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The Paradox of Environmental Psychology

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Scientific and applied contributions of environmental psychology are examined in relation to 6 trends that have occurred in this field over the past 3 decades: (a) development of novel constructs and methods for analyzing the links between environment and behavior; (b) increased emphases on cross-paradigm research, (c) transactional models of environment and behavior, and (d) group-environment relationships; (e) expanded application of environment-behavior research to community problem solving; and (f) broadened international scope of the field. A paradoxical feature of environmental psychology is that its identity as a distinct area of study has become more diffuse and transparent, even as psychologists have become increasingly interested in "core" contextual and environmental concerns. This diffusion of scientific identity is discussed in relation to environmental psychology's multidisciplinary and international scope and the incorporation of environmental-contextual perspectives into other areas of psychology and related disciplines. Directions for research and theory development are considered in light of several societal concerns, including global environmental change, the spread of violence at regional and international levels, impacts of new information technologies on work and family life, rising costs of health care delivery, and processes of societal aging.

This article examines the scientific and applied contributions of environmental psychology over the past 30 years and considers future directions of the field as psychologists look toward the 21st century. Psychologists have studied the effects of environment on behavior at least since the days of Watson (1913). Yet, prior to the emergence of environmental psychology during the mid-1960s, most environmentally oriented psychologists directed their attention away from the molar physical environment and toward either Lewin's (1936) "life space"—the psychological situation as perceived by the individual—or the microenvironmental "stimuli" of perceptual and operant psychology (Gibson, 1960; Skinner, 1953). Only with the advent of Barker's (1968) research on behavior settings, Hall's (1966) and Sommer's (1969) studies of territoriality and personal space, and Ittelson, Proshansky, Rivlin, and Winkel's (1974) articulation of foundational principles of environmental psychology did psychologists begin to attend systematically to the study of people's interactions with their sociophysical surroundings.

The coalescence of theoretical and empirical research programs around the banner of environmental

psychology during the 1960s and 1970s prompted considerable enthusiasm and collaboration among personality, social, developmental, cognitive, and experimental psychologists and their colleagues in architecture, urban planning, geography, and urban sociology. Hundreds of experimental studies on topics such as crowding, personal space, territoriality, environmental cognition, and environmental stress were conducted during the 1970s (Baum & Epstein, 1978; Cohen, 1980; Evans, 1980; Stokols, 1978). New textbooks (Bell, Fisher, & Loomis, 1978; Ittelson et al., 1974; Proshansky, Ittelson, & Rivlin, 1970), monograph series (Altman & Wohlwill, 1976; Baum, Singer, & Valins, 1978), and journals (e.g., *Environment and Behavior*, *Population & Environment*, and *Journal of Environmental Psychology*) were published; new professional organizations were established (including the Environmental Design Research Association, the Division of Population and Environmental Psychology within the American Psychological Association, and the Environmental Psychology section of the International Association of Applied Psychology); and the first doctoral training program in environmental psychology was organized at the City University of New York.

Looking back on these developments today, one is struck by an apparent paradox: The field of environmental psychology in recent years has not grown as rapidly as might have been expected from the fast pace of research developments during the 1970s, whereas other areas such as health psychology, community psychology, and cognitive neuroscience have undergone substantial growth (Boneau, 1992; Linney, 1990; Maier, Watkins, & Fleshner, 1994; McNally, 1992; Rappaport, 1987; S. E. Taylor, 1995). For example, whereas the institutional and professional manifestations of the field (e.g., its journals, monograph series, and professional organizations) have prevailed, few new graduate training programs and specializations in environmental psychology have been established in North America since the 1970s, although some emerged during the 1980s in other regions. Pro-

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shansky (1990), one of the founders of environmental psychology, offered the following assessment of the field:

As I look at the field of environmental psychology today, I am concerned about its future. It has not, since its emergence in the early 1960s, grown to the point where it can match the fields of social, personality, learning, or cognitive psychology. To be sure, it has increased in membership, in the number of journals devoted to it, and even in the amount of professional organizational support it enjoys, but not enough so that one could look at any major university and find it to be a field of specialization in a department of psychology, or, more importantly, in an interdisciplinary center or institute. If it were not for environmental psychology's growth in Europe and, to a lesser extent on other continents, its practitioners would be few indeed. Here in the United States only the fact that architects, geographers, designers, and social planners as well as psychologists now identify themselves as environmental psychologists ensures that their numbers stay respectable. (p. 28)

Similarly, Ittelson (1995) observed that the identity of environmental psychology as a distinct field of inquiry has become more diffuse over the past several years and that the broad overarching theory of environment and behavior, which had been hoped for during the 1970s, has not been achieved.

How can the paradox of environmental psychology's rapid growth and institutionalization, accompanied by an apparent diffusion of identity, be explained? The present appraisal of environmental psychology's development and future directions suggests at least three answers to this question. First, any effort to trace the intellectual contours of environmental psychology as a coherent field is immediately confronted by its multidisciplinary complexity. Although environmental psychology can be viewed as a branch of psychological research (Russell & Ward, 1982), it is more accurately characterized as part of a multidisciplinary field of environment and behavior that integrates the conceptual and methodological perspectives of architecture, urban planning, psychology,

anthropology, sociology, geography, and other disciplines (Altman & Christensen, 1990; Saegert & Winkel, 1990; Zube & Moore, 1991). This multidisciplinary quality has contributed to the innovative and eclectic nature of environmental psychology but also has resulted in a more diffuse and less easily circumscribed identity for the field as a whole. Environmental psychology as it now exists cannot be neatly categorized as a singular "paradigm" (Kuhn, 1962), "research program" (Lakatos, 1978), or "research tradition" (Gholson & Barker, 1985; Laudan, 1977) but rather as a disparate set of research areas and perspectives, spanning multiple disciplines, that are linked by a common focus on people's relationships with their sociophysical surroundings. Thus, the terms *environmental psychology* and *environment-behavior studies* are used synonymously in this article in recognition of the multidisciplinary orientation of the field today.

Second, the international scope of environmental psychology has increased dramatically over the past three decades. The theoretical, methodological, and policy concerns of environmental psychologists in different countries have been shaped by a variety of indigenous cultural, political, and geographic conditions (Hagino, Mochizuki, & Yamamoto, 1987; Kuller, 1987; Moore, 1987; Pol, 1993; Sanchez, Wiesenfeld, & Cronick, 1987; Singh & Singh, 1991). Although much of the scholarly work in environmental psychology that was initiated abroad has been less visible to North American psychologists than work characteristic of the early development of the field, these international developments have been essential for the continuing vitality and diversity of research on environment and behavior. The fact that a "grand" or overarching, integrative theory of environment and behavior has not emerged is not surprising, then, considering the broad range of research topics addressed by environmental psychologists and the inherently multidisciplinary and international scope of the field.

A third explanation for the gradual diffusion of environmental psychology's identity asserts that its conceptual and methodological principles are so fundamental to all areas of psychology, and so overlapping with the concerns of cognitive, developmental, social, personality, health, and community psychologists, that the initially strong identity of environmental psychology during the 1970s has been largely absorbed over the past 10–15 years by these other research domains. Just as Fowler (1990) characterized psychology as a "core discipline" that contributes concepts and findings essential to the functioning of other disciplines, Wapner (1995) noted that the contextualist concerns of environmental psychology provide the basis for integrating diverse subfields of psychology and bridging the gap between professionally oriented and academic psychologists. He also contended that the core conceptual and methodological concerns of environmental psychology can serve as a "centripetal" force to counter "centrifugal" trends toward specialization and fragmentation in psychological research and graduate training (cf. Altman, 1987; Bower, 1993; Staats, 1991).

Considering psychologists' growing interest in contextual influences on behavior (Altman & Rogoff, 1987; Bronfenbrenner, 1989; Rosnow & Georgoudi, 1986; Stokols, 1982; Wapner, 1987) and their concerns about the behavioral dimensions of global and regional environmental problems (Baum & Fleming, 1993; Cvetkovich & Earle, 1992; Gifford, 1993; Stern, 1992; Vaughan, 1993; Wandersman & Hallman, 1993), it seems reasonable to anticipate that virtually all areas of psychology will become increasingly "environmental" in future years. Yet, the preceding interpretations of environmental psychology's current status as a scientific field raise several questions about its evolution and future directions that warrant more thorough examination. First, to what extent has environmental psychology contributed novel concepts and research methods to behavioral research? Alternatively, did environmental psychology develop primarily through the application of preexisting concepts and methods from more "traditional" psychological research on cognition, learning, life span development, personality, and social behavior? If new concepts and research methods emanated from this field, in what respects were they innovative and to what degree have they advanced researchers' understanding of human behavior? Also, to what extent does environmental psychology today comprise an international field of inquiry rather than one for which the theories and methodologies are bound by particular cultural and geographic contexts?

Finally, in what ways has environmental psychology contributed to the analysis and resolution of contemporary societal problems? Many researchers were drawn to environmental psychology during the 1960s and 1970s because of their concerns about problems such as poverty; racial discrimination and violence; urban crowding and air pollution; the depletion of natural resources; and the design of homes, offices, and classrooms that were non-responsive to occupants' needs. They believed that their research eventually would help to ameliorate these problems. After 30 years of research on environment and behavior, it seems fitting to ask whether these activist goals have been realized. If so, what specific contributions has environmental psychology made toward improving the quality of environmental conditions and the effectiveness of public policies?

I address these questions in this article by first examining theoretical, methodological, and policy-relevant developments in environmental psychology over the past 30 years. Next, emerging directions for future theory development and research are considered. These directions highlight several scientific and public policy questions that remain to be addressed by environmental psychologists over the next several years.

Developments in Environmental Psychology Between 1965–1995

The scientific and applied contributions of environmental psychology can be viewed in relation to certain developmental trends that have occurred in this field over the

past three decades. A review of the research literature since the mid-1960s suggests at least six major trends: (a) development of novel constructs and methods for analyzing the links between environment and behavior, (b) increased emphases on cross-paradigm research, (c) transactional models of environment and behavior and (d) group–environment as well as individual–environment relationships, (e) expanded application of environment and behavior research to the development of public policies and community problem-solving efforts, and (f) broadened international scope of environmental psychology.

These trends are viewed not as fundamental shifts in orientation, whereby one research paradigm or tradition displaces another (Friman, Allen, Kerwin, & Larzelere, 1993; Kuhn, 1962), but rather as part of a cumulative process in which earlier theoretical and methodological perspectives are supplemented by and, in some cases, integrated with new and more differentiated ones. Thus, the identification of trends toward cross-paradigm research, transactional theorizing, and analyses of group–environment relations in the following discussion is not meant to imply that single-paradigm studies, nontransactional models, and analyses of individuals' interactions with their environments are no longer viable or important. Rather, these developments reflect the increased diversity and complexity of research perspectives in environmental psychology as they have evolved over the past several years.

Formulation of Novel Constructs and Methods for Analyzing the Links Between Environment and Behavior

The ecological and urban problems of the 1960s prompted increased scientific interest in the behavioral impact of the large-scale physical environment. As psychologists and their colleagues in other disciplines turned their attention to the study of environment–behavior relationships, they confronted several theoretical and methodological questions that had been neglected in earlier research. Most important, traditional psychological theories had omitted the molar physical environment and focused more narrowly on the links between microlevel stimuli and intrapersonal processes such as perception, cognition, learning, and development.¹ Strategies for describing and measuring the ecological context of behavior still remained to be developed.

