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## Transformational Processes in People-Environment Relations

DANIEL STOKOLS

The past two decades of psychological research have witnessed a growing interest in ecological and contextual influences on human behavior and well-being. This trend is reflected in the conceptual and empirical contributions of environmental, population, and community psychology, all of which are part of a growing interdisciplinary field of environment-behavior research. The environment-behavior field also encompasses several other disciplinary paradigms such as environmental sociology, behavioral geography, natural resources management, and environmental design research, which share a common interest in the relationships between people and their everyday environments.

The rapid growth of the environment-behavior field during the late 1960s and early 1970s was precipitated not only by global environmental problems (e.g., depletion of natural resources, overcrowding, urban violence), but also by the neglect of important theoretical concerns within more traditional areas of the behavioral and environmental sciences. For instance, earlier psychological research had neglected the molar environmental contexts of everyday behavior (e.g., schools,

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TRANSFORMATIONAL PERSPECTIVES ON ENVIRONMENT AND BEHAVIOR

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homes, work settings, neighborhoods) and, instead, had construed the environment in more "micro" terms as an array of isolated, diverse stimuli. Also, much of that research had been dominated by linear, stimulus-response models of environment and behavior that virtually ignored the geographical, historical, and sociocultural contexts of people's daily activities (see Gergen, 1973; Michelson, 1976).

By contrast, the newly emerging field of environmental psychology signaled a surge of scientific interest in more complex and molar patterns of people-environment transaction (see Ittelson, 1973; Wapner, Kaplan, & Cohen, 1973). From the late 1960s onward, research attention began to shift away from discrete stimuli within the physical environment toward more highly structured units of analysis such as behavior settings, neighborhoods, and activity systems (see Barker, 1968; Chapin, 1974; Michelson, 1977). The social and physical facets of behavior settings were viewed as highly interdependent rather than as independent of each other. Also, the occupants of organized settings were portrayed as actively involved in the design and management of their surroundings rather than as passively responding to immediate environmental constraints (see Ittelson, Proshansky, Rivlin, & Winkel, 1974). All of these developments were part of a broad-based effort within the environment-behavior field to establish a more transactional and contextually oriented view of human behavior than had been evident in earlier research (see Lazarus & L'Amier, 1978; Little, 1987; Stokols & Shumaker, 1981).

The philosophical perspective of transactionalism encompasses certain key assumptions about the relationships between people and their environments (see Altman & Rogoff, 1987; Dewey & Bentley, 1949; Ittelson, 1973; Wapner, 1987). First, rather than simply construing environment and behavior in terms of independent and dependent variables, transactional analyses are concerned with more enduring qualities of interdependence that can arise between people and places. Second, human behavior is assumed to be embedded in and markedly influenced by the environmental contexts or settings in which it occurs. Thus the interrelations between specific environmental conditions (e.g., noise, high density, architectural enclosure) and behavior are understood to be highly dependent on the types of situations and settings (e.g., formal versus informal, primary versus secondary, public versus private) in which they are observed. Third, the relationships between people and environments are viewed as reciprocal rather than unidirectional. People not only react to existing environmental conditions—

they also take an active role in shaping and modifying their surroundings. Fourth, people-environment relations are assumed to be inherently dynamic rather than static: They are characterized as much by departures from equilibrium as by equilibrium maintenance.

To date, much progress has been made in translating the first two assumptions of transactionalism into operational strategies for theorizing and research. Several new concepts have been developed for representing the complex and varied forms of interdependence that can exist among particular people and places. For example, the concepts of undermanning (Barker, 1968), sociofugal setting (Osmond, 1957; Sommer, 1983), defensible space (Newman, 1973), place identity (Proshansky, 1978), and life situation (Magnusson, 1981) all highlight emotionally significant and enduring qualities of people-environment relations, rather than more circumscribed links between immediate environmental conditions and behavioral responses. Also, strategies for mapping spatially and temporally extended patterns of behavior across multiple settings have been proposed (see Barker & Schoggen, 1973; Ittelson, Rivlin, & Proshansky, 1976; Lennertorp, 1978; Stokols, 1982; Wicker, 1979). These approaches have broadened the geographic, temporal, and cultural scope of behavioral research and have encouraged the development of "contextual theories," or those that explain cross-setting variations in the relationships between particular facets of environment and behavior (see Stokols, 1987).

