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Psychology in an Age of Ecological Crisis

From Personal Angst to Collective Action

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Recent technological, geophysical, and societal forces have fundamentally altered the structure and functioning of human environments. Prominent among these forces are the rise of the Internet; rapid rates of global environmental change; and widening rifts among different socioeconomic, racial, religious, and ethnic groups. The present article traces the influence of these conditions on individuals' cognition, behavior, and well-being. New theoretical questions are raised and conceptual frameworks proposed to understand how global conditions are restructuring people's relationships with their everyday environments. New directions for psychological research and practice aimed at reducing global threats to personal and societal well-being are discussed.

Keywords: global environmental and social change, virtual and place-based settings, psychological stress, restorative environments

We live in an era fraught with technological hazards, degraded natural resources, and the pervasive threat of global conflict Many regions of the world continue to be plagued by war, millions of people in the Third World are ravaged by disease and famine, and people in industrialized nations are becoming painfully aware of the health costs resulting from their exposure to environmental pollution and other by-products of high technology. (Stokols, 1992, p. 6)

The war in Afghanistan, the fight against terrorism, the war in Iraq Back home there's the struggling economy to deal with. The housing market collapsed, and inflation is on the rise and there's fear we are already in a recession. There is also, of course, the environment and global warming. The warnings continue with greater urgency about a threat facing not just the country, but the world and future generations. (Cooper, 2008)

In the 16 years separating those statements, the world has witnessed the 9/11 terrorist attacks, genocidal killings in Darfur, the Lebanon War, the Indian Ocean tsunami, Hurricane Katrina, and a host of other disasters. One billion members of the world's population now live in slums, and citizens of both industrialized and developing countries are becoming increasingly worried about the public health impacts of global destabilization (Davis, 2006; UNFPA, 2007; UN-HABITAT, 2003). Two decades ago, global problems and their pervasive impacts on local life were coming into focus among scientists working in fields ranging from atmospheric chemistry and molecular biology to environmental, community, and health psychology; demography; economics; urban planning; and public health

(cf. Bullard, 1990; Edelstein, 1988; Siver & DeFries, 1990). Concerns about the catastrophic implications of economic and ecological crises, however, were less salient and prevalent among the lay public. Yet today, frequent coverage of these issues in the mass media and in widely publicized scientific reports has sensitized millions of people throughout the world to the potentially disastrous consequences of global problems for their everyday lives and well-being (cf. Bates, Kundzewicz, Wu, & Palutikof, 2008; CNN, 2007; Giddens, 2002; Gore, 2006).

In this article, we examine the rapid changes that are occurring in the structure of human environments at both local and global levels and the implications of these changes for personal and public health. Of central concern are the roles that psychological research and practice can play in enabling individuals, organizations, and communities to better manage multiple sources of environmental change and to collaborate effectively toward reducing their negative impacts on population health and societal cohesion.

Analyses of psychological phenomena are essential to understanding the ways in which individuals perceive, experience, and respond to global threats in the context of their local communities and behavior settings. There is growing evidence, for example, that individuals' worries about environmental health threats take a toll on their subjective well-being (Barsky, 1988; Greenhalgh & Wessely, 2004; Petrie et al., 2005; Wandersman & Hallman, 1993). Moreover, people are confronted today by an onslaught of rapid changes in the structure and functioning of their residential, work, and community settings owing to the advent of the Internet and wireless communications technologies (Jackson, 2008; Stokols, 1999; Wellman & Haythornthwaite, 2002). Psychological processes such as environmental cognition, information processing, stress, and coping play key roles in determining how global conditions impinge on individuals' psyche and behavior in the context of their daily lives (cf. Baum & Fleming, 1993; S.

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Kaplan, 1972; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002).

At the same time, the sources of global problems and the development of strategies to ameliorate them are closely linked to psychological and behavioral processes. Global climate change and the depletion of the earth's ozone layer, for instance, are not explainable solely in terms of atmospheric chemistry—they must be understood also as by-products of individual motivation and behavior (e.g., incentive structures that support solo car driving, coal burning, and the use of aerosol products) that have led, in the aggregate, to adverse environmental changes (National Research Council Committee on Global Change Research, 1999; Stern, 1992). Furthermore, solutions to global problems depend on the ways in which individuals and government leaders perceive these threats and undertake collective efforts to resolve them. Particularly important in this regard is to identify and mobilize the psychological and situational circumstances that enable individuals to move from anxiety and passivity in the face of global threats toward constructive collaborative action.

The ensuing discussion is organized around the following goals and tasks: (a) Identify major categories of global change (e.g., technological, geophysical, and social forces) that have altered the organization and functioning of local settings and communities in recent decades; (b) present new theoretical questions and conceptual frameworks to better understand how global conditions are restructuring people's relationships with their sociophysical surroundings; (c) trace the influence of these global and local environmental changes on individuals' cognition, behavior, and well-being; and (d) consider promising directions for psychological research and practice that can help reduce global threats to personal and collective well-being.