The 1970s were a time in which researchers from several different fields came together to forge new theoretical and methodological approaches to the study of environment and behavior. At a theoretical level, impor-

¹ The behavioral significance of the large-scale physical environment was recognized several decades ago by psychologists such as Koffka (1935), Murray (1938), Brunswik (1943), Tolman (1948), and Chein (1954). But the "cognitive revolution" of the 1950s (Dember, 1974; Sperry, 1993) pushed these ecological issues to the sidelines of psychological research until the emergence of environmental psychology during the mid-1960s (Barker & Gump, 1964; Kates & Wohlwill, 1966). See Margulis (1995) for a recent discussion of the status of the objective physical environment in environmental psychological theory.

tant distinctions were drawn between environmental and object perception (Ittelson, 1973) and between fundamental and macrospatial cognition (Hart & Moore, 1973; Moore & Golledge, 1976). These distinctions extended earlier studies that had examined perceptual and cognitive processes associated with discrete stimuli and objects, but not in relation to larger-scale physical settings. For example, Ittelson wrote,

The distinction between object and environment is crucial. Objects require subjects—a truism whether one is concerned with the philosophical unity of the subject-object duo, or is thinking more naively of the object as a “thing” which becomes a matter for psychological study only when it is observed by a subject. In contrast, one cannot be a subject of an environment, one can only be a participant. The very distinction between self and object breaks down: The environment surrounds, enfolds, engulfs, and no thing and no one can be isolated and identified as standing outside of, and apart from, it. (1973, pp. 12–13)

Additional efforts to address the complexity of people's interactions with their sociophysical surroundings included (a) the conceptualization of environmental dispositions (Craik, 1976)—people's response tendencies toward urban, natural, and other kinds of physical settings—that took their place alongside the traditional trait constructs of personality psychology; (b) the concepts of defensible space (O. Newman, 1973) and social climate (Moos, 1976), which provided a theoretical basis for assessing the psychological impact of residential and institutional settings; (c) Barker's (1968) theory of behavior settings—systemically organized environmental units occurring at a specific time and place and consisting of both physical components and a behavioral program; (d) Wicker, McGrath, and Armstrong's (1972) extension of behavior setting theory to encompass conditions of overstaffing as well as understaffing; (e) Lawton and Nahemow's (1973) analysis of environmental competence in older adults; (f) Bronfenbrenner's (1979) ecological theory of human development, which underscored the developmental significance of large-scale environmental contexts (i.e., the microsystem, mesosystem, exosystem, and macrosystem); (g) Proshansky's (1978) formulation of place identity as a component of self identity; and (h) Altman's (1975) integrative model of human spatial behavior linking the concepts of privacy, territoriality, personal space, and crowding.

At a methodological level, several new strategies were devised for studying people's interactions with their sociophysical environments. In research on environmental cognition, sketch maps, wayfinding, and photographic-recognition tasks were combined to measure the “imageability” of urban environments (e.g., Lynch, 1960; Milgram & Jodelet, 1976). Indexes of perceived environmental quality (Craik & Zube, 1976) and techniques of environmental simulation (Appleyard & Craik, 1978; McKechnie, 1977) also were developed to evaluate people's reactions to existing or imagined settings (e.g., residential, recreational, health care, and work environments). Behavioral mapping protocols (Ittelson, Rivlin, & Proshansky, 1976) and behavior setting surveys (Barker

& Schoggen, 1973) were used to assess activity patterns within buildings, public parks, and whole communities. And studies of spatial behavior and environmental stress used a variety of observational, self-report, and physiological probes to measure people's reactions to environmental demands (Altman, 1975; Cohen, 1980).

These research developments reflect an important facet of environmental psychology, namely, the creation of new concepts and methods for studying the links between environment and behavior. Yet, not all research in this field has involved the development of novel theories and methodologies. Some studies incorporated physical-environmental variables into preexisting theories of learning, cognition, personality, development, and social behavior. A classic example of this approach was Festinger, Schachter, and Back's (1950) investigation of the effects of physical and functional distances between residential apartments on occupants' social comparison processes, friendship formation, and attitude change. Similarly, Glass and Singer (1972) examined the behavioral after-effects of exposure to unpredictable and uncontrollable noise, thereby extending Lazarus's (1966) prior analysis of psychological stress (arising from perceived environmental threats) to the study of “urban stressors.”

Other studies applied traditional psychological theories to the analysis of community problems such as resource shortages and environmental degradation. For example, Everett (1981) and his colleagues at the Pennsylvania State University developed token reinforcement strategies for modifying travel behavior. These procedures were found to be effective in several field experiments as a means of increasing community levels of bus ridership. Also, the provision of cash rebates, social praise, and feedback about the consequences of environmentally supportive behavior proved effective in modifying patterns of household energy consumption, waste disposal, and recycling (Cone & Hayes, 1980; Geller, Winett, & Everett, 1982). These research examples illustrate what Darley and Gilbert (1985) referred to as the “problem-centered rather than theory-centered” aspect of environmental psychology (p. 296).

These scientific developments suggest that environmental psychological research during the 1970s yielded several new conceptual and methodological tools for expanding psychologists' knowledge of people-environment interactions. At the same time, many research programs during this period involved the direct application of preexisting concepts and methods from social, personality, cognitive, learning, and developmental psychology to the study of community environmental problems. These “novel” and “derivative” contributions of environmental psychology have been, and will continue to be, influential at both scientific and societal levels.

Increasing Emphasis on Cross-Paradigm Research

During the 1970s, Craik (1977) characterized environmental psychology as “a loose array of multiple scientific paradigms,” each emphasizing a particular facet of per-

son-environment relations. Studies of environmental perception, environmental attitudes, environmental decision making, and operant analyses of environmentally supportive behavior, for example, comprised coherent research domains by virtue of their firm grounding in traditional theories of perception, attitude change, cognition, and learning. Other paradigms, such as ecological psychology and environmental assessment, evolved from novel conceptions of environment and behavior (e.g., Barker's 1968 analysis of behavior settings; McKechnie's 1977 typology of environmental simulation methods) rather than from well-established psychological theories.

Building on Craik's (1973) review of research paradigms in environmental psychology, Stokols (1978) examined developments within eight subareas of the field including environmental cognition, attitudes, and assessment; personality and environment; spatial behavior; operant analyses of environmentally supportive behavior; ecological psychology; and environmental stress. He noted several instances of "paradigm merging"—the integration of concepts and methods drawn from two or more subareas of the field or from different disciplines. For example, Willems (1974) offered a critique of operant approaches to the study of environment and behavior from the perspective of ecological psychology (cf. Rogers-Warren & Warren, 1977). Holahan and Dobrowolny (1978) used both cognitive and behavioral mapping strategies to examine the relationships between college students' daily activity patterns and their mental maps of urban areas. And, Hart and Moore's (1973) analysis of the development of spatial cognition linked the theories of Piaget (1963) and Werner (1948) with research on urban residents' cognitive maps conducted by geographers and urban planners (Downs, 1970; Lynch, 1960).

A continuing emphasis on paradigm merging is reflected in Saegert and Winkel's (1990) synthesis of the adaptation, opportunity structure, and sociocultural paradigms in environmental psychology.² Wicker's (1987) analysis of the life cycles of behavior settings integrated dispositional, motivational, and cognitive constructs with ecological psychology, a research paradigm that had previously neglected individuals' motives for establishing and participating in environmental settings. Similarly, Wohlwill and Heft (1987) provided an integration of cognitive and ecological perspectives in their discussion of environmental influences on children's development; and Garling and Evans (1991) offered a cross-paradigm perspective on environmental cognition, assessment, and action. Future research in environmental psychology is likely to reflect a continuing emphasis on the development of broad-gauged, multiparadigm perspectives as the field confronts increasingly complex environmental problems at regional and global levels (Stern, 1992; Stokols, 1992; Zube, 1991).

Development of Situationist, Interactional, and Transactional Theories

During the 1960s and 1970s, much of the research in environmental psychology was guided by situationist and

interactional models of behavioral change. Situationist theories account for behavioral change in terms of the specific stimuli and events occurring within an individual's social or physical environment. Barker's (1968) theory of behavior settings, for example, emphasized the direct effects of staffing levels on members' participation in setting activities, while neglecting the interplay between environmental conditions and intrapersonal factors (e.g., introversion vs. extroversion; Eddy & Sinnett, 1973). Interactional theories, on the other hand, account for the joint influence of environmental and personal factors on behavior. For instance, Argyle and Dean's (1965) analysis of spatial behavior suggested that individuals' responses to others' invasion of their personal space (e.g., by averting eye contact or retreating from the situation) depends on a variety of psychological factors, including one's need for affiliation and his or her familiarity with the approaching persons.

Both situationist and interactional theories are linear or unidirectional, in that they predict behavioral changes from environmental conditions, alone, or from both situational and intrapersonal factors. Transactional theories, on the other hand, emphasize the reciprocal or bidirectional nature of people-environment relations—individuals not only respond to environmental conditions but also take steps to influence and restructure their surroundings (Altman & Rogoff, 1987; Russell & Ward, 1982; Saegert, 1987; Stokols, 1988; Wapner, 1987). Since the 1980s, environmental psychologists have given increasing attention to the development of transactional theories in an effort to better understand the complex interdependencies between people and their environments.

Transactional theories highlight the enduring qualities of interdependence between people and their environments. The concepts of place identity (Proshansky, Fabian, & Kaminoff, 1983), place dependence (Stokols & Shumaker, 1981), person-environment fit (Caplan & Harrison, 1993), environmental symbolism (Cooper, 1974), and defensible space (O. Newman, 1973) all reflect different kinds of interdependencies that can arise between people and their surroundings, rather than the transitory effects of situational factors on behavior. Moreover, the contextual (i.e., spatial, temporal, and sociocultural) scope of transactional theories is generally broader than that of nontransactional analyses (Stokols, 1987). Little's (1983) conceptualization of personal projects and Buss and Craik's (1983) act-frequency model of personality both require sequential (rather than episodic) analyses of people's activities within multiple settings as a basis for understanding their personal dispositions. Thus, they provide a more dynamic, cross-setting perspective on personality processes than traditional trait theories (Little, 1987).

² The trend toward paradigm merging has become increasingly evident across several areas of psychological research. Recent examples of this trend include Epstein's (1994) integration of cognitive and psychodynamic perspectives on unconscious processes and the linkages that have been drawn between cognitive and neurophysiological perspectives in the field of cognitive neuroscience (McNally, 1992).

Similarly, Wicker's (1987) extension of Barker's (1968) theory of behavior settings offers an evolutionary view of setting life cycles, spanning their formation, maintenance, and dissolution phases. And Canter and Larkin's (1993) analysis of serial rape reveals the geographic and temporal clustering of crime incidents within neighborhood areas surrounding the perpetrator's residence. These research programs reflect an increasing emphasis on molar and transactional analyses of environment and behavior that has become evident in recent years.

As noted earlier, however, nontransactional theories and laboratory investigations have continued to provide alternative and powerful approaches to the study of certain environment-behavior phenomena that are more amenable to experimental research designs. Examples of these nontransactional approaches include laboratory studies of the behavioral and health consequences associated with "sick building syndrome" in work environments (Berglund, Berglund, Johansson, & Lindvall, 1984; Hedge, 1989), and field-experimental evaluations of psychoneuroendocrine and medical outcomes resulting from exposure to environmental stressors (Cohen, Tyrrell, & Smith, 1991; Frankenhaeuser, 1980). Thus, future research in environmental psychology is likely to be influenced by both transactional and nontransactional perspectives. The relative power and utility of these alternative approaches will depend on the nature of the environment-behavior relationships examined within a particular research program (especially their complexity and sensitivity to contextual influences).

From Analyses of Person-Environment to Group-Environment Transaction

During the 1960s and 1970s, environmental psychology focused primarily on individuals' experiences with their environments. The early research on environmental cognition and environmental stress, for instance, dealt with individuals' perceptions of their surroundings (Downs & Stea, 1973; Lynch, 1960; Moore & Golledge, 1976) and their reactions to high density (Altman, 1975; Baum & Epstein, 1978; Evans, 1979; Freedman, 1975; Stokols, 1972), noise (Glass & Singer, 1972), ambient temperature (Baron & Bell, 1976; Baron & Ransberger, 1978), malodor (Berglund, Berglund, & Lindvall, 1976), and other stressors.

The increased emphasis on transactional theorizing during the late 1970s and 1980s coincided with a growing interest among researchers in group-environment transactions—those processes by which aggregates of individuals, organized groups, and other collectivities are affected by and, in turn, influence their sociophysical milieu (Minami & Tanaka, 1995; Stokols, 1981; Stokols & Shumaker, 1981). This expanding interest among environmental psychologists in studying group-environment relations and processes of social change (cf. Ahrentzen, 1990; Saegert, 1987) paralleled the concerns expressed by researchers in other areas of psychology who called for the development of "generative theories" to challenge prevailing patterns of social behavior (Gergen, 1978;

Sampson, 1981), offered social constructionist views of people's encounters with their sociophysical milieu (Gergen, 1985), and presented feminist critiques of individually oriented, decontextualized research (Gilligan, 1982; Riger, 1992).