At the same time, however, the third and fourth assumptions of transactionalism noted earlier—that people and their environments mutually influence each other, and that these reciprocal patterns of influence are continuously changing rather than static—have received considerably less emphasis in environment-behavior research. For instance, the majority of research on behavior settings has taken the existence of these settings as a "given," and has emphasized their stability rather than their inherent changeability. Only recently has research attention shifted to the processes by which settings are established, imbued with social meaning and a "sense of place," structurally modified, or disbanded (see Barker, 1987; Canter, 1984; Relph, 1981; Rowles, 1983; Seamon, 1982; Sime, 1986; Wicker, 1987). Also, efforts to develop contextual theories often assume that the situational moderators of environment-behavior phenomena, once identified, can be reliably detected across different programs of research. Yet, the key sources of contextual influence on environment-behavior relationships may shift dramatically especially during periods

of rapid social, cultural, geographic, and technological change (see Archa & Kobayashi, 1985; Saegert, 1987). Moreover, these social and environmental transformations may be triggered by fortuitous and unpredictable events and, therefore, are not readily accommodated by existing models of environment and behavior that presume the stability of environmental settings and the links between contextual factors and target phenomena.

Thus although much progress has been made over the past two decades in achieving a more contextually oriented approach to the study of environment and behavior, an important challenge for future work in this field is to give greater expression to the reciprocal, dynamic, and fortuitous aspects of people-environment transaction that has been evident in prior research.

### *The Two Streams of Environment-Behavior Research*

At present, there appear to be two broadly discernible streams of environment-behavior research, each of which emphasizes different aspects of transactionalism. I shall refer to the first stream as the *nontransformational perspective*. This perspective emphasizes the study of relatively stable patterns of person-environment transaction, and has been the predominant conceptual orientation within environmental psychology and related areas of environment-behavior research. The nontransformational perspective assumes that the relationships between people and their sociophysical surroundings are largely predictable and relatively unaffected by chance. Also, nontransformational analyses emphasize processes of adaptation, normalization, and equilibrium maintenance in people's encounters with their milieus, and view the geographic and sociocultural context of human behavior as stable rather than unstable.

The second stream of environment-behavior research I shall refer to as the *transformational perspective*. Transformational analyses of environment and behavior have been relatively sparse to date, but they are likely to exert a strong influence on the future directions of the field as researchers become increasingly aware of the limitations of relying exclusively on nontransformational models. In contrast to nontransformational approaches, the transformational perspective assumes that fortuitous events play an important role in shaping the patterns of

people's transactions with their everyday environments. Also, transformational analyses give explicit attention to deviation-amplification and optimization processes in people-environment transaction, as well as those of equilibrium maintenance and normalization (see Maruyama, 1963; Sampson, 1985; Stokols, 1977). Finally, the transformational perspective assumes that certain forms and phases of people-environment transaction are highly prone to rapid change and extreme instability. Thus transformational analyses are explicitly concerned with the myriad factors that influence the relative stability or instability of people's relationships with their sociophysical milieu.

For the most part, the nontransformational and transformational perspectives have developed independently and have remained relatively separate from each other, as they emphasize rather different assumptions about the nature of people's relationships with their surroundings. The continued separation of these perspectives in future research could promote an unfortunate polarization and reification of our assumptions about the stability or instability of environment-behavior relations. On the other hand, efforts to integrate these perspectives would be valuable to the extent that they differentiate between those facets of people-environment transaction that are most consistent with nontransformational models, and those that can be better understood from a transformational perspective.

Before we can effectively integrate nontransformational and transformational models and develop strategies for selectively applying these approaches to environment-behavior phenomena, it is necessary to give more detailed attention to the unique research questions raised by the transformational perspective. Thus the ensuing discussion offers a preliminary agenda of research issues concerning processes of change in people-environment relations. This discussion may provide a preliminary basis for linking the transformational and nontransformational perspectives in future research.

### *Developing Transformational Theories of Environment and Behavior*

Transactional analyses of environment and behavior, while emphasizing the dynamic quality of people's relationships with their surroundings, have generally stopped short of addressing a whole series of crucial questions about the nature of change in those relationships. For

instance, are all forms and phases of people-environment transaction equally susceptible to change? If not, what situational and personal factors account for the variable rates of change or stability associated with different aspects of people-environment relations? Also, to what extent are changes in environment-behavior relations predictable or, instead, attributable to chance? In what ways might future theories better accommodate the role of chance events in altering patterns of people-environment transaction?

