

UC Berkeley
IURD Working Paper Series

Title

Environmental Planning and Social Science: Strategies for Environmental Decision-Making

Permalink

<https://escholarship.org/uc/item/1tk1z9k9>

Author

Appleyard, Donald

Publication Date

1973-09-01

ENVIRONMENTAL PLANNING AND SOCIAL SCIENCE:
STRATEGIES FOR ENVIRONMENTAL DECISION-MAKING

Donald Appleyard

September 1973

Working Paper No. 217

ABSTRACT

Professional priorities for man-environment research should depend on the public context of environmental decision-making in the next few years. Citizen participation, environmental evaluation, planning, and management are likely to receive increasing emphasis. The low rate of communication between research findings and professionals suggests that the integration of social science concepts and methods in decision-making may be more urgent than basic research. Strategies for the integration of man-environment concepts with decision-making include participatory techniques, situational research, checklists, media change, simulation and prediction, environmental adaptability, and manuals. Basic research should be seen by professionals as supportive and innovative.

The research field of man-environment relations is now firmly established. Four E.D.R.A. conferences, two Architectural Psychology conferences, six years of Environment and Behavior, a few reviews of the field (e.g., Craik, 1970; Proshansky, et al., 1970; Michelson, 1968), and perhaps a thousand or so articles scattered among various journals are evidence of a broad interdisciplinary movement, which includes environmental professionals, psychologists, anthropologists, sociologists, geographers, and others. Yet there are many questions about how this research can be used by professional planners and designers. This paper will explore some of the problems and propose some strategies that professionals might consider to incorporate socio-environmental concerns in day-to-day decision-making.

Let me start with the present state of the environmental professions -- architecture, civil engineering, landscape architecture, physical and transportation planning in the United States. Before the 1960's, professionals were treated as experts -- whether powerful or ineffectual -- who lived their professional lives relatively free from public scrutiny (Altshuler, 1965). Those whom the professionals designated as leaders received public praise, awards, and perhaps a note in Time or Life magazine. The rest pursued their professional destinies, constructed their designs, and produced their plans without much public stir.

In the 1960's, the public began to question, first the urban renewal projects and the freeways; and then, when the environmental

crisis exploded in 1970, any development that contributed to urban growth -- residential communities, high-rise buildings, and even rapid transit systems. Much of the protest has arisen because of the "externalities" of large-scale projects. People have been summarily removed from their homes; valued environments, often historical, have been destroyed, threatened, or cut off. The scale of new development is termed oppressive, "plastic," impersonal, and is said to increase traffic congestion, noise, air pollution, crime levels, to disrupt the life of adjacent neighborhoods, to block off views, and generally reduce the quality of urban areas. But the users of environments are often unhappy too. Public housing projects are also targets of criticism, and as in less developed countries, owner-built houses are proposed as a superior solution to the professional product (Turner and Fichter, 1972). Public parks (Gold, 1972) are criticized for not serving their purposes. In California today, a sizable minority, and in many areas a majority, of the population are skeptical of or antagonistic towards nearly all buildings and plans for urban growth.

This is a revolutionary change in the context of professional life, which is forcing professionals to reevaluate their roles and their products. At least three trends can be discerned.

There is increasing emphasis on citizen participation in the planning and design process. In a few years we have moved from professional dominance of decision-making, through professional concepts of advocacy planning (where professionals represent deprived groups), to the point where people of all classes want the power of environmental decision-making for themselves. Citizens are likely to dispense with the old listener roles and claim full participation in

environmental decisions (Arnstein, 1968). Professionals may have to become more adept at being facilitators, brokers, and servant technicians, while their traditional roles of leader, artist, and educator are revised.

The comprehensive environmental evaluation of projects prior to acceptance is being thrust upon professionals by the rulings of the National and State Environmental Policy Acts, which require environmental impact assessments of nearly all significant new construction projects. Most of these assessments are at present no more than guesses at future socio-environmental impacts, since relatively little empirical research has been carried out in the field.

A shift from the design of new environments to a broader interest in existing environments, their conservation, rehabilitation, and management is taking place. Environmental management, which emphasizes the monitoring of environments over time, is seen as a way of developing more responsive environments than those produced by one-time interventions.

What roles can the emerging field of man-environment relations play in this context? The social sciences, including environmental psychology should be able to make substantial contributions to the improvement of citizen participation, evaluation, and management. However, while basic and applied research will be necessary as developmental and supportive activities, the most urgent priority for environmental psychology will be its integration with environmental decision-making processes. Such an integration in the United States still seems quite a long way off for a number of reasons.

1. The man-environment field in the 1960's emerged almost entirely from an increasing "science" orientation among educationists. Most research in the U.S. has been sponsored through academically oriented institutions rather than government agencies. There have been relatively fewer coordinated research programs related to environmental problems than there have been in countries like Great Britain. Hence, professional relevance has not necessarily been a research priority, and the communication of research findings has not been carried out under such authoritative auspices -- for the professional -- as government agencies, which in many countries have the "teeth" to update professional methods.
2. Research is often too specialized in content for most decision-making problems. Professionals find it difficult to incorporate general research findings into typically specific and complex problems where information has always been inadequate.
3. Research methods seldom provide professionals with usable environmental variables. Many of the methods developed by psychologists, for instance, such as the semantic differential, adjective checklists, or behavior setting analysis, describe well response and behavior, but describe poorly the environment which is the professionals' primary variable.
4. Research is rarely future-oriented. Most research is carried out in the post- rather than the pre-construction

phase of projects. Although environmental projects can be partly based on their analogy with previous schemes, the use of analogy encourages conservative rather than innovative solutions.

5. Research is often obscurely written, poorly communicated, and scattered in a wide range of publications. The problem of elusiveness may diminish as "readers" and research reviews begin to emerge (e.g., Proshansky, et al., 1970; Craik, 1970), but the problems of comprehensibility may remain. Researchers do not seem to value communication to professional laymen very highly.