Global Sources of Change in Human Environments

People's relationships with their environments are not static; rather, they are characterized by continual change (cf. I. Altman & Rogoff, 1987; Bronfenbrenner, 1992). Some of the changes that occur in human environments are incremental in nature, are confined to a particular setting, and do not alter the essential qualities and purposes of the setting. Examples of such changes are temporal phases in the life cycle of a behavior setting (e.g., a small business), including its initial establishment, growth, maintenance, modification, and eventual dissolution (Wicker, 1987). The focus and timing of these change processes are unique to particular settings and may not generalize to other similarly structured settings within a community. In contrast to these setting-specific changes, human environments occasionally undergo fundamental shifts in their organization, functioning, and purposes. These generic transformations of settings are triggered by abrupt changes in the societal contexts in which they are embedded. Generic changes extend to multiple settings making up a particular category of environments within a community (e.g., the recent proliferation of home-based businesses and technology-enhanced classrooms in educational settings made possible by the Internet). This discussion focuses primarily on generic transformations of settings, encompassing the pervasive, nonincremental, externally driven shifts that sometimes occur in the structure and organization of environments.

Transformative changes in human environments during the early 21st century are attributable in large part to certain technological, environmental, and social forces. One of the most powerful among those is the rapid emergence of the Internet and digital communications technologies over the past two decades. These developments have prompted fundamental shifts in the organization and functioning of human environments. Whereas behavior settings used to be organized around a distinct set of activities (e.g., parenting within residential settings, occupational activities within workplaces), contemporary settings have become more polyfunctional, whereby residential, work, and recreational functions are now accommodated within the same environment. The boundaries between individuals' public and private spheres have become less distinct, as now both can be experienced within the same setting (e.g., when a customer at a coffee house participates in a computer-based chat with friends located elsewhere or talks to them on her cell phone). Also, occupants of polyfunctional settings are more continually accessible by others via cell phones, fax machines, and computers and, consequently, are coping with higher rates of communication and distraction than they experienced in the past (Gleick, 2000; Guzzetta, 2005; Jackson, 2008).

A second source of change in the functioning of human environments is the increasing intensity and salience of global shifts toward planetary warming, environmental pollution, and the depletion of natural resources. These geophysical forces are altering people's sense of security within various kinds of environments (Matthew,



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2007; McDonald, 2008). For instance, heightened awareness of the dangers associated with global warming (e.g., potential flooding of coastal plains due to the melting of glacial ice packs, food shortages and fire dangers in arid regions) has triggered political debates about the management of scarce resources (e.g., potable water supplies, petroleum, natural gas). Also, growing concerns about extreme weather events are prompting families in some locales to reassess their attachments to residential environments—for instance, among those living in highly scenic but potentially dangerous fire and flood zones (cf. Bates et al., 2008; Ekins, 2000; Federal Emergency Management Agency, 2007).

A third category of societal change and destabilization encompasses the widening disparities among different socioeconomic, racial, religious, and ethnic groups so evident today at local, regional, and global levels (Bullard, 1990; Castells, 1998; National Cancer Institute, 2006; Thomas & Quinn, 2008). Environmental injustice, terrorism, and longstanding struggles among groups espousing competing worldviews are rampant throughout the world (Bullard & Johnson, 2000; Delpech, 2007; Library of Congress, 2004). These sociopolitical trends have elevated people's concerns about personal and collective safety within a wide range of environments, including residential neighborhoods, public spaces, transportation, and recreational settings (Lee & Farrall, 2008; Stafford, Chandola, & Marmot, 2007).

The technological, geophysical, and sociopolitical sources of global change noted above are synergistic: They exert combined as well as separate influences on behavior and well-being. For instance, the Internet affords individuals instantaneous and frequent access to vivid descriptions and imagery of worldwide events such as hurricanes, floods, wildfires, oil spills, terrorist attacks, and military

conflicts. Continual exposure to information about these problems raises the salience of global crises and can engender anxiety and passivity in the face of seemingly overwhelming threats. Digital technologies also have been exploited to perpetrate criminal activities (e.g., cyber stalking, identity theft) and racial prejudice (Ballard, Nornik, & McKenzie, 2002; U.S. Department of Justice, 2008). Yet, the Internet and wireless communications have the potential to be used far more constructively to enable people to better understand global problems and coordinate their efforts to solve them. The interrelations among different types of global change and the ways in which they can be managed to promote greater stability and well-being are discussed below. We begin by considering how information technologies have transformed the structure and functioning of human environments and the behavioral and psychological ramifications of those changes.

Structural Changes in Behavior Settings During the Early 21st Century

More than three decades ago, Barker and Schoggen (1973) published a comparative analysis of the behavior settings they observed in an American town and an English town. This massive work revealed contrasting types and distributions of behavior settings in the two communities. Each town had a relatively stable stock of settings that structured residents' day-to-day activities and experiences in each locale. The tasks of identifying and counting the settings in each town and categorizing them according to their major functions (e.g., educational, commercial, recreational, residential) were relatively straightforward as described by the authors.

Fast forward to the year 2009: Striking features of human environments in the context of modernity are the rapidity with which they change and the diverse range of activities carried out by participants in settings such as workplaces, homes, and public spaces. Not only are contemporary behavior settings increasingly *polyfunctional* (in that they combine diverse behavioral programs), but they also encompass both place-based and cyber-based (or virtual) components (Blanchard, 2004; Blanchard & Horan, 1998; Stokols, 1999). When Barker, Schoggen, Wicker, and other students of behavior settings published their influential works during the 1970s and 1980s (e.g., Barker, 1968; Barker & Schoggen, 1973; Wicker, 1987), it was relatively simple to identify the spatial and temporal boundaries of settings located in a particular region and categorize each setting according to its major behavioral functions (e.g., residential, occupational). Nowadays, the boundaries of many settings extend beyond specific geographical coordinates to the expanding domain of cyberspace, and they encompass diverse activities that are not easily grouped into singular, simplex categories (Stokols & Montero, 2002; Wellman, 2001).