The preceding questions suggest an important direction for future research on environment and behavior: namely, the development of *transformational theories*, or those that explain the circumstances under which people-environment transactions are likely to undergo fundamental and demonstrable change. Examples of transformational analyses are Archa and Kobayashi's (1985) research on the behavior of household members during emergency situations such as earthquakes and fires; Wapner's (1981) analysis of the processes by which people prepare for and cope with "environmental transitions" such as residential relocation; Wicker's (1987) discussion of the social, psychological, and locational factors that encourage the formation, modification, or termination of behavior settings; and Sager's (1987) analysis of the ways in which researchers promote social change through the very process of studying the relations between people and their environments. Each of these analyses focuses directly on different sources and rates of change in people-environment transaction.

To be useful for research purposes, several key terms in the proposed definition of transformational theories must be clarified. Each of these terms raises a host of complex issues concerning the description, measurement, prediction, management, and outcomes of change processes in people-environment relations. For instance, what distinguishes changes in people-environment transactions from nontransactional forms of change? Also, can "fundamental and demonstrable" changes in people's relations with their environments be reliably measured and differentiated from those that are routine and inconsequential? We begin below by addressing some of the descriptive tasks associated with the development of transformational theories.

#### Describing Patterns of Transformational Change

The concept of change as it applies to patterns of people-environment transaction must first be distinguished from changes that occur within

individuals as the result of physiological or developmental processes, and from those that occur in the physical structure of environments as a result of erosion or routine wear and tear. Such changes reflect purely intrapersonal or environmental processes and do not necessarily promote a restructuring of the relationships between people and their surroundings. On the other hand, developmental transitions such as graduation from college, marriage, or retirement, that substantially alter earlier patterns of people-environment transaction (e.g., through changes in one's residence or social networks) would be relevant to transformational theories as they are defined above. Similarly, transformations of the physical environment that are triggered by purely geographic factors (e.g., natural disasters), but which subsequently promote fundamental and persisting changes in people's relationships with their surroundings, would be encompassed by the proposed definition. Thus the basic units of analysis in transformational theories are those qualities and patterns of people's relationships with their environments that undergo fundamental and demonstrable change during a particular period.

The focus of transformational theories on changes in people's relationships with their surroundings requires a rather different descriptive approach than is typical of most behavioral theories. The traditional focus of nontransformational theories is on *behavioral change* rather than *transformational change*, as shown in Figure 11.1. Four categories of nontransformational theories are depicted, namely: trait, environmental, interactionist, and contextual theories (see Endler & Magnusson, 1976; Altman & Rogoff, 1987; and Stokols, 1987; for further discussions of these theories). *Trait models* portray behavioral change as an outcome of intrapersonal processes such as personality, physiology, and life-span development. *Environmental theories* account for behavioral change entirely in terms of specific stimuli and events occurring within the individual's social or physical environment. *Interactionist theories* explain behavioral change in terms of the interplay between intrapersonal and environmental factors. And *contextual theories* focus on behavioral variations that are attributable not only to the interactions between intrapersonal and "target" environmental ("E<sub>T</sub>") events, but also to the influence of contextual qualities of a particular situation or setting ("P-E<sub>C</sub>"). By incorporating terms to represent these structural qualities of settings, contextual theories give greater expression to the transactional view of environment and behavior than do trait, environmental, and interactionist models. Like these other models, however, contextual analyses generally focus on

1. Trait Theory: Trait → Behavior
2. Environmental Theory: Environment → Behavior
3. Interactionist Theory: Environment X Trait → Behavior
4. Contextual Theory: {People-Environment} X Environment<sub>T</sub> X Trait → Behavior

Figure 11.1. Nontransformational Theories

changes in individual behavior as the central phenomenon to be explained, rather than on fundamental changes in the transactional qualities of situations and settings.

