5.
Pedestrian Street Use:
Culture and Perception

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The major question to be addressed in this chapter is: What are the variables that influence the use of streets by pedestrians, or, more specifically, which perceptual qualities of streets influence such use? Since comparative approaches tend to clarify matters, these perceptual characteristics will be contrasted with those desirable for high-speed traffic. This chapter is a summary and synthesis of some previous work as well as of a major project on streets still in progress. In dealing with the question of pedestrian street use, several specific questions will be addressed:

1. What is a street, and how can a cross-culturally valid definition be derived?
2. What is the role of culture, and of rules, in defining behaviors appropriate to streets?
3. How can we classify the variety of street behaviors so that those perceptual characteristics supportive of various behaviors can be derived?
4. How can we formulate a more detailed set of physical characteristics that are perceptible and that support walking?

It will be suggested in the chapter's conclusion that not only is this comparative approach extremely useful for analyzing streets, but as is the case in much of my recent work, I take it to represent a paradigm for valid design in general.

WHAT IS A STREET?

It is quite clear, as I have repeatedly argued, that, in order to be valid, design must be based on theory. In turn, valid theory must be based on proper generalizations about environment-behavior interaction. Such generalizations only become reliable when they, in turn, are based on the very broadest evidence possible. This involves the use of the most extensive historical data; the use of all forms of design, including vernacular, "primitive," and so on; and the use of cross-cultural data.

All these types of evidence, particularly the use of cross-cultural data (which the other two categories presuppose), require that the units used in analysis and in any comparisons be appropriate. In anthropological terms, such units must in the first instance be at the *emic* level; in other words, they must be fully embedded in the cultures in question and seen in their terms. Only then can units be derived for use in comparisons. That is to say, one needs to use *derived* etic units; what must be avoided is the use of *imposed* etic units.[1] (The undesirable consequences of this have been demonstrated for cities [Wheatley 1971], for privacy [Rapoport 1976, 1977], and for dwellings [Rapoport 1980a].)

In these terms, the definition of a street is far from self-evident (Rapoport 1973). That setting called *street* needs to be defined in such a way that the type of comparison desired can be made validly. For some purposes it can be defined morphologically; from another perspective it may more usefully be designated as a setting for a particular set of activities (Rapoport 1980a). This would then determine whether the common notion of *street* is an adequate descriptive category or whether it should be defined in terms of a public-private continuum or in terms of activities and uses. In other words, is a morphological definition in terms of "a linear space between buildings" useful, or would a definition in terms of "that setting in which a specified set of activities occur" be more useful (as an

All drawings are by the author.

analogue of the dwelling in Rapoport 1980a)? If the latter is the case, a compound may be the most relevant unit to compare with a street in some cases; in others, analogous activities may take place in restaurants, pubs, coffee shops, or dwellings. This, then, would affect the discussion of the street as a behavior setting and the choice of units to be used in the analysis. Any such discussion would also need to include the cultural definition of rule systems for appropriate public behavior (see the next two sections) and also the different "space splits" or domain definitions respectively corresponding to what cognitive anthropologists have called reality splits or cognitive domains.

It is this problem of what one could term functional nonequivalence, and the failure to relate environmental form to cultural norms, that is at the root of the weakness of otherwise insightful studies of the street by various designers (Rudofsky 1969). Definitions, however, depend on the purposes for which they are used. In this chapter, I will assume that even though streets are difficult to define (as are cities [Rapoport 1980b], dwellings [Rapoport 1980a], or units of settlement [Rapoport 1981]), there are such units that are comparable across cultures. While it is desirable to use a *derived* etic, I will use an *imposed* etic for two reasons: First, the principal activity with which we are concerned is walking, for which *street* is commonly the accepted unit in many cultures; second, the imposed etic is based on the observation that *street* is a well known and accepted setting (Barker and Barker 1961; Barker and Schoggen 1973) and that this definition, which we all commonly use, is *morphological*. Thus, for the purpose of this discussion, *streets are the more or less narrow, linear spaces lined by buildings found in settlements and used for circulation and, sometimes, other activities.*

THE USE OF STREETS

The main concern is with the use of streets by pedestrians but, as I will show below, one needs to approach the topic more broadly. The activities that occur in any setting are a function of culture, primarily of a set of rules that are part of the culture in question. These not only define the setting itself, but also define both the repertoire of activities available to members of that culture and that subset of activities appropriate in specific settings. For example, in the case of streets, this is clearly a major question, particularly since the presence or absence of certain activities depends on how the street is seen in terms of front/back or public/private oppositions. Moreover these rules then lead others to attribute meaning to the street: to judge it, for example, as a "slum" (Rapoport 1977), because "hanging out" on the streetfront in the United States communicates a negative image, even to people who so use the street (Brower 1977: 9). In that case use conflicts with the rules of the majority culture, those rules being related to front/back and public/private.

From the perspective of environment-behavior research, the relation of people and environments is the result of complex interactions among cultural, environmental (physical), and perceptual variables. This also applies to the specific set of activities that occur in that environment called *streets* and, specifically, to the pedestrian use of streets. The following list enumerates some of the many variables involved in pedestrian street use:

1. *Technology*. In places where wheels, or even riding animals, were unknown or known but little used, walking was extremely prevalent, since the only alternative—being carried—was available only to a small minority.
2. *Safety*, whether from traffic or crime (especially, *perceived* safety).
3. *Environmental variables*, such as noise, fumes, congestion, quality of paving, and so forth.
4. *Climate and weather* (for example, season, shade or sunlight), although these are clearly modified by culture.
5. *Topography*, for example, hills, slopes, and so on, which may, however, affect certain people—for example, the elderly or handicapped—differentially. (We are thus dealing with "*perceived* topography.")
6. *Distance* to a given goal, or, more correctly, cognized, subjectively defined distance.
7. *Availability and presence of services*, such as shops, cafés, kiosks, toilets, seats, and so on.
8. *Culture*, which defines settings, rules for appropriate behavior, and so on.
9. *Physical, perceptual characteristics*, for example, adequate complexity levels and adequate interest that may be supportive of the particular activity in question.

In general, walking and other street activities are mainly a function of the last two variables—cultural and physical. The remainder of this chapter will, therefore, concentrate on them, starting with the role of culture.