Consider, for example, Oldenburg's (1999) typology of places. He defined *first places* as homes, *second places*

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as work environments, and *third places* as “the core settings of informal public life” (Oldenburg, 1999, p. 16). A major premise of Oldenburg’s conceptualization of settings is that cities and towns of varying size should offer their residents access to a wide array of third places, which function as a kind of retreat from the pressures of home and work life. Without third places where residents can mingle with strangers in a relaxed and informal atmosphere, human settlements become stifling and dreary.

Although Oldenburg’s (1999) typology offers an alluringly simple and straightforward conceptualization of settings, it no longer captures the growing diversity and complexity of human environments (Guzzetta, 2005). For instance, Oldenburg’s typology omits *hybrid places*, in which the functions of first and second, second and third, and first and third places are merged within the same environment. Examples of this trend toward hybridization of human environments include residential settings that are wired to enable residents to work at home on a daily basis; workplaces that now offer various domestic and recreational services such as day-care centers, fitness centers, athletic fields, and meditation rooms; and third places like coffee shops and Internet cafes that are often populated by solitary computer workers who interact more closely with their laptops and cell phones than with fellow customers in their immediate vicinity.

Considering the substantial changes that have occurred and will continue to emerge in the design and functioning of human environments, it is timely to rethink earlier conceptualizations of settings and places and to develop new ones that are more commensurate with the realities of the 21st century. Analyses of human environments are not simply of theoretical concern: They often

have direct practical implications for understanding contemporary patterns of human behavior, social integration, community planning, and population health. For instance, Oldenburg (1999) advocated the provision of third places to create vibrant cities, whereas other scholars have emphasized the value of urban parks as a resource that promotes physical activity, psychological restoration, and stress reduction (Duany, Plater-Zyberk, & Speck, 2000; Frumkin, 2001; R. Kaplan & Kaplan, 1989).

Emergence of Polyfunctional Environments

Research on the environmental psychology of the Internet considers how people’s reliance on digital communication technologies is changing the design and functioning of place-based environments (Stokols & Montero, 2002). Blanchard (2004) extended Barker’s (1968) behavior-setting theory to the realm of cyber communities and defined these new environmental forms as *virtual behavior settings*—that is, “naturally-occurring, computer-accessible social spaces in which groups of people participate in on-going exchanges of communication” (Virtual Behavior Settings section, para. 2). Time and space boundaries—essential features of place-based environments—are considerably weakened in virtual behavior settings. Virtual settings possess several of the same qualities as physical places (e.g., they afford social interaction and convey symbolic meanings just as physical places do). They also facilitate a sense of belonging and attachment (e.g., social networking sites such as MySpace and Facebook) and enable recreation and leisure activities through video sharing, podcasting, and online gaming (e.g., YouTube, iTunes, and World of Warcraft).¹

People’s experiences of virtual behavior settings are, of course, dependent on and influenced by the physical locations from which they are accessed via computer, cell phone, or some other electronic device. Places that incorporate the requisite electronic infrastructure (e.g., computers, Internet connectivity, cell phone coverage) permit access to virtual settings, thereby enabling the intermingling of behavioral programs associated with both the place-based host setting and the virtual communities that are accessed from it. Stokols (1999) characterized these link-

¹ Whereas non-Internet communications (e.g., reading a book, watching TV, talking with others on the telephone, or corresponding with others by snail mail) can bring geographically distant people and places psychologically closer to the individual, the Internet enables individuals to communicate simultaneously and interactively with hundreds of other persons—for example, through instant messaging among acquaintances online at the same time and electronic mailing lists. By contrast, TV programs are experienced more passively than interactively, and phone conversations usually are restricted to dyads (or to slightly larger groups participating in conference calls). Although print media can depict far-away people and places through photographs, drawings, and text, they do not offer real-time, interactive views of distant people and events, nor can they deliver nearly instantaneous, multimodal communications as exemplified by electronic mailings that contain document, voice, and video attachments. The Internet also affords serendipitous encounters with large numbers of unknown persons in cyberspace and opportunities to explore hundreds of Web sites within relatively short time intervals.



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ages between real (place-based) and virtual (cyber-based)² settings as “R-V” mesosystems, as distinct from “R-R” units that link two or more place-based (nonvirtual) settings (cf. Bronfenbrenner, 1992). The intermingling of place-based and virtual behavior programs within R-V mesosystems reflects the polyfunctional nature of these settings in the sense that participants are able to pursue multiple and diverse activities (e.g., babysitting and online banking) concurrently. The virtual and place-based functions of R-V settings may either complement each other (as when teachers incorporate educational resources from the Internet into their classroom teaching) or conflict with each other (as when employees engage in recreational Web surfing while at work).

Whereas some polyfunctional settings are devoid of virtual elements and incorporate only place-based functions (e.g., provision of exercise facilities and child care services at corporate work sites), we focus here on the subset of hybrid settings that encompasses both cyber-based and place-based elements. These R-V polyfunctional settings are less restricted by temporal constraints than are settings whose multiple functions are entirely place based. An essential condition for the existence of an R-V polyfunctional setting is the ability of its members to use the Internet or related digital communication tools.