By contrast, the unique focus of *transformational theories* is on properties of a situation at time, [P-E], that prompt intrapersonal processes, (P), and individual (or collective) behavior, B, yielding a modified situation at time, [P-E]:

$$[P-E]_t \rightarrow (P) \rightarrow B \rightarrow [P-E]_{t+1}$$

(The inclusion of "P" within parentheses denotes cognitive processes, rather than overt behavior as represented by "B".) In transformational theories, the key phenomena to be explained are the structural changes that occur in particular situations between two or more points in time ([P-E]<sub>t</sub> → [P-E]<sub>t+1</sub>), rather than individual or group behaviors, B, that mediate these altered patterns of transaction. Thus behavioral change is viewed as an intermediate step that accompanies certain processes of situational transformation rather than as the "endpoint" of theoretical analysis.

Four descriptive categories of situational change are depicted in Figure 11.2. Each category represents a different pattern of change processes. The first category describes a sequence whereby events within a situation at time, or [P-E]<sub>t</sub>, stimulate new insights (P) about possible changes in that setting at time, or (P-E)<sub>t+1</sub>. The enclosure of "P-E," within parentheses rather than brackets denotes a "cognitive transformation" of the existing setting through one's imagination of an alternative situation (see Kelley & Thibaut, 1978; Mischel, 1973).

1. Cognitive Transformation of Situations: {P-E}<sub>t</sub> → (P) → (P-E)<sub>t+1</sub>
2. Enactment of Intended Situational Change: {P-E}<sub>t</sub> → (P) → B → {P-E}<sub>t+1</sub>
3. Serendipitous Changes in Situations (behaviorally mediated): {P-E}<sub>t</sub> → B → {P-E}<sub>t+1</sub>
4. Serendipitous Changes in Situations (environmentally induced): {P-E}<sub>t</sub> → {P-E}<sub>t+1</sub>

Figure 11.2. Descriptive Categories of Transactional Change

Examples of cognitive transformations include the processes by which architects design new buildings, entrepreneurs formulate plans for establishing a new business, and homeowners develop contingency plans for dealing with impending emergencies such as earthquakes.

The actual implementation of planned changes within settings involves a more elaborated sequence of events, whereby mental images of an alternative situation are translated into intentional actions that lead to observable changes in the setting at time. In this instance, overt patterns of behavior are instrumental in altering the structure of the situation. Examples of planned situational changes include voluntary residential moves, the development of new technologies that fundamentally restructure people's work environments, the design and construction of "planned communities," and efforts among household members to reduce their consumption of electrical energy.

The third pattern of change shown in Figure 11.2 involves unplanned or serendipitous alterations of people's relationships within their environments. In these instances, an initial situation affords opportunities for novel and spontaneous behavior that eventually alters the original pattern of transaction among individuals and their surroundings. The "Commons Dilemma" (Hardin, 1968) exemplifies this transformational sequence. The ready availability of natural resources at time, encourages excessive consumption of those resources, resulting

in unanticipated shortages at a later time. Also, exposure to stressful situations and life events may prompt new patterns of behavior that eventually bring about noticeable improvements in one's overall life situation.

Figure 11.2 depicts one other sequence of serendipitous change that is instigated by environmental forces, rather than mediated by individual or group behavior. Environmental transformations such as earthquakes, volcanic eruptions, and floods occur quite independently of cognitive, behavioral, and social processes. Yet, these massive and sudden events impose long-standing and pervasive changes in people's transactions with their social and physical milieus.

The above-noted categories of transactional change are useful in suggesting several directions for future research on the measurement, prediction, management, and outcomes of transformation processes. Some of these avenues for future study are outlined below.

#### Measuring Transactional Change

The basic units of measurement in transformational research are changes in the qualities of people's relationships with their surroundings. These transactional qualities of situations and settings (e.g., "person-environment fit," "defensible space," "public territory," "restorative environment") are generally more subtle and difficult to observe than the overt behavior of individuals or the physical conditions of environments. A prerequisite for measuring patterns of transactional change is a clear conceptualization of the dimensions on which change is expected to occur during a particular time interval. Yet, relatively little attention has been given in prior environment-behavior research to the development of theoretical constructs for representing the transactional or "composite" qualities of situations (see Stokols, 1987). Thus an important direction for future work is to develop taxonomic frameworks for describing and comparing situations and settings in terms of their distinctive transactional properties.