Some blame for the lack of integration must be placed on professionals, too. Indeed, social scientists may wish to carry out man-environment research for quite other reasons than its application to decision-making, and therefore may legitimately question the above criticisms. [In the last ten years, I have been consistently impressed with the inertia of professional thinking. Younger professionals thrive on innovative ideas and methods, but those who run professions still tend to rely on the methods and styles of thinking they learned when young.] Some useful research on the diffusion of innovation within the environmental professions is waiting to be done.

Meanwhile, here are some of the blocks to professional adoption of research findings.

1. Professionals seldom see why research is needed. Most professionals believe their perceptions of the world are objective and commonly held -- "the objective illusion." Many also believe that only "common sense" is needed to

understand the world. Hence, they are not curious to find out other viewpoints. An aura of complacency and ignorance still surrounds most environmental decisions.

2. Professionals sometimes see research as a threat. Participation by others of information on others' values threaten to diffuse the control professionals have over decision-making, and increase financial and time costs.
3. Professionals rarely read research even when it is available. To most environmental professionals research is boring. They are more action- and future-oriented, reluctant to look back on the past. Many are also more graphically than verbally oriented. Besides, the professional journals seldom report research. Editors of professional magazines have been slow to waken to this new field, and so separate research journals, like Environment and Behavior, have emerged, which professionals do not read.
4. Professionals find it difficult to understand empirical research. Conceptually, most professionals are used to making assertions without evidence. They live in a world of opinion, not fact. The care with which behavioral scientists try to separate evidence from assertion is often lost on them. At a more detailed level, the methods and language of social science are also incomprehensible, since few professionals have yet taken courses in statistics or research design.

Given these blocks to the use of research findings in the decision-making process, the integration of environmental psychology with decision-making will be difficult. A number of strategies for making such an integration however, seem to be possible. I shall start with those that are more informal, concrete, and intuitive, and end with those that call for more formal restructuring of decision processes.

Citizen Participation

The very act of bringing people into the environmental decision process will open professional minds to other viewpoints, however informal, unstructured, and abrasive that participation may be. The risk of failure, of non-communication, of increased conflict, or indifference are high, but necessary. This is not a paper on citizen participation techniques, but many are available, and many social science research methods could be utilized in this process. Case studies of citizen participation efforts and the political roles of professionals (Blecher, 1971; Altshuler, 1965; Rabinovitz, 1969) are a field of research that should be very helpful to professionals. The particular problems of citizen participation for environmental decision-makers may well be in understanding the environmental perceptions of laymen (Appleyard, 1969), in the communication of environmental issues, and the structuring by which to resolve them. The media for representing environmental problems and solutions are abstract and professionally oriented. New communications media which the public are interested in and can understand are needed (NYRPA, 1973; Appleyard, Craik, et al., 1973). Structuring the information and decision process has been the subject of research in design methods and gaming.

Such processes have to become more transparent and accessible to laymen.

Situational Research

The use of social science methods, during the exploratory, programming, design, and management phases of projects and plans, should become a regular component of professional decision-making, whether or not social scientists are at hand to help. Such research might include interviews, questionnaires, behavior observation, and environmental measurement. If each project or plan were viewed as an experiment in which explicit hypotheses were made, then the idea of testing their merit after its materialization might become more natural to professionals.

There are risks in having professionals engage in such research -- risks of biased sampling, observer contamination, misinterpretations of the data, and other non-scientific errors. Yet the risks are less than those of total ignorance. Social scientists may disagree, but Robert Sommer in his latest book (Sommer, 1972) invites professionals to take on this new role. Such research need not involve sophisticated statistical analysis, so long as its lack of generality is made clear, since it need only be situationally valid. Also, the accuracy of socio-environmental research data used in planning and design can frequently be gross rather than fine.

The validation of various research methods and development of situational research manuals dealing with research design, from sampling to report-writing, would be helpful. Some manuals of this kind have been developed for the incorporation of general survey research methods

into planning (e.g., Saroff, et al., 1969), but none so far deal with specifically environmental variables.

Media Change

The language that professionals use in their planning, design, and communications with clients and the public is a critical factor in how environmental decisions get made. For too long professionals have adopted abstracts, esoteric, and glamorous media techniques, which create illusions quite different from the resulting realities. The authenticity and realism of this language, its veridicality, are at issue. It is impossible to simulate exactly what a new environment will be like, but we should endeavor to approach future reality as closely as possible. The use of authentic media may just by their adoption help to ensure better predictions of projects.

Adaptability and Choice

The rapidity of value change and the prevalence of fashion and facts make any projections into the future a hazard. Some aspects of the future are just unknowable. The adaptability of any designed environment, the ability of users and owners to change it in response to their changing needs, therefore becomes critical. This is not so easy as it sounds. Adaptability has too often meant the creation of feasible construction systems which by their nature are unadaptable. Lynch proposed some qualities of adaptable cities some years ago -- low density, excess space, time zoning -- but many of these are expensive on resources. We need to learn more about human needs for adaptability in different buildings and situations.

A Socio-Environmental Model for Planning and Design

The above strategies involve changes in method and style, but have no transitional base. Decision-makers make decisions on the basis of inadequate, piecemeal, scattered information. Research, which by its nature is narrow and specialized, is only occasionally helpful. The call is on for more comprehensive theories of man-environment relations to remedy this situation. Any efforts to gain such a "gestalt" are worthy of encouragement, but should be treated with caution. There exist, for instance, at least thirteen theories of perception, many of them current (Allport, 1955). It is likely therefore that the first theories in man-environment research will be only partial explanations.

Conceptualization of man-environment relations can take place, however, at the relatively primitive level of "categorization" (Bruner et al., 1962). The identification of variables that may be critical in man-environment relations and the development of comprehensive lists of such variables can be useful professionally, and can be the first step to conceptual models of man-environment relations.

In the U.S. the National Environmental Policy Act's stipulation that major public projects be evaluated by an environmental impact report has let loose a flow of sample checklists which are being used to assess the environmental qualities of any project. Until recently, these checklists have concentrated on physical measures -- air pollution counts, number of wildlife species endangered, traffic generated, noise level changes, etc., without explicit connections to social values or affected populations.