CULTURE AND STREET USE

As noted, activity in any given setting is primarily culturally based in that it is the result of unwritten rules, customs, traditions, habits, and the prevailing lifestyle and definition of activities appropriate to that setting (Rapoport 1969, 1977, 1979a, 1979b). Note that while I have listed technology in a separate category above, it is, strictly speaking, part of culture.

Accordingly, the use of streets by pedestrians has to do not only with accepted levels of physical exertion but also with attitudes of sociability or reserve. For example, if reserve and anonymity are the accepted norms, then settings encouraging sociability will be seen as inhibiting; if the contrary is true, then the same settings will be seen as supportive. In addition, in cases in which sociability is acceptable, those settings that are appropriate will further influence the activities that occur in a street (Rapoport 1982c). This, then, is partly a function of design; in other words, two major sets of variables with which this chapter deals both play a part. Thus, designing the best Italian hill-town street or Greek island plaza will have no effect if particular uses are seen as generally undesirable or as inappropriate in public settings. If, however, there *is* a desire to use streets for walking or promenading and plazas for sitting, then certain physical configurations are much more likely to be supportive than others, while those that are antithetical may be so inhibiting as to block such behavior completely. But even appropriately designed settings will be used or not used depending on the culturally established rules.

Note, however, that rules can change with general changes in the culture and that they can also change in a given case. For example, a residential block in Milwaukee may be used for a block party, but only on the Fourth of July. In effect, the situation is redefined, and previously inappropriate behavior becomes appropriate in a new context and changes accordingly (Rapoport 1979c). In the same physical milieu, ball games, eating, drinking, cooking, and socializing become acceptable. Note also that different subgroups who dominate areas of a city may define appropriateness differently. Thus, in Baltimore, the same design worked for one group that used back areas, such as backyards and center block parks, for socializing, but not for another that used the street region (Brower and Williamson 1974; Brower 1977). As already seen, (Rapoport 1977, 1982b), other groups may then read meaning into these "inappropriate" activities and see such a place as an undesirable "slum." That is to say, they may stigmatize it.

I hypothesized as early as 1969 that there were two major kinds of street use, two major "styles" of urban space use; I have since elaborated this (Rapoport 1977, chap. 1; chap. 2: 91–96; and chap. 5), citing some more recent empirical work (Becker 1973; Thakudersai 1972, among others). Members of some cultures and subcultures do seem predisposed to use streets and plazas for many more activities than members of other groups, either seeking greater public involvement or turning many streets into semiprivate settings —or both, as seen in the case of India, for example.

Thus, in comparing a fictitious small town in Britain ("Yoredale") with one in the United States ("Midwest"), researchers found pedestrian activities to be much more important in the former (Barker and Barker 1961: 458). The setting category *streets and sidewalks* was used a total of 77,544 hours per year in Midwest versus 300,000 in Yoredale—a 400 percent greater use in the latter, although it had a smaller population. In terms of the popularity of public settings, Yoredale streets came first, with 21.33 percent of public behavior, whereas Midwest's were third, with 7.76 percent of behavior (Barker and Schoggen 1973: 415, 425). I expect that if one were to compare Britain with other cultures, such as France, Greece, Italy, Brazil, or India, the difference would be even more striking.

Consider India as a final example of the effects of culture on street use. On one hand, many of its highways and major roads seem to be treated as extremely public—in fact, almost as free occupancy space. Thus, the pavement may be used for drying grain or dung, working, talking, or engaging in a wide variety of commercial activities. However, other streets, particularly in small, homogeneous residential areas, variously called Mahallas, Paras, Pols, and Bustis depending on the region, are semiprivate, so that, effectively, only residents have access. *Their* rules apply, and a whole different set of activities takes place in them, many of which are appropriate in our culture only to the dwelling and other buildings.

At first sight, the streets provide a setting for what seems to be a bewildering variety of activities and correspondingly diverse sounds, smells, and sights. A confusing mixture of animals, people, bicycles, rickshaws, trucks, and buses moves continuously. Activities are intermingled at an extraordinarily fine grain and in close juxtaposition. The streets are full of a great variety of people in all sorts of costumes, not only walking and riding but standing, sitting, squatting, and lying down; sleeping, cooking, eating, getting their hair cut or getting shaved; doing laundry, fixing bicycles or tires, manufacturing things, sewing, playing, chanting, arguing, bargaining—even praying. The contrast to streets in, say, Beverly Hills, California, where even walking is regarded with suspicion, could not be greater.

Note, however, that the streets yet display a high degree of cultural specificity. There are clear differences in activity among regions in the country, as well as among different groups within a single region or city. Frequently, in high-status areas inhabited by high officials or professionals (often occupying the old English "civil lines"), the streets are empty and quiet, resembling those found in comparable areas in Britain and the United States. (In the latter, in turn, there are subgroups using streets in ways contrary to majority norms.) This distinction in India reflects two traditions: the indigenous and the colonial (King 1976).

Without elaborating this point further, I would summarize the argument of this section as follows: cultural variables are primary for any activity, including walking and others, occurring in streets. It is culture that structures behavior and helps explain the use or nonuse of streets and other urban spaces—or of other settings. Thus, the use of streets by pedestrians is primarily culturally based, since physical environments do not determine behavior. Physical environments, however, can be supportive or inhibiting. Given this culturally based predisposition toward obeying unwritten rules of proper street use, people can also be influenced by physical variables. The particular physical, especially perceptual, qualities of these urban spaces, which broadly have to do with complexity, characterize settings that are facilitating rather than inhibiting and thus support pedestrian activities. Hence, given a particular cultural context, certain physical and perceptual characteristics are needed to provide that environmental quality appropriate for pedestrians. This can be seen in Brasilia, where street life is much more prevalent in the squatter settlements; in the disappearance of pedestrian activities in French housing projects (Rapoport 1977); and, again, in India. There I recently compared two environments in the same city inhabited by identical populations in terms of ethnicity, caste, socioeconomic level, and life-style. One environment was full of pedestrian activities as described before; the other made them impossible. Thus, environments, while never determining positively (they cannot *generate* behavior), can be so inhibiting as effectively to block behavior—in this case the pedestrian use of space—and thus can be *negatively* determining (Rapoport 1983a).

