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APPLICATIONS AND CAREERS IN PSYCHOLOGY SCIENCE

Meghan Norris

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CHAPTER 13: ENVIRONMENTAL PSYCHOLOGY

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INTRODUCTION

Have you ever wondered whether playing music while you study helps you to focus? Why some people bicycle, recycle, or turn down the heat in winter – while others do not? Do people become more aggressive when it's hot

outside? Would playing in a park, as opposed to a paved playground, help children with ADHD focus their attention better? These are examples of questions that environmental psychologists answer.

OVERVIEW OF ENVIRONMENTAL PSYCHOLOGY

Environmental psychology is the study of how we, as individuals and as part of groups, interact with our physical settings — how we experience and change the environment, and how our behaviour and experiences are changed by the environment. In environmental psychology, *environment* includes both natural and built settings, such as parks, natural landscape, homes, workplaces, and public spaces. Environments can vary in scale from the immediate space surrounding us to the room, the building, the neighbourhood, the city, the wilderness, or the globe.

In most fields of psychology, behaviour seems to be considered as occurring in a vacuum. The physical environment is often treated in research as mere “noise,” something to be controlled for in studies. Environmental psychology embraces the physical world in which we experience life. Environmental psychologists consider any human activity to be situated along three dimensions at the same time: the person (e.g., age, gender, personality, culture), the place (e.g., home, classroom, workplace, park, nature), and the psychological process of interest (e.g., socializing, working, learning, playing, exploring). Change over time can be an important dimension as well. Behaviours in a particular physical environment can be influenced by social-psychological contextual factors such as the presence of others or one’s role in the group, and these are also part of environmental psychology (Gifford, 2014).

Environmental psychology is a relatively new field —

about 60 years old now – that has grown rapidly in response to the degradation of the natural environment and the need to design buildings that better meet the needs of their users. Like most areas of psychology, environmental psychology has a theoretical side as well as an applied side. Some environmental psychologists focus their efforts on developing knowledge, whereas others work as consultants to answer practical questions; a few aim to make their work serve immediate, practical goals as well as to contribute knowledge for others to build on (Stokes, 1997).

The goal of environmental psychologists who focus mainly on research is to understand individuals' transactions with their environments. They study fundamental psychological processes as they relate to the physical environment, including environmental perception, spatial cognition, appraisals of environments, and personality, child development, and social interaction as they relate to the environment. They ask: How do humans mentally represent their spatial surroundings? What are some common attitudes toward energy consumption? Which physical variables affect learning in the classroom?

At a broader level, environmental psychologists examine how transactions with our work, home, and natural environments are related to our satisfaction and productivity, well-being, and mental health. For example, do crowded cities contribute to depression? Does better lighting on sidewalks encourage people to go out at night? Does indoor air quality associate with better performance at the office? How is climate change affecting mental health (Gifford & Gifford, 2016)?

In the long run, many environmental psychologists aim to use the knowledge generated by their research to influence built and natural environments in positive and constructive ways. This can be done by contributing to government

policies or programs that help to promote sustainable behaviour. It could also be done through influencing the architecture and construction industries by informing design guidelines or by offering recommendations to city planners about how to encourage place-making and create urban spaces that are psychosocially healthy.

Other environmental psychologists work as consultants with goals to solve a practical problem brought to them by someone with a need to solve that problem. Such issues are likely to be local, specific, and pressing. When a client is less interested in the theoretical aspects of the problem, then effective, quick, and evidence-based action is called for. For example, when city officials are interested in establishing a food recycling program, their main concern could be to increase the number of people who participate in their program. They expect the environmental psychologist they hire to know the theories and the body of research well in order to translate this knowledge into practical recommendations that will result in more food recycling in the city.

The work of an environmental psychologist is interdisciplinary in nature. Depending on the area of focus, the successful researcher-practitioner will know something about architecture, organizational behaviour, health, natural resources management, and other related disciplines. Knowing how to work with other specialists is important, as is understanding the needs of users (or potential users) of the setting that is being planned, constructed, or renovated. Often, projects involving environmental psychology will be important to community leaders, volunteers, and policy-makers who may use research findings to formulate or change government regulations and guidelines. In short, environmental psychologists:

- Seek to improve our stewardship of natural resources

and help mitigate climate change, including how best to adapt to it;

- Understand how to increase the habitability of the built environment;
- Study everyday settings in relation to human attitudes, emotions, and behaviours;
- Recognize that we actively cope with, and shape, environments; we do not passively respond to environmental forces; and,
- Work in conjunction with other disciplines.

A BIT OF HISTORY

Psychologists have conducted research on the built environment since the 1920s. In the earliest studies (as cited in Gifford, 2014), researchers investigated the effects of noise and heat on work performance, classroom seating on student grades, and lighting on work performance in the infamous Hawthorne studies — studies you might have heard about in some of your courses.

The modern intellectual roots of environmental psychology can be traced back to the middle of the 20th century. Egon Brunswik (1943) argued that psychologists should focus on an organism's environment as much as the organism itself. Like Brunswik, Kurt Lewin (1