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Culture Change

Translating Social Ecological Theory into Guidelines for Community Health Promotion

Daniel Stokols

Abstract

Health promotion programs often lack a clearly specified theoretical foundation or are based on narrowly conceived conceptual models. For example, lifestyle modification programs typically emphasize individually focused behavior change strategies, while neglecting the environmental underpinnings of health and illness. This article compares three distinct, yet complementary, theoretical perspectives on health promotion: behavioral change, environmental enhancement, and social ecological models. Key strengths and limitations of each perspective are examined, and core principles of social ecological theory are used to derive practical guidelines for designing and evaluating community health promotion programs. Directions for future health promotion research are discussed, including studies examining the role of intermediaries (e.g., corporate decision-makers, legislators) in promoting the well-being of others, and those evaluating the duration and scope of intervention outcomes. (Am J Health Promot 1996;10[4]:282-98.)

OVERVIEW

The past 15 years have witnessed a tremendous growth in health promotion research and practice. This quantitative growth in research and intervention programs has been accompanied by a qualitative shift in emphasis from individually oriented analyses of health behavior to those that encompass environmentally based as well as behaviorally focused strategies of health promotion. Whereas the 1979 *Surgeon General's Report on Health Promotion and Disease Prevention*¹ emphasized the modification of individuals' health habits and lifestyles, more recent conceptualizations have stressed the importance of linking behavioral strategies of health promotion with efforts to strengthen environmental supports within the broader community that are conducive to personal and collective well-being.^{2,3}

The shift from person-focused to environmentally based and community-oriented health promotion is evident in several streams of research, including the development of cultural change strategies to foster socially supportive norms and healthful environmental conditions within work organizations;^{4,5} community-wide efforts to facilitate citizen participation in the development and implementation of health promotion programs;⁶⁻¹⁰ and the Healthy Cities Movement, which has evolved from sustained international collaboration in the design and delivery of community health promotion programs.^{11,12} These areas of research all reflect the increasingly ecological orientation of the health promotion field.^{3,13-16} The increased popularity of the ecological orientation stems from a growing

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recognition that most public health challenges (e.g., encouraging people to exercise regularly, improve their diet, and refrain from smoking) are too complex to be understood adequately from single levels of analysis and, instead, require more comprehensive approaches that integrate psychologic, organizational, cultural, community planning, and regulatory perspectives.¹⁷⁻¹⁹

This article examines the core assumptions and principles inherent in the social ecological approach to health promotion. Social ecology is viewed as an overarching framework, or set of theoretical principles, for understanding the interrelations among diverse personal and environmental factors in human health and illness. The article also considers some of the ways in which social ecological theory can be used to develop practical guidelines for designing, implementing, and evaluating community health promotion programs. The assumption here is that social ecological theory offers a variety of conceptual and methodologic tools for organizing and evaluating health promotive interventions.

I begin with an overview of the core assumptions and distinguishing features of three alternative, yet complementary, perspectives on health promotion:

- Behavioral change and lifestyle modification
- Environmental enhancement and restructuring
- Social ecological analyses of health promotion

In many respects, the social ecological approach integrates person-focused efforts to modify persons' health behavior with environment-focused interventions to enhance their physical and social surroundings. Yet the social ecological approach goes beyond behavioral and environmental change strategies by offering a theoretical framework for understanding the dynamic interplay among persons, groups, and their sociophysical milieu. Thus the latter portions of this article emphasize the translation of social ecological theory into practical guidelines for community health promotion.

BEHAVIORAL, ENVIRONMENTAL, AND SOCIAL ECOLOGICAL APPROACHES TO HEALTH PROMOTION

The 1979 *Surgeon General's Report on Health Promotion and Disease Prevention*¹ was instrumental in alerting the American public to the impact of unhealthy behaviors, such as smoking and substance abuse, on personal and community well-being. As clinical evidence for the links between smoking, lung cancer, and cardiovascular disease mounted during the 1970s and 1980s, the prevailing view of health as merely the "absence of illness"²⁰ and the corresponding emphasis on medical interventions to remediate disease began to be challenged by broader conceptions of health as "complete physical, emotional, and social well-being"²¹ and supplemented by preventive strategies for modifying unhealthy behavior and lifestyles before the onset of illness symptoms.²²⁻²⁵

Whereas earlier approaches to health enhancement had focused almost exclusively on the medical treatment of disease, the 1970s and 1980s saw a growing interest in disease prevention, health protection, and health promotion programs. The terms *disease prevention* and *health protection* have been used to describe various medical and public health strategies aimed at preventing the onset of physical and mental illness (e.g., inoculation against infectious diseases, enhanced community sanitation services, reduction of workplace hazards, and governmental regulation of food and drug safety). The concept of *health promotion*, however, differs from the disease prevention orientation in that it places greater emphasis on the role of persons, groups, and organizations as active agents in shaping health practices and policies to optimize both individual wellness and collective well-being.^{1,21,26} Of particular relevance to this discussion is *community health promotion*, which emphasizes collaborative efforts among various public and private sectors to enhance the well-being of a population within a geographically defined area.¹³

Behavioral Change Strategies of Disease Prevention and Health Promotion

The behavioral change approach to disease prevention and health promotion focuses on the modification of persons' health-related behaviors. Examples of these behaviors are dietary and exercise regimens, smoking and alcohol consumption, safe or unsafe sexual practices, and personal actions that either decrease or increase the likelihood of bodily injury (e.g., vehicle safety belt and bicycle helmet usage, firearm purchases, substance abuse). During the 1970s, several studies documented the empirical links between persons' routine health practices, stressful patterns of living, and their susceptibility to disease and premature death.²⁷⁻³⁰ These research programs further suggested that personal vulnerability to disease increases in proportion to the number and regularity of unhealthy behaviors performed by individuals.

People who regularly engage in multiple health-threatening behaviors—for example, by smoking cigarettes, consuming excessive amounts of alcohol and saturated fat, adopting irregular sleep and exercise patterns, and experiencing chronically high levels of interpersonal stress—are described as having unhealthy lifestyles.^{22,27,31} Behavioral change interventions to prevent disease can focus on modifying single patterns of unhealthy behavior (e.g., smoking cessation programs), or on the replacement of unhealthy lifestyles (characterized by interrelated clusters of behavioral risk factors for disease) with healthier ones.³²

Efforts to modify individuals' unhealthy behaviors and lifestyles have been guided by several distinct theories of social influence. Social influence is the alteration of a person's thoughts, attitudes, and behavior in response to the actions or feelings of others.^{33,34} A substantial amount of psychologic research has focused on three basic forms of social influence: cognitive changes involving the alteration of a person's beliefs and opinions; affective changes reflecting a shift in one's evaluation of some entity; and behavioral modification involving changes in a

person's overt actions toward his or her surroundings.