Within environmental psychology, social perception processes (or the ways in which community members collectively perceive and ascribe meaning to their environments) began to receive greater attention. Moos (1976) studied group perceptions of organizational and institutional environments in terms of their "social climates." Milgram and Jodelet (1976) developed techniques for measuring aggregate perceptions of places in their study of Parisians' cognitive maps of Paris. Building on Lynch's (1960) study of individuals' mental maps of urban areas, Milgram and Jodelet concluded that the "imageability" (or memorability) of cities depends as much on social factors as on physical features of environments. In their words, "The perception of a city is a social fact and, as such, needs to be studied in its collective as well as its individual aspect" (p. 108).

Environmental psychologists also have given greater attention to group-environment transactions at the neighborhood level. Several programs of research on residents' participation in block organizations, their sense of community, fear of crime, and the impact of vehicular traffic on neighborhood cohesion were launched during the 1980s (Altman & Wandersman, 1987; Appleyard, 1981; Brown & Werner, 1985; Holahan & Wandersman, 1987; Saegert, 1987; R. B. Taylor, Shumaker, & Gottfredson, 1985; Unger & Wandersman, 1985). A continuing emphasis on group-environment transactions is reflected in the development of scales for measuring neighborhood sense of community (Chavis & Wandersman, 1990) and in recent studies of the links between physical decay or "incivilities" in communities (e.g., graffiti, vandalism, and dilapidated buildings), residents' perception of crime vulnerability, and their active involvement in neighborhood organizations (Nasar & Fisher, 1993; Perkins, Meeks, & Taylor, 1992; Perkins, Wandersman, Rich, & Taylor, 1993).

In an effort to address increasingly complex environmental problems (e.g., pollution, resource shortages, and urban violence) at regional and global levels, the scope of environment-behavior research has expanded to encompass national and global issues. Stern and Gardner (1981), for example, compared energy use patterns within residential and industrial sectors of the United States. They found that the majority of energy produced in the United States is consumed within commercial and industrial sectors, rather than at the household level, and suggested behavioral strategies for conserving energy within nonresidential as well as residential settings. Also, Stern (1992) analyzed the impact of individual and collective behavior on global environmental change (e.g., ozone depletion, global warming, and loss of biodiversity) and identified public policy options for preventing behavior damaging to the environment.

Applications of Environment and Behavior Research to Community Problem Solving

The research on energy consumption and conservation at national and global levels reflects another important trend in environment-behavior research, namely, the increasing application of basic theory and research to the analysis and amelioration of community environmental problems (Archer, Pettigrew, & Aronson, 1992; Cherulnik, 1993; Kempton, Darley, & Stern, 1992; Wandersman & Hallman, 1993). For example, research on people's reactions to density and crowding, conducted during the 1970s, yielded guidelines for improving the design of residential environments (Aiello & Baum, 1979). Investigations of wayfinding, environmental stress, territoriality, and privacy also were used as a basis for developing design guidelines for residential, work, child care, playground, and school environments (Becker, 1990; Brill, Margulis, & Konar, 1984; Cooper-Marcus & Sarkissian, 1986; Moore & Hart, 1989; Moore & Lackney, 1993; Noschis, 1992; Sundstrom, 1986; Wineman, 1986). And experimental evidence for the psychological and behavioral benefits of exposure to natural environments was applied in offices and health care settings to reduce stress and enhance occupants' well-being (Kaplan, 1993; Kaplan & Kaplan, 1989; Reizenstein-Carpman, Grant, & Simmons, 1986; Ulrich, 1991).

The concepts, research methods, and findings of environmental psychology also have been applied in public policy and urban planning contexts. Baum and Fleming (1993) considered the implications of research on environmental stress and technological disasters for establishing regulatory policies that enable communities to manage environmental hazards more effectively. Cvetkovich and Earle (1992) offered recommendations for improving risk communication strategies on the basis of the findings from earlier studies of people's reactions to environmental hazards. Also, environmental simulation techniques for estimating people's responses to potential environmental changes were used in several community planning situations (Lawrence, 1987; Marans & Stokols, 1993). For instance, the Berkeley Environmental Simulation Laboratory (Appleyard & Craik, 1978), which features a computer-guided telescopic camera (and provides realistic simulated tours, by use of a television monitor, through scale models of urban areas), was used to evaluate alternative zoning and urban design plans for San Francisco and New York City (Bosselmann, 1993). Finally, postoccupancy evaluation (POE) techniques were used to assess people's reactions to newly designed or renovated buildings, parks, and public plazas (Carr, Francis, Rivlin, & Stone, 1992; Preiser, 1989; Zeisel, 1981).

These applications of research to facilities design, urban planning, and public policy suggest that environmental psychology will continue to provide theories and findings that can be used to improve the fit between people's psychological, behavioral, and sociocultural needs on the one hand, and the design of their homes, neighborhoods, workplaces, transportation systems, and institutional environments on the other.

Broadening International Scope of Environmental Psychology

Over the past three decades, the international scope of environmental psychology has expanded dramatically (Canter & Craik, 1981; Levy-Leboyer, 1982; Pol, 1993; Stokols & Altman, 1987). Since the founding of the Environmental Design Research Association and the journal *Environment and Behavior* in 1969, several professional organizations, scientific journals, and graduate training programs have been established outside of North America. The Association for the Study of People and Their Physical Surroundings (IAPS) initiated in Europe, the Man-Environment Relations Association (MERA) in Japan, the People and Physical Environment Research Organization (PAPER) in Australia and New Zealand, and the Environmental Psychology Task Force of the Colegio Oficial de Psicólogos in Spain are some of the organizations that have been established in recent years.

In addition to the annual conferences of these groups, several international conferences in environmental psychology have been organized, including the Japan-U.S. Seminars on Environment and Behavior (Hagino & Ittelson, 1980; Ittelson, Asai, & Ker, 1986; Yoshitake, Bechtel, Takahashi, & Asai, 1990), the Estonian conferences on Psychology and Architecture, the Socio-Psychological Basis of Environmental Design (Niit, Heidmets, & Kruusvall, 1983, 1985), the European Conference on Full-Scale Modeling (Dalholm, 1991), and the Turkish Symposium on the Human Consequences of Crowding (Gurkaynak & LeCompte, 1979). Also, several international journals have been established, including the *Journal of Environmental Psychology, Architecture and Behavior* and the *Journal of Architectural and Planning Research*. The *National Geographic Journal of India* also published a special issue on Environmental Experience and the Value of Place (Singh & Singh, 1991). And graduate training programs in environmental psychology have been organized in several countries, including those at the University of Surrey, the Autonomous National University of Mexico, the University of Madrid, and the University of Barcelona.

The organizations, journals, and graduate training programs previously noted are not meant to be a complete listing of research and professional developments in environmental psychology throughout the world. However, this small sample of relevant developments does convey the high level of international research activity and exchange that has occurred within the environment and behavior field. These events suggest that the international orientation of environmental psychology will continue to remain strong in the foreseeable future.

Future Directions of Environmental Psychology

Over the past 30 years, environmental psychology has documented the behavioral significance of the large-scale, sociophysical environment and has contributed a variety of new concepts and methods for analyzing people-en-

vironment transactions. At the same time, effective applications of environment-behavior research have been achieved within several community problem-solving arenas. These accomplishments provide a strong foundation for future research and policy innovations. In the remaining sections, I discuss certain broad societal concerns that are likely to affect the course of research in environmental psychology during the 1990s and beyond. I then consider some emerging directions for theory development that are less directly linked to community problem-solving and policy concerns.

Research and Policy Challenges Posed by Contemporary Societal Problems

Efforts to forecast the directions of a field as diverse as environmental psychology can be regarded as highly tentative and incomplete at best, and even presumptuous and ill-advised at worst. Nonetheless, continuities in the development of environmental psychology since the mid-1960s, including its long-standing concern with community environmental problems, provide a basis for anticipating at least some future directions of the field. Thus, it seems reasonable to expect that the research and policy interests of environmental psychologists will continue to be influenced by at least five major societal concerns that have arisen in recent decades and are likely to become even more salient during the 21st century: (a) toxic contamination of environments and rapid changes in the global ecosystem, (b) the spread of violence at regional and international levels, (c) the pervasive impact of information technologies on work and family life, (d) escalating costs of health care delivery and the growing importance of disease prevention and health promotion strategies, and (e) processes of societal aging in the United States and other regions of the world.

Psychological and behavioral dimensions of environmental pollution and global environmental change. The cumulative toxic effects of agricultural, industrial, and military technologies developed during the 20th century pose a growing threat to population and ecosystem health. Geophysical studies indicate that global environmental changes are occurring at an alarmingly rapid rate (Silver & DeFries, 1990). Ecological research also reveals the direct links between individual and group behaviors toward the environment (e.g., consumption of electricity and fossil fuels, recycling of used materials, corporate ride-sharing programs, and efforts to reduce environmental pollution) and the severity and rapidity of atmospheric ozone depletion, global warming, and reduced biodiversity (Stern, Young, & Druckman, 1992). The potentially catastrophic consequences of these global changes highlight the importance of understanding the circumstances under which individuals and groups make decisions and enact behaviors that affect levels of resource consumption and environmental pollution (Leaf, 1989; Stern, 1992).

Prior research by environmental psychologists and sociologists has examined the correlates of environmentally supportive behavior and has demonstrated the ef-

fectiveness of certain interventions (e.g., providing household members with monthly feedback about their energy consumption patterns; implementing corporate policies to encourage recycling and ride sharing among employees) in promoting ecologically protective actions (Cone & Hayes, 1980; Dunlap, Grieneeks, & Rokeach, 1983; Geller, Winett, & Everett, 1982; Oskamp et al., 1991; Stern & Gardner, 1981). Some studies suggest that people are more likely to enact ecologically supportive behavior when they feel personally and immediately threatened by environmental problems (Baldassare & Katz, 1992; Platt, 1973) and are able to recognize the local implications of global environmental changes (Zube, 1991). These and related studies provide an empirical basis for developing more comprehensive public policies aimed at slowing the pace of environmental deterioration and promoting higher levels of population and ecosystem health.

Regulatory initiatives designed to protect regional and global environmental quality are already being implemented and evaluated for their effectiveness in Canada, the United States, and world wide (e.g., Giuliano, Hwang, & Wachs, 1993; Saunders, 1990; World Resources Institute, 1994). Similarly, community-wide coalitions to promote population health have become more prevalent in recent years, and World Health Organization (WHO)-sponsored programs to encourage the development of healthy cities have been organized in several countries (e.g., Ashton, Grey, & Barnard, 1986; Conner, 1994; Duhl, 1986; Goodman, Burdine, Meehan, & McLeroy, 1993). Considering the time urgency of current global environmental changes, the development of theory-based policies to ameliorate these problems, and programmatic evaluations of their health and cost benefits, should be a high priority for future research on environment and behavior.

Stemming the tide of violence at regional and international levels. In the United States between 1981-1990, all categories of violent crime (e.g., murder, nonnegligent manslaughter, forcible rape, and aggravated assault) increased by nearly 30% among youths under the age of 18 (Federal Bureau of Investigation, 1990). Homicide is the second leading cause of death among United States adolescents and young adults and the leading cause of death among black youths (United States Department of Health and Human Services [USDHHS], 1991). The number of reported child abuse incidents in the United States also has increased steadily from 1.7 million in 1984 to 2.4 million in 1990 (Goldstein, 1995), with the homicide rate among children under 4 years of age reaching a 40-year high in 1995 (United States Advisory Board on Child Abuse and Neglect, 1995).³ Moreover, the proliferation of interracial and interethnic violence in many parts of the world (e.g., Bosnia, Rwanda, regions of the

³ In addition to these acute and severe forms of child victimization, a vast quantity of "pandemic victimizations" (e.g., physical punishment by parents and nonfatal assaults by siblings and peers) goes unreported each year (Finkelhor & Dziuba-Leatherman, 1994).

former Soviet Union, the Middle East, and several U.S. cities) demonstrates how little progress has been made during the 20th century in curbing violence, terrorism, and war.