Once the key transactional dimensions of a situation have been identified, criteria for detecting quantitative and qualitative change along those dimensions can be derived. Quantitative aspects of change include the magnitude, scope, suddenness, and duration of transformational events. These parameters of transactional change can be used to describe a variety of events ranging from relatively modest and gradual changes to those that are quite massive and abrupt. In the definition of

transformational theories proposed earlier, the phrase "fundamental and demonstrable change" is used to shift the focus of analysis away from the routine (and inconsequential) fluctuations that occur during people's day-to-day encounters with their environments, toward those that entail significant and noticeable departures from previous transactional patterns. At the same time, however, it is important that future transactional research address a broad spectrum of change processes (some of which occur more slowly than others), rather than focusing only on the most extreme and clear-cut instances of change.

Certain qualitative aspects of change also warrant attention in future research. These qualitative dimensions include the source (internal/external), level (individual/aggregate), and focus (social/physical) of transactional change. For instance, some change processes originate internally whereas others arise from sources outside the target situation (e.g., voluntary organizational changes enacted by the members of a setting versus those imposed by external constraints). Some are manifested through altered patterns of individual-environment relations while others occur at the level of group-environment transaction. Furthermore, situational changes can be differentiated in terms of their focus on interpersonal processes or, alternatively, on people's transactions with nonsocial aspects of their milieus. Taken together, these dimensions illustrate the diverse types of measurement criteria that can be used to detect patterns of transactional change.

#### Predicting and Explaining Transactional Change

Transformational theories, as defined above, seek to explain important sources of change in environment-behavior phenomena. Considering the alternative categories of transactional change summarized in Figure 11.2, it appears that certain patterns of change may be considerably more difficult to model and explain than others. For example, although it may be possible to predict the timing and direction of planned changes in people's relations with their surroundings, serendipitous changes occur in a much more spontaneous or random fashion. The occurrence of fortuitous changes within situations raises some intriguing questions for future research: First, are certain facets of people-environment transaction more susceptible to the influence of chance events than others? If so, what circumstances increase or reduce the likelihood that chance events will significantly alter existing

patterns of environment-behavior transaction within a particular spatial, temporal, and cultural context?

Although the exact nature and timing of fortuitous events cannot be reliably modeled, it may be possible to identify certain forms or phases of people-environment transaction that are especially susceptible to influence by such events. As noted earlier, the impact of chance factors on environment and behavior may be particularly great during periods of environmental upheaval and developmental transition (see Wapner, 1981). Also, acutely stressful events that restructure a person's life situation (e.g., death of spouse and subsequent residential and employment change) may instigate unanticipated encounters with new settings and people that profoundly affect the future course of the individual's life (see Aldwin & Stokols, in press). Thus an important direction for transformational research is to assess the varying influence of chance factors across different forms, phases, and contexts of environment and behavior, and to identify those situations in which chance factors are likely to play a major or minor role in shifting the course of people's relationships with their surroundings.

Additional questions for future study relate to the processes by which people cognitively transform their environments and actually modify those settings through intentional behavior. For example, what situational circumstances prompt individuals to visualize and prepare for potential environmental crises (see Edney, 1980; Kaplan, 1972)? Also, are some environments more conducive to creative thinking and innovation than others (see Hamblin, Jacobsen, & Miller, 1973)? Along these lines, situations can be characterized as "generative" to the extent that they promote insight and functional environmental change, and "degenerative" to the degree that they discourage creativity and/or promote dysfunctional environmental change (see Stokols, 1981).

The notion that some environments are more conducive to transactional change than others suggests the possibility of modeling the "transformational potential" of settings—that is, the extent to which group members are motivated to modify the physical or social structure of a setting in accord with their environmental preferences. The degree of transformational potential reflects the discrepancy between existing and potential levels of environmental quality. To the degree that group members possess clear images of preferred future environments, the current quality of their situation may be judged as inferior to its potential quality. But high levels of transformational potential do not necessarily result in actual modifications of the setting. The accomplish-

ment of environmental change requires not only salient images of the future but also sufficient levels of environmental flexibility and behavioral competence among group members. Thus assuming that group members are motivated to improve their environment, the greatest amount of change would be initiated by imaginative groups within flexible settings whereas the lowest levels of change would be achieved by unimaginative groups within rigid settings.

The change-promotive circumstances noted above hardly constitute a predictive theory of transactional change; but they do illustrate some of the conceptual issues that remain to be addressed by future transformational models.