Theoretical and clinical perspectives on modifying persons' health-relevant actions reflect varying degrees of emphasis on cognitive, affective, and behavioral processes. For example, behavioral therapies based on operant and classical conditioning principles emphasize the manipulation of nonsymbolic reinforcement contingencies as the primary strategy for changing personal health behavior.³⁶⁻³⁸ Alternatively, the health belief model³⁹⁻⁴⁰ and theories of social learning,^{41,42} self-efficacy,⁴³ reasoned action,⁴⁴ and planned behavior⁴⁵ give greater attention to the role of cognitive and symbolic processes in mediating personal behavior change. The affective and motivational underpinnings of people's health beliefs and behavior, on the other hand, are explicitly emphasized in theories of risk perception,^{46,47} fear arousal and self-protective behavior,⁴⁸⁻⁵⁰ and learned helplessness⁵¹ and in studies of disease-prone and disease-resistant personalities,⁵²⁻⁵⁴ and health communications and mass media.⁵⁵

Several lines of research have demonstrated the effectiveness of cognitive and behavioral modification programs and educational and mass media campaigns in diminishing health-threatening actions and personal orientations, such as the coronary-prone behavior pattern,⁵⁶ and in promoting the adoption of improved dietary, exercise, stress management, and safety regimens.⁵⁷⁻⁶³ At the same time, however, certain large-scale behavior change programs, such as the Multiple Risk Factor Intervention Trials (MRFIT) and the Minnesota Heart Health Program to reduce cardiovascular disease, have had a modest or negligible impact on persons' health practices and health status.⁶⁴⁻⁶⁷

The modest impact of these interventions reveals some potential limitations that are inherent in behavior change models of health promotion. First, persons' efforts to modify their own health practices are often impeded by economic, social, and cultural constraints. Low educational status, lack of time, money and energy, chronic exposure to neighbor-

hood violence, and proximity to friends and family members who frequently exhibit health-threatening behavior are some of the situational factors that can derail people's best efforts and intentions to improve their health practices.^{3,14,22,68,69}

On the other hand, efforts to persuade a person to adopt improved health practices may go unheeded if that person is unready or unmotivated to enact the suggested behaviors.^{70,71} And even when persons do manage to adopt new and improved health practices, the efficacy of their behavioral changes can be undermined by their exposure to environmental toxins and safety hazards.^{2,72-74}

In recent years increasing attention has been paid to the role of environmental factors in human well-being, as the result of growing public concerns about the health impacts of indoor and outdoor air pollution, soil and water contamination, lead poisoning in children, ultraviolet and electromagnetic radiation, dysfunctional environmental design, global warming, and ozone depletion.⁷⁵⁻⁸¹ Health promotion efforts based on environmental enhancement strategies are a crucial adjunct to individually focused lifestyle modification programs. We turn now to a consideration of environmentally oriented models of health promotion.

Environmental Change Strategies of Health Promotion

Earlier discussions of health policy in the United States have subsumed environmental strategies of health enhancement under the rubric of health protection—that is, those changes in the physical environment that are undertaken to eliminate or reduce toxic, pathogenic, or injurious conditions.^{1,26} The analysis presented in this paper, however, construes the environments of persons and whole communities as multidimensional, encompassing social and cultural as well as physical (e.g., geographic, architectural and technologic) components. Moreover, the environment is assumed to function not only as a potential source of pathogens, toxins, and safety hazards, but also as a provider of health-promotive information and social support that can enable

people to achieve higher levels of well-being than are implied by the term *health protection* (that is, avoidance of unhealthful or unsafe environmental conditions). In this discussion, therefore, the broader concept of health promotion is used to refer to the full array of environmentally based strategies of health enhancement.^{2,21}

Recent evidence for the health impacts of global environmental change^{82,83} underscores the importance of developing environmentally based strategies of health promotion in conjunction with behavioral-change and lifestyle-modification programs. Environmental enhancement interventions can be considered in relation to at least five "envirogenic," or health-influencing, functions of the physical and social environment.¹⁵

- The physical and social environment can serve as a medium of disease transmission, exemplified by waterborne and airborne diseases and the spread of contagious illnesses through interpersonal contact.
- The environment can operate as a stressor, exerting detrimental effects on people's mood, performance, and physiology as the result of their exposure to uncontrollable demands such as noise, political upheaval, or interpersonal conflict.
- The environment can function as a source of safety or danger (e.g., residing in areas that are chemically contaminated, geographically unsafe, or socially violent).
- The environment can serve as an enabler of health behavior, exemplified by the installation of safety devices in motor vehicles, proximity of physical fitness facilities to one's home or workplace, and exposure to interpersonal modeling or cultural practices that foster health-promotive behavior.
- The environment can serve as a provider of health resources such as effective community sanitation systems, public health services, and legislation ensuring citizens' access to health insurance and primary care.

Environmental enhancement strategies have emphasized these health-related functions of the

environment to varying degrees, depending on the theoretical or disciplinary bases of the intervention program. For example, the role of the environment in transmitting disease and as a source of safety or danger has been emphasized in the fields of industrial hygiene,⁸⁴ occupational epidemiology,⁸⁵ injury control,^{86,87} environmental health science,^{75,76} and environmental psychology.^{88,89}

The stress-inducing and stress-buffering qualities of environments have been examined in studies of social support, environmental stressors, and well-being,⁹⁰⁻⁹⁵ and in the fields of ergonomics and human factors.⁹⁶⁻⁹⁸ The role of the environment as an enabler of health behavior and as a provider of health resources, on the other hand, has received more attention in studies of organizational development⁹⁹⁻¹⁰² and in fields such as architecture, facilities management, geography, sociology, and urban planning.^{75,103-108}

An important advantage of environmental-enhancement models of health promotion is that they provide a more complete understanding of the situational factors that can facilitate or hinder persons' efforts to improve their health practices and well-being. Moreover, environmental analyses reveal the direct and often imperceptible effects of people's physical and social surroundings on their well-being, which can undermine the benefits of favorable health practices or exacerbate the negative outcomes associated with unhealthful and injury-prone behavior.

Environmental enhancement strategies of health promotion also tend to be more powerful than behavioral and lifestyle modification programs, because they have the capacity to benefit all persons exposed to an environment rather than focusing narrowly on improving the health of one person at a time. For example, environmentally based health promotion programs typically emphasize *passive interventions*,⁷⁴ or those that simultaneously enhance the health of several people without requiring any voluntary and sustained effort on their part (e.g., the use of child-resistant caps on medicine bottles; factory installation of airbags

in all new motor vehicles). Behavioral change models, on the other hand, emphasize *active interventions* that require voluntary and sustained effort by persons as a prerequisite for achieving the desired health benefits (e.g., encouraging persons to give up smoking and to engage in vigorous physical exercise on a regular basis). Thus, active interventions are usually more difficult to maintain over extended periods than passive interventions.