Earlier studies suggested that the physical and social environment can influence the occurrence and severity of violence in several ways. For example, physical conditions such as ambient heat may increase the likelihood of violent outbursts among aggression-prone individuals by intensifying their levels of discomfort and annoyance (Baron & Ransberger, 1978). Environmental design features of urban areas may create opportunities for assaultive behavior among already-motivated offenders (Nasar & Fisher, 1993). The interior design and spatial arrangement of homes, the temporal patterning of household activities, neighborhood transience, and incivilities may function as predisposing or constraining factors in the etiology of child abuse (Belsky, 1993; Holman & Stokols, 1994). Frequent portrayals of violent episodes in the mass media may weaken societal norms against aggressive behavior and suggest opportunities for "copy-cat violence" among audience members (Goldstein, 1995; Slaby, 1992). And a variety of social environmental factors, including historical patterns of intergroup conflict and differential access among community groups to educational and employment opportunities, may increase the likelihood of interracial and interethnic violence (Baldassare, 1994; Merton, 1938). A major challenge for environmentally oriented research is to develop more integrative theoretical and policy perspectives that account for the joint influences of these environmental factors on the etiology of violence (USDHHS, 1993).

The prevalence of intergroup violence in the United States and other countries highlights the importance of documenting the links between environmental design, urban planning, the multicultural structure of society, and community cohesion (Baldassare, 1994; Vila, 1994). An important question in this regard is whether community environments can be designed to provide functional and symbolic supports for diverse lifestyles and cultural identities, while at the same time strengthening collective allegiance to superordinate (or widely shared) goals. Both Riger (1993) and Leavitt and Saegert (1990) emphasized the importance of balancing group empowerment efforts with the cultivation of organizations and settings that foster a strong sense of community. Workable strategies for achieving this goal, however, remain to be developed and tested in future research.

Impact of technological change on individuals and groups. The processes by which people create new technologies and are, in turn, transformed by them remain an unexplored frontier for future theory development and research in environmental psychology (Ittelson, 1986). Technological innovations such as electronic mail, fax machines, mobile phones, and desktop computing, for example, have fundamentally altered people's work routines, commuting patterns, and social behavior (*Business Week*, 1995; Handy & Mokhtarian, 1995; Meyrowitz, 1985). The percentages of home-based

workers and telecommuters grew during the 1980s and are expected to increase further in the coming years (Rosen & Berger, 1991). Yet, little is known about the impacts of telecommuting on organizational effectiveness and social cohesion (Bezold, Carlson, & Peck, 1986; Christensen, 1994). For instance, does telecommuting impair team productivity by reducing face-to-face communication among coworkers? Also, will computer-based networks exacerbate the tensions between advantaged and disadvantaged groups by further separating "information-rich" and "information-poor" segments of society? These questions remain to be examined in future research.

Also, in what ways are family dynamics and child-rearing practices being altered by changing work routines and technological innovations? As household structures become more diverse (e.g., single-parent families in which the adult works at home), and as multiple life roles are incorporated within the same environments (e.g., homes that accommodate both work and parenting roles and workplaces that support physical fitness, recreational, and child care needs), innovative design strategies will be needed to help occupants accommodate to these multifunctional settings (Christensen, 1994; Franck & Ahrentzen, 1989; Stokols, 1990). The development of design guidelines for multifunctional environments is, therefore, an important direction for future research.

A significant byproduct of urbanization and the rapid deployment of new information technologies is attentional overload, a psychological state in which individuals are overwhelmed by higher quantities and faster rates of information than they can manage (Cohen, 1978; Glass & Singer, 1972; Milgram, 1970). An important challenge for future research is to identify environmental resources and behavioral strategies that enable people to cope more effectively with a surfeit of information and stimulation. Certain environments, such as natural and wilderness settings, have the capacity to enhance individuals' recovery from stressful experiences associated with the complexities of urban living and rapid technological change (Hartig, Mang, & Evans, 1991; Kaplan & Kaplan, 1989; Kaplan & Talbot, 1983; Knopf, 1987; Korpela, 1992; Ulrich, 1983). Earlier studies, however, have not examined the ways in which organizational and socio-cultural processes affect the restorative value of natural and built environments (Hartig & Stokols, 1994). Settings whose members experience a strong sense of community and attachment to a shared environment may be especially restorative, whereas those in which members feel more detached from their social and physical surroundings may intensify rather than reduce feelings of stress (Stokols, 1990). The social and cultural dimensions of restorative environments remain to be identified in future research.

Environmentally based strategies of community health promotion. The costs of health care in the United States grew from about \$42 billion in 1965 to approximately \$820 billion in 1992—nearly a 20-fold increase (Walsh & Francis, 1992). Health care expenditures accounted for 6% of the gross national product (GNP) in

1966, but they are expected to comprise nearly 16% of the GNP by 1998 (O'Donnell, 1994). This dramatic rise in national health costs over the past 30 years highlights the importance of developing more effective disease prevention and health promotion strategies as an adjunct to medical care (Stokols, Pelletier, & Fielding, 1995).

The growing interest in worksite and community health promotion can be expected to open new avenues of research at the interface of environmental and health psychology (Quirk & Wapner, 1995). For example, efforts to develop more comprehensive approaches to community health promotion can combine the focus of health psychology on behavioral and "psychogenic" factors in health and illness (e.g., personality and psychophysiology) with ecological perspectives (Green & Ottoson, 1994; Moos, 1979; Stokols, 1992; Winett, King, & Altman, 1989) that give greater attention to "envirogenic" variables (e.g., geographic, architectural, technological, and sociocultural influences on health status). Similarly, therapeutic strategies that rely on "active interventions" or those requiring voluntary and sustained adherence to prescribed behavioral regimens (e.g., refraining from smoking, maintaining a low-fat diet, and using vehicular safety belts) could be fruitfully combined with environmentally based, "passive interventions" (Williams, 1982) that require little or no effort on the part of individuals (e.g., installation of nontoxic furnishings and equipment in work facilities).

In the future, environmental psychological theories of privacy, stress, wayfinding, and place attachment, and research-based guidelines for facilities design and management, should play an increasingly important role in the development of comprehensive worksite health promotion programs (California Occupational Safety and Health Administration, 1995; Danko, Eshelman, & Hedge, 1990; Green & Cargo, 1994; Ornstein, 1990; Stokols, in press). The concerns of environmental psychology are also directly relevant to nonoccupational settings and the development of effective community health promotion programs. For example, earlier research on environment and behavior suggests a variety of urban design and planning strategies for improving the quality of residential, neighborhood, school, and health care settings (Cooper-Marcus & Sarkissian, 1986; Moore & Lackney, 1993; Nasar & Fisher, 1993; Ulrich, 1991). These planning guidelines can be used to enhance public health through their incorporation into environmentally based programs for community health promotion (Conner, 1994; Duhl, 1986).

Implications of societal aging for environmental design and community planning. In 1900, people over 65 constituted about 4% of the U.S. population. By 1988, that proportion rose to 12.4%; by 2000 it will be 13%, and by 2030, 22%. The most rapid population increase over the next decade will be among those over 85 years of age (USDHHS, 1991). During the past two decades, the population 85 and older has doubled. By 2010, those 75 and older (the "old-old") may constitute more than 40% of the elderly population (S. J. Newman, Zais, & Struyk, 1984).

In view of these trends toward societal aging and the fact that older persons are more burdened by chronic diseases and physical disabilities than younger people, the design of health promotive environments for an aging population becomes increasingly important as a direction for future research (Green & Ottoson, 1994; Pastalan, 1983; Verbrugge, 1990). For instance, because the elderly are disproportionately vulnerable to fatalities from injuries sustained while slipping and falling, the design of stairwells to reduce the likelihood of these events in residential and institutional settings is an important task for future research (Archea, 1985). Also, the design of residential and recreational environments (e.g., physical fitness facilities and neighborhood support groups) to encourage higher levels of physical activity may prove to be an effective strategy for enhancing health status and independent functioning among the elderly (Parmelee & Lawton, 1990; USDHHS, 1991). And, because older persons spend more time indoors and are more susceptible to respiratory ailments than younger people, the development of improved ventilation systems and nonsmoking policies to reduce indoor air pollution will become increasingly important tools for promoting well-being among the elderly and among other age groups as well (Green & Ottoson, 1994; Greenberg, 1986).

Each of the societal concerns noted previously has direct implications for environmental design and management. For example, high rates of violence and crime in the United States have altered patterns of public investment in capital projects. In several states (including California, Connecticut, Florida, Massachusetts, Michigan, and Minnesota), more public funds are now allocated to correctional facilities than to colleges and universities (*New York Times*, 1995). Also, new information technologies are changing the locations and physical designs of residential and occupational environments (Allen, 1977; Becker, 1990; Christensen, 1994). In addition, processes of societal aging are expected to result in higher levels of public and private investment toward the construction of nursing homes, health care facilities, recreational settings, and retirement communities for older adults (Marans, Hunt, & Vakalo, 1984; S. J. Newman et al., 1984; Parmelee & Lawton, 1990). These anticipated changes in the design and construction of new environments, while prompting new areas of applied research, also will pose new theoretical questions and directions for scientific inquiry.

Directions for Theory Development in Environmental Psychology

Efforts to ameliorate community problems through applied research often stimulate new theoretical developments as scientists confront the complexities of people-environment transactions in naturalistic settings. For instance, the complex realities of global environmental change, diffusion of new technologies, intergroup violence, and societal aging will challenge researchers to bridge previously separate areas of theorizing and research. Thus, the goal of creating health promotive en-

vironments for older adults may stimulate new conceptual links between environmental, developmental, and health psychology (Lawton, 1989). Similarly, the development of programs intended to slow the rising tide of intergroup violence will likely require greater consolidation of psychological, sociological, environmental design, and urban planning perspectives (Goldstein, 1995).

As noted earlier, a grand theory of environment and behavior is not likely to emerge in future years due to the enormous diversity and multidisciplinary scope of environmental psychology. However, more modest efforts to consolidate middle-range theories of environment and behavior across different areas of psychological research, and at the interface of psychology and neighboring disciplines, can be expected to continue and, perhaps, become more prevalent over the next several years (McNally, 1992; Merton, 1968; Wapner, 1995). In the remaining sections, I outline some prospective directions for further theoretical development and integration.

The expanding interface between architecture, environmental psychology, and urban design. Cross-paradigm research linking the theories and methods of environmental psychology with the fields of architecture, facilities planning, and urban design is likely to expand in future years. Directions for such research include the development of environmental simulation, programming, and design strategies that are more sensitive to the diverse needs of individuals and multiple user groups occupying common buildings and urban areas (Becker, 1990; Marans & Stokols, 1993; Mazumdar, 1992). Attention to individual and group-specific needs in environmental design (based on developmental stage, disabilities, lifestyle, and gender) is expected to increase as architects and urban designers strive to develop more comprehensive and effective plans for buildings and cities (Altman & Churchman, 1994; Franck & Ahrentzen, 1989; Hubbard, 1992; Michelson, 1985; Preiser, 1988; Sommer, 1983). Scientific interest in the sociocultural aspects of environment and behavior is also likely to expand as advanced telecommunications bring diverse populations and geographic regions into closer contact (Altman & Chemers, 1980; Meyrowitz, 1985; Rapoport, 1980; Saegert & Winkel, 1990).

The ecology of creativity and theory development. Environment-behavior research conducted in different countries and cultures suggests that historical, geographic, sociocultural, and political factors strongly influence the selection of topics for scientific study and the course of theory development within each region. For instance, Scandinavian research has emphasized the impact of interior design features on occupants' mood and social behavior (Kuller, 1987). Japanese studies have documented the effects of climate and natural disasters on individuals' behavior and well-being (Hagino, Mochizuki, & Yamamoto, 1987). And Latin American researchers have given greater attention to the behavioral consequences of sociocultural and political processes such as poverty, colonization, and class conflict (Sanchez, Wiesenfeld, & Cronick, 1987; Wiesenfeld, 1992). To date, however, compar-

ative studies examining the influence of geographic, architectural, and sociocultural factors on creativity and theory development have not been conducted.