It thus becomes necessary to turn to those physical characteristics of streets that are of primary interest to designers. But before doing so, it is necessary briefly to discuss the various activities that are found in streets.

STREET ACTIVITIES

Activities are highly varied even when considered at their manifest level in any one culture and among cultures. Equally or even more varied are the ways in which they are carried out—as well as where, when and including or excluding whom. The association of any given activity with others—in other words, how it forms an activity system—varies even more. Most variable of all is the most latent aspect—what activities mean (Rapoport 1977, 1982b).

However, with regard to streets, even the most highly varied set of activities and their characteristics, manifest and latent, can be discussed in terms of three broad classes:

1. *Nonpedestrian Movement.* This consists mainly of wheeled vehicles (in our own culture, mainly motorized vehicles). In other cultures and periods, animals may be involved—either carrying riders or on their own (for example, cows in India).
2. *Pedestrian activities*, which can further be subdivided into two principal types:
   (i) *dynamic* pedestrian behavior, mainly walking and strolling. These are comparatively constant in nature; culture influences how acceptable walking is, who walks, where, when, how fast, and with whom.
   (ii) *static* pedestrian activities—sitting and standing, squatting, lying down, eating, playing, working, sleeping, and so on. These tend to vary greatly with culture and many of those acceptable in India, for example, would not be acceptable in the United States.

If one wishes to concentrate on physical, perceptual variables the question then becomes: What are the characteristics of the physical environment that will constitute supportive environments for the various classes of activity? One could begin with any, but I will stress pedestrian behavior, particularly walking, since that is my current interest, although I will contrast the requirements for walking with those for static pedestrian activities and, in more detail, with those necessary for fast vehicular movement. This comparison should clarify both; it also leads to lessons that I believe to be highly relevant to urban design.

PEDESTRIAN-SUPPORTIVE SETTINGS

The particular aspect to be discussed is what I have called the *perceptual* separation of pedestrians and motorists, in contrast with the *physical* separation that

is usually considered (Rapoport 1982a). When variables other than physical separation are considered, they tend to be restricted to matters of noise, fumes, and the like. When complete separation is not at issue, the concern is still with some form of physical separation—overpasses or underpasses—or with other forms of physical manipulation barriers, such as channeling, controlling crossing points, or slowing down traffic through physical devices or legislation, as in the *Woonerven* of the Netherlands (*Ekistics* 1978: 417–22). More recently, there has been some discussion of the physical facilities that encourage the use of spaces (Whyte 1980).

The notion of *perceptual separation* addresses a different topic: the very different perceptual characteristics that settings for pedestrians and vehicular traffic require. (A few studies have addressed some requirements for pedestrian spaces [Khisty n.d.; Lozano 1974; Joardar and Neill 1978].) It does this by concentrating on the perceptual requirements of pedestrian spaces and the contrasting ones needed in spaces for motorists. The stress is thus on the perceptual rather than cognitive level, or on dealing with the experiential, sensory aspects leading to interest and exploration, rather than with imageability and clarity leading to orientation, subjective distance, and the like (Rapoport 1977).

In summary, the argument is as follows: pedestrian behavior, like any activity, is a function of two major sets of factors, cultural and physical. As we have already seen, any activity is primarily culturally based in that it is the result of unwritten rules and customs, traditions and habits, and the prevailing life-style and definition of behavior appropriate to given settings. Regarding pedestrian behavior, there are two major "styles" of street use, with some cultures predisposed to use urban spaces for many more activities than others. Also included in "culture" is the level of technology, which is to say, the availability or nonavailability of animal, mechanical, or other forms of transport or conveyances.

Physical factors include those characteristics of settings that are supportive of the activity in question. In this case, a set of perceptual characteristics can be broadly described as having to do with *complexity*, which, in a given cultural context, will maximize and encourage walking. In other words, given a set of cultural rules, certain perceptual characteristics are needed for such settings to work. Clearly, other physical characteristics exist (which have already been mentioned). Among these may be the size of a town (Gump and James n.d., and others); safety—whether from traffic or crime; climate, sunshine, and shade; topography (which may influence people differentially, such as hills in the case of the elderly); distance; and the presence of services, such as food, shopping, toilets, or seating.

These last will not be discussed. The question that will now be addressed is which perceptual characteristics of environments are supportive for walking. Note that we are *not* discussing environments *causing* walking; the relationship is not a deterministic one. Rather, settings are either supportive or inhibiting, although, as already pointed out, some can be so inhibiting as to block behavior. Thus, they can be negatively determining (Rapoport 1977, 1983a).

A detailed discussion of the nature of supportive environments in general would be inappropriate here (however, see Rapoport 1979d, 1980c, and 1983b). But one can ask three major questions about any supportive environment: What is supported? How is it supported? By what is it supported? In this case the hypothesized answers are: *Walking is being supported; it is done, other things being equal, by maintaining high levels of interest; this is achieved through high levels of perceptual complexity.*

These perceptual characteristics are hypothesized as increasing the *pleasure* of walking by stimulating exploratory activity. We are thus not dealing with the manifest or instrumental function of safety but with the latent functions of pleasure, delight, interest, exploration, ludic behavior, and the like (on this use of manifest and latent, see Rapoport 1977 and 1982b). While environments are not determining but supportive, they can also be seen as catalysts (Wells 1965). In other words, they elicit previously inhibited behavior. Note that this can also sometimes be achieved by physical separation, particularly where there is a tradition of pedestrian behavior and where, as in many traditional cities in Europe, the perceptual characteristics of pedestrianized areas frequently happen to be like those proposed here, and unlike those of U.S. pedestrian malls.

The effect of environment on behavior can also be considered another way: through the notion of *habitat selection*. Like other organisms, people match perceived characteristics of environments against certain needs, expectations, norms, desires, and images so as to try to make consistent desired characteristics of a particular setting with a particular behavior pattern (Rapoport 1977, chap. 2; 1982a).