Like behavioral-change models of health promotion, however, environmentally based interventions reflect some important limitations. First, interventions aimed at improving environmental quality typically have focused on single facets of the physical or social environment (e.g., indoor air quality, seismic hazards, or social climate within work organizations) rather than examining multiple environmental dimensions (e.g., both physical and social conditions within settings) and the relationships among them. Second, environmental analyses of health promotion give little or no attention to the varying behavioral patterns and sociodemographic characteristics of the people occupying particular places and settings. Clearly, the health-related value of environmental enhancements (e.g., designating workplaces as "smoke-free") may be diminished for those people who continue to engage in unhealthful activities (e.g., smoking cigarettes at home and during lunch breaks at work), or for those groups who are more vulnerable to the negative health impacts of environmental hazards and stressors because of their restricted income, educational level, and geographic mobility. Thus, environmental approaches to health promotion often neglect individual and group differences in people's response to their socio-physical milieu.

Having noted some of the strengths and limitations associated with behavioral change and environmental enhancement strategies of health promotion, we now consider the ecological perspective that addresses several of the limitations inherent in the behavioral and environmental approaches.

Social Ecological Models of Health Promotion

The social ecological perspective on health promotion is based, not on a singular discipline or theory, but rather on a broad, overarching paradigm that bridges several different fields of research. The term *ecology* refers to the study of the relationships between organisms and their environments.¹⁰⁹ Early ecological analyses of the relations between plant and animal populations and their natural habitats^{110,111} were later extended and applied to the study of human communities and environments within the fields of sociology, psychology, and public health.^{13,112-116} The field of social ecology, which emerged during the mid 1960s and early 1970s, gives greater attention to the social, institutional, and cultural contexts of people-environment relations than did earlier versions of human ecology, which focused primarily on biologic processes and the geographic environment.^{115,117,118}

The social ecological paradigm is rooted in certain core principles or themes concerning the interrelations among environmental conditions and human behavior and well-being. First, ecological analyses characterize environmental settings as having multiple physical, social, and cultural dimensions that can influence a variety of health outcomes, including physical health status, developmental maturation, emotional well-being, and social cohesion.²¹ Accordingly, the health-promotive capacity of an environment is understood, not simply in terms of the health effects of separate environmental features (e.g., air quality, seismic safety, or social climate), but more broadly as the cumulative impact of multiple environmental conditions on occupants' physical, emotional, and social well-being, over a specified time interval.¹⁵

Another core theme of social ecological research is that human health is influenced not only by environmental circumstances, but also by a variety of personal attributes, including genetic heritage, psychologic dispositions, and behavioral patterns. Social ecological analyses emphasize the dynamic interplay between situational and personal

factors rather than focusing exclusively on environmental, biological, or behavioral determinants of well-being. The same environmental conditions (e.g., population density, change of residence, or economic recession) may affect people's health differently, depending on their personality, perceptions of environmental controllability, health practices, and financial resources.^{51,54,119-121} Thus the level of congruence (or compatibility) between people and their surroundings is viewed as an important predictor of well-being in social ecological research.^{115,122,123}

Social ecological analyses incorporate a variety of concepts derived from systems theory (e.g., interdepen-

dence, homeostasis, negative feedback, deviation amplification) to understand the dynamic relations between people and their environments.¹²⁴⁻¹²⁷ For instance, people-environment transactions are characterized by cycles of mutual influence, in which the physical and social features of settings directly influence occupants' health and, concurrently, the participants in settings modify the healthfulness of their surroundings through their individual and collective actions. Also, the health impacts of various roles and behavior patterns in organized settings are presumed to vary widely, with some roles and behaviors exerting a substantial influence on well-being and others

having negligible health consequences.^{2,83}

Social ecological analyses also emphasize the interdependence of environmental conditions within particular settings and the interconnections between multiple settings and life domains. For instance, the physical and social facets of settings are assumed to be closely interlinked and capable of exerting independent as well as joint effects on occupants' well-being. Also, the multiple domains of human activity (e.g., one's residence, neighborhood, workplace, and surrounding community) are viewed as nested structures in which local settings and organizations are embedded within larger and more remote regions.¹²⁸⁻¹³⁰ Thus, efforts to promote human health must take into account the interdependencies that exist among immediate and more distant environments (e.g., the "spill-over" of workplace and commuting stress to residential environments;^{131,132} and the influence of state and national ordinances on the healthfulness of occupational settings).^{133,134}

Finally, the social ecological perspective is inherently interdisciplinary in its approach to health research and the development of health promotion programs. Ecological analyses integrate the community-wide, preventive strategies of public health and epidemiology with the individual-level, therapeutic and curative strategies of medicine.¹³⁵ The ecological perspective also encompasses the behavioral and social sciences' emphases on the active role played by persons and groups in modifying their own health behavior; the development and testing of theoretical models describing people-environment transactions; and the importance of conducting evaluative studies to assess the cost-effectiveness and social impact of health promotion programs.^{2,3,136} Thus ecologically based health research incorporates multiple levels of analysis and diverse methodologies (e.g., medical examinations, questionnaires, behavioral observations, environmental recordings, epidemiologic analyses) for assessing the healthfulness of settings and the well-being of persons and groups.

Table 1
Theoretical and Research Perspectives Associated with Behavioral Change, Environmental Enhancement, and Social Ecological Approaches to Health Promotion

Health Promotion Orientation	Theoretical and Research Perspectives Associated with Each Orientation
Behavioral Change and Lifestyle Modification	Operant behavior modification ^{36,37} Social learning theory ^{41,42} Self-efficacy theory ⁴³ Health belief model ^{39,40} Theory of reasoned action ⁴⁴ Theory of planned behavior ⁴⁵ Stages of behavior change theory ⁷¹ Risk perception theory ^{46,47} Fear arousal/protection motivation theory ^{48,49} Personality theory ^{53,54} Health communications and mass media ⁵⁵
Environmental Enhancement and Restructuring	Industrial hygiene ⁸⁴ Ergonomics/human factors ^{97,98} Occupational epidemiology ⁸⁵ Facilities design and management ^{104,106} Architecture and urban planning ^{75,105} Injury control ^{86,87} Environmental health science ^{76,77} Health effects of involuntary smoking ⁷³ Social support and organizational development ^{90,83}
Social Ecological Approach	Cultural change models of health ^{4,5} Biopsychosocial model of health ^{137,138} Person-environment fit theory ^{122,123} Stressful life events research ¹¹⁹ Ecology of human development ¹⁴¹ Public health psychology ³ Social epidemiology and medical sociology ^{113,121} Social ecology of health ^{14,15,139} Community health promotion ^{6,9,13,142} Public policy initiatives ^{143,144,154} Healthy Cities movement ^{11,12}

A social ecological orientation is reflected in several lines of health research. The biopsychosocial model of health,^{137,138} for example, emphasizes the interdependencies between psychologic dispositions, social behavior, and physiologic processes in health and illness. Similarly, studies of person-environment fit and stressful life events reveal the joint influence of personal and situational factors on persons' well-being.^{119,122,128,139} And cultural change models of health promotion emphasize the importance of engaging persons in active efforts to reshape their social and physical environments in ways that enhance individual and collective well-being.^{4,5}