Categories of Hybrid Environments

All physical behavior settings (e.g., Oldenburg’s, 1999, first, second, and third places) have the potential to become polyfunctional environments. Examples of the hybridization of behavior settings are noted below.

Hybridization of home environments.

Personal computers and cell phones enable people to work at home. Teleconferencing, videoconferencing, and other

synchronous communication methods replace travel to meetings; electronic transmission of data and documents replaces traditional mail delivery. The movement of information replaces the movement of people and goods (Negroponte, 1995). Telecommuting, or the use of telecommunication technologies in lieu of physically commuting between home and work, has expanded people’s work locations and yielded first–second hybrid places. Internet access in domestic environments also enables residents to participate in diverse recreational activities while at home. Chat rooms, social networking Web sites, and virtual communities such as Second Life, SeniorNet, eBay, and Craigslist offer new opportunities for social interaction and support while people are at home (Rheingold, 1993; Schuler, 1996). Web sites that support video and radio streaming, online gaming, blogging, and e-commerce afford recreation for residents without requiring them to leave home, thereby yielding first–third hybrid places.

Hybridization of work environments.

In addition to telecommuting and home computer work, wireless communications further enlarge individuals’ access to other people, places, and information. Employees and students increasingly are taking their work away from traditional workplaces and bringing it with them to coffee shops, parks, and other public venues, resulting in hybrid second–third places. Another pervasive change in work environments is the temporal elasticity of their boundaries. Work activities no longer are confined to the hours of 9 a.m. to 5 p.m. The structure of organizations also has changed with the advent of virtual teams, whose members are geographically, temporally, and culturally dispersed. Virtual team members collaborate on tasks predominantly through the Internet and other digital communication technologies (Olson & Olson, 2000). Also, the Internet has spawned new forms of employment such as managing virtual stores on eBay and running other online businesses from home.

Hybridization of recreational urban and natural environments.

The Internet has enlarged the functions of third places, public spaces, and natural environments by giving people multiple reasons to visit public settings: for example, for work, personal entertainment, and electronic communication with distant friends, family, and strangers. The ease of communication afforded by the Internet and mobile phones enables people to organize their use of public spaces (e.g., plazas and parks) efficiently and economically (Thompson, 2002). Besides serving as the “core settings of informal public life” (Oldenburg, 1999, p. 16), some third places like coffee houses,

² The term *real* denotes settings that have observable geographic boundaries and a temporal patterning of activities (behavioral program) coordinated with and attached to the physical milieu of the setting. The term *virtual* denotes Internet-based social settings in which time–space boundaries are absent or nonexplicit. Real settings may have virtual components, but they are still located in physical space and provide geographic contexts for face-to-face encounters among participants, which set them apart from virtual behavior settings and virtual communities as defined by Blanchard (2004).

cafés, and bookstores have been transformed into settings where private life can be pursued in public. At least in some instances, the core functions of third places as sociable settings that celebrate community have become more diverse—many of them now offer a unique blend of togetherness and remoteness. One wonders whether public and private realms will become virtually indistinguishable in the Internet age.

Behavioral, Psychological, and Health Impacts of Environmental Change

Global technological, geophysical, and social forces have transformed local environments in fundamental ways, as reflected in the emergence of Internet-enabled hybrid places. What are the behavioral, psychological, and health consequences of these pervasive environmental changes? In many ways, Internet-supported behaviors have made people's daily lives more convenient and enjoyable. They can telecommute and avoid the hassles of rush-hour traffic between separate home and work locations. They can stay in closer touch with geographically distant friends and relatives by exchanging e-mail with them. They can engage in recreational and political activities and pursue myriad professional, friendship, and romantic relationships by networking with large numbers of others who are also online (cf. Bargh & McKenna, 2004; Gackenbach, 1998; Wallace, 1999).

Yet, the Internet age and the hybridization of places also have imposed behavioral costs, psychological burdens, and health challenges on citizens of the postmodern world. People's daily routines have become more fragmented, in the sense that they switch between multiple tasks and activities frequently and encounter a larger number of interruptions throughout the day as a result of their reliance on the Internet and wireless technologies. Recent studies of knowledge workers indicate that they handle a large number of tasks each day, spend relatively little time on one task before switching their attention to another, and encounter frequent interruptions (Mark, Gonzalez, & Harris, 2005; Mark, Gudith, & Klocke, 2008). Moreover, the complexity and pace of people's jobs, as well as the number of hours they work each week, have increased in recent years within the United States and several other countries (Jacobs & Medalia, 2008; Maume & Purcell, 2007). These trends toward behavioral fragmentation and "continuous partial attention" (Stone, 2007) are also evident in residential and family domains where the intersection of spousal, parenting, and work behaviors has transformed the modern home into a polyfunctional hub of activities rather than a refuge from the pressures of work and the outside world (Jackson, 2002).

The demands of multitasking, frequent interruptions, and managing large volumes of electronic communications have been linked to a number of cognitive and affective problems. Employees and managers from diverse occupations and workplaces report that they are increasingly inundated by a surfeit of information transmitted to them via

e-mail, faxes, and voice messages (Edmunds & Morris, 2000; Eppler & Mengis, 2004). Recipients of electronic communications expend considerable amounts of time and effort each day processing spam or junk messages, which now constitute almost half of all e-mail traffic (Bargh & McKenna, 2004).