#### Managing the Occurrence and Outcomes of Transactional Change

A final set of research questions pertains to the management of transactional change and its outcomes. The management of change refers to the application of strategies to prevent or facilitate the occurrence of transformational events, and to reverse, ameliorate, or amplify the outcomes of such events. Opportunities for managing and coping with transactional change are greatest when the processes of change are planned and/or predictable, and when the positive or negative consequences of those events can be clearly specified.

In some instances, individuals have a clear image of the type of change they would like to achieve, and an action plan for implementing that change. Yet, the effectiveness of efforts to promote intentional change is often thwarted by an incomplete conceptualization of situational structure. Consider, for example, an organization that is committed to promoting higher levels of health or energy conservation among its members. All too often, health-promotive interventions or those to encourage resource conservation focus narrowly on changing individuals' life-styles and habitual patterns of behavior, while ignoring other aspects of settings that may be relevant to achieving the desired outcomes (see Figures 11.3 and 11.4). In this regard, the physical design of facilities is a pivotal element that is often overlooked in behavioral change programs. Yet, the ergonomic design of work areas and the installation of high-quality acoustical, lighting, and ventilation systems may be as important in promoting employees' health as those interventions that focus solely on changing individual's health habits (e.g., smoking, alcohol consumption, dietary and exercise regimens; see



		Temporal Focus of Health Promotion Strategies	
		Preoccupancy Affordances for Health Promotion	Postoccupancy Interventions to Promote Health
Behavior Setting Components	Physical Milieu	<ul style="list-style-type: none"> <li>▪ installation of appropriate HVAC, air purification systems</li> <li>▪ installation of appropriate lighting systems</li> <li>▪ installation of noise reduction devices</li> <li>▪ space planning to reduce visual and auditory distractions</li> <li>▪ ergonomic design of work areas</li> <li>▪ installation of environmental monitoring devices</li> </ul>	<ul style="list-style-type: none"> <li>▪ regular assessments of environmental quality data (air quality, noise levels, ventilation, lighting quality, and illumination)</li> <li>▪ regular assessments of individual and aggregated health data</li> <li>▪ retrofit to replace faulty HVAC, lighting, seating, and related equipment</li> <li>▪ development of restorative settings</li> </ul>
	Organizational Program	<ul style="list-style-type: none"> <li>▪ organizational size, structure, management style as sources of stress</li> <li>▪ financial status of the firm</li> <li>▪ commitment of the firm to health promotion</li> <li>▪ employee health benefits</li> <li>▪ clear versus vague health planning goals</li> </ul>	<ul style="list-style-type: none"> <li>▪ smoking cessation programs</li> <li>▪ hypertension reduction</li> <li>▪ alcohol intake reduction</li> <li>▪ nutrition, weight management</li> <li>▪ fitness, exercise</li> <li>▪ stress management</li> <li>▪ job redesign</li> <li>▪ ride-sharing programs</li> </ul>

Figure 11.3. A Summary of Health Promotion Strategies in Relation to the Physical Milieu and Organizational Program of Work Environments

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		Temporal Focus of Resource Conservation Strategies	
		Preoccupancy Affordances	Postoccupancy Interventions
Behavior Setting Components	Physical Milieu	<ul style="list-style-type: none"> <li>▪ geography, climate, size of setting</li> <li>▪ energy efficient architecture (e.g., solar-oriented site plans, thermal insulation)</li> <li>▪ energy-efficient appliances and labeling of appliances according to their efficiency (e.g., solar water heaters, refrigerators, air conditioners)</li> <li>▪ household-specific metering devices</li> <li>▪ availability of fuel-efficient automobiles</li> </ul>	<ul style="list-style-type: none"> <li>▪ energy audits to establish energy-efficient levels within the dwelling</li> <li>▪ retrofit to replace inefficient appliances and to install energy-saving devices</li> <li>▪ postoccupancy installation of household-specific metering devices</li> </ul>
	Organizational Program	<ul style="list-style-type: none"> <li>▪ development of resource-sharing strategies among setting members</li> <li>▪ social cohesion among setting members</li> <li>▪ communication and modeling among neighbors about energy conservation and consumer preferences</li> <li>▪ availability of community recycling programs</li> <li>▪ availability of neighborhood ride-sharing programs</li> </ul>	<ul style="list-style-type: none"> <li>▪ cash rebates on utility bills for reduction of consumption</li> <li>▪ feedback about consumption patterns to setting members</li> <li>▪ social praise of setting members for reduced consumption</li> <li>▪ prizes, rewards for outstanding conservation efforts</li> <li>▪ community cable TV programs to provide information and modeling about resource conservation strategies</li> </ul>