In this connection, walking is an interesting activity because it has remained essentially unchanged since the origin of our species. This suggests the possible existence of a clear evolutionary baseline. Unlike other travel modes, pedestrian behavior is millions of years old and it evolved in settings of a particular level of complexity (see the arguments, in other connections, of Boyden 1974, 1979; Hamburg 1975; Dubos 1966, 1972; Tiger and Fox 1971; and Fox 1970, among

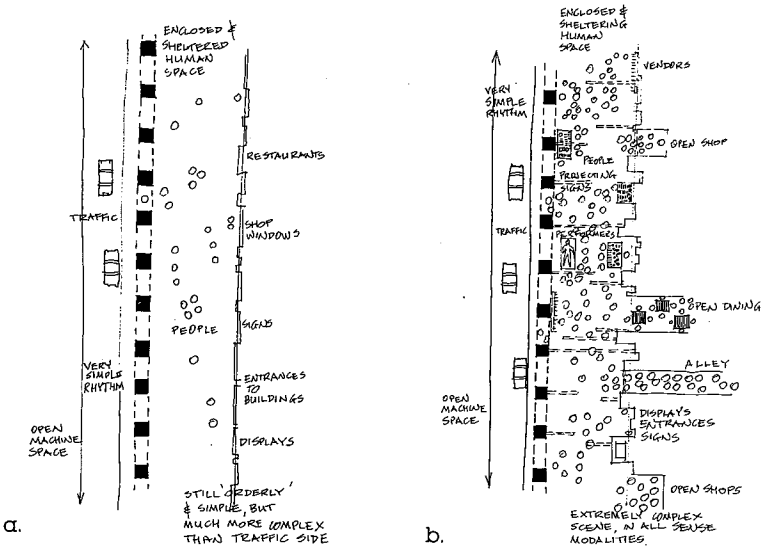
others. See also Rapoport 1979a and 1979b). Note also that since the evolutionary *perceptual* baseline is still generally valid, the criteria derived for other travel modes, for example, high-speed motor traffic, will be equally valid if based on these same perceptual needs and characteristics. Thus, in terms of habitat selection, it is likely that even if people are "unaware" of their needs, they will respond to those characteristics being discussed and walk more in settings possessing them.

Thus, the underlying notion, summarized in Rapoport (1977: 207–47) and based on extensive research literature, is that human beings, like most organisms, process information and, in doing so, seek certain levels of information input at certain perceptual rates that depend on the individual (and his culture) and on the activity in question. These preferred levels can be described as constituting complexity (contrasted with the extremes of deprivation and boredom, chaos, and overload). Note that with regard to complexity, there seems to be a difference between liking and preference, as opposed to interest and exploration. Liking seems best described by an inverted U-curve (where there is an optimum), whereas interest seems best described by a monotonically rising line (although there is probably an upper limit when overload is approached or reached [Rapoport 1977: 212, fig. 4.7]).

Since the U-curve seems to apply to preference and the straight line to time of exploration, they likely describe two different sets of pedestrian spaces. Recall that there are two types of pedestrian activity and hence two types of supportive environments: those related to walking or strolling (dynamic spaces, such as streets), and those related to sitting and standing (static spaces, such as plazas). It is likely that interest is the principal criterion for the former and liking the principal criterion for the latter; these spaces may have different desirable characteristics, particularly since liking is more influenced by *meaning*. Thus, liking is more (although not exclusively) a matter of associational qualities than interest, which is more (although not exclusively) a matter of perceptual qualities. An example is the frequent liking of *green* spaces for sitting (Rapoport 1977: 207–40). Hence, also, the important role of other people and culturally appropriate and acceptable activities while sitting or standing. Note once again that *cultural variability is likely to play a larger role in static pedestrian behavior than in walking.*

Both settings are pedestrian; while they differ from each other, both differ from settings for vehicular traffic. I will concentrate on dynamic spaces—streets—although the same approach is applicable to static spaces and to traffic spaces. In other words, the same type of analysis will reveal which qualities are supportive of the different activities.

While the discussion will concentrate on perceptual aspects, it will touch on the associational qualities of dynamic spaces. For example, the effectiveness of arcades as pedestrian settings is based on both perceptual and associational variables. Not only are the levels of complexity inside and outside the arcade very different and suitable for the types of movement concerned (as we shall see), but the highly enclosed, sheltered, and almost nurturant arcaded space; its uses, such as shops, restaurants, and so on; its very different spatial quality; its enclosure and separation from, yet visibility to, traffic; its freedom of movement and slow tempos, contrasted with the adjoining speed and linear flow of traffic—all provide a clear contrast in meaning. One is clearly in a human rather than nonhuman space (Rapoport 1970), in a pedestrian rather than machine space (Horvath 1974) (fig. 5-1).



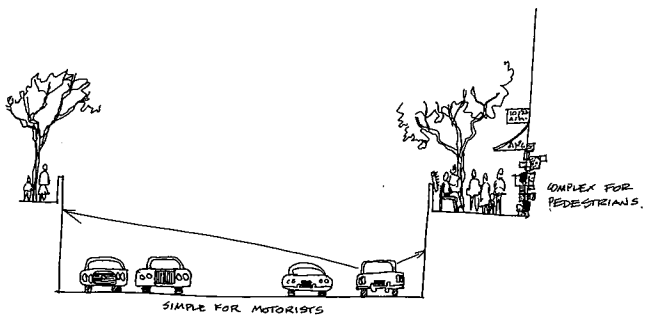
5-1. Two examples of arcaded streets among many throughout the world: a. Rue de Rivoli, Paris; b. composite, Singapore, early 1960s. (Redrawn from Rapoport 1977: 221)

Similarly, the raised sidewalks in Paris do more than provide different and appropriate perceptual experiences to the two classes of users: by putting pedestrians *above* ground rather than underground (and in what is clearly an important place, as opposed to an overpass, which is clearly a second-class place), they communicate meanings about relative importance, status, and the like. They set a context and define a situation (Rapoport 1979c) and hence work in the associational realm as well as in the perceptual one. It is, however, likely that many of the characteristics that provide appropriate perceptual complexity also tend to communicate the appropriate meaning, most simply that the raised sidewalks are a desirable pedestrian space (fig. 5-2).