The cumulative impact of conditions within multiple settings and life domains on individual and collective well-being is examined in the fields of social epidemiology, medical sociology, community health promotion, and the ecology of human development.^{13,113,121,140-142} Similarly, the advantages of developing multisectoral health promotion programs that incorporate biomedical, behavioral, environmental, and regulatory components are emphasized in the analysis by Winett et al.³ linking the fields of public health and health psychology; in social ecological models of health and illness;^{14,15,139} in studies of political and regulatory processes in health promotion;^{59,133,143,144} and in research on healthy cities and communities.^{11,12}

Summary of Differences Between Behavioral Change, Environmental Enhancement, and Social Ecological Approaches

The major theoretical and research perspectives associated with behavioral change, environmental enhancement, and social ecological strategies of health promotion are summarized in Table 1. This summary of relevant theoretical and research orientations is intended to be representative rather than exhaustive. Alternative but complementary classifications of theoretical perspectives associated with different strategies and levels of health promotion have been provided by McLeroy et al. and Winett.^{18,19} A comparison of the key emphases and differences among the behavioral, environmental, and ecological models of health promotion is presented in Table 2.

A major strength of social ecological approaches to health promotion is that they integrate strategies of behavioral change and environmental enhancement within a broad systems-theoretical framework. Social ecological theories also emphasize cross-level analyses of health problems and related intervention strategies. A key feature of ecological models is that they incorporate two or more analytic levels (e.g., personal, organizational, community) and, thereby, permit researchers and practitioners to examine both individual and aggregate manifestations of health problems and impacts of community interventions.¹⁴⁵⁻¹⁴⁷ Thus the conceptual "blind

spots" resulting from an exclusive focus on either behavioral or environmental factors at single analytical levels are avoided by giving explicit attention to the dynamic interplay among personal and situational factors in health and illness, at both individual and aggregate levels.

At the same time, however, social ecological models of health promotion reflect certain practical limitations. Most importantly, ecological interventions require the integration of knowledge from several different disciplines and close coordination among persons and groups from various sectors of the community. Moreover, the combined use of active and passive interventions for health promotion and the incorporation of multi-level, multi-method assessments of program outcomes over extended periods can be quite expensive and logistically complex. Such cross-level, longitudinal studies of program effectiveness can sometimes prove to be too cumbersome and impractical to implement.

These logistical complexities raise some important questions about the potential over-inclusiveness and utility of ecologically oriented health promotion programs. If ecological models are construed as all-encompassing and assumed to include every conceivable health-relevant variable, then their utility as a basis for research and intervention is substantially reduced. That is, overly inclusive models are not likely to assist researchers in targeting

Table 2
Behavioral Change, Environmental Enhancement, and Social Ecological Approaches to Health Promotion

Health Promotion Orientation	Key Determinants of Health and Illness	Focus of Health Promotive Interventions	Types of Interventions Emphasized
Behavioral Change or Lifestyle Modification	Individual health behavior	Modify persons' health-related attitudes, beliefs, and behavior	Active interventions (require voluntary and sustained effort by target individuals)
Environmental Enhancement and Restructuring	Quality of people's physical and social environments	Improve environmental hygiene/safety and strengthen social supports for health	Passive interventions (require no effort by individuals exposed to them)
Social Ecological Approach	Degree of fit between people's biological, behavioral, and sociocultural needs and the environmental resources available to them	Integrate behavioral and environmentally based health promotion strategies	Combination of active and passive interventions (spanning individual, organizational, and community levels)

selected variables for study, or clinicians and policy-makers in determining where, when, and how to intervene.

In contrast to this all-encompassing view of ecological models, the present analysis suggests that social ecological strategies of health promotion should be based on "middle-range" theories of the specific circumstances (e.g., intrapersonal, physical environmental, organizational, cultural) that account for the occurrence and prevalence of particular health problems, and a corresponding analysis of the contextual factors that are likely to influence the effectiveness of health-promotive interventions designed to reduce those problems.^{8,148,149} McLeroy et al. refer to these complementary theoretical perspectives as "theories of the problem" and "theories of intervention."¹⁵⁰ An important aspect of social ecological approaches to health promotion is that they integrate both problem theories and intervention

theories of particular health issues. By linking these two theoretical perspectives, researchers and practitioners are better able to formulate coherent, focused, and theoretically grounded interventions while avoiding overly inclusive and diffusely organized health promotion programs.

The dual emphases of social ecological models on intervention as well as problem theories reflects the "action research" and public policy orientation of the health promotion field.¹⁵¹ As delineated by Kurt Lewin, action research involves an iterative sequence of theorizing, community intervention, and evaluation research, whereby theories guide the development of interventions and the results of community programs enable researchers to elaborate and refine their theories. Intrinsic to this action research orientation is an emphasis on linking organizational (e.g., corporate) and public (e.g., state, national)

policies with nonregulatory efforts to promote healthful behavior and environmental conditions. Social ecological models of health promotion assume that these regulatory and nonregulatory strategies work best when they reinforce each other (e.g., as when cigarette vending machines are removed from work settings to reinforce corporate nonsmoking policies,^{152,153} or when state taxes on cigarette purchases reinforce smoking cessation programs and policies at the worksite¹⁵⁴) and give rise to broad-based social movements and secular trends that support public health interventions.¹⁵⁵⁻¹⁵⁸

The core themes and principles of social ecology outlined earlier provide a valuable foundation for organizing and implementing effective community interventions. The remaining portions of this article focus on the translation of social ecological theory into practical guidelines for community health promotion.

GUIDELINES FOR COMMUNITY HEALTH PROMOTION BASED ON SOCIAL ECOLOGICAL PRINCIPLES

This section is organized around six procedural guidelines for the design, implementation, and evaluation of community health promotion programs. These practical guidelines are based on the core concepts and principles of social ecology discussed earlier, including the following:

- The multifaceted nature of environmental influences on well-being
- The interactive effects of intrapersonal and environmental factors on health and illness
- The relevance of person-environment fit and perceived environmental controllability for individual and collective well-being
- The importance of identifying behavioral and organizational "leverage points" for health promotion, and considering both personal and other-directed health behaviors as targets for change
- The interdependencies that exist among a person's or group's major activity settings and life domains
- The value of combining biomedical,

Table 3

Guidelines for Designing and Evaluating Health Promotion Programs on the Basis of Ecological Principles

Ecological Principle	Corresponding Procedural Guideline
Physical, mental, and social well-being are influenced by a variety of environmental factors	Examine links between multiple facets of well-being and diverse conditions of the physical and social environment
Personal characteristics and environmental conditions often have interactive as well as direct effects on well-being	Examine the joint influence of behavioral, dispositional, developmental, demographic factors on people's exposure and responses to environmental hazards and demands
The degree of fit between people's biological, behavioral, and sociocultural needs and the environmental resources available to them is a key determinant of well-being	Identify sources of person-environment and group-environment misfit, and develop interventions that enhance the fit between people and their surroundings
Within the context of structured community settings, certain behaviors and roles exert pivotal influence on well-being	Identify behavioral and organizational "leverage points" for health promotion; consider both personal and other-directed health behavior as targets for change within community interventions
Examine links between physical and social conditions within particular settings, and the joint influence of multiple settings and life domains on persons' health over extended periods	Account for the moderating and mediating influences of physical and social conditions on health; design community interventions that span multiple settings and have enduring positive effects on well-being
Interdisciplinary research, linking the perspectives of medicine, public health, and the behavioral and social sciences, is essential for developing comprehensive and effective health promotion programs	Integrate biomedical, behavioral, regulatory, and environmental interventions for health promotion; use multiple methods to evaluate the health and cost-effectiveness of community programs

behavioral, educational, environmental, organizational and regulatory interventions at several community levels, and adopting an interdisciplinary, multimethod approach to evaluating the outcomes of health promotion programs.