A conceptual system of categories that I shall now describe grows out of some earlier work by Lynch and Rodwin (1957), Lynch and Appleyard (1967), and Appleyard and Okamoto (1968).

This system which began as a goal-form system which concentrated on professionally defined aims, has now become more people-oriented by redefining the goal system in terms of population needs and values.

This model can be seen as consisting of three major components, (1) people and their activities, (2) their needs and values, and (3) perceived and effective environments; or as a five-part system of (1) people, (2) their activities, (3) need/values, (4) perceptions, and (5) environments (Figure 1).

The system is an a priori system developed through intuitive brainstorming, extensive review of the research literature, and some direct empirical research. It has evolved over the years as "hidden" population groups were discovered, new needs and values arose, and new environmental variables emerged. More recently we have been trying to test it empirically (Appleyard, Carp, 1973).

This classification system suggests a conceptual model that involves two-way relationships between most of these components. People engage in activities, they have environmental needs, and hold environmental values. These needs and values demand certain qualities of the environment, especially those which figure importantly in their perceptions or fit their conceptions of what an environment should be. Within this people-environment chain, sub-relationships exist. Activities develop their own environmental needs and values, activities will guide perceptions of the environment, and environments can be modified or changed through human behavior. This might be called a cognitive motivational model of man-environment relationships, a model that professionals have tended to ignore.

The more familiar model for professionals starts at the environmental end of the chain. Environments can determine perceptions,

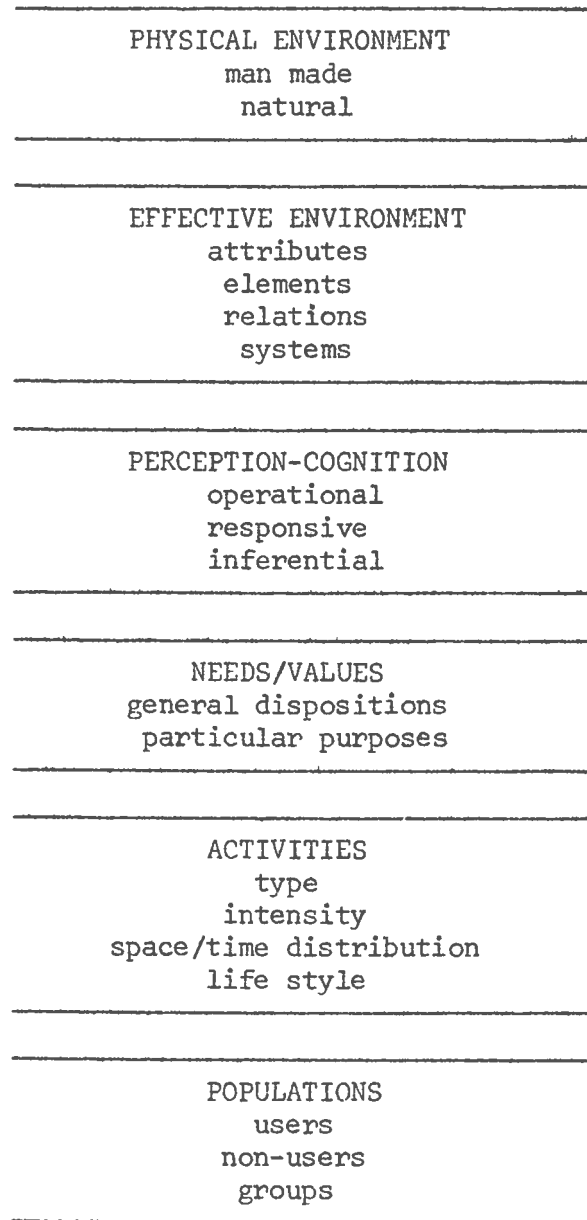


FIGURE 1. A simple model of man-environment relations ignoring time effects.

structure activities, create needs, and even select what kind of people will be there. The environmentally-dominant model has been held as a deeply rooted belief by professionals for the last half-century. It conforms to the stimulus-response model of the behaviorists, and has been under increasing attack, either on grounds of unsubstantiated claims or for its manipulative motivations. There is evidence, however, for both models, and it will be wise for professionals to accept each as relevant. Note that at this point, no time dimension is being described in this model. Each component and relationship is likely to change over time with adaptations and modifications (Appleyard, Carp, 1973).

Given the likelihood that each of these components affects the others, we can begin to draw up a list of relevant variables within each system.

Populations

Starting with the populations that may be involved in a project or plan is still an unusual activity for environmental professionals, yet it may be the only one that ensures that people will not be forgotten. For years, professionals talked of environments for "man" and planning for "people." Who are these people? Guidelines for the meaningful identification of population groups are an urgent priority. We should be identifying populations who have substantially different environmental attitudes, needs, perceptions, and behaviors. We should be particularly aware of invisible people deprived of decent environments; and we should be concentrating on those who have the most intense relations with environments, those particularly vulnerable or sensitive

to environmental experience, and those who have special powers over environmental change. Difference, deprivation, sensitivity, and power are qualities that research can help to identify.

The listing in Table 1 suggests some ways of understanding the populations involved in an environment. This list is formidable. It contains overlapping categories; people play different roles, and will appear in several groups. The main breakdown appears to be between users and non-users, between individuals and groups at different levels of societal organization. As we begin to look at organized groups, we enter the realm of politics, the effects of politics on environment, and the environmental dispositions of environmental decision-makers (Craik, 1970).

The most urgent matter for research may be to make visible many of these forgotten groups, to depict in a vivid, brief, and comprehensive way their life styles, perceptions, and viewpoints on the environment. Another priority is to identify the groups who are most critically affected by environmental decisions.

Needs, Values and Satisfaction

Needs and values are used here as terms to represent what other researchers might entitle motivations, desires, concerns, problems, aspirations, and which professionals might picture as goals, objectives, or criteria for desirable environments.