The ecology of creativity and theory development encompasses several different issues including (a) the interplay among psychological and situational factors in the development of an individual's ideas, theories, or artistic contributions and (b) the historical, geographic, sociocultural, and political circumstances that influence the selection of topics for scientific study and the evolution of theoretical perspectives within different national and cultural contexts. The first issue has been examined in earlier studies of the joint effects of psychological and organizational factors on creative thinking and problem-solving strategies (Amabile, 1984; Wicker, 1985). Less attention has been given to the role of physical environmental factors in promoting or constraining creativity (Clitheroe, 1995), though one study found a positive link between reduced environmental stimulation and creative scientific thinking (Suedfeld, Metcalf, & Bluck 1987). The influence of architecture, interior design, and natural settings (e.g., wilderness) on creativity and theory development warrants greater attention in future research.

The second issue, concerning the influence of ecological factors on theory development in different geographic and cultural regions, remains as an intriguing topic for future study. The global exchange of ideas afforded by the Internet, for example, may reduce the impact of local and regional events on future theorizing and research. The effects of technological, geographical, and cultural factors on theory development merit further investigation in view of the scientific and practical benefits associated with the cultivation of creative ideas.

Development of contextually broader theories and community problem-solving strategies. Research in environmental psychology today encompasses both highly focused analyses of individual behavior in particular places and broader formulations of group-environment transactions that span multiple settings in large geographic regions (e.g., neighborhoods and cities) and occur over prolonged periods (e.g., during developmental transitions and relocations). The contextual scope of environmental psychological theories has expanded since the mid-1960s in that several recent conceptions of environment and behavior subsume spatially, temporally, and socioculturally broader units of analysis (cf. Altman & Rogoff, 1987; Canter & Larkin, 1993; Saegert & Winkel, 1990; Stokols, 1987). This trend toward contextually broader theories and methodological approaches is likely to continue as environmental psychologists delve further into the behavioral underpinnings of global environmental change, design criteria for culturally diverse communities, and the effects of new information technologies on patterns of international communication and scientific collaboration.

At the same time, community intervention strategies based on environmental psychological theories also can be expected to become more integrative and expansive. Previous applications of environment-be-

behavior research to community problem solving have been targeted primarily toward specific settings and occupant groups rather than implemented in a more integrative fashion across multiple environments and populations. For example, research on the environmental needs of different age groups suggests design guidelines for enhancing (a) infants' cognitive development in residential settings (Wachs, 1992); (b) the quality of day care, school, and play environments for children (Moore, 1986; Moore & Lackney, 1993; Noshis, 1992; Susa & Benedict, 1994); (c) the social cohesion of urban neighborhoods (Appleyard, 1981; O. Newman, 1973; Perkins et al., 1993); (d) the comfort and quality of occupational settings (Becker, 1990; Danko et al., 1990; Sundstrom, 1986; Wineman, 1986); and (e) the design of residential environments for the elderly (Parmelee & Lawton, 1990). What has not been achieved in earlier research, however, is the consolidation of these setting-specific and group-specific guidelines within more comprehensive approaches that address the interdependencies between multiple settings and age groups (Bronfenbrenner, 1979; Friedman & Wachs, in press; Hubbard, 1992; Moen, Elder, & Luscher, 1995)

More comprehensive approaches to community planning and design would (a) consider age, gender, cultural, and ethnic differences in people's response to a wide range of settings; (b) address the relationships that exist among multiple behavior settings (e.g., the social and spatial linkages between residential, child-care, and work environments); and (c) incorporate multiple design guidelines for improving the quality of individuals' "overall life situation" (Magnusson, 1981) and the healthfulness of neighborhoods and communities (Ashton, Grey, & Barnard, 1986; Conner, 1994; Duhl, 1986). The importance of developing more comprehensive, research-based guidelines for community planning and health promotion is underscored by the rapidity of recent technological, social, and global environmental changes (Bezold et al., 1986; Dunlop & Kling, 1991; Stern, 1992). The pace and scope of these changes, and the urgency of developing broad-gauged strategies for managing them, will substantially influence the course of research in environmental psychology over the next several years.

Conclusions

The field of environmental psychology has made major strides over the past 30 years in (a) developing novel conceptualizations of people-environment transaction and (b) applying research concepts, methods, and findings to the analysis and resolution of community problems. Additional research trends include (c) the shift from paradigm-specific to cross-paradigm research, (d) the increasing emphasis on transactional analyses of environment and behavior and (e) on the relationships between groups and their environments, and (f) the expanding international scope of environmental psychology.

Future research in environmental psychology will continue to be influenced by societal concerns including (a) global environmental change, (b) intergroup violence and crime, (c) impact of new information technologies on work and family life, (d) rising health costs and interest in environmental strategies of health promotion, and (e) processes of societal aging. These community concerns will create new opportunities for cross-paradigm research within psychology and between psychology and other disciplines. Examples of these directions include theoretical analyses of individual and subgroup differences in people's reactions to built and natural environments; research on the role of cultural, geographic, and technological factors in creativity and theory development; and the development of contextually broader theories and community problem-solving strategies.

To the extent that environmental psychology develops along the lines suggested earlier, the identity of this field may become increasingly "transparent" as environment-behavior concepts and methodologies are incorporated into other areas of psychology (e.g., clinical, community, developmental, health, social, and personality) and related disciplines (e.g., architecture, facilities management, urban planning, sociology, geography, and public health). The paradoxical feature of this scientific transparency and diffuse identity is that they coincide with a growing interest in core environmental and contextual concerns across several areas of behavioral research (cf. Wapner, 1995). Boneau (1992) commented on the importance of developing a contextually oriented psychology as follows:

Cognitive science and neuroscience and clinical practice and whatever are only dealing with pieces of a bigger picture. Will we not always need to have a science of humanity, a discipline concerned with understanding and explaining the human individual coping in a social-cultural-environmental context? I must point out that that is not what psychology is now, but perhaps it should be. (p. 1596)

The preceding discussion of research trends and opportunities is undoubtedly incomplete and bounded by the author's own geographic and cultural frame of reference on the environment and behavior field.⁴ Nonetheless, the summary of research developments and directions for future study outlined in this article provides at least a partial glimpse of environmental psychology's accomplishments and challenges as we approach the 21st century.

REFERENCES

- Ahrentzen, S. B. (1990). Rejuvenating a field that is either "coming of age" or "aging in place": Feminist research contributions to environmental design research. In R. I. Selby, K. H. Anthony, J. Choi, & B.

⁴ Additional topics that are likely to receive greater research attention in the future are the design of environments for living and working in outer space (Harris, 1992; Harrison, Clearwater, & McKay, 1991) and the formulation of effective policies for reducing conflicts among industrialized and developing countries related to the contamination of shared environments and the depletion of natural resources (Sommer, 1987).

- Orland (Eds.), *Coming of age: EDRA 21/1990* (pp. 11–18). Proceedings of the Twenty First Annual Conference of the Environmental Design Research Association. Oklahoma City, OK: EDRA, Inc.
- Aiello, J. R., & Baum, A. (Eds.). (1979). *Residential crowding and design*. New York: Plenum Press.
- Allen, T. J. (1977). *Managing the flow of technology*. Cambridge, MA: MIT Press.
- Altman, I. (1975). *Environment and social behavior: Privacy, personal space, territory, and crowding*. Monterey, CA: Brooks/Cole.
- Altman, I., & Chemers, M. M. (1980). *Culture and environment*. New York: Cambridge University Press.
- Altman, I., & Christensen, K. (Eds.). (1990). *Environment and behavior studies: Emergence of intellectual traditions. Human behavior and environment: Advances in theory and research* (Vol. 11). New York: Plenum Press.
- Altman, I., & Churchman, A. (Eds.). (1994). *Women and the environment. Human behavior and environment: Advances in theory and research* (Vol. 13). New York: Plenum Press.
- Altman, I., & Rogoff, B. (1987). World views in psychology and environmental psychology: Trait, interactional, organismic, and transactional perspectives. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 7–40). New York: Wiley.
- Altman, I., & Wandersman, A. (Eds.). (1987). *Neighborhood and community environments. Human behavior and environment: Advances in theory and research* (Vol. 9). New York: Plenum Press.
- Altman, I., & Wohlwill, J. F. (Eds.). (1976). *Human behavior and environment: Advances in theory and research*. New York: Plenum Press.
- Amabile, T. M. (1984). *The social psychology of creativity*. New York: Springer-Verlag.
- Appleyard, D. (1981). *Livable streets*. Berkeley: University of California Press.
- Appleyard, D. A., & Craik, K. H. (1978). The Berkeley Environmental Simulation Laboratory and its research program. *International Review of Applied Psychology*, 27, 53–55.
- Archea, J. C. (1985). Environmental factors associated with stair accidents by the elderly. *Clinics in Geriatric Medicine*, 1, 555–569.
- Archer, D., Pettigrew, T. F., & Aronson, E. (1992). Making research apply: High stakes public policy in a regulatory environment. *American Psychologist*, 47, 1233–1236.
- Argyle, M., & Dean, J. (1965). Eye contact, distance, and affiliation. *Sociometry*, 28, 289–304.
- Ashton, J., Grey, P., & Barnard, K. (1986). Healthy cities: WHO's New Public Health Initiative. *Health Promotion*, 1, 319–324.
- Baldassare, M. (1994). Introduction. In M. Baldassare (Ed.), *The Los Angeles riots: Lessons for the urban future* (pp. 1–17). Boulder, CO: Westview Press.
- Baldassare, M., & Katz, C. (1992). The personal threat of environmental problems as predictor of environmental practices. *Environment and Behavior*, 24, 602–616.
- Barker, R. G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behavior*. Stanford, CA: Stanford University Press.
- Barker, R. G., & Gump, P. V. (1964). *Big school, small school*. Stanford: Stanford University Press.
- Barker, R. G., & Schoggen, P. (1973). *Qualities of community life*. San Francisco: Jossey-Bass.
- Baron, R. A., & Bell, P. A. (1976). Aggression and heat: The influence of ambient temperature, negative affect, and a cooling drink on physical aggression. *Journal of Personality and Social Psychology*, 33, 245–255.
- Baron, R. A., & Ransberger, V. M. (1978). Ambient temperature and the occurrence of collective violence: The “long hot summer” revisited. *Journal of Personality and Social Psychology*, 36, 351–360.
- Baum, A., & Epstein, Y. M. (Eds.). (1978). *Human response to crowding*. Hillsdale, NJ: Erlbaum.
- Baum, A., & Fleming, I. (1993). Implications of psychological research on stress and technological accidents. *American Psychologist*, 48, 665–672.
- Baum, A., Singer, J. E., & Valins, S. (Eds.). (1978). *Advances in environmental psychology: The urban environment*. Hillsdale, NJ: Erlbaum.
- Becker, F. D. (1990). *The total workplace: Facilities management and the elastic organization*. New York: Van Nostrand Reinhold.
- Bell, P. A., Fisher, J. D., & Loomis, R. J. (1978). *Environmental psychology*. Philadelphia: W. B. Saunders.
- Belsky, J. (1993). Etiology of child maltreatment: A developmental-ecological analysis. *Psychological Bulletin*, 114, 413–434.
- Berglund, B., Berglund, U., Johansson, I., & Lindvall, T. (1984). Mobile laboratory for sensory air quality studies in non-industrial environments. In B. Berglund, T. Lindvall, & J. Sundell (Eds.), *Indoor air. Sensory and hyperactivity reactions to sick buildings* (Vol. 3, pp. 467–472). Stockholm: Swedish Council for Building Research.
- Berglund, B., Berglund, U., & Lindvall, T. (1976). Psychological processing of odor mixtures. *Psychological Review*, 83, 432–441.
- Bezold, C., Carlson, R. J., & Peck, J. C. (1986). *The future of work and health*. Dover, MA: Auburn House Publishing Company.
- Boneau, C. A. (1992). Observations on psychology's past and future. *American Psychologist*, 47, 1586–1596.
- Bosselmann, P. (1993). Dynamic simulation of urban environments. In R. Marans & D. Stokols (Eds.), *Environmental simulation: Research and policy issues* (pp. 279–302). New York: Plenum Press.
- Bower, G. H. (1993). The fragmentation of psychology? *American Psychologist*, 48, 905–907.
- Brill, M., Margulis, S., & Konar, E. (1984). *Using office design to increase productivity*. Buffalo, NY: Workplace Design and Productivity.
- Bronfenbrenner, U. (1979). *The ecology of human development*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1989). Ecological systems theory. In R. Vasta (Ed.), *Annals of child development* (Vol. 6, pp. 187–249). Greenwich, CT: JAI Press.
- Brown, B. B., & Werner, C. M. (1985). Social cohesiveness, territoriality, and holiday decorations: The influence of cul-de-sacs. *Environment and Behavior*, 17, 539–565.
- Brunswick, E. (1943). Organismic achievement and environmental probability. *Psychological Review*, 50, 255–272.
- Business Week*. (1995). Special report: Rethinking work. October 17, 14–93.
- Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review*, 90, 105–125.
- California Occupational Safety and Health Administration. (1995). *Model injury and illness prevention program for workplace security*. Sacramento: State of California, Department of Industrial Relations, Division of Occupational Safety & Health.
- Canter, D., & Craik, K. H. (1981). Environmental psychology. *Journal of Environmental Psychology*, 1, 1–11.
- Canter, D., & Larkin, P. (1993). The environmental range of serial rapists. *Journal of Environmental Psychology*, 13, 63–69.
- Caplan, R. D., & Harrison, R. V. (1993). Person–environment fit theory: Some history, recent developments, and future directions. *Journal of Social Issues*, 49, 253–275.
- Carr, S., Francis, M., Rivlin, L., & Stone, A. (1992). *Public space*. Cambridge, England: Cambridge University Press.
- Chavis, D. M., & Wandersman, A. (1990). Sense of community in the urban environment: A catalyst for participation and community development. *American Journal of Community Psychology*, 18, 159–162.
- Chein, I. (1954). The environment as a determinant of behavior. *Journal of Social Psychology*, 39, 115–127.
- Cherulnik, P. D. (1993). *Applications of environment–behavior research: Case studies and analysis*. New York: Cambridge University Press.
- Christensen, K. (1994). Working at home: Frameworks of meaning. In I. Altman & A. Churchman (Eds.), *Women and the environment. Human behavior and environment: Advances in theory and research* (Vol. 13, pp. 133–166). New York: Plenum Press.
- Clitheroe, C. (1995). Creativity in context: Defining and researching creativity from an environmental psychology perspective. In J. Nasar, P. Grannis, & K. Hanyu (Eds.), *Proceedings of the Twenty-Sixth Annual Conference of the Environmental Design Research Association* (p. 163). Oklahoma City, OK: EDRA, Inc.
- Cohen, S. (1978). Environmental load and the allocation of attention. In A. Baum, J. Singer, & S. Valins (Eds.), *Advances in environmental psychology: Vol. 1. The urban environment* (pp. 1–29). Hillsdale, NJ: Erlbaum.