Table 3 summarizes the core themes of social ecological theory and their corresponding implications for the development of community health promotion programs.

1. Examine Links Between Multiple Facets of Well-being and Diverse Conditions of the Sociophysical Environment

Social ecological theory emphasizes the importance of identifying various physical and social conditions within environments that can affect occupants' physiologic, emotional, and/or social well-being. For example, architectural and interior design features of environments such as the adjustability of chairs and work surfaces, ambient temperature and noise levels, and the construction of stair wells can influence a variety of physical health outcomes, including lower back pain, physiologic stress and fatigue, and the likelihood of falls and orthopedic injuries.^{75,97,159}

Moreover, the perceived predictability, controllability, novelty, and symbolic value of environments can influence emotional well-being, as reflected in persons' feelings of competence, identity, creativity, and sense of attachment to their surroundings.^{120,160-163} And social conditions of environments, including their economic stability, structural flexibility, and provision of opportunities for involvement in supportive interpersonal relationships, can profoundly influence levels of cohesion, commitment, and innovation observed at organizational and community levels.^{90,164,165}

Thus social ecological theory emphasizes a multivariate approach to the assessment of environmental conditions and the effects of those conditions on a variety of health outcomes. Health-relevant facets of the sociophysical environment include various geographic, architectural, technologic, organizational, and

sociocultural conditions that are present within a particular setting or cluster of interlinked life domains. Ecological analyses place greater emphasis on the study of health-promotive environments (or those whose physical and social conditions are linked to positive health outcomes at both individual and community levels), than on the study of isolated environmental conditions as they influence a particular criterion of well-being.¹⁵

2. Consider Joint Influence of Intrapersonal and Environmental Conditions on Individual and Community Well-being

Social ecological theory holds that human health is influenced not only by a broad array of physical and social environmental conditions, but also by a diversity of intrapersonal factors including genetic heritage, personality dispositions, and health practices. These intrapersonal attributes can influence well-being either directly or in conjunction with a variety of environmental circumstances.

Behavioral models emphasize the direct effects of health practices (e.g., diet, exercise, stress management) and psychologic orientations (e.g., hostility, depression, self-esteem, coronary-prone behavior) on well-being, whereas environmentally based analyses focus on the direct effects of physical and social conditions on health. A unique contribution of social ecological theory is that it emphasizes the dynamic interaction of intrapersonal and environmental factors in health and illness. For example, susceptibility to respiratory disease is increased not only by personal smoking behavior, but also through passive exposure to others' cigarette smoke at the workplace. The interactive influence of environmental and behavioral factors on health is especially evident in epidemiologic data concerning lung cancer rates. Smokers are 10 times more likely to develop lung cancer than nonsmokers, and persons exposed to asbestos at the workplace are 5 times more vulnerable to lung cancer than those who avoid asbestos exposure at work. However, among people who smoke *and also* are exposed to asbestos at work, lung

cancer rates are 50 times greater than among nonsmokers who also avoid occupational asbestos exposure.¹⁶⁶

Certain personal attributes, such as low socioeconomic status (SES), heighten vulnerability to a wide range of illnesses.^{26,167} The long-observed correlation between low SES and increased morbidity and mortality is most likely attributable to the joint influence of multiple personal and environmental factors associated with lower educational and economic standing—e.g., psychologic dispositions toward pessimism, helplessness, and perceived externality of control; poor nutrition and related health practices; and disproportionate exposure to environmental hazards and stressors.^{68,168-170}

Explicit recognition of the interactive effects of personal and environmental factors on well-being poses some important, practical implications for the design and implementation of health promotion programs. First, when community interventions for health promotion are being designed, it is important to consider personal and sociodemographic characteristics that may heighten a person's or group's vulnerability to environmental health risks or reduce the beneficial effects of environmental enhancements on personal or collective well-being. Community interventions that take these sources of personal and subgroup vulnerability and persisting "pockets of prevalence" into account should be developed and made available to those segments of the population that are in greatest need of disease prevention and health promotion resources.^{155,158,171-175}

Second, it is advisable (whenever possible) to incorporate a combination of active (behavioral) and passive (environmental) interventions within community health promotion programs, rather than relying exclusively on one or the other.⁷⁴ For instance, the health-enhancing value of behaviorally based smoking cessation programs is likely to be enhanced by organizational and legislative policies that mandate smoke-free workplaces, schools, restaurants, and commercial areas.¹⁷⁶ The development of intervention "packages" incorporating both active and passive interventions for

health promotion is a logical extension of social ecological analyses that emphasize the interplay among personal and environmental factors in health and illness.

3. Develop Health Promotion Programs that Enhance the Fit Between People and Their Surroundings

The preceding guideline highlights the importance of considering the interactions among personal and environmental influences on well-being as a basis for designing health promotion programs. One way of representing the links between personal and environmental factors in health is in terms of the congruence or fit between persons' needs, on the one hand, and the structure and quality of their environments, on the other.^{115,123} The manifestations of fit or misfit between people and their surroundings can be quite diverse, ranging from the discomforts and distractions of living in noisy and congested neighborhoods, and the sense of alienation that results from having insufficient input into organizational or community planning decisions, to the health, safety, and productivity costs associated

with poorly designed work environments.^{159,177,178}

These diverse manifestations of people-environment misfit share a common feature—they all arise in settings where persons' opportunities for modifying or controlling their surroundings are blocked by rigid environmental constraints. Conversely, instances of people-environment fit occur in settings where participants enjoy a high degree of control over their surroundings and are free to initiate goal-directed efforts to modify the environment in accord with their preferences and plans. The processes by which persons and groups rationally guide their transactions with the environment so as to achieve successively higher levels of fit between their present (or anticipated) needs and environmental conditions are referred to as human-environment optimization.¹⁷⁹