As with populations, many needs and values are still invisible, unknown, or only imperfectly understood. We have been trying to list those which have particular relevance for environmental change, especially those relating to survival, health, comfort, and efficiency,

TABLE 1.

POPULATION TYPES AND ROLES

	Familiarity, e.g., inhabitants/commuters, irregulars, strangers/tourists
	Class, e.g., upper, middle, working, lower
	Education, e.g., college, high school, elementary, none
	Sub-culture, e.g., Irish, Italian, Negro, Spanish-American, WASP
<u>Users</u>	Age, e.g., children (1-4), (4-10), teenagers, single adults, married adults, elderly
	Sex, females, males
	Travel mode, e.g., pedestrians, cyclists, bus, rail, auto, air travelers
	Mobility, e.g., locals, cosmopolites
	Information, e.g., television viewers, newspapers, map readers
	Ownership, e.g., homeowners, absentee owners, renters
	Service, e.g., fire, police, milkman, recreation supervisor
	Handicapped, e.g., blind, deaf, paraplegic
	Deprived groups, e.g., invisible groups
	Animals, e.g., wildlife, domestic pets

<u>Non-Users</u>	Potential users, e.g., disaffected, inaccessible groups
	Neighbors, e.g., local, remote, transient public

<u>Groups</u>	Individuals, families, firms
	Street, neighborhood, community organizations
	Special interest groups, e.g., conservationists, ethnic groups
	Change agents, e.g., public agencies, developers, owners, professionals
	Arbitrating groups, e.g., city councils public agencies

and to personal, social, and administrative development. Table 2 outlines a provisional list of values with "problem" or "good" environments that might deny or satisfy them. This system has evolved through introspection, empirical research, and from the field of motivational psychology. The distinction between basic (survival, health, comfort, and efficiency) needs and personal self-actualization needs is close to Maslow's view of the field (Maslow, 1968). Social values are more germane to the relations between social groups than direct man-environment relations. Questions of equity and cultural identity became dominant issues in the racial conflicts of the 1960's, and rank as important goals for most planning agencies. Resource conservation has been a rapidly growing value in the last few years. Administrative values presently dominate the urban environment, despite the declared intentions of administrators. Studies of resource agencies, highway departments, parks and recreation departments, developers, and managers could tell us much more about the relation between administrative and other values.

Many of these values have been described elsewhere; many conflict with each other; some overlap and are held in different esteem by different population groups under different conditions. Some values may still have been omitted.

The levels of desirable satisfaction are a seldom discussed issue in man-environment research, but for decision-makers involved in trade-offs, the question is always present. Man-environment research may be able to describe environmental conditions for maximizing individual satisfaction in a number of conditions, but the decision-maker has to make trade-offs. Individual desires may be in conflict

TABLE 2.

ENVIRONMENTAL NEEDS AND VALUES

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
1. Survival		
1.1 Safety/Security	Environments susceptible to earthquake, landslide, unfenced heights, depths, fires;	
Natural		
Criminal	Defenseless, crime-prone environments, lack of surveillance;	
Traffic	Auto, pedestrian, cycle conflicts.	
1.2 Health	Lack of light, sun, pure air and water, sanitation, presence of garbage, vermin, etc.	
2. Comfort/Lack of Stress	Over-protection, over-comfort	Reasonable stress
2.1 Spaciousness	Overcrowding, cramped spaces, "empty" spaces.	Spatial fit, tolerance.
2.2 Quiet	Excessive noise, sporadic noise, indoor/outdoor noise, vibration.	
2.3 Light	Glare, gloom, uniformity.	
2.4 Cleanliness	Dust	
2.5 Climate	Excessive wind, rain, cold, heat, fog, drought.	
2.6 Ease of Movement	Long fatiguing walks (with heavy loads), uphill.	

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
3. Efficiency		
3.1 Access to Services/Jobs/Schools/Shops/Recreation/Transportation/Churches	Long commutes, indirect routes, disruption of local access paths.	
3.2 Convenience	Difficult travel mode changes, long waiting times, indirect routes.	
3.3 Orientation/Information	Excessively confusing, disrupted, ambiguous, hidden buildings, environments, destinations, routes, intersections, etc.	Environments of sufficient legibility, imageability, clarity, system continuity, visual access to highly used and significant facilities and destinations, recognizable stereotypes e.g., "it looks like a school."
4. Personal Development		
4.1 Privacy	Visual, audial intrusion, strangers, distractions, one-to-one confrontations; indoor/outdoor, home, street, neighborhood intrusion.	Sufficient control of social inputs and outputs at individual, home, block, and neighborhood level; a degree of anonymity.
4.2 Identity	Lack of an identifiable personal "place," excessive identifiability of an undesired kind, e.g., "projects"; environments presenting an image of undesirable low status; cheap materials, standardization, poor maintenance, and other low status symbols.	Unique identifiable home, street, neighborhood; custom-design; objects, places that connect with personal history; environments encouraging social status, "prestige" materials, elements, objects, details, "luxury" items.

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
4.3 Territorial Control	Inadequate personal territory, invaded by others; ambiguous, disputed territories.	Sufficient personal space, sensed and defined territory.
4.4 Personal Expression	Anonymous environments.	Ability to demonstrate personal presence in outdoor environment through planting, painting, construction, etc.
4.5 Environmental Mastery and Scale	Rigid, hard, authoritarian, regulatory, preventive environments; oppressive, large agoraphobic, repetitive, endless environments, cute, trivial, pretty, Disney-like environments.	Responsive, permissive changeable environments; human scale environments, related in size, complexity to human dimensions and comprehension (7± 2 complexity levels?)
4.6 Security Structure	fragile, breakable, destructible environments. Lack of relationships between parts, incongruity, disruption, intrusion, clutter, visual noise, impropriety. Remoteness between places desiring proximity, isolation, suspension.	"Tough" environments, resistant to vandalism. Relationships, fit, congruence, neatness, simplicity, similarity, proximity. Closeness, immediacy, interpenetration.
Continuity	Strange, mysterious, unpredictable environments, temporal disruption of personal behavior patterns (eviction, relocation), environmental disruption, destruction of valued places.	Familiar, "homey," "natural," stable, well-worn environments, conforming with expectations, stereotypes; old, historical environments.