- Cohen, S. (1980). Aftereffects of stress on human performance and social behavior: A review of research and theory. *Psychological Bulletin*, 88, 82-108.
- Cohen, S., Tyrrell, D. A. J., & Smith, A. P. (1991). Psychological stress and susceptibility to the common cold. *New England Journal of Medicine*, 325, 606-612.
- Cone, J. D., & Hayes, S. C. (1980). *Environmental problems/behavioral solutions*. Monterey, CA: Brooks/Cole.
- Conner, R. (1994, July 17-22). *Evaluation of the Colorado Healthy Communities Initiative*. Paper presented at the 23rd International Congress of Applied Psychology, Madrid, Spain.
- Cooper, C. (1974). The house as symbol of the self. In J. Lang, C. Burnette, W. Moleski, & D. Vachon (Eds.), *Designing for human behavior* (pp. 130-146). Stroudsburg, PA: Dowden, Hutchinson, & Ross.
- Cooper-Marcus, C., & Sarkissian, W. (1986). *Housing as if people mattered: Site design guidelines for medium-density family housing*. Berkeley: University of California Press.
- Craik, K. H. (1973). Environmental psychology. *Annual Review of Psychology*, 24, 403-422.
- Craik, K. H. (1976). The personality research paradigm in environmental psychology. In S. Wapner, S. Cohen, & B. Kaplan (Eds.), *Experiencing the environment* (pp. 55-80). New York: Plenum Press.
- Craik, K. H. (1977). Multiple scientific paradigms in environmental psychology. *International Journal of Psychology*, 12, 26-31.
- Craik, K. H., & Zube, E. H. (Eds.). (1976). *Perceiving environmental quality: Research and applications*. New York: Plenum Press.
- Cvetkovich, G., & Earle, T. (1992). Environmental hazards and the public. *Journal of Social Issues*, 48, 1-20.
- Dalholm, E. H. (Ed.). (1991). *Full-scale modelling: Applications and development of the method*. Documentation of the 3rd Full-Scale Modelling Conference, September, 1990. Lund, Sweden: Department of Building Functions Analysis, School of Architecture, University of Lund.
- Danko, S., Eshelman, P., & Hedge, A. (1990). A taxonomy of health, safety, and welfare implications of interior design decisions. *Journal of Interior Design Education and Research*, 16, 19-30.
- Darley, J. M., & Gilbert, D. T. (1985). Social psychological aspects of environmental psychology. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (Vol. 2, 3rd ed.). Reading, MA: Addison-Wesley.
- Dember, W. N. (1974). Motivation and the cognitive revolution. *American Psychologist*, 29, 161-168.
- Downs, R. M. (1970). The cognitive structure of an urban shopping center. *Environment and Behavior*, 2, 13-39.
- Downs, R. M., & Stea, D. (Eds.). (1973). *Image & environment: Cognitive mapping and spatial behavior*. Chicago: Aldine.
- Duhl, L. (1986). The healthy city: Its functions and its future. *Health Promotion*, 1, 55-60.
- Dunlap, R. E., Grieneeks, J. K., & Rokeach, M. (1983). Human values and pro-environmental behavior. In W. D. Conn (Ed.), *Energy and material resources: Attitudes, values, and public policy* (pp. 145-168). Boulder, CO: Westview Press.
- Dunlop, C., & Kling, R. (Eds.). (1991). *Computerization and controversy: Value conflicts and social choices*. Boston: Academic Press.
- Eddy, G. L., & Sinnett, E. R. (1973). Behavior setting utilization by emotionally disturbed college students. *Journal of Consulting and Clinical Psychology*, 40, 210-216.
- Epstein, S. (1994). Integration of the cognitive and psychodynamic unconscious. *American Psychologist*, 49, 709-724.
- Evans, G. W. (1979). Crowding and human performance. *Journal of Applied Social Psychology*, 9, 27-46.
- Evans, G. W. (1980). Environmental cognition. *Psychological Bulletin*, 88, 259-287.
- Festinger, L., Schachter, S., & Back, K. (1950). *Social pressures in informal groups*. New York: Harper.
- Finkelhor, D., & Dziuba-Leatherman, J. (1994). Victimization of children. *American Psychologist*, 49, 173-183.
- Fowler, R. D. (1990). Psychology: The core discipline. *American Psychologist*, 45, 1-6.
- Franck, K. A., & Ahrentzen, S. (Eds.). (1989). *New households, new housing*. New York: Van Nostrand Reinhold.
- Frankenhaeuser, M. (1980). Psychoneuroendocrine approaches to the study of stressful person environment transactions. In H. Selve (Ed.), *Selye's guide to stress research* (pp. 46-70). New York: Van Nostrand Reinhold.
- Freedman, J. L. (1975). *Crowding and behavior*. San Francisco: W. H. Freeman.
- Friedman, S. L., & Wachs, T. D. (Eds.). (in press). *Measurement of environment across the lifespan*. Washington, DC: American Psychological Association.
- Friman, P. C., Allen, K. D., Kerwin, M. E., & Larzelere, R. (1993). Changes in modern psychology: A citation analysis of the Kuhnian displacement thesis. *American Psychologist*, 48, 658-664.
- Garling, T., & Evans, G. W. (Eds.). (1991). *Environment, cognition, and action: An integrated approach*. New York: Oxford University Press.
- Geller, E. S., Winett, R. A., & Everett, P. B. (1982). *Preserving the environment: New strategies for behavior change*. New York: Pergamon Press.
- Gergen, K. J. (1978). Toward generative theory. *Journal of Personality and Social Psychology*, 36, 1344-1360.
- Gergen, K. J. (1985). The social constructionist movement in modern psychology. *American Psychologist*, 40, 255-265.
- Gholson, B., & Barker, P. (1985). Kuhn, Lakatos, and Laudan: Applications in the history of physics and psychology. *American Psychologist*, 40, 755-769.
- Gibson, J. J. (1960). The concept of the stimulus in psychology. *American Psychologist*, 15, 694-703.
- Gifford, R. (1993). Announcement: Special issue on green psychology. *Journal of Environmental Psychology*, 13, 91.
- Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.
- Giuliano, G., Hwang, K., & Wachs, M. (1993). Employee trip reduction in Southern California: First year results. *Transportation Research*, 27A, 125-137.
- Glass, D. C., & Singer, J. E. (1972). *Urban stress*. New York: Academic Press.
- Goldstein, A. P. (1995). *The ecology of aggression*. New York: Plenum Press.
- Goodman, R. M., Burdine, J. N., Meehan, E., & McLeroy, K. R. (1993). Community coalitions for health promotion. *Health Education Research: Theory and Practice*, 8, 305-448.
- Green, L. W., & Cargo, M. D. (1994). The changing context of health promotion in the workplace. In M. P. O'Donnell & J. S. Harris (Eds.), *Health promotion in the workplace* (2nd ed., pp. 497-524). Albany, NY: Delmar Publishers.
- Green, L. W., & Ottoson, J. M. (1994). *Community health* (7th ed.). St. Louis: Mosby.
- Greenberg, M. R. (1986). Indoor air quality: Protecting public health through design, planning, and research. *Journal of Architectural and Planning Research*, 3, 253-261.
- Gurkaynak, M. R., & LeCompte, W. (1979). *Human consequences of crowding*. New York: Plenum Press.
- Hagino, G., & Ittelson, W. H. (Eds.). (1980). *Interaction processes between human behavior and environment*. Tokyo: Busei Printing Company.
- Hagino, G., Mochizuki, M., & Yamamoto, T. (1987). Environmental psychology in Japan. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1155-1170). New York: Wiley.
- Hall, E. T. (1966). *The hidden dimension*. Garden City, NY: Doubleday & Co.
- Handy, S. L., & Mokhtarian, P. L. (1995). Planning for telecommuting: Measurement and policy issues. *American Planning Association Journal*, 61, 99-111.
- Harris, P. R. (1992). *Living and working in space: Human behavior, culture, and organization*. New York: Ellis Horwood.
- Harrison, A. A., Clearwater, Y. A., & McKay, C. P. (1991). *From Antarctica to outer space: Life in isolation and confinement*. New York: Springer-Verlag.
- Hart, R. A., & Moore, G. T. (1973). The development of spatial cognition: A review. In R. M. Downs & D. Stea (Eds.), *Image and environment: Cognitive mapping and spatial behavior* (pp. 246-288). Chicago: Aldine.
- Hartig, T., Mang, M., & Evans, G. W. (1991). Restorative effects of natural environment experiences. *Environment and Behavior*, 23, 3-26.