Several lines of research suggest that uncontrollable and inflexible environments are detrimental to well-being, whereas more controllable and responsive settings are health promotive.^{51,97,120,162,180,181} These studies suggest that interventions to enhance the

controllability, flexibility, and responsiveness of social and physical environments should be an important component of community health promotion programs. Examples of such interventions include architectural and facilities design techniques to improve the responsiveness of physical environments for disabled people;¹⁸² the redesign of occupational roles and job requirements to enhance employees' sense of autonomy in their work activities;^{183,184} urban planning strategies that insulate residential areas from high-volume automobile traffic, reduce opportunities for neighborhood crime, and support the activity patterns of working mothers;^{88,108,177,185} and the design of residential care facilities and relocation orientation programs to accommodate the special needs of the frail elderly.^{186,187}

4. Focus Health Promotive Interventions on High-Impact Behavioral and Organizational "Leverage Points"

According to social ecological theory, everyday human behavior is organized into recurring patterns of activity that take place within highly structured environmental settings and life domains.^{107,112,128,129} Within these recurring activity patterns and environmental contexts, certain behaviors, social roles, and situational conditions can exert a disproportionate influence on personal and collective well-being. These influential behaviors, roles, and environmental conditions can be viewed as high-impact "leverage points" for enhancing people's well-being. An important implication of social ecological theory is that these personal and environmental leverage points for influencing well-being should be identified as prime targets for change during the early stages of planning health promotion programs.

The importance of identifying leverage points for health promotion is emphasized by the distinction between *personal* and *other-directed* health behavior. Personal health behaviors are actions taken by persons that directly affect their own well-being. Other-directed health behaviors are actions taken by persons and groups that influence others' well-being. For instance, a person might decide to

Table 4
Personal and Other-Directed Health Behavior

Personal Health Behavior	Other-Directed Health Behavior
Person takes actions that directly affect his or her own health Examples: Individual orders only items labeled as "heart-healthy" on restaurant menus Individual purchases an ergonomically designed chair for use at his or her own desk Employee decides to seek psychological counseling for an emotional problem at work Advantages: Person's health behavior is directly under his or her control Person takes responsibility for mobilizing personal and local resources to promote health Disadvantages: Person may lack knowledge or resources for health-promotive action Can be financially costly to implement and difficult to sustain	Person or group takes action that affects others' health Examples: Restaurant managers include only "heart-healthy" selections on their menus Facility manager at the person's company purchases ergonomically designed chairs for all employees Case manager at person's health maintenance organization disallows insurance-covered visits for psychological counseling Advantages: Adopts a systems approach for removing impediments to persons' health behavior Utilizes others' health expertise on behalf of several persons, resulting in more cost-effective and sustainable efforts Disadvantages: If done poorly, many people are negatively affected for extended periods Potential for bureaucratization, depersonalization, and system overload

order only those menu selections in restaurants that are labeled "heart-healthy." Alternatively, a restaurant owner might decide to include only heart-healthy selections on his or her menu. The former instance is an example of personal health behavior, whereas the latter exemplifies other-directed health behavior. The distinction between personal and other-directed health behavior, and some examples of each, are summarized in Table 4.

Certain personal and other-directed behaviors exert a disproportionate influence on well-being. For example, a woman's lifestyle may include several unhealthy behaviors (e.g., smoking, alcohol consumption, lack of physical exercise, high-stress job and commute between home and work), but her involvement in a high-stress job may be the pivotal lifestyle dimension that poses greatest risks for illness because it prompts inappropriate coping strategies to alleviate stress (such as smoking and alcohol consumption), requires a long and stressful commute between home and work, and reduces available leisure time, thereby eliminating recreational opportunities for her to engage in physical exercise. Thus behavioral-change efforts to reduce or eliminate smoking and to encourage more frequent physical exercise may prove ineffective unless and until she is able to shift from her current job to a less demanding one.

Previous research on behavioral-change strategies of health promotion have focused primarily on modifying personal health behavior rather than on influencing organizational and community decision-makers whose actions affect the health of many other people.^{22,74} Therefore an important challenge for the health promotion field is to identify high-impact roles in corporate and institutional settings that have the capacity to influence the health and safety of large numbers of people.

For example, the decision of urban planners to locate elementary schools under the flight path of large metropolitan airports may have long-term negative impacts on the physical and emotional well-being of students and teachers at those schools.¹⁸⁸ Also, the decision of facility managers within

large corporations to purchase ergonomically designed chairs and work stations for their employees may help to lower the prevalence and financial costs of lower back and repetitive strain injuries in those organizations.^{96,97} And programs that train beverage servers in restaurants to recognize the signs of intoxication in their customers and to intervene accordingly (e.g., by offering food with alcoholic drinks and by arranging for others to drive intoxicated persons home) have been implemented in several states as a strategy for reducing alcohol-related fatalities from car crashes.¹⁸⁹

Increasingly, corporations and government agencies are relying on intermediaries to ensure the health and safety of their constituents. Within large companies, for example, medical benefits are often administered by health maintenance organizations whose case managers decide whether or not to approve payment for mental health counseling visits, diagnostic tests, medical treatment, and rehabilitative therapy for particular employees. Also, legal initiatives to protect the healthfulness of occupational and community environments generally require public agencies and private firms to designate a coordinator who is officially responsible for maintaining organizational compliance with the legislative requirements.^{190,191}

The use of corporate and public officials as intermediaries for health promotion has several advantages. Intermediaries can serve as advocates for improving the quality of environmental and health resources available to organizational and community members. They are often trained in health-related fields and can make use of their expertise as advocates for environmental and health improvement. Whereas persons' efforts to improve their own well-being are sometimes blocked by situational constraints, intermediaries often have the authority to alleviate unhealthful environmental conditions and to encourage others to adopt improved health practices.

At the same time, however, relying too heavily on intermediaries to ensure the health of their constituents may have the disadvantage of under-

mining persons' sense of responsibility and personal initiatives to improve their own well-being. Also, bureaucratic rigidities and an overload of work demands within organizations can lead to impersonal and frustrating encounters between intermediaries and their constituents. When such circumstances result in inappropriate or health-threatening actions by corporate or government officials, the well-being of many people can be adversely affected for extended periods.

Some of the potential advantages and disadvantages of using intermediaries to promote others' well-being are summarized in Table 4. It is essential that these issues be carefully considered in the design of health promotive interventions, particularly as legislative and healthy-community interventions come to rely increasingly on certain roles and persons as leverage points for enhancing personal and collective well-being.