The proliferation of cyber communications in recent years (Lyman & Varian, 2003) has increased the frequency with which people experience distraction and information overload in workplaces and other settings (Gleick, 2000; Jackson, 2008; Rosen, 2008). The subjective experience of overload occurs when people feel overwhelmed by an excessively high volume or rate of communications and information, relative to their capacity to manage it (cf. Lazarus & Folkman, 1984; Lipowski, 1975; Milgram, 1970; Miller, 1978). Higher levels of information overload have been found to be associated with greater self-reported stress, poorer health status, reduced productivity, and less time devoted to contemplative activities (Misra & Stokols, 2008). The cognitive demands imposed by excessive stimulation and interruptions also have been linked to poorer decision making, degraded performance on complex tasks, reduced sensitivity to social cues, and higher rates of medical errors in health care settings (Hwang & Lin, 1999; Kohn, Corrigan, & Donaldson, 2000; Mathews & Canon, 1975; Speier, Valacich, & Vessey, 1999).

Some scholars have suggested that in addition to promoting performance deficits and stress, intensive Internet use gives rise to interpersonal orientations that may be detrimental at personal and societal levels. Gergen (2002b) contended that people nowadays spend much of their time immersed in "floating worlds" of cyber communication where participants are psychologically present but physically absent from each other; while at the same time being physically present in their respective locations but psychologically detached from events occurring in their immediate surrounds. According to Gergen (2002a), these states of "absent presence" undermine social cohesion and moral understandings in local communities. Rosen (2007) expressed similar concerns about the changing meaning of friendship in the Internet age. She described online social networks as "congeries of mostly weak ties" (Rosen, 2007, p. 20; cf. Granovetter, 1973) devoid of intimacy and suggested that people's conceptions of friendship are becoming more superficial and diluted in the context of Facebook, MySpace, and other networking sites (whose members often list hundreds of friends on their personal profile pages). Rosen characterized this tendency to publicly trumpet one's online friendships as a narcissistic quest for social status. Both Rosen and Gergen called attention to what they regarded as contemporary trends toward superficiality in interpersonal relationships and withdrawal from face-to-face discourse in local settings due to people's immersion in cyber networks.

In sum, although widespread Internet use and mobile communications have distinct advantages, they exact a considerable toll on people's capacity to focus their attention, increase their susceptibility to stress, and decrease the time they can devote to face-to-face interactions in their

immediate locale. It is important to address these potential costs of Internet life, as they may deter individuals from paying close attention to impending threats at local and global levels and from joining with others in collective efforts to resolve them. Yet, while affluent and middle-income Internet users withdraw into privatized cyber enclaves (Boyer, 1996), large segments of the world's population remain excluded from the Internet, yielding an ever-widening "digital divide" between the information haves and have-nots (Castells, 1998; Investor Group Against Digital Divide, 2008). Those living in poverty fall further behind in education, employment, and health status and become increasingly alienated from civil society (Davis, 2006; Eberly, 2008).

Growing disparities in people's access to information and other resources, coupled with the pressures of living and working in fast-paced polyfunctional environments, pose important challenges for psychological research. What role can psychological theory and practice play in helping to repair socioeconomic divisions in society, while also enabling people to cope more effectively with the pressures of everyday life and shift from personal anxiety and passivity toward engagement in collective efforts to reduce global problems?

Psychological Perspectives on People–Environment Relations in a Turbulent World

Much research in environmental psychology suggests that people ideally strive to achieve optimal environments or those that maximize the fulfillment of their needs and the accomplishment of their goals and plans (Stokols, 1978). Individuals perceive, evaluate, and act on their surroundings in an effort to enhance the fit between environmental conditions and personal needs. In reality, people often must *satisfice*, or accommodate less than optimal surroundings because of a variety of external constraints (Simon, 1957). But they expend considerable effort in trying to maintain a modicum of compatibility between themselves and their surroundings, even when environmental circumstances are largely beyond their control (S. Kaplan, 1983). The field of positive psychology also highlights human resilience in the face of external challenges and individuals' capacity to achieve fulfillment and creativity, even in nonoptimal environments (Aspinwall & Staudinger, 2003; Diener, Suh, Lucas, & Smith, 1999; Seligman & Csikszentmihalyi, 2000). Yet, it seems plausible that when individuals are regularly confronted by urgent warnings about impending ecological disasters, socioeconomic disparities, and political antagonisms and by the frenetic pace of modern life, they are likely to experience attentional fatigue, feel helpless against seemingly insurmountable odds, and curtail social contacts with others in their local milieu. The ecological realities and geopolitical exigencies of the 21st century may simply overwhelm individuals' best efforts to improve, let alone optimize, their surroundings and to strive toward self-actualization and flow (cf. Csikszentmihalyi, 1990; Maslow, 1943; Stokols, 2003).

Several psychological theories are pertinent to understanding people's responses to suboptimal environments. Analyses of stress and coping have identified the circumstances under which people appraise environmental challenges as threatening and make adaptive efforts to alter the immediate situation or their perception and evaluation of it (Baum & Fleming, 1993; Lazarus, 1999). Studies of learned helplessness and allostatic load have documented the limits of humans' capacity to cope with uncontrollable and stressful conditions, especially when exposure to those conditions is prolonged and unrelenting (G. W. Evans, 2004; McEwen & Stellar, 1993; Seeman, McEwen, Rowe, & Singer, 2001). Theories of psychological restoration highlight the value of providing people access to restorative environments—those that offer respite from their usual responsibilities and routines and opportunities to replenish mental and physical energy—thus bolstering people's coping capacity and reducing their susceptibility to helplessness (Hartig, 2004; R. Kaplan & Kaplan, 1989; Ulrich, 1983).