- Hartig, T., & Stokols, D. (1994). *Toward an ecology of stress and restoration. Man and nature* (Working Paper 54-1994). Humanities Research Center, Odense University, Odense, Denmark.
- Hedge, A. (1989). Environmental conditions and health in offices. *International Review of Ergonomics*, 2, 87-110.
- Holahan, C. J. (1986). Environmental psychology. *Annual Review of Psychology*, 37, 381-407.
- Holahan, C. J., & Wandersman, A. (1987). The community psychology perspective in environmental psychology. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 827-862). New York: Wiley & Sons.
- Holman, E. A., & Stokols, D. (1994). The environmental psychology of child sexual abuse. *Journal of Environmental Psychology*, 14, 237-252.
- Hubbard, P. J. (1992). Environment-behavior studies and city design: A new agenda for research. *Journal of Environmental Psychology*, 12, 269-279.
- Ittelson, W. H. (1973). *Environment and cognition*. New York: Seminar Press.
- Ittelson, W. H. (1986). The psychology of technology. In W. H. Ittelson, M. Asai, & M. Ker (Eds.), *Cross cultural research in environment and behavior* (pp. 145-154). Tucson: University of Arizona Press.
- Ittelson, W. H. (1995). Interview with Bill Ittelson. *Environmental Theory Arena*, 3, 1-7.
- Ittelson, W. H., Asai, M., & Ker, M. (Eds.). (1986). *Cross cultural research in environment and behavior*. Tucson: University of Arizona Press.
- Ittelson, W. H., Proshansky, H. H., Rivlin, L. G., & Winkel, G. (1974). *An introduction to environmental psychology*. New York: Holt, Rinehart & Winston.
- Ittelson, W. H., Rivlin, L. G., & Proshansky, H. H. (1976). The use of behavioral maps in environmental psychology. In H. M. Proshansky, W. H. Ittelson, & L. G. Rivlin (Eds.), *Environmental psychology: People and their physical settings* (2nd ed., pp. 340-351). New York: Holt, Rinehart & Winston.
- Kaplan, R. (1993). The role of nature in the context of the workplace. *Landscape and Urban Planning*, 26, 193-201.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. New York: Cambridge University Press.
- Kaplan, S., & Talbot, J. F. (1983). Psychological benefits of a wilderness experience. In I. Altman & J. F. Wohlwill (Eds.), *Human behavior and environment: Advances in theory and research: Vol. 6. Behavior and the natural environment* (pp. 163-203). New York: Plenum Press.
- Kates, R. W., & Wohlwill, J. F. (Eds.). (1966). Man's response to the physical environment [Special issue]. *Journal of Social Issues*, 22 (4).
- Kempton, W., Darley, J. M., & Stern, P. C. (1992). Psychological research for the new energy problems: Strategies and opportunities. *American Psychologist*, 47, 1213-1223.
- Knopf, R. C. (1987). Human behavior, cognition, and affect in the natural environment. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 1, pp. 783-825). New York: Wiley.
- Koffka, J. (1935). *Principles of Gestalt psychology*. New York: Harcourt, Brace & World.
- Korpela, K. M. (1992). Adolescents' favorite places and environmental self-regulation. *Journal of Environmental Psychology*, 12, 249-258.
- Kuhn, T. S. (1962). *The structure of scientific revolutions*. Chicago: University of Chicago Press.
- Kuller, R. (1987). Environmental psychology from a Swedish perspective. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1243-1279). New York: Wiley.
- Lakatos, I. (1978). *The methodology of scientific research programmes*. Cambridge, England: Cambridge University Press.
- Laudan, L. (1977). *Progress and its problems: Towards a theory of scientific growth*. Berkeley: University of California Press.
- Lawrence, R. J. (1987). *Housing, dwellings, and homes: Design theory, research, and practice*. Chichester, England: Wiley.
- Lawton, M. P. (1989). Behavior relevant ecological factors. In K. W. Schaie & C. Schooler (Eds.), *Social structure and aging: Psychological processes* (pp. 57-78). Hillsdale, NJ: Erlbaum.
- Lawton, M. P., & Nahemow, L. (1973). Ecology and the aging process. In E. Eisdorfer & M. P. Lawton (Eds.), *Psychology of adult development and aging* (pp. 619-674). Washington, DC: American Psychological Association.
- Lazarus, R. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Leaf, A. (1989). Potential health effects of global climatic and environmental changes. *New England Journal of Medicine*, 321, 1577-1583.
- Leavitt, J., & Saegert, S. (1990). *From abandonment to hope: Community households in Harlem*. New York: Columbia University Press.
- Levy-Leboyer, C. (1982). *Psychology and environment* (Trans. by D. Canter & I. Griffiths). Beverly Hills, CA: Sage Publications.
- Lewin, K. (1936). *Principles of topological psychology* (Trans. by F. Heider & G. Heider). New York: McGraw-Hill.
- Linney, J. A. (1990). Community psychology into the 1990s: Capitalizing opportunity and promoting innovation. *American Journal of Community Psychology*, 18, 1-17.
- Little, B. (1983). Personal projects: A rationale and method for investigation. *Environment and Behavior*, 15, 273-309.
- Little, B. (1987). Personality and environment. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 1, pp. 205-244). New York: Wiley.
- Lynch, K. (1960). *The image of the city*. Cambridge, MA: MIT Press.
- Magnusson, D. (1981). Wanted: A psychology of situations. In D. Magnusson (Ed.), *Toward a psychology of situations: An interactional perspective* (pp. 9-32). Hillsdale, NJ: Erlbaum.
- Maier, S. F., Watkins, L. R., & Fleshner, M. (1994). Psychoneuroimmunology: The interface between behavior, brain, and immunity. *American Psychologist*, 49, 1004-1017.
- Marans, R. W., Hunt, M. E., & Vakalo, K. L. (1984). Retirement communities. In I. Altman, M. P. Lawton, & J. F. Wohlwill (Eds.), *Elderly people and the environment. Human behavior and environment: Advances in theory and research* (Vol. 7, pp. 57-93). New York: Plenum Press.
- Marans, R. W., & Stokols, D. (1993). *Environmental simulation: Research and policy issues*. New York: Plenum Press.
- Margulis, S. (1995). The status of the objective built environment in environmental-psychological theory. In J. Nasar, P. Grannis, & K. Hanyu (Eds.), *Proceedings of the 26th Annual Conference of the Experimental Design Research Association* (pp. 9-12). Oklahoma City, OK: EDRA, Inc.
- Mazumdar, S. (1992). How programming can become counterproductive: An analysis of approaches to programming. *Journal of Environmental Psychology*, 12, 65-91.
- McKechnie, G. E. (1977). Simulation techniques in environmental psychology. In D. Stokols (Ed.), *Perspectives on Environment and behavior: Theory, research, and applications* (pp. 169-189). New York: Plenum Press.
- McNally, R. J. (1992). Disunity in psychology: Chaos or speciation? *American Psychologist*, 47, 1054.
- Merton, R. K. (1938). Social structure and anomie. *American Sociological Review*, 3, 672-682.
- Merton, R. K. (1968). On sociological theories of the middle range. In R. K. Merton (Ed.), *Social theory and social structure* (pp. 39-71). New York: The Free Press.
- Meyrowitz, J. (1985). *No sense of place: The impact of electronic media on social behavior*. New York: Oxford University Press.
- Michelson, W. H. (1985). *From sun to sun: Daily obligations and community structure in the lives of employed women and their families*. Totowa, NJ: Rowman & Allenheld.
- Milgram, S. (1970). The experience of living in cities. *Science*, 167, 1461-1468.
- Milgram, S., & Jodelet, D. (1976). Psychological maps of Paris. In H. M. Proshansky, W. H. Ittelson, & L. G. Rivlin (Eds.), *Environmental psychology* (2nd ed., pp. 104-124). New York: Holt, Rinehart & Winston.
- Minami, H., & Tanaka, K. (1995). Social and environmental psychology: Transaction between physical space and group-dynamic processes. *Environment and Behavior*, 27, 43-55.
- Moen, P., Elder, G., & Luscher, K. (Eds.). (1995). *Linking lives and contexts: Perspectives on the ecology of human development*. Washington, DC: American Psychological Association.
- Moore, G. T. (1986). Effects of the spatial definition of behavior settings on children's behavior: A quasi-experimental field study. *Journal of Environmental Psychology*, 6, 205-233.
- Moore, G. T. (1987). Environment and behavior research in North America: History, developments, and unresolved issues. In D. Stokols

- & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1359–1410). New York: Wiley.
- Moore, G. T., & Golledge, R. G. (Eds.). (1976). *Environmental knowing*. Stroudsburg, PA: Dowden, Hutchinson, & Ross.
- Moore, G. T., & Hart, R. A. (Eds.). (1989). Child care environments: Policy, research, and design [Special issue]. *Children's Environments Quarterly*, 6(4).
- Moore, G. T., & Lackney, J. A. (1993). School design: Crisis, educational performance, and design applications. *Children's Environments*, 10, 99–112.
- Moos, R. H. (1976). *The human context: Environmental determinants of behavior*. New York: Wiley & Sons.
- Moos, R. H. (1979). Social ecological perspectives on health. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.), *Health psychology: A handbook* (pp. 523–547). San Francisco: Josey-Bass.
- Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.
- Nasar, J. L., & Fisher, B. (1993). "Hot spots" of fear and crime: A multi-method investigation. *Journal of Environmental Psychology*, 13, 187–206.
- Newman, O. (1973). *Defensible space: Crime prevention through urban design*. New York: Macmillan.
- Newman, S. J., Zais, J., & Struyk, R. (1984). Housing older America. In I. Altman, M. P. Lawton, & J. F. Wohlwill (Eds.), *Elderly people and the environment. Human behavior and environment: Advances in theory and research* (Vol. 7, pp. 17–55). New York: Plenum Press.
- Niit, T., Heidmets, M., & Kruusvall, J. (Eds.). (1983). *Psychology and architecture*. Tallinn, Estonia: Tallinn Pedagogic Institute.
- Niit, T., Heidmets, M., & Kruusvall, J. (Eds.). (1985). *The socio-psychological basis of environmental design*. Tallinn, Estonia: Tallinn Pedagogic Institute.
- Noschis, K. (1992). Child development theory and planning for neighborhood play. *Children's Environments*, 9, 3–9.
- O'Donnell, M. P. (1994). Employers' financial perspective on health promotion. In M. P. O'Donnell & J. S. Harris (Eds.), *Health promotion in the workplace* (2nd ed., pp. 41–65). Albany, NY: Delmar.
- Ornstein, S. (1990). Linking environmental and industrial/organizational psychology. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 5., pp. 195–228). Chichester, England: Wiley.
- Oskamp, S., Harrington, M. J., Edwards, T. C., Sherwood, D. L., Okuda, S. M., & Swanson, D. C. (1991). Factors influencing household recycling behavior. *Environment and Behavior*, 23, 494–519.
- Parmelee, P. A., & Lawton, M. P. (1990). The design of special environments for the aged. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (3rd ed., pp. 464–488). New York: Academic Press.
- Pastalan, L. A. (1983). Environmental displacement: A literature reflecting old person–environment transactions. In G. D. Rowles & R. J. Ohta (Eds.), *Aging and milieu: Environmental perspectives on growing old* (pp. 189–203). New York: Academic Press.
- Perkins, D. D., Meeks, J. W., & Taylor, R. B. (1992). The physical environment of street blocks and resident perceptions of crime and disorder: Implications for theory and measurement. *Journal of Environmental Psychology*, 12, 21–34.
- Perkins, D. D., Wandersman, A., Rich, R. C., & Taylor, R. B. (1993). The physical environment of street crime: Defensible space, territoriality, and incivilities. *Journal of Environmental Psychology*, 13, 29–49.
- Piaget, J. (1963). *The origins of intelligence in children*. New York: Norton.
- Platt, J. (1973). Social traps. *American Psychologist*, 28, 641–651.
- Pol, E. (1993). *Environmental psychology in Europe: From architectural psychology to green psychology*. Aldershot, England: Avebury Press.
- Preiser, W. F. E. (1988). A combined tactile–electronic guidance system for visually impaired persons in indoor and outdoor spaces. In E. Chigier (Ed.), *Design for disabled persons*. Tel Aviv, Israel: Freund Publishing House Ltd.
- Preiser, W. F. E. (Ed.). (1989). *Building evaluation*. New York: Plenum Press.
- Prison-building binge in California casts shadow on higher education. (1995, April 12). *New York Times*, National Section, p. 1.
- Proshansky, H. M. (1978). The city and self identity. *Environment and Behavior*, 10, 147–169.
- Proshansky, H. M. (1990). The pursuit of understanding: An intellectual history. In I. Altman & K. Christensen (Eds.), *Environment and behavior studies: Emergence of intellectual traditions. Human behavior and environment: Advances in theory and research* (Vol. 11, pp. 9–30). New York: Plenum Press.
- Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place identity: Physical world socialization of the self. *Journal of Environmental Psychology*, 3, 57–83.
- Proshansky, H. M., Ittelson, W. H., & Rivlin, L. (Eds.). (1970). *Environmental psychology: People and their physical settings*. New York: Holt, Rinehart & Winston.
- Quirk, M., & Wapner, S. (1995). Environmental psychology and health. *Environment and Behavior*, 27, 90–99.
- Rapoport, A. (1980). Cross-cultural aspects of environmental design. In I. Altman, A. Rapoport, & J. F. Wohlwill (Eds.), *Environment and culture. Human behavior and environment: Advances in theory and research* (Vol. 4, pp. 7–46). New York: Plenum Press.
- Rappaport, J. (1987). Terms of empowerment/exemplars of prevention: Toward a theory for community psychology. *American Journal of Community Psychology*, 15, 1–15.
- Reizenstein-Carpman, J., Grant, M. A., & Simmons, D. A. (1986). *Design that cares: Planning health facilities for patients and visitors*. Chicago: American Hospital Association.
- Riger, S. (1992). Epistemological debates, feminist voices: Science, social values, and the study of women. *American Psychologist*, 47, 730–740.
- Riger, S. (1993). What's wrong with empowerment. *American Journal of Community Psychology*, 21, 279–292.
- Rogers-Warren, A., & Warren, S. F. (1977). *Ecological perspectives in behavior analysis*. Baltimore: University Park Press.
- Rosen, R., & Berger, L. (1991). *The healthy company: Eight strategies to develop people, productivity, and profits*. Los Angeles: J. P. Tarcher, Inc.
- Rosnow, R. L., & Georgoudi, M. (Eds.). (1986). *Contextualism and understanding in behavioral science: Implications for research and theory*. New York: Praeger Publishers.
- Russell, J. A., & Ward, L. M. (1982). Environmental psychology. *Annual Review of Psychology*, 33, 651–658.
- Saegert, S. (1987). Environmental psychology and social change. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 99–128). New York: Wiley.
- Saegert, S., & Winkel, G. H. (1990). Environmental psychology. *Annual Review of Psychology*, 41, 441–477.
- Sampson, E. E. (1981). Cognitive psychology as ideology. *American Psychologist*, 36, 730–743.
- Sanchez, E., Wiesenfeld, E., & Cronick, K. (1987). Environmental psychology from a Latin American perspective. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1337–1357). New York: Wiley.
- Saunders, J. O. (Ed.). (1990). *The legal challenge of sustainable development*. Calgary: Canadian Institute of Resources Law.
- Silver, C. S., & DeFries, R. S. (1990). *One earth, one future: Our changing global environment*. Washington, DC: National Academy Press.
- Singh, R. L., & Singh, R. P. B. (Eds.). (1991). Environmental experience and value of place [Special issue]. *National Geographic Journal of India*, 37(1 & 2).
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Slaby, R. (1992). Media influences on violence. In American Psychological Association (Ed.), *Report of the American Psychological Association Commission on Youth Violence*. Washington, DC: American Psychological Association.
- Sommer, R. (1969). *Personal space: The behavioral basis of design*. Englewood Cliffs, NJ: Prentice Hall.
- Sommer, R. (1983). *Social design: Creating buildings with people in mind*. Englewood Cliffs, NJ: Prentice Hall.
- Sommer, R. (1987). Dreams, reality, and the future of environmental psychology. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1489–1511). New York: Wiley.
- Sperry, R. W. (1993). The impact and promise of the cognitive revolution. *American Psychologist*, 48, 878–885.