Given these distinctions, let us turn back to the central issue of perceptual characteristics. There is clearly a continuum of travel modes and conditions and associated complexity levels (walking, bicycling, slow driving, and fast driving, as well as various public transport modes, such as bus, train, and subway). Each has different requirements for complexity levels, in other words, different perceptual characteristics that can be specified. Moreover, driving on a narrow road lined by trees is different from driving on a road through open country or through mountains; an urban freeway is different from a rural one; driving on a surface or elevated road is different from driving through a tunnel—all in terms of the perceptual characteristics that are desirable.

The point is made most clearly, however, by picking two extremes—walking, strolling, and sauntering on the one hand, as opposed to fast, urban motor traffic on the other hand—and deriving the perceptual characteristics desirable in these contrasting settings. Although my interest is in pedestrians, I can clarify the whole issue by contrasting their needs to motorists'. In discussing urban pedestrian streets and urban highways, the perceptual variables considered will be mainly *visual*, although environmental perception is *multisensory* (Rapoport 1977: 184–95). Moreover, *the nonvisual senses are particularly important in pedestrian spaces*, since there is opportunity to experience and appreciate them; while driving one tends to be isolated from those nonvisual variables. They thus add greatly to the desirable complexity of such settings by providing many more potential noticeable differences in various sensory modalities (Rapoport 1977: 229–30). Also, while complexity in all settings, and especially in pedestrian settings, is achieved both through fixed feature and semifixed feature elements (as well as through nonfixed feature elements, meaning other people), only fixed feature elements will be discussed here. While the semifixed elements may, in fact, be most important, they can be fit easily into the conceptual framework. Also, they are less under the control of the designer.

5-2. Raised sidewalk, Boulevard St. Dennis, Paris. One of several such boulevards in the city. (Redrawn from Rapoport 1977: 246)



THE PERCEPTUAL CHARACTERISTICS OF PEDESTRIAN VERSUS VEHICULAR SPACES

The specific suggested perceptual characteristics that should distinguish pedestrian spaces from those designed for motor traffic can be derived from the variable speed of travel and the different ways of perceiving the environment: free and flexible for pedestrians, constrained and "tunnel" for motorists. (For more detail, see Rapoport 1977: 240–47.)

Notions such as information processing and channel capacity suggest that complexity is best expressed in terms of noticeable differences. What is important is the *rate* of information, or, the number of noticeable differences per unit time. Thus, speed plays an important role in the perception of noticeable differences and hence of complexity. It can, therefore, be asserted that pedestrians and motorists differ greatly in the way they perceive urban environments.

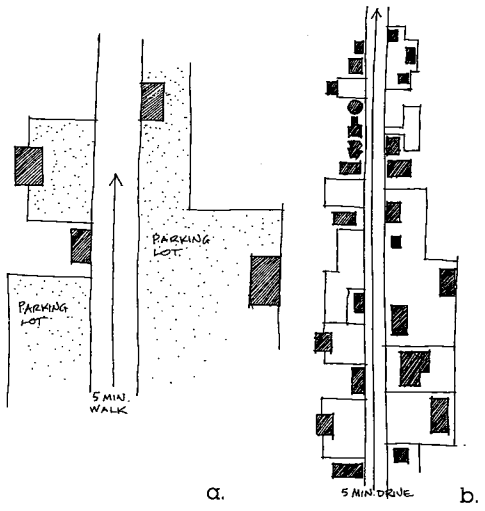
Perception of the city is dynamic and sequential. The city is experienced over time and its image is made up of the integration of successive partial views, each of which, however, must be noticeably different, and never wholly predictable.[2] This integration of partial views is affected by speed and the nature of the environment, both of which influence the rate of noticeable differences. Assuming that the environment provides potential noticeable differences, speed influences how often noticeable differences occur, how long they are seen, and, hence, whether they are observed. Subtle cues need a slow pace, yet driving is not only fast, but it also demands concentration, leaving little time or capacity to appreciate the environment. Pedestrians thus have a much better awareness of places and clearer ideas of the meaning and ac-

tivities in the city than have either drivers or users of public transport. Because of the lower speed and lower criticality of their movement, pedestrians can perceive many more differences in form and activity. Pedestrians are also less insulated from multisensory information, whose dimensionality is increased by the active nature of walking.

This suggests that for different speeds, different cues and different levels of complexity should be designed. For example, streets with arcades can provide different levels of complexity for motorists and pedestrians. Long pedestrian underpasses, with white, shiny, tiled walls are much too featureless at pedestrian speeds; the apparent rate of progress is reduced by the lack of noticeable differences and adequate levels of information. The roadside strip is too complex and chaotic at driving speeds while residential streets seen at slower driving speeds or at pedestrian speeds are too monotonous; there is a reversal of needed levels of complexity related to speed. A roadside strip, full of parking lots and large elements, is extremely open spatially and provides inadequate information to pedestrians, since there are few visible changes; at slow speeds there is a low rate of information, few noticeable differences, and the environment is boring (fig. 5-3).

The perception of complexity is thus related to the number of noticeable differences per unit time and hence to speed. Speed also influences the way people organize discrete stimuli into groups. At high speeds, elements are grouped into simple chunks, while at slow speeds more discrete elements are perceived. High speed makes a complex environment too chaotic; a simple environment, interesting at high speed, becomes monotonous at slow speeds. Complexity in a traffic tunnel and simplicity in a prison yard are both undesirable. In all these cases the *perceived* complexity of spaces is more constant than their *designed* complexity, because of the variability of speed. Thus high-speed environments need to be designed with much lower complexity than slow-speed environments, and the elements need to be composed differently (as will be shown later).