5. Design Health Promotion Programs That Address Interdependencies Between the Physical and Social Environment and Encompass Multiple Settings and Life Domains

A core principle of social ecology is that the environmental contexts of human activity function as dynamic systems. This systemic quality of settings is reflected in the interdependencies between physical and social conditions within particular environments and in the nested structure of multiple settings and life domains. A person's residential and occupational environments, for example, are embedded within broader geographic and governmental regions. These local and more remote environments jointly affect the person's well-being, as when state and federal regulations improve the healthfulness and safety of workplaces located within those jurisdictions.^{133,190}

Environmentally based health promotion programs that target isolated conditions within a setting (e.g., the air quality or noise levels within a workplace) often neglect important links between the physical and social aspects of environments and the joint influence of multiple settings on participants' well-being. Two types

of linkages between the physical and social features of occupational settings are illustrated in Figures 1 and 2. In Figure 1, the effects of physical conditions within a workplace on employee well-being are mediated by social processes that develop in response to the precipitating physical conditions. Specifically, high levels of ambient noise can lead to personal feelings of annoyance, which make conflicts and hassles among co-workers more likely. These interpersonal experiences can, in turn, lead to elevated levels of emotional and physiologic stress. Similarly, the physical separation of team members caused by poor space plans and adjacencies in offices can reduce informal social contacts and communications among co-workers and thereby create personal and group strains resulting from poor coordination and lack of cohesion.

Figure 2 depicts a different kind of interdependence between the physical and social features of a workplace. In this illustration, the effects of the physical environment on employee injury rates and corporate health costs are moderated by a prevailing climate of social conflict among workers and management. Despite adequate levels of workplace hygiene and injury-resistant facility design, a disproportionately large number of workers' compensation claims may occur within conflict-prone organizations.¹⁹² The potential role of social factors in moderating the healthfulness and financial costs of work facilities should be carefully considered in the design of worksite health promotion programs, especially in view of the increasing rates of stress-related workers' compensation claims in many regions of the United States¹⁹³ and the tremendous economic costs associated

with these employee health insurance claims.⁵⁹

There are, of course, several other ways in which the physical and social conditions within a setting can jointly influence personal and group well-being. For example, the health consequences of social conditions at the workplace can be mediated by physical environmental resources, as when managers' concern about their employees' well-being prompts a substantial corporate investment in workplace amenities (e.g., the purchase of ergonomically designed furniture for all employees). The provision of these amenities, in turn, improves workers' comfort and morale while reducing their stress and health problems. Alternatively, the health consequences of a nonsupportive social environment may be moderated by the availability of certain physical resources (e.g., the availability of private work space and onsite fitness facilities), which enable employees to cope more effectively with interpersonal strains at work (e.g., by avoiding stressful interactions and maintaining a regular exercise regimen). These examples further illustrate the variety of ways in which social and physical conditions within settings can mutually influence well-being. An understanding of the structure and dynamics of the sociophysical environment is an important prerequisite for developing effective health promotion programs at organizational and community levels.

Social ecological theory emphasizes not only the interrelatedness of conditions within single settings but also the links between multiple settings and life domains within the broader community. Persons' activity patterns are organized in relation to their major life domains—for example, their residential, educational, occupational, recreational, religious, and health-care environments. These environments have a cumulative and combined influence on well-being, as shown by the substantial health benefits that accrue from one's involvement in social support networks across a variety of life domains.^{95,194} Therefore, health promotion programs that recognize the influence of multiple settings on well-being,

Figure 1

Social Environment Mediates Influence of the Physical Environment on Health Outcomes

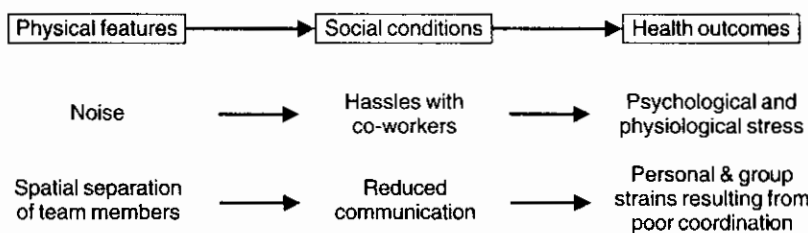
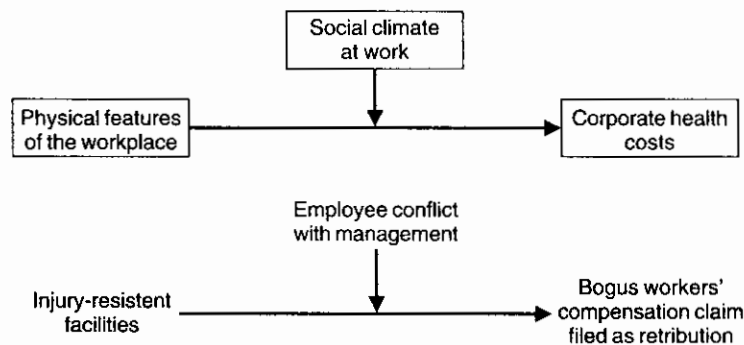


Figure 2

Social Environment Moderates Influence of the Physical Environment on Organizational Health Costs



incorporate multi-channel interventions, and establish collaborative coalitions spanning several different sectors of the community, should be more effective than those restricted to single domains.^{195,196} For example, smoking-prevention programs that combine school-based education campaigns with regulatory initiatives to ban smoking in public places^{3,197} are expected to have more pervasive and sustained effects in the community than those focusing only on educational settings.

A potentially useful criterion for judging the success of health promotion programs is the *ecological depth* of intervention outcomes. Ecological depth increases to the extent that positive intervention effects occur over extended periods and at multiple levels of a community. Table 5 illustrates the varying duration and levels of intervention outcomes associated with Los Angeles' Regulation XV to promote corporate ridesharing.¹⁹⁸ This law requires all public and private employers having 100 or more employees at any worksite to implement a plan to increase "average vehicle ridership" (AVR), or the number of employees reporting to work during rush-hour divided by the number of vehicles driven by them to and from work.

In this case, a legal initiative to promote corporate ridesharing may yield immediate health benefits by reducing persons' commuting stress from solo driving during rush hour traffic. Other community-level benefits of ridesharing programs, such as improved air quality in urban areas

and reduced incidence of smog-related respiratory disease, may become apparent over longer time intervals. Finally, ridesharing programs may also have longer-term, global benefits by curtailing the production of "greenhouse gasses" from fossil fuel consumption, thereby reducing global warming and its concomitant health impacts.^{82,83}

Intervention outcomes should be evaluated in terms not only of their scope and duration, but also their positive or negative implications for well-being. Improvements in building insulation techniques during the 1970s, for example, resulted in greater energy efficiency and lower air-conditioning costs. Yet these same advances in construction technologies also led to poorer levels of indoor air quality and more frequent health complaints among building occupants, sometimes referred to as the "sick building syndrome."^{106,199} Thus community interventions should be designed so as to avoid unintended, negative side effects, while promoting long-term and pervasive health benefits within a broad segment of the population.