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
	Submersion of valued locales under new development, ecological damage or disruption, transition areas.	
	Unplanned development, undecided ambiguous future change, lack of information about the future, "future shock."	Planned, predictable and informed future.
4.7 Education		
Explorability	Closed, faceless, impenetrable, hostile, bland environments; Inadequate choices, trivial choices, too many choices.	Inviting, explor-able, "open" environ-ments; Significant manage-able choices of life styles, friends, services, activities, environments.
Diversity	Monotonous, drab, boring, overly simple, standardized, "look-alike" environments, overload, excessive stimulus, trivial variation, chaos.	Contrast, variation, surprise, differ-entiation, complex-ity, novelty, new-ness, uniqueness, natural environments in the city.
Instruction		Instructive environ-ments, visible social, functional, ecologi-cal systems, visible past and future, Montessori environ-ments.
5. Social Development		
5.1 Equity	Environments dominated by one group to the exclusion and depriva-tion of others (e.g. poor, children, aged, handicapped, housewives, etc.).	Equal environmental opportunity, minimum levels of environ-mental quality for each population group, "balance" between individual,

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
5.2 Social Interaction	Environments which encourage excessive neighboring, alienation, conflict, isolation, loneliness, fear; defenseless environments, undesirably heterogeneous or homogeneous;	public, and corporate environments.
	Segregated environments	Environments encouraging sufficient and desirable interaction, neighboring participation in community organizations, sense of community, lowering of prejudice and misperception, help in times of trouble; sufficient heterogeneous/homogeneous interaction;
5.3 Publicness	Public squalor (private affluence), public environment dominated by private commercial interests, or public environment dominating individual identity.	Socially integrated environments.
5.4 Cultural Expression, Preservation, Development	Environments which suppress sub-cultural identity; environments where sub-cultural symbols are suppressed, hidden, dominated by "trivial" low priority messages.	A quality public environment, adequate publicly accessible territory, not subject to private dominance or invasion.
5.5 Resource Conservation	Environments which consume or destroy non-renewable or scarce resources such as energy, pure air or water, wildlife species, natural scenery.	Environments which encourage the identity, expression, and continuity of sub-cultures; environments where significant functions, symbolic places are visible and evident.
		Environments which conserve or increase natural resources.

<u>Needs/Values</u>	<u>Problem Environments</u>	<u>Good Environments</u>
6. Administration		
6.1 Economy	Environments which are expensive, particularly for client populations.	Environments with low initial and maintenance costs to public agencies, individuals, corporations.
6.2 Management Efficiency	Environments which require continuous attention to supervision, repair, etc. difficult to service.	Environments which allow reasonably efficient management, supervision, maintenance, emergency service for fire protection, police, ambulance, normal delivery services, sanitation, garbage, trash collection.
Adaptability		Environments which are adaptable to changing techniques, use patterns, etc.
6.3 Agency and Professional Image	Environments which detract from an agency's image, e.g., authoritarian, remote, bureaucratic?	Environments which enhance the development agency and professional image, e.g., responsive to its client populations?

with each -- one may want privacy but also high access to others, a view but the environment may be noisy. More difficult conflicts will occur between individuals and social groups. Individuals want personal comfort, but society has limited resources -- low density housing is costly in services, heating and air-conditioning take up energy. At a political scale, regional transportation routes must travel through local environments creating severe conflicts between travelers and neighbors. In all these cases we may need to know as much about minimum acceptable levels of satisfaction, what Herbert Swain calls satisfying solutions, as much as those which maximize satisfaction. The romantic finds these unpleasant choices, the realist relishes in their resolution. I think one of the more attractive (and romantic) qualities of man-environment research is that much of it is searching for ideal environmental relationships. Too frequently these have been ignored in the past by the economic and political realists in the decision-making field.

Activities

The activities and behavior in which people engage have traditionally been the source of programs for environmental projects. Architectural environments are usually designed for specific dominant activities. Libraries are for reading; classrooms, for learning; movie houses, for watching. In fact many other ancillary, non-conforming activities take place at the same time. Listings of activities for outdoor recreation also conform to the standard recreational sports, leaving hidden many of the less structured activities that take place in outdoor space. Planners develop land use systems

based on the broadest of categories: commercial, residential, industrial, etc. These classification systems have powerfully influenced professional plans and designs, yet they have often led to overly simple, sterile, and dull environments of homogeneous zones (Jacobs, 1961), buildings, and spaces.

The relations between activities have been hypothesized frequently in compatibility and linkage matrices; desirable densities have been proposed, but the typical chains of activities that people engage in, the way people budget their temporal and spatial patterns of behavior are still relatively unknown.

Recent research design has moved towards "uncoupling" previous categories of activities (Lindheim, 1967) in efforts to design environments closer to activity needs. Research into behavior settings, and observations of outdoor behavior in urban settings are getting down to fine grain differentiations, even of relatively ephemeral activities (Appleyard, Carp, 1973). If professionals could be more explicit about their predictions of behavior, then these hypotheses could be tested in post-construction feedback.

Perception and Comprehension

To identify the relevant characteristics of the perceived environment, some elementary knowledge of how people comprehend their environments is necessary. Some research has been carried out in this field, looking at the ways in which people image cities, view roads, perceive urban walks or individual buildings. It is increasingly clear that the environment is perceived differently by different population groups, which makes the a priori listing of relevant

characteristics a somewhat risky task. Variations in motivation, familiarity, cognitive skills, travel mode, and information sources may all affect urban perception (Appleyard, in preparation).