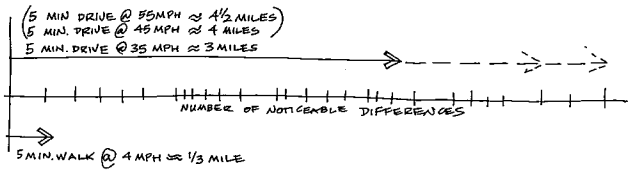
5-3. Speed and noticeable differences. Roadside strip covered: a. in a five-minute walk; b. in a five-minute drive. (Redrawn from Rapoport 1977: 241)



Fine detail and small differences are picked up by central vision, while peripheral vision detects motion and its importance increases at high speeds. Thus elements close to a rapidly moving observer, particularly if they are complex, can be made distressing by greatly exaggerating apparent speed. Movement itself, as it affects perception and creates sequences, can be understood in terms of noticeable differences. Movement through an environment can be described in terms of transitions, "emergence from behind," sequences, and transformations. This can only happen when there are noticeable differences, so that on a featureless plan or a completely featureless tunnel, and in a vehicle with no kinesthetic cues to speed and movement, the apparent rate of movement would be much lower than in an environment rich in transitions and noticeable differences. In other words, complexity depends on the number of changes or noticeable differences per unit time, including changes of any uniform, or uniformly varying, attribute, such as rate, direction, slope, curvature, color, enclosure, smell, sound, light, and temperature. All analyses of an urban environment in terms of transitions and sequences, while easily interpreted in terms of noticeable differences, must include a consideration of how fast they occur. Given a certain number of noticeable differences per unit length, it is clear that at lower speeds an environment would tend to be simplified, while at higher speeds it would tend toward more complexity (fig. 5-4).

At pedestrian speeds, the perceiver is free to explore the environment using all sensory modalities. This leads to some increase in complexity if potential noticeable differences are present. It follows that settings for high and low speed should be perceptually quite different. The subtleties of traditional high-style or

5-4. Speed and noticeable differences. (Redrawn from Rapoport 1977: 242)



vernacular architectural or urban design cannot be appreciated at high speed; neither can a freeway at walking speed. At driving speeds, the time available to obtain information is also greatly reduced. The need is thus for large-scale elements and infrequent broad and smooth rhythms. The pedestrian receives very different input—it is fine grain, he can vary the rate, he can look around and stop to observe detail, he is aware of the environment all around him in all sense modalities. Motorists' perceptions are affected by the length of time each element is in view and also by the criticality of the task. The pedestrian has each element in view as long as he wishes and can satisfy his interest in it because of the low criticality of this task. When pedestrians are harassed by traffic, their task becomes more critical and they cannot perceive the environment in the way appropriate to their speed. This is a common design problem.

Urban light and sign systems have different effects at different speeds, as anyone who has experienced a highway strip at night at high speed knows. The effects of speed on highway and road design have been discussed (Tunnard and Pushkarev 1963; Appleyard, Lynch, and Myer 1964; Carr and Schissler 1969), but the general effects on perception or on the design of pedestrian spaces have not been considered. The important conclusion is that pedestrian and high-speed environments are perceptually incompatible, so that the conflict is not only between cars and pedestrians, but between fast and slow speeds and also between such types of movement as smooth and jerky or straight and irregular.

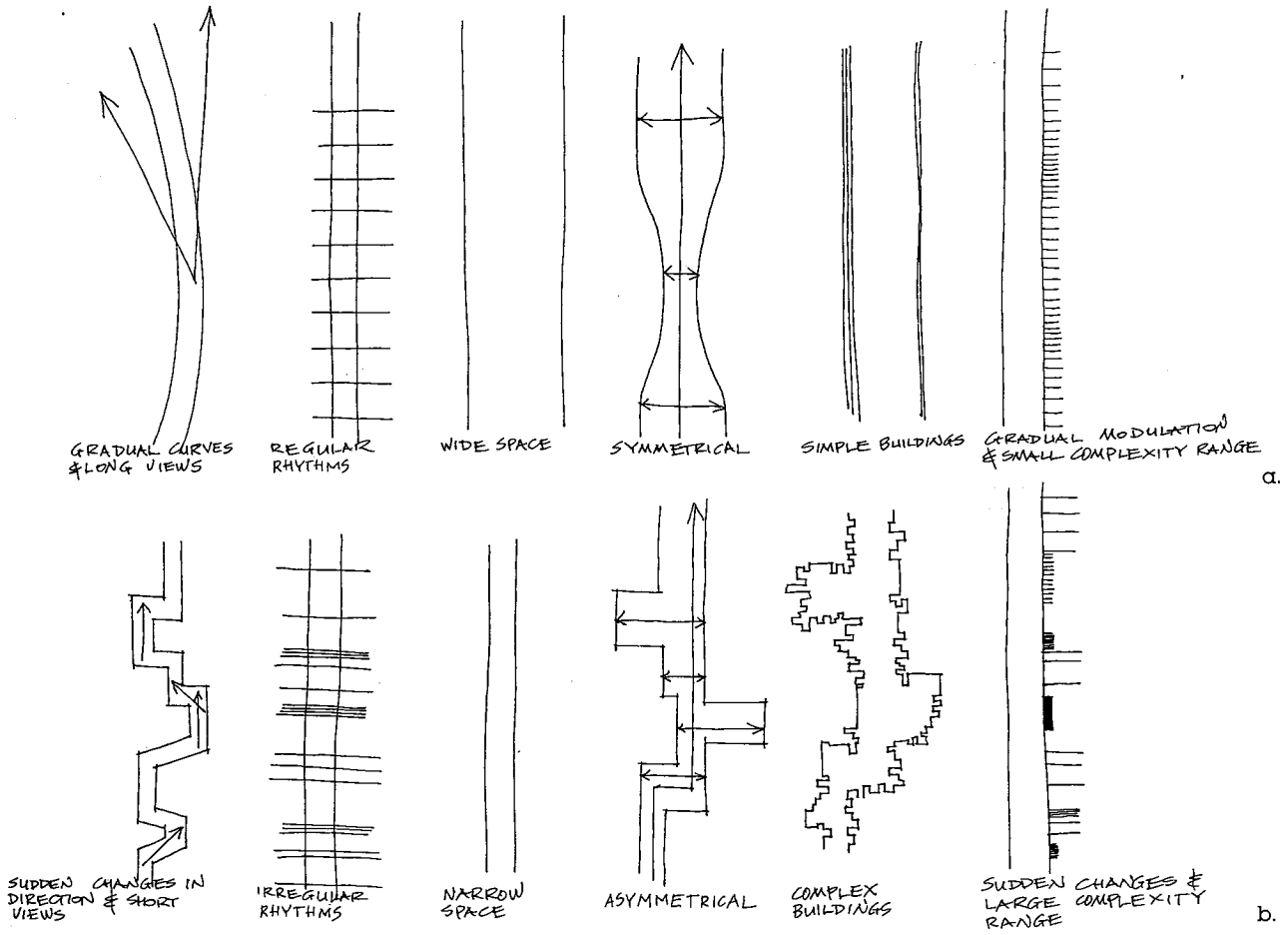
To repeat, an environment that is comfortably stimulating from a car becomes monotonously boring on foot, while what is interesting on foot becomes chaotic in a car. The Shambles at York is a good pedestrian environment, while the Egyptian Pyramids are ideal at car speeds. More generally, the medieval city is pedestrian; Ville Radieuse and its progeny are for motorists. The two environments need to be quite different in terms of noticeable differences and perceptual organization: at high speeds one needs distant views, simplicity and a large scale, while at slow speeds one needs a small scale, intricacy, and complexity. It can also be shown that as speed increases, not only do tasks become more demanding and concentration increases, but several other things also happen (Tunnard and Pushkarev 1963: 172–74). These include changes in the distance of the point of focus, which changes the relation of objects to the route and narrows peripheral vision, so that changes are required in the relation of side elements to the route as a result of the need to avoid "tunnel vision." Foreground detail fades, so that elaborate detail is both useless and undesirable. Finally, space perception becomes impaired, which influences the placing of elements to avoid "looming." In general, then, the requirements for both the high- and low-speed environments, as well as for dynamic or static pedestrian spaces, can be specified in perceptual terms (Rapoport 1977: 240–47).