The above theories shed light on people's efforts to cope with environmental challenges, but they share some important limitations when used to explain human responses to ecological crises, sociopolitical conflicts, and rapid technological change. Psychological analyses of stress and coping, learned helplessness, and restoration often have focused on individuals' efforts to manage immediate challenges in their local environments (although some studies have examined responses to community stressors over extended periods; cf. Baum & Fleming, 1993; Silver et al., 2002). The individualistic, local, and short-term orientations of many psychological theories are useful for understanding people–environment transactions in the context of a particular behavior setting or community. However, because people and events in different parts of the world have become increasingly interdependent through cyber communications, air travel, and other technologies, individuals' perceptions of environments and efforts to achieve equanimity in their daily lives are now substantially influenced by geographically remote as well as proximal conditions. These realities of the modern era suggest that even when individuals successfully cope with local challenges, participate in restorative environments, and experience creativity and fulfillment, their adaptive successes may be illusory or short-lived, particularly if they are myopically viewed as being insulated from objective conditions elsewhere in the world that, at any moment, could negatively impact one's immediate situation. Examples of these realities include the one billion people currently living in slums, creating cauldrons of conflict and destabilization, and the deleterious effects of burning coal on air quality in one location and on population health in other parts of the world. Thus, Sampson (1981) exhorted psychologists to avoid the biases of subjectivism and individualism in their theories, whereby objective realities are ignored or cognitively diminished in the minds of individual "knowers," often to the detriment of their well-being. Wohlwill (1973) similarly observed that "the [objective] environment is not in the head" and must be addressed

explicitly in studies of people's transactions with their surroundings.

New conceptualizations of human response to ecological, social, and technological change are needed, particularly those that (a) address the links between local and global events, (b) encompass collective as well as individual efforts to cope with impending threats, and (c) incorporate an extended rather than narrow time perspective. The predominant focus of psychological studies on individuals interacting with local settings over short time periods should be supplemented by future theorizing and research that explains how and when people become aware of and conceptualize the relationships between their immediate and more distant surroundings; addresses the social and collaborative dimensions of environmental decision making, coping with stress, and achieving restoration and well-being (especially today, as individuals find themselves confronted by increasingly complex challenges at both local and global levels); and gives broader attention to the ways these phenomena unfold over extended time frames—for example, developmental and intergenerational influences on how individuals, organizations, and governments construe and cope with environmental change.

Psychological Perspectives on the Relationships Between Local and Global Environments

Prior research has given considerable attention to the determinants of ecologically supportive behaviors, such as energy conservation, ridesharing, and recycling, that affect environmental quality at local and global levels (Gardner & Stern, 2002; Howard, 2000; Osbaldiston & Sheldon, 2003; Stern, 2000; Winter, 2000). Other psychological facets of the interplay between people's local and global environments, however, have been relatively neglected in earlier studies. Little is known about how people mentally represent distant settings and events—for instance, how affluent individuals construe living conditions in urban slums that are far removed from their own neighborhoods and whether or when they ponder how those conditions might affect their own lives or the well-being of future generations. Also, there is scant empirical information about conditions that predispose some people to embrace superordinate interests and goals (Oskamp, 2000; Sherif, Harvey, White, Hood, & Sherif, 1961; Sherif & Sherif, 1953), especially those shared among diverse populations and world regions (e.g., the goal of promoting global sustainability), rather than identifying more narrowly with group-specific and locally based interests. Earlier studies of place identity demonstrated the strong influence of individuals' emotional attachments to local places (e.g., hometowns and local neighborhoods) on their personal values and self-concept (Proshansky, 1978; Proshansky, Fabian, & Kaminoff, 1983). Yet, factors that encourage people to identify with places and populations that are geographically distant from their own barely have been explored (cf. Harré, 2007).

Another important topic for further study is the influence of remote environmental conditions on personal ex-

periences of stress, coping, and psychological restoration. Even among people living in relatively stable and desirable places, worries about remote and unseen environmental threats such as air pollution, nuclear contamination, tainted food, extreme weather events, random violence, and terrorist attacks are engendering chronic stress and feelings of insecurity (Baum & Fleming, 1993; Lee & Farrall, 2008; McDonald, 2008; Petrie et al., 2005; Stafford et al., 2007; Vaughan, 1993; Wandersman & Hallman, 1993). Increasing worries about remote environmental threats may result in a syndrome of *topophobia*, or chronic fear associated with particular places (González, 2005; Hipp, 2006)—for instance, scenic coastal areas that have been devastated by hurricanes or tsunamis and downtown areas or transportation depots that have been targeted by terrorists. Whereas residents of scenic natural areas and those in urban settings may continue to experience *topophilia*, or strongly favorable attachments to their environments (Ogunseitan, 2005; Tuan, 1974), they also may become more susceptible to *topophobia*, or fearful reactions to those places, as concerns about global ecological and social threats continue to grow.