6. Integrate Multidisciplinary Perspectives in the Design of Health Promotion Programs and Use Multiple Methods To Gauge Scientific and Social Validity of Interventions

Ecological analyses of health promotion encompass a broad range of theoretical and disciplinary perspectives (see Table 1). An important part of designing effective community interventions is the selection and

integration of theoretical perspectives most relevant to the goals of the program.²⁰⁰⁻²⁰² For example, if the major program goal is to reduce alcohol-related traffic fatalities, then a multicomponent intervention could be developed that includes school-based drug abuse prevention programs, alcohol prevention and ridesharing programs at the worksite, beverage servers' training programs in restaurants, factory installation of airbags in all new motor vehicles, and laws mandating the use of seat belts and child safety seats in cars.^{15,61,203-205} Although not all of these interventions will be under the direct control of program planners, their knowledge of multidisciplinary research and theoretical perspectives (e.g., epidemiologic data on traffic injuries and fatalities; social influence and educational strategies for reducing substance abuse; rates of behavioral compliance with health and safety legislation) will enable them to develop "synergistic" program components that complement preexisting laws and car manufacturing standards.

The social ecological perspective also emphasizes the value of conducting longitudinal evaluations of intervention outcomes and effectiveness. In view of the interdisciplinary foundations and multisectoral design of ecological interventions, evaluations of program outcomes will require the combined use of several different behavioral, environmental, and health indices. For example, program evaluations might incorporate pre- and postintervention assessments of persons' health practices and overall

Table 5
Ecological Depth of Intervention Outcomes
Example: Los Angeles' Regulation XV to Promote Corporate Ridesharing

Potential Health Outcomes of Regulation XV	Duration and Levels of Health Outcomes		
	Short-Range/Personal	Medium-Range/Community	Long-Range/Global
	Reduce commuters' stress from solo driving during rush hour traffic	Improve levels of air quality in urban areas and reduce smog-related respiratory ailments	Reduce production of "greenhouse gases" from fossil fuel consumption; curb global warming and related health impacts

Regulation XV requires all public and private employers having 100 or more employees at any worksite to develop and implement a plan to increase "average vehicle ridership," or AVR, defined as the number of employees reporting to work between 6:00 and 10:00AM, divided by the number of vehicles driven by those employees to and from work.

well-being, levels of cooperation or conflict within organizations, personal or group exposure to physical environmental hazards, epidemiologic data on illness and mortality rates among specified groups in the community, and measures of employee health costs within public and private organizations. In addition to summative evaluations of program outcomes, formative evaluations of the effectiveness with which intervention components are implemented should be incorporated to assess overall program results.^{206,207}

Two different criteria for evaluating the summative impacts of health promotion programs are scientific and social validity. *Scientific validity* refers to the methodologic rigor and theoretical adequacy of a research or intervention program. For example, internal validity is the extent to which program outcomes are attributable to treatment conditions rather than to extraneous variables, whereas external validity is the extent to which research findings can be generalized from one study or intervention site to other specified populations, environments, and time intervals.²⁰⁸⁻²¹⁰ An alternative, yet complementary, criterion for evaluating research and intervention programs is social validity. *Social validity* refers to the societal value and practical significance of a research or intervention program.²¹¹⁻²¹³ Like scientific validity, social validity encompasses several interrelated criteria. Among these are the epidemiologic prevalence of particular health problems in the community, the economic costs and sustainability of programs designed to alleviate those problems, the number of people who are likely to benefit from or be adversely affected by the intervention program, the possible occurrence of undesirable side effects from the program, and public opinion about community health priorities. The social validity of a community health promotion program is greater to the extent that it is firmly grounded in scientific and epidemiologic research, economically feasible, likely to benefit a broad segment of the target population, unlikely to cause adverse side effects, and consistent with public priorities and commitments.

A major assumption underlying

social ecological analyses of health promotion is that those programs designed from a multidisciplinary perspective and combining interventions implemented across several community settings are likely to achieve higher levels of scientific and social validity than programs that are more narrowly conceived.

SUMMARY AND CONCLUSIONS

The formulation and evaluation of health promotion interventions can be made more effective by clearly specifying the theoretical assumptions underlying these programs.²⁰⁰⁻²⁰² In the preceding sections, three alternative theoretical perspectives on health promotion, including behavioral change, environmental enhancement, and social ecological models were reviewed, and key strengths and limitations of each orientation were noted. Social ecological theory, which integrates and extends behavioral change and environmentally focused models of health promotion, was used as a basis for deriving several practical guidelines for organizing and evaluating community health promotion programs.

The theoretical underpinnings of social ecology are relevant to several practical issues that arise in attempts to design effective community interventions. For example, the challenge of developing health promotion programs that have enduring positive effects on well-being at several community levels and avoid unintended adverse side effects is explicitly addressed in preintervention analyses of social validity and the ecological depth of anticipated program outcomes. Moreover, the importance of understanding the interactive influence of physical and social environmental conditions on health is highlighted by recent studies showing the differential impacts of technologic and natural disasters on well-being.²¹⁴ This research reveals that the emotional and physiologic consequences of technologic disasters (e.g., those leading to the threat of toxic exposure or radioactive contamination) are more severe and prolonged than those associated with natural disasters such as hurricanes and tornadoes.

The greater disruptiveness of technologic disasters has been attributed to the negative social processes accompanying the precipitating physical event—especially the feelings of bitterness and the attributions of blame that are directed toward community or corporate officials held responsible for the technologic failure. Also, the health risks associated with technologic disasters, such as potential exposure to toxic or radioactive materials, create greater emotional and physical distress because these conditions are often imperceptible (in contrast to the onset of an earthquake, flood, or tornado), and can evoke perceptions of helplessness and environmental uncontrollability that persist for prolonged periods.²¹⁵ Thus health promotion programs and public health services for communities vulnerable to technologic and natural disasters should incorporate interventions that address the joint influence of physical and social conditions on well-being, the potential effects of other-directed health behavior (e.g., enacted by the managers of nuclear energy facilities) on community cohesion, and the capacity of uncontrollable and imperceptible environmental hazards to provoke psychological stress and social conflict.

The preceding discussion suggests several directions for future research and theory development within the health promotion field. First, the extent to which health promotion intermediaries function effectively or ineffectively in corporate and public settings may depend on situational factors, such as the quality of social climates and levels of staffing within organizational environments. The influence of these factors on the effectiveness of other-directed health behavior warrants further investigation. Also, a more detailed analysis of the ways in which physical and social environmental conditions jointly affect well-being within various life domains (especially work, residential, educational, and health care settings), and the identification of high-impact leverage points for health enhancement within these domains, are important directions for future study. Finally, the development of operational criteria for evaluating the scope

and duration of health promotion outcomes, and for measuring the synergistic effects of multilevel interventions undertaken at different community levels, remains as a priority for future research.

SO WHAT? Implications for Health Promotion Researchers and Practitioners

Social ecological theory suggests several key issues that warrant further study in health promotion research. These include the importance of (1) identifying high-impact leverage points and intermediaries within organizations that can facilitate the successful implementation of health-promotive interventions; (2) combining person-focused and environmentally based components within comprehensive health promotion programs; and (3) measuring the scope and sustainability (ecological depth) of intervention outcomes over prolonged periods. At a practical level, social ecological theory offers clear implementation guidelines for maximizing the health, economic, and societal benefits (social validity) of health promotion programs.

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