When we move through an environment, we are likely to perceive it at operational, responsive, and inferential levels. Operationally, we select those characteristics which support or hinder our actions, whether they be floor surfaces, steps, entrances, or doorknobs (for pedestrians), or traffic signs, traffic islands, other cars, intersections, or orientational landmarks (for auto-travelers). Simultaneously, we might respond to the sensory configuration of the environment -- to vivid imageable events and features that force themselves on our attention, whether they be spectacular vistas or advertising signs. Finally, we inferentially match the environment with our pre-conceived mental model of expectations, reading into the environment -- sometimes incorrectly -- social, functional, economic, or other information. A building is identified as a school, or as an historical building; an area is labeled a ghetto or a slum. This symbol-reading view of the world may be the dominant mode of urban perception.

From these different "sets" predictions about perceptions might be made. Operational, imageable, and significant characteristics of environments can be identified as relevant.

Environments

Environmental variables have always been the focus of attention and manipulation for environmental designers. However, they have usually been of a very selective nature. Designers have emphasized plans and models, the shapes of spaces, sections, and elevations;

planners have unsuccessfully attempted to imply environments through a land use-circulation language. The urban development process has emphasized the construction viewpoint -- individual buildings, complexes, and circulation systems -- while ignoring the perceived environment.

A classification system for the environment should concentrate on the effective and perceived environments of those populations affected by them. A person may not consciously perceive the effective environment, but it may still influence his perceptions, attitudes, and behavior. Hence, a distinction is made in the model between the man-made or natural physical environment as such, and those attributes that enter a relationship with the people who use it.

The characteristics of environments relevant to users include the sense of motion, spatial enclosure, mass, views and visibility, ground surfaces, wall surfaces, evident activity and movement, equipment, natural elements such as plants, water, rocks, sound, smell, light, signs, and symbols (Lynch, 1968). The intensity and distribution of these or other relevant qualities should be described in any plan or design. Unfortunately, limitations of current design media usually disallow such descriptions.

The identification of critical elements in the environment is complicated by the frequent mismatch between activity patterns and physical elements. Both Barker's "behavior settings," and Lynch's perceived urban elements combine rather than separate behavior and environment. In recent empirical studies we have concentrated on physical units such as houses, street blocks, access paths, and local facilities as the units of analysis with intention of testing

empirically whether they are also behavior settings (Appleyard, Carp, 1973). Other studies have used arbitrary grid cells as units (Steinitz, 1968; Abell, Appleyard, 1973).

The relations between components of the model can be diagrammed as a cluster of matrices (Figure 2), which could be used to generate programs, suggest alternatives, or evaluate projects or plans. Tedious though the completion of such matrices may be, they would help ensure that items and relationships were not neglected when decisions are made. For heuristic purposes, critical variables could be identified and traced through the system.

These checklists are assumptions of which variables might be important in planning or designing an environment. It should be useful for professionals to think through the possible populations, needs, activities, and environmental characteristics that are most relevant to a particular context. The checklists are intended to raise more questions than answers, questions such as which population groups require privacy (see Marshall, 1970), during which activities do they require what kinds of privacy, and which environmental characteristics contribute to privacy? The checklists may also serve as guides for identifying research priorities.

Predictive Hypotheses

Beyond environmental simulations, one seldom sees in environmental projects any explicit prediction of where the professionals think people will be or what they might be doing, where the children will actually play, the speeds that cars will actually travel. Only at the gross level of land use allocations and transportation flows have such predictions been developed. If professionals do not use mathematical

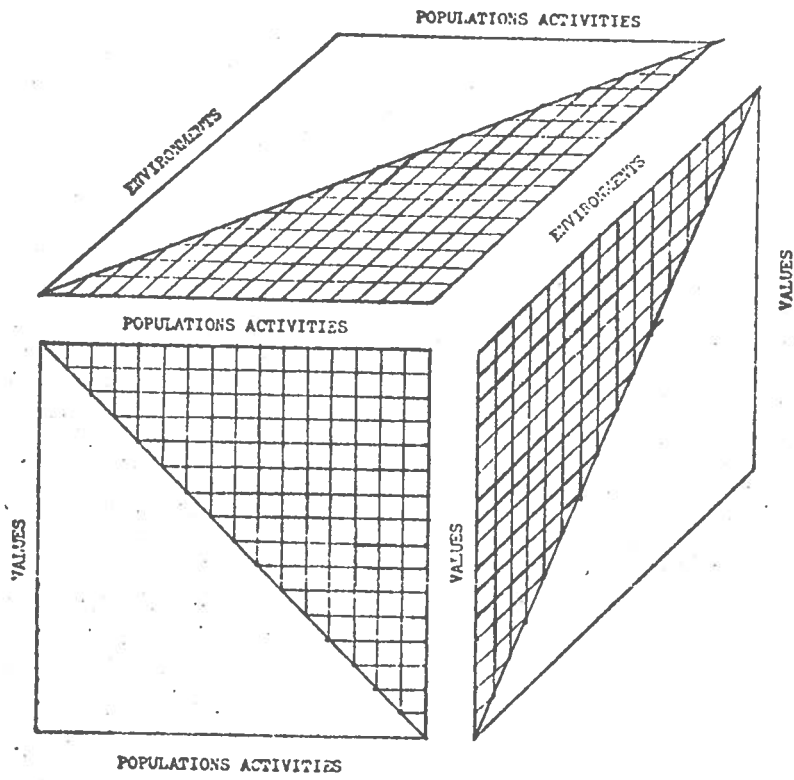


FIGURE 2. Man-environment linkage matrix.

simulation they seldom try to predict any behavior. It is too risky. But a commitment to make more explicit the predicted consequences of plans and projects would allow them both to be debated more knowledgeably prior to execution and to be tested more explicitly afterwards.

The explicit spatial plotting of environmental qualities, even on a hypothetical basis, can be a specific way of articulating predictions. Such plotting can be carried out either through the zoning of characteristics or through the evaluation of spatial elements.

Figure 4 diagrams both ways in which an environmental quality can be plotted over several blocks of a hypothetical city, although the systems have been used at scales down to the interior of individual buildings. The zoning of characteristics can be assessed through the use of an overlay grid in which individual cells each receive a score. Individual elements can be selected on the basis of their physical, behavioral or perceptual homogeneity.