For high-speed environments, these include gradual curves, long views, regular rhythms, wide symmetrical spaces, generally low complexity, gradual modulation, and a restricted complexity range. For pedestrian movement, the opposite is true. Pedestrians need sudden changes in direction, short views hiding and gradually revealing other views, irregular rhythms, narrow asymetrical spaces of high enclosure, generally high complexity, and a wide complexity range.

In somewhat more detail, it would follow that, for motorists, building setbacks should be greater than for pedestrians and should not be uniform. Uniform and consistent surroundings confound orientation, confuse destination location, and reduce curiosity, since they do not provide noticeable differences. The shapes of the visual fields on either side of the road should be similar, that is to say, symmetrical. Although one side is always dominant, the visual field never expands equally on both sides. Distances between peripherally and foveally viewed elements should be large scale and simple. Elements along the road should provide information at an intermediate rate with gradual transitions—sudden contrast between high- and low-information environments should be avoided; although areas of differing complexity are still needed, the transitions among them should be gradual. There should be a smooth continuous succession of such areas, with their intensity decreasing as speed increases. Generally, then, as speed increases, the number of noticeable differences in the environment should decrease and setbacks should increase. As traffic intensity increases, the perceptual complexity of the environment should be reduced.

Pedestrians can use, and they desire, much more acute and abrupt transitions in space, sensory experience, light levels, sounds, and all other sense modalities. Only they can notice and respond to the variety of stimuli that can be used in a rich, opulent environment. The characteristics of pedestrian spaces, which also follow from the discussion generally, and those of high-speed spaces can be illustrated and combined (fig. 5-5).

Note that we are only discussing perceptual variables. Many other considerations will also play a role. For example, activity will also modify these relationships, since play and exploratory, as opposed to grimly purposeful, behavior will need very different levels of

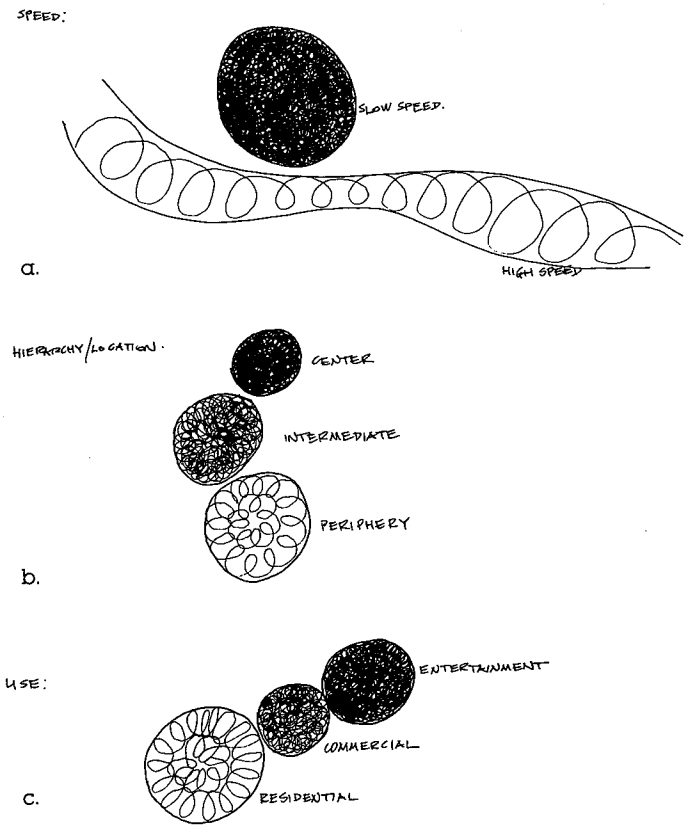


5-5. Perceptual characteristics for: a. motorist, and b. pedestrian spaces. (Redrawn from Rapoport 1977: 244)

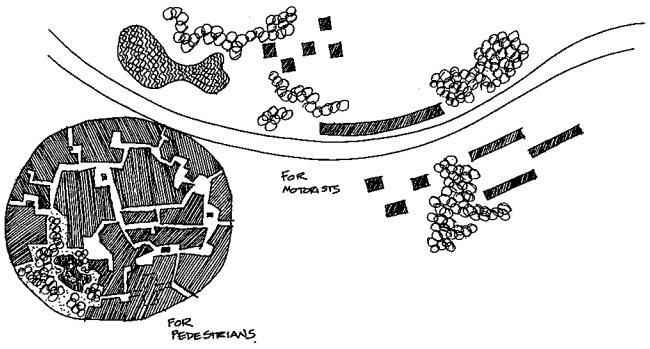
complexity at given speeds. Walking or driving for pleasure or to a job are all very different. People may thus select different environments for apparently similar activities, depending on the context and the situation as well as the culture; but the difference between slow- and high-speed environments will persist.