Individuals' efforts to minimize stress and maximize restorative opportunities become more daunting when relatively stable local environments are overshadowed by broader ecological contexts that are turbulent and unstable. Analyses of restorative environments (Hartig, 2004; R. Kaplan & Kaplan, 1989; Ulrich, 1983) typically focus on the psychological and physiological benefits derived by individuals when they retreat from the demands of their everyday environments into relatively serene natural settings (e.g., scenic resorts and wilderness areas). However, with the increasing severity of ecological and societal dangers in recent years (e.g., related to global climate change and terrorism), the individual's capacity to achieve psychological restoration has become heavily dependent on collective efforts to protect the quality of remote as well as local environments. New conceptualizations of restorative environments are needed that address the interdependencies between the psychological restoration experienced by individuals in low-stress settings and environmental restoration efforts undertaken by collectivities (e.g., local and national governments, private foundations, international organizations) to improve the quality of community and global environments.

From Individualist to Collectivist Analyses of Human Response to Environmental Change

Complex ecological, technological, and social crises, such as global warming, information overload, environmental racism, terrorism, and the digital divide—as well as personal anxieties fueled by these problems—cannot be averted through isolated individual efforts (Bullard & Johnson, 2000; Investor Group Against Digital Divide, 2008; Wilson, 2002). Analyses of psychological stress in the context of rapid environmental change must confront the social and political dimensions of global crises and well-being. Prilleltensky (2003, 2008), for example, contended that psychologists should maximize the *psychopolitical validity* of their theories, or the extent to which they ad-

dress power issues and encourage positive structural changes in communities. In the context of stress research, power issues are reflected in the differential access of affluent and impoverished groups to mental health and medical services, information technologies, employment opportunities, and uncontaminated and restorative environments. These objective disparities are an important source of psychological stress among both affluent and low-income groups because of their growing interdependence in an increasingly unstable world.

The social dimensions of modern-day stressors are evident not only in the origins of these problems but also in the strategies people use to cope with them. For instance, not only is it impossible for many individuals to escape to restorative wilderness areas on a regular basis (e.g., going for hikes in a national park) due to the demands of their weekly schedules, but also, when given the choice, many people select urban social settings over solitary rural environments for restorative purposes (Gould, 2006; S. Kaplan, Bardwell, & Slakter, 1993; Runnerstrom, 2008; Scopelliti & Guiliani, 2004), for example, bookstores, museums, public plazas, coffee shops, and other third places (Oldenburg, 1999) where they can relax with friends or acquaintances in informal conversation, pursue creative activities, or engage in casual people watching. These findings highlight the importance of giving greater attention to social and collaborative sources of psychological restoration in future research (cf. Runnerstrom, 2008). Socially mediated restoration, at least in some instances, may prove to be more satisfying and enduring than solitary restorative experiences. For instance, many individuals derive considerable satisfaction and enjoyment from their collaboration with others in community organizations that are working to improve local environmental and social conditions (S. D. Evans & Prilleltensky, 2007; Harré, 2007; Saegert, Thompson, & Warren, 2001; Shinn & Toohey, 2003; Venkatesh, 1999; Wandersman & Florin, 2000).

The challenges of managing complex local and global environmental demands will require increasingly broadly gauged partnerships that span multiple disciplines, societal sectors, and world regions (Gardner & Stern, 2002; Wilson, 1998). A new science of transdisciplinary action research is needed to guide these future interdisciplinary, cross-sectoral, and international coalitions aimed at remediating global problems (Christens & Perkins, 2008; Shen, 2008; Stokols, 2006). This new area of study could address several interrelated issues, including the contextual determinants of collaborative effectiveness among partners representing multiple disciplines, professions, cultures, and nations; key personal and situational circumstances that prompt individuals to join community activist groups and collaborate with others to promote environmental and social justice; and new strategies for cultivating social capital at international as well as local community levels (Bullard & Johnson, 2000; Harré, 2007; Pancer, Pratt, Hunsberger, & Alisat, 2007; Putnam, 2000; Stokols, Misra, Hall, Taylor, & Moser, 2008).

Broadening the Temporal Scope of Research on Human Response to Environmental Change

Sources of ecological and social instability and their impacts on individual and collective well-being emerge gradually (and often invisibly) over extended periods (Hardin, 1968). Psychologists' efforts to understand these problems, while working in collaboration with scholars and professionals from several other fields (e.g., political science, public policy, sociology, urban planning, public health), will necessitate research designs that span multiple years and levels of analysis and include individual, community, societal, and global perspectives (Siver & DeFries, 1990; Stern, 1992). For instance, longitudinal studies are required to identify circumstances that spawn environmental protection and social reform movements, which emerge and gain momentum gradually. Also, factors influencing the effectiveness and sustainability of local, cross-regional, and international partnerships to reduce environmental and social threats must be studied over extended periods to evaluate whether these collaborations are meeting their intended goals (D. G. Altman, 1995; Warden, 2007). Moreover, an understanding of the long-term behavioral and health consequences of individuals' routine exposure to multitasking and information overload in polyfunctional settings will require extended time-series research designs that can gauge the effectiveness of personal and organizational efforts to cope with chronic distraction and burgeoning communications loads.