Take, for instance, the plotting of privacy. The recording of high, medium and low scores for privacy is an overly simple measure of what should be an aggregate index of, for instance, number and type of intruders, time available for intrusion, visibility and distance of intruders from intruded. The spatial plot could just as well measure quality of view -- in different directions, by distance, amount of vegetation visible, complexity and so on -- or levels of orientation, imageability or perceived safety. These spatial hypotheses can later be checked by observing behavior, obtaining perceptual maps or through other modes of interviewing.

In any project the components will all change over time. Satisfaction depends to some extent on levels of expectations, and degrees

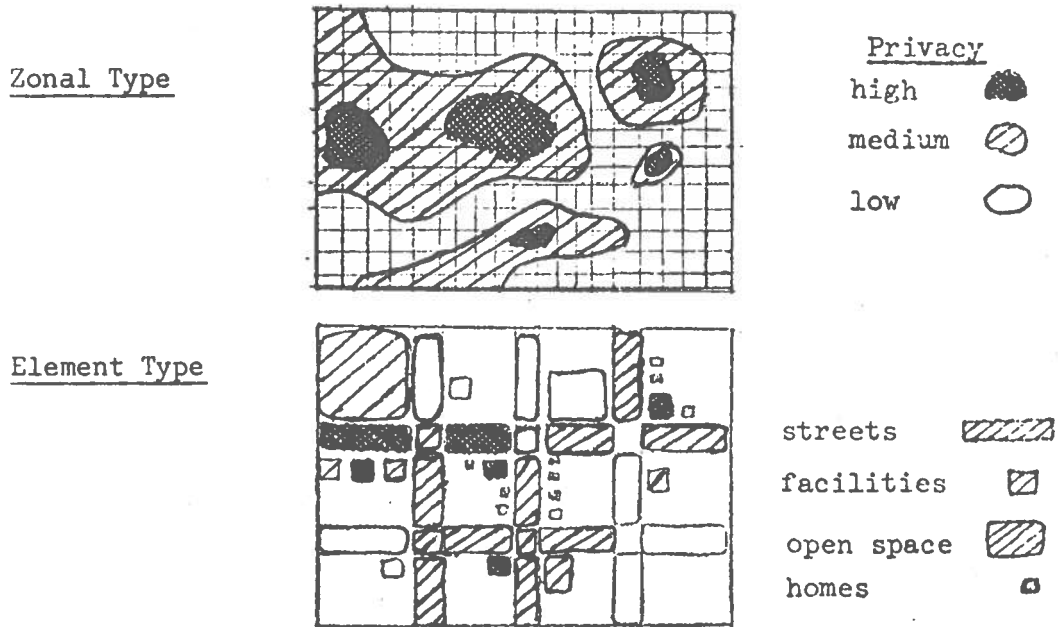


FIGURE 4. Spatial Evaluation

of adaptation and modification. Projects have "honeymoon," "shakedown," and stabilization periods. Checklists of relations may therefore have to be made for different timeframes and be regularly updated. Figure 3 illustrates the principal time phases of a transit system's impact on surrounding residential neighborhoods.

Manuals and Cookbooks

One step more specific than checklists of this kind is the manual, which states the relationships between the variables as a kind of rule system. Many manuals have been constructed in the past for the assistance of architects and planners (APHA, 1959; Urban Land Institute, 1968; Butler, 1959). Such manuals have been implicitly questioned in recent years by new research, although no comprehensive explicit critiques have been made. The lack of empirical evidence to support these rule systems has been their major weakness, as has their tendency to deal only with narrow "functional" considerations of space occupancy and capacity. Newer efforts at providing guidelines are no more comprehensive, but introduce new factors.

In the United States, Alexander's pattern language, although usually limited to single rather than alternative sub-solutions of identified problems, lies in the manual tradition and begins to introduce more behavioral and psychological considerations into design. That system suffers from the same lack of empirical base as the former manuals, but tries to cope with this by quoting as much research as can be found. Recent work by Cooper (1973) and Newman (1972) proposes empirically based guidelines for the design or redesign of housing projects. This kind of research, which attempts to make a direct link between research and guidelines, promises to be most useful for professionals.

However, dependence on such guidelines has its dangers. It is too easy for professionals to rely on manuals to avoid close and careful scrutiny of the particular environmental situation they face or to avoid contact with the particular people involved in a project. Situational research may still be the necessary central activity for any particular project or plan.

Both the informal and particular processes of citizen participation, situational research, media change, and simulation, and the more formal checklists, models and manuals may best continue to exist side by side in decision-making processes, since the changing context of decision-making will hopefully never allow the automatic application of universal solutions to environmental problems. While we increase our understanding of how environmental change works, each new project will crystallize particular and new sets of issues and responses.

Basic and Applied Research

From a professional perspective research can be seen as a long-term supportive, validation and innovative activity for environmental decision-making. Many of the categories, concepts and methods suggested as useful for integration in the decision processes require the validation and development that only well-financed research has the time to carry through.

A number of research priorities come to mind, not in any definite order:

1. Research can provide us with more detailed comprehensive and understandable case studies. Too much social science research is abstract, "placeless," and difficult for professionals to understand. Most research is too narrow, the

setting is seldom articulated, the role of the particular analysis is not related to the broader context. Case studies which reveal to professionals within a familiar professional paradigm, what actually happens, will have relevance and high chances of communication, even if they question the traditional paradigm. (Kuhn, 1972)

2. Research helps to identify critical population groups. Criteria for criticality may include relative deprivation, typicality, sensitivity. It can characterize these in terms of personality traits, need profiles, dispositions, cognitive styles, behavioral life styles, resources, etc.
3. Research can consider particular needs and values. Besides privacy, neighboring, social interaction, which have been a major focus of attention, research is needed on the nature of security, stress, curiosity, mastery, esthetics, meaning, adaptation.
4. Research can develop and validate research methods and instruments that can better fit the environmental variables that professionals and decision-makers have to deal with. Current psychological techniques such as the semantic differential, Q-sort tests, adjective checklists, are more useful for psychologists than for professionals, since they do not deal specifically with the variables professionals have to handle. Multivariate analysis techniques which relate the objective measurement and validation of environmental variables with human response look promising.