- Staats, A. W. (1991). Unified positivism and unification psychology: Fad or new field? *American Psychologist*, 46, 899-912.
- Stern, P. C. (1992). Psychological dimensions of global environmental change. *Annual Review of Psychology*, 43, 269-302.
- Stern, P. C., & Gardner, G. T. (1981). Psychological research and energy policy. *American Psychologist*, 36, 329-342.
- Stern, P. C., Young, O. R., & Druckman, D. (Eds.). (1992). *Global environmental change: Understanding the human dimensions*. Washington, DC: National Academy Press.
- Stokols, D. (1972). On the distinction between density and crowding: Some implications for future research. *Psychological Review*, 79, 275-277.
- Stokols, D. (1978). Environmental psychology. In M. R. Rosenzweig & L. W. Porter (Eds.), *Annual review of psychology* (Vol. 29, pp. 253-295). Palo Alto, CA: Annual Reviews.
- Stokols, D. (1981). Group \times place transactions: Some neglected issues in psychological research on settings. In D. Magnusson (Ed.), *Toward a psychology of situations: An interactional perspective* (pp. 393-415). Hillsdale, NJ: Erlbaum.
- Stokols, D. (1982). Environmental psychology: A coming of age. In A. Kraut (Ed.), *G. Stanley Hall lectures* (Vol. 2, pp. 155-205). Washington, DC: American Psychological Association.
- Stokols, D. (1987). Conceptual strategies of environmental psychology. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (pp. 41-70). New York: Wiley.
- Stokols, D. (1988). Transformational processes in people-environment relations. In J. E. McGrath (Ed.), *The social psychology of time* (pp. 233-252). Beverly Hills, CA: Sage.
- Stokols, D. (1990). Instrumental and spiritual views of people-environment relations. *American Psychologist*, 45, 641-646.
- Stokols, D. (1992). Establishing and maintaining healthy environments: Toward a social ecology of health promotion. *American Psychologist*, 47, 6-22.
- Stokols, D. (in press). Environmental design and occupational health. In J. M. Stellman & C. Brabant (Eds.), *ILO encyclopedia of occupational health and safety* (4th ed), Section IV, Psychosocial and organizational factors (S. L. Sauter & L. Levi, section eds.). Geneva, Switzerland: International Labor Office.
- Stokols, D., & Altman, I. (Eds.). (1987). *Handbook of environmental psychology* (Vols. 1 & 2). New York: Wiley.
- Stokols, D., Pelletier, K., & Fielding, J. E. (1995). Integration of medical care and worksite health promotion. *Journal of the American Medical Association*, 273, 1136-1142.
- Stokols, D., & Shumaker, S. (1981). People in places: A transactional view of settings. In J. Harvey (Ed.), *Cognition, social behavior, and the environment* (pp. 441-488). Hillsdale, NJ: Erlbaum.
- Suedfeld, P., Metcalfe, J., & Bluck, S. (1987). Enhancement of scientific creativity by flotation rest (restricted environmental stimulation technique). *Journal of Environmental Psychology*, 7, 219-231.
- Sundstrom, E. (1986). *Workplaces: The psychology of the physical environment in offices and factories*. New York: Cambridge University Press.
- Susa, A. M., & Benedict, J. O. (1994). The effects of playground design on pretend play and divergent thinking. *Environment and Behavior*, 26, 560-579.
- Taylor, R. B., Shumaker, S. A., & Gottfredson, S. D. (1985). Neighborhood-level links between physical features and local sentiments: Deterioration, fear of crime, and confidence. *Journal of Architectural and Planning Research*, 2, 261-275.
- Taylor, S. E. (1995). *Health psychology* (3rd ed.). New York: McGraw-Hill.
- Tolman, E. C. (1948). *Cognitive maps in rats and men*. *Psychological Review*, 55, 189-208.
- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment. In I. Altman & J. F. Wohlwill (Eds.), *Behavior and the natural environment. Human behavior and environment: Advances in theory and research* (Vol. 6, pp. 85-125). New York: Plenum Press.
- Ulrich, R. S. (1991). Effects of interior design on wellness: Theory and recent scientific research. *Journal of Health Care Interior Design*, 3, 97-109.
- Unger, D., & Wandersman, A. (1985). The importance of neighbors: The social, cognitive, and affective components of neighboring. *American Journal of Community Psychology*, 13, 139-169.
- United States Advisory Board on Child Abuse and Neglect. (1995). *A nation's shame: Fatal child abuse and neglect in the United States*. Washington, DC: U.S. Government Printing Office.
- United States Department of Health and Human Services. (1991). *Healthy People 2000: National health promotion and disease prevention objectives* (PHHS Publication No. PHS 91-50212). Washington, DC: U.S. Government Printing Office.
- United States Department of Health and Human Services. (1993). *Preventing homicide in the workplace* (DHHS NIOSH Publication No. 93-109). Cincinnati, OH: Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health.
- Vaughan, E. (1993). Individual and cultural differences in adaptation to environmental risks. *American Psychologist*, 48, 673-680.
- Verbrugge, L. (1990). The iceberg of disability. In M. Stahl (Ed.), *The legacy of longevity* (pp. 55-75). Newbury Park, CA: Sage.
- Vila, B. (1994). A general paradigm for understanding criminal behavior: Extending evolutionary ecological theory. *Criminology*, 32, 311-359.
- Wachs, T. D. (1992). *The nature of nurture*. Newbury Park, CA: Sage.
- Walsh, J., & Francis, S. (1992). *U.S. industrial outlook*. Washington, DC: Health Care Financing Administration, Office of the Actuary, U.S. Department of Commerce.
- Wandersman, A. H., & Hallman, W. K. (1993). Are people acting irrationally? Understanding public concerns about environmental threats. *American Psychologist*, 48, 681-686.
- Wapner, S. (1987). A holistic, developmental, systems-oriented environmental psychology: Some beginnings. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 2, pp. 1433-1465). New York: Wiley.
- Wapner, S. (1995). Toward integration: Environmental psychology in relation to other subfields of psychology. *Environment and Behavior*, 27, 9-32.
- Watson, J. B. (1913). Psychology as the behaviorist views it. *Psychological Review*, 20, 159-177.
- Werner, H. (1948). *Comparative psychology of mental development*. New York: International Universities Press.
- Wicker, A. W. (1979). *An introduction to ecological psychology*. New York: Cambridge University Press.
- Wicker, A. W. (1985). Getting out of our conceptual ruts: Strategies for expanding conceptual frameworks. *American Psychologist*, 40, 1094-1103.
- Wicker, A. W. (1987). Behavior settings reconsidered: Temporal stages, resources, internal dynamics, context. In D. Stokols & I. Altman (Eds.), *Handbook of environmental Psychology* (Vol. 1, pp. 613-653). New York: Wiley.
- Wicker, A. W., McGrath, J. E., & Armstrong, G. E. (1972). Organization size and behavior setting capacity as determinants of member participation. *Behavioral Science*, 17, 499-513.
- Wiesenfeld, E. (1992). Public housing evaluation in Venezuela: A case study. *Journal of Environmental Psychology*, 12, 213-223.
- Willems, E. P. (1974). Behavioral technology and behavioral ecology. *Journal of Applied Behavior Analysis*, 7, 151-164.
- Williams, A. F. (1982). Passive and active measures for controlling disease and injury: The role of health psychologists. *Health Psychology*, 1, 399-409.
- Wineman, J. (Ed.). (1986). *Behavioral issues in office design*. New York: Van Nostrand Reinhold.
- Winett, R. A., King, A. C., & Altman, D. G. (1989). *Health psychology and public health: An integrative approach*. New York: Pergamon Press.
- Wohlwill, J. F., & Heft, H. (1987). The physical environment and the development of the child. In D. Stokols & I. Altman (Eds.), *Handbook of environmental psychology* (Vol. 1, pp. 281-328). New York: Wiley.
- World Resources Institute. (1994). *World resources, 1994-95*. New York: Oxford University Press.
- Yoshitake, Y., Bechtel, R. B., Takahashi, T., & Asai, M. (Eds.). (1990). *Current issues in environment-behavior research: Proceedings of the Third Japan-United States Seminar*. Tokyo: University of Tokyo Press.
- Zeisel, J. (1981). *Inquiry by design: Tools for environment-behavior research*. New York: Cambridge University Press.
- Zube, E. H. (1991). Environmental psychology, global issues, and local landscape research. *Journal of Environmental Psychology*, 11, 321-334.
- Zube, E. H., & Moore, G. T. (Eds.). (1991). *Advances in environment, behavior, and design* (Vol. 3). New York: Plenum Press.