Summary and Conclusions: Developing Evidence-Based Strategies for Managing Contemporary Ecological Challenges

Global technological, geophysical, and sociopolitical transitions have transformed people's local environments and communities and the patterning of their everyday lives. In those parts of the world where individuals have access to the Internet and digital information technologies, they are spending more and more of their time working, residing, and socializing in polyfunctional settings where they are confronted by escalating flows of electronic communications. Although the Internet and wireless technologies have afforded significant benefits, including unprecedented and instantaneous access to vast stores of information and unlimited opportunities to network with people in far-flung locations, they also have imposed significant behavioral, psychological, and health costs. The latter include the fragmentation of people's activities resulting from continual multitasking, greater vulnerability to psychological stress and physical strains generated by chronic exposure to information overload, and heightened anxieties and feelings of helplessness arising from frequent media reports of ecological and sociopolitical dangers in local as well as distant regions. These pressures of modern-day life can distract and discourage people from confronting ecological and social challenges and joining with others in constructive efforts to resolve them.

For psychologists to better comprehend local and global threats to ecological stability, new lines of psychological theory and research are needed that encompass supraregional as well as local perspectives on people's transactions with their surroundings and illuminate social and collaborative as well as intrapersonal dimensions of stress reduction, poverty alleviation, conflict resolution, and environmental management and decision making. Particularly valuable would be investigations of how people conceptualize the links between their local environments and global events and why and when they begin to identify with cross-national as well as local interests and goals. Also, because many individuals feel overwhelmed by the complex environmental and sociopolitical challenges facing them and future generations, new studies are needed to identify personal and situational factors that enable people to move from personal states of anxiety and passivity toward collective action to ameliorate local and global problems. These new lines of theorizing and research necessarily will be of broad temporal and interdisciplinary scope to permit longitudinal assessments of the behavioral and health impacts of global ecological conditions (e.g., rising information overload and repeated threats of terrorist attacks) and the effectiveness of collaborative partnerships implemented over several years to mitigate ecological and societal sources of destabilization.

Future efforts to translate scientific research into evidence-based strategies for managing environmental change and averting global crises will require extensive interdisciplinary collaboration as psychologists partner with urban planners, political scientists, sociologists, information scientists, public health and policy experts, and community practitioners to develop local interventions, as well as community-wide and international initiatives, aimed at resolving urgent societal problems. For instance, environmental and ecological psychologists might work with architects and planners to establish design guidelines for polyfunctional settings to ensure that they function as smoothly as possible (cf. Alexander et al., 1977; Horan, 2000). Such guidelines would address the value of including design features in residential and occupational settings that afford privacy regulation and solitude (e.g., physical separation of work and family activities in homes, incorporation of meditation rooms in corporate workplaces) and designing workplaces to accommodate organizational shifts toward greater collaboration and teamwork (Becker, Quinn, & Tennesen, 1995). Cognitive psychologists and management professionals could collaborate to develop organizational routines that assist employees in their efforts to limit interruptions and handle increasing volumes of e-mail and digitized information (Huff, 2008; Information Overload Research Group, 2008). Also, community, social, and health psychologists might partner with health professionals and community activists to establish incentive structures and educational programs that foster public participation in environmental protection, antipoverty, and health promotion initiatives. Examples of these interventions include educational programs and public-private partnerships to promote individuals' understanding of ecolog-

ical crises, their identification with the plight of impoverished communities, and their appreciation of superordinate (e.g., cross-national) environmental interests and concerns (Gore, 2006; Investor Group Against Digital Divide, 2008; Mappin & Johnson, 2005; Palmer, 1998).

Despite the cognitive, behavioral, and social challenges associated with the use of modern information technologies, Internet-based communications are among the most promising and powerful strategies for promoting greater ecological and societal stability. In addition to enabling the pursuit of individualized interests (e.g., forming new friendships through social networking Web sites, sharing creative ideas and personal experiences through blogging), the Internet has changed the way collective concerns are pursued. For instance, environmental educators and proponents of civic governance have created interactive Web sites for disseminating information about global ecology, environmental protection, and community-organizing techniques (e.g., Conservation Science Institute, 2008; Work Group for Community Health and Development, 2008). Internet communications also can encourage geographically dispersed people to broaden their awareness of global events, organize and participate in political protests, and collaborate in the creation of new products such as open-source software (Kahn & Kellner, 2004). The Internet, by lowering communication and coordination costs, is well suited for promoting public participation in social movements and a collective sense of identity and community among people from across the globe (Garrett, 2006; Norris, 2004). Finally, the Internet and wireless communication technologies can be used to warn people of impending natural disasters and emergent crises. In California, interactive Web sites have been created to assist the public in preparing for a projected magnitude 7.8 or larger earthquake along the San Andreas Fault (Southern California Earthquake Center, 2008). The Japanese government plans to use cell phone alerts to warn citizens about imminent seismic events in their region (Williams, 2007). Cell phones also can be used by emergency response personnel to locate trapped or injured persons via GPS and wireless signaling and by relatives and friends to provide social support to victims during natural and technological disasters (as occurred during the 9/11 terrorist attacks, the 2004 Indian Ocean tsunami, Hurricane Katrina, and the London Tube bombings in 2005).

In the context of a rapidly changing and often unstable world, psychological research and practice are positioned to play a major role in broadening psychologists' understanding of how global environmental and social forces are restructuring local settings and communities and the diverse impacts of those changes on human cognition, performance, social behavior, and well-being. Broader conceptualizations of people-environment relations encompassing the technological, geophysical, and social realities of the 21st century will enable the creation of new and effective strategies for sustaining ecological stability during the coming decades.

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