Figure 11.4. A Summary of Resource Conservation Strategies in Relation to the Physical Milieu and Organizational Program of Behavior Settings

Stokols, 1985). Similarly, the installation of household appliances that conserve electrical energy and metering devices that provide feedback to family members about their levels of energy use may, in the long run, have a greater impact on consumption patterns than efforts to modify individuals' daily behavior (e.g., encouraging people to set heating thermostats at lower levels or to turn off all lights when they leave a setting; see Stern & Gardner, 1981). Thus a transactional approach to environmental change emphasizes the interdependencies among the behavioral, social, and physical components of settings and the importance of considering these relationships when attempting to bring about desired patterns of situational change.

Perhaps the most difficult forms of change to manage are those that are undesirable, unpredictable, and unpreventable (e.g., natural disasters). In such instances, management efforts shift from change-promotive or preventative programs toward those involving preparatory coping and cost-containment strategies. For example, community residents may be provided with information about how to prepare for environmental emergencies and where to obtain government aid following such events. Also, strengthening community sources of social support may be an effective strategy for enabling individuals and groups to cope successfully with acutely stressful events (see Cohen & Syme, 1985; Sarason & Sarason, 1985; Shumaker & Brownell, 1985).

The preceding examples of change-management strategies presume that the outcomes of specific changes are clearly positive or negative. Yet, it is often extremely difficult to specify the quality of outcomes associated with certain types of situational change. First, there is the issue of deciding on the most appropriate time interval in which to measure the positive or negative consequences of change. For instance, the short-term gains in productivity resulting from the installation of automated office equipment may be offset by the potential health costs associated with employees' exposure to video display terminals (see Pearce, 1984). In this example, short-term assessments of employee productivity are likely to be insensitive to the longer-term impacts of organizational change.

The above example illustrates a second complexity inherent in the measurement of change outcomes: the fact that many instances of change bring about a mixture of both positive and negative events. In research on environmental stress, for example, there has been a tendency to focus on the negative impacts of environmental constraints and undesirable life events. This emphasis on the negative impacts of

stressors tends to obscure some of the more positive consequences of exposure to situational challenges and constraints (e.g., increased levels of immunocompetence, behavioral innovation, self-esteem, virtuosity of performance, and social cohesion that result from coping with certain types of stressors; see Aldwin & Stokols, in press). Also, the multiple impacts of stressful changes in environments may occur at both individual and aggregate levels. For example, although exposure to increased population density sometimes provokes stress and health problems among individuals, the same conditions, when viewed at a sociocultural level and within an expanded time frame, may be found to promote higher levels of technological innovation, resourcefulness, and coordination among group members (see Hawley, 1950; Keyfitz, 1966).

Thus the effective management of transactional change and its outcomes presupposes a conceptual perspective that is sensitive to the structural complexities of situations; and a methodological orientation that encompasses multivariate and cross-level assessments of both the positive and the negative impacts of change.

### Summary and Conclusions

The preceding discussion has outlined what appear to be some of the distinctive contours of a transformational perspective on environment and behavior. Several descriptive categories of transactional change were presented, along with an agenda of research questions concerning the measurement, prediction, management, and outcomes of transformation processes in people-environment relations. This discussion has merely "scratched the surface" in considering the range of theoretical and procedural questions that remain to be examined in future transformational research. Also, the relationships between transformational analyses of environment and behavior and related programs of psychological research—for example, on the "chance-dependency" of human development (Gergen, 1982), the nonhomeostatic facets of self-identity and social order (Sampson, 1985), and psychotherapy as a context for promoting interpersonal change (Strupp, 1986)—have not been examined here. A major goal of this chapter has been to delineate several descriptive and taxonomic issues posed by a transformational perspective on environment and behavior. It is hoped that this discussion will serve as a useful, albeit partial, basis for future theoretical and empirical work.

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