the presence of visual queuing devices such as cordons or a "parcel slide" are confusing for many customers who, seeing them, assume they are supposed to form a line. Facilities without such devices did not experience this problem. The four diagrammatic plans show queuing patterns in post offices with a variety of queuing devices.
In these visually complex environments, when the take-a-number system dispenser was not readily visible, a great deal of confusion ensued. Many customers joined the queue only to find they lacked a number, occasionally leading to conflict among customers about who had been waiting longer.

Recommendations and Results

The study yielded recommendations for keeping, improving, and eliminating various lobby design and operational features.

- Carefully size and place exterior signage for maximum visibility by passing traffic
- Study color schemes further because results comparing the two present color schemes were mixed and decisions relating to color can have major implications for the overall USPS corporate image
- Make more evident and visible on signage critical information such as hours of operation
- Coordinate interior graphics and signage to emphasize critical information and to avoid distracting customers with unnecessary or low-priority messages
- Fully implement the take-a-number system within a coordinated design program to successfully free customers from the queue
- Create clear graphics for the take-a-number dispenser indicating that numbers are to be taken only for clerk service and that there is no need to wait in line and make these graphics prominent and bold and locate them where customers cannot miss them upon entering the service lobby
- Redesign or remove queuing devices such as parcel slides to avoid giving customers a “cue to queue”
- Make open merchandise displays highly visible and accessible
These key recommendations from the multi-site POE were combined in a single Full Service Lobby test site that was evaluated prior to being “rolled out” nationwide. Features include:

- Newly designed graphics, information, and casework for the take-a-number dispenser and system.
- Elimination of the parcel slide, with the addition of sufficient surfaces for writing and resting packages.
- Redesigned cashier station with adequate workspace, a location that reinforces visibility, and sufficient queuing space in front of it.
- Improved relationship between layout, circulation, and function by locating primary merchandise display sections (especially stamps) where they are easily seen and accessed by customers and ensuring clear view and circulation throughout the area so customers can see and reach all key elements.

This case study is based on the work of research architect Jay Farbstein, Ph.D., FAIA, of Jay Farbstein Associates, Inc., Los Angeles and San Luis Obispo, CA. and Min Kantrowitz, psychologist, architect, and planning and design consultant, School of Architecture and Planning at the University of New Mexico.

**OVERVIEW**

To design environments suited to what people do in them, we must understand environmental behavior: Who does what with whom? In what relationship, sociocultural context, and physical setting? This chapter proposes that by looking at how environments affect people’s ability to see, hear, touch, smell, and perceive each other, we can begin to understand how environments impinge on social behavior.

Environmental elements that affect relationships include barriers such as walls, screens, objects, and symbols; and fields, such as shape, orientation, size, and environmental conditions. Design decisions about these elements have identifiable side effects for social behavior.

Environmental-behavior descriptions that can enable designers to improve control over behavioral side effects of their decisions include six elements: actor, act, significant others, relationships, context, and setting.

The next three chapters discuss how to find out about people’s feelings, attitudes, perceptions, and knowledge—namely, by asking questions.