At the scale of the city, the existence of many levels of complexity and their appropriate relationship to the context is important. For example, designers could modulate complexity levels to reflect the nature of areas and their activities, their importance in the urban hierarchy, and the speed at which they will be perceived (fig. 5-6). It has already been noted that pedestrians rarely look above eye level in enclosed urban spaces, where perception of detail is almost inevitable. Given the needs of drivers as described, their movement channels should be simple, and it is free-standing elements and tops against the sky, and clusters of tall buildings that become important (fig. 5-7).

We have already seen that pedestrian spaces themselves can be separated into movement and rest spaces, dynamic and static spaces. This is an example of the need for specificity; to say *pedestrian spaces* is not really enough (neither can one ignore cultural variables and the specific activities that follow). As suggested, these two forms of pedestrian spaces may require different perceptual characteristics: movement spaces need to be linear, narrow, and winding so that they entice with hidden views and encourage walking, strolling, and sauntering; while rest spaces need to be more static and wider (although still enclosed), frequently green, provided with sitting spaces, and so on. Such spaces, whether plazas or avenues, encourage visual exploration—mainly of other people—from one place and need to act as a stage for social behavior. It is people who become objects of interest, providing the requisite complexity levels. Thus streets that seem excessively broad, like the Champs Elysées in Paris, Dizengof Street in Tel Aviv, or Paseo Colon in Barcelona, provide human interest through their outdoor cafés, which narrow



5-6. Complexity and context at the area level: a. speed; b. hierarchy/location; c. use. (Redrawn from Rapoport 1977: 245)



5-7. Pedestrians and motorists—separation by perceptual needs. (Redrawn from Rapoport 1977: 246)

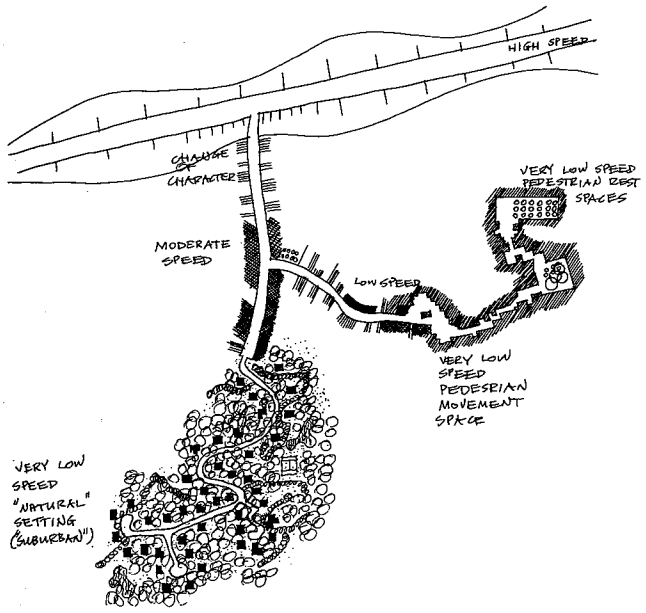
the pavement, creating more appropriate pedestrian movement spaces. They also become complex as the result of people, tables and chairs, awnings overhead, sounds and smells, and so forth. Moreover, pedestrians and seated people see and are seen. In many cities, as in the Plaka in Athens, one finds the contrast of narrow shopping and pedestrian streets with wider rest spaces, often with trees, where cafés, *tavernas*, tables, and markets are found, although these spaces can still be remarkably small. In Athens, one also finds vast spaces like Parliament Square, which have parts that become satisfactory static pedestrian settings—but this is another topic.

CONCLUSION

The argument concerning the cultural and perceptual aspects of pedestrian street use can best be summarized in visual form (fig. 5-8). Rather brief and condensed, this argument simplified what is a more complex set of issues that ideally require greater development, elaboration, and even qualification. However, I believe that, even in its simple form, it is both valid and useful.

Nothing more need be said about its validity. Regarding its usefulness, two concluding comments can be made. The first one is general: Design is culture-specific (Rapoport 1979d, 1980c, 1983b). Therefore, any design requires the identification of the cultural characteristics of the group or groups in question, their unwritten rules about permitted activities, and acceptable settings and situations for such activities. The argument in this chapter is thus a specific instance of a more general model about the nature of design which, if used, would prevent some rather unfortunate designs. It would also avoid unlikely arguments, which imply that if we built Greek Island town streets and plazas, people would use them the way they are used in the Greek Islands.

Second, however, through the concept of supportive environments, and also through the argument about evolutionary constancies, it *does* suggest that any cultural predisposition that exists for pedestrian activity (or any other activity) in a given place will usually be greatly helped by appropriate design. It also suggests that in this specific instance such appropriate design is related to what can broadly be described as appropriate levels of complexity. It also provides some fairly specific suggestions of what these might be, which become a hypothesis to be tested (as any design must be). Moreover, it suggests that one type of urban design analysis that is extremely useful is in terms of rates of speed of movement. While it goes without saying that this needs to be complemented by many others, it finally suggests that we think of the urban system as a system of settings for systems of activities (Rapoport 1977, 1982c) which, in this case of streets, are distinguished in terms of rapid movement, slow movement, and static behavior, each with its appropriate perceptual qualities.



5-8. Complexity and speed: motorists and pedestrians. (Redrawn from Rapoport 1977: 247)

An urban street (and road) system based, in the first instance, on such an analysis and set of considerations would work better than current ones in terms of supporting the widest possible range of culturally appropriate behaviors—which, moreover, can be specified for any milieu (see Beverly Hills or India!). This would lead to much more satisfactory street design. It would also, when combined with other human considerations with which I have dealt elsewhere (Rapoport 1977), provide a framework for cities that would be much more varied, complex, interesting and supportive, and hence more satisfactory, than current cities tend to be.

NOTES

1. In *etic* operations, the *observer* judges the information, concepts, and analyses used, whereas in *emic* operations, the *native informer* judges the observer's description and analyses—ED.
2. This is the reason why I argue that the concept of "mystery," which is seen by Stephen Kaplan as a separate characteristic of the environment, is, in fact, an aspect of complexity.

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