5. Research can clarify the perceptual and cognitive processes whereby environments are learned, recognized and used. Research of this kind has been more common at the larger scale of the urban and natural environment, where planners, geographers, and psychologists have pioneered research, than in smaller scale environments, where behavior has been easier to observe.
6. Research can experiment with and validate the media and language used in environmental decision-making for its veridicality, comprehensibility, interest and relevance.
7. Research can attempt to build theoretical models of man-environment relations on the basis of empirical data, which can be used as predictive tools in decision-making.
8. Research can be much better communicated than it presently is. Since professionals do not read very much, research should be graphically and vividly communicated. Films, videotapes, photographs, diagrams, and maps can be used to illustrate behavior, perceptions, or environmental variables.

Conclusion

The coming years promise to be as traumatic for professionals as have those in the recent past. Exposure to public scrutiny, participation and evaluation may be seen as a constraint on imagination and creativity. A new kind of professional, more thoughtful, less cavalier than the heroes of the past is likely to emerge. Yet, I hope this does not become an age of timidity, in which professionals fail to use their imagination and sensitivity for fear of rational criticism.

The field of environmental psychology has a creative role to play. The design and interpretation of research can be biased toward a constraint dominant style or towards an innovative style. Research can be directed to the proposition of ideas for environmental awareness and improvement and to the ingenious solution of difficult conflicts, as much as to critical evaluation.

Bibliography

- Allport, F. H., Theories of Perception and the Concept of Structure.
New York: Wiley, 1955.
- Altshuler, A. A., The City Planning Process. Ithaca, New York:
Cornell University Press, 1965.
- American Public Health Association, Planning the Neighborhood.
Chicago Public Administration Service, 1948.
- Appleyard, D., The Plural Environment, unpublished manuscript, (in
preparation).
- Appleyard, D., F. Carp, "The BART Residential Impact Study: A
Longitudinal Study of Environmental Impact," Institute of
Urban and Regional Development, Working Paper No. 205,
U.C., Berkeley, 1973.
- Appleyard, D., K. H. Craik, M. Klapp, A. Kreimer, "The Berkeley
Environmental Simulator," Institute of Urban and Regional
Development, Working Paper No. 206, U.C., Berkeley, 1973.
- Appleyard, D. and R. Okamoto, "Environmental Criteria for Ideal
Transportation Systems," in Guidelines for New Systems of
Transportation, by Barton-Aschman Associates for the U.S.
Dept. of Housing and Urban Development, Chicago, 1968.
- Arnstein, S., "The Ladder of Community Participation," Journal of
the American Institute of Planners, July, 1969.
- Blecher, E. M., Advocacy Planning for Urban Development. New York:
Praeger, 1971.
- Bruner, J. S., J. J. Goodman, G. A. Austin, A Study of Thinking.
New York: Science Editions, Inc., 1962.
- Butler, G., Introduction to Community Recreation. National
Recreation Association, N. Y., 1959.
- Cooper, C., "Some Social Implications of House and Site Plan Design at
Easter Hill Village: A Case Study," Center for Planning and
Development Research, U.C., Berkeley, 1965.
- Craik, K. H., "The Environmental Dispositions of Environmental
Decision-Makers," in Society and its Physical Environment,
S. Klausner (ed.), Annals of the American Academy of Political
Social Science, 389.87-94, 1970.

- Craik, K. H., "Environmental Psychology," in New Directions in Psychology, IV, New York: Holt, Rinehart and Winston, 1970.
- Craik, K. H., "Environmental Psychology," Annual Review of Psychology, Vol. 24, 1973.
- Jacobs, Jane, The Death and Life of Great American Cities. New York: Vintage Books, 1961.
- Kuhn, T. S., The Structure of Scientific Revolutions. Chicago: University of Chicago Press, 1972.
- Lindheim, R., "Uncoupling and Regrouping Activities for the Hospital System," Center for Planning and Development Research, Working Paper No. 64, U.C., Berkeley, 1967.
- Lynch, K., and L. Rodwin, "A Theory of Urban Form," Journal of the American Institute of Planners, November 1958, Vol. 24, No. 4.
- Lynch, K., and D. Appleyard, "Esthetic Criteria for Highway Design," in E. N. Thomas and J. L. Schofer, Strategies for the Evaluation of Alternative Transportation Plans. Evanston, Illinois: Northwestern Transportation Center Research Report No. 96, 1967.
- Lynch, K., "City Design and City Appearance," in Wm. Goodman (ed.) The Principles and Practice of Urban Planning, International City Managers' Association, 1968.
- Marshall, N., "Environmental Components of Orientations towards Privacy," in EDRA 2, Proceedings of the 2nd Annual Environmental Design Research Conference. Pittsburgh, 1970.
- Maslow, A., Towards a Psychology of Being. Van Nostrand, 1968.
- Michelson, W., Man and His Urban Environment, A Sociological Approach. Reading, Mass.: Addison-Wesley Publishing Co., 1968.
- Newman, O., Defensible Space. New York: MacMillan, 1972.
- Proshansky, H. M., W. H. Ittelson, L. G. Rivlin (eds.), Environmental Psychology. New York: Holt, Rinehart and Winston, 1970.
- Rabinovitz, F. F., City Politics and Planning. New York: Atherton Press, 1969.
- Saroff, J. R., A. L. Levitan, Survey Manual for Comprehensive Urban Planning. University of Alaska, Institute of Social, Economic and Government Research, 1969.
- Sommer, R., Design Awareness. San Francisco: Rinehart Press, 1972.
- Turner, J. F. C. and R. Fichter, Freedom to Build. New York: MacMillan, 1973.
- Urban Land Institute, The Community Builders' Handbook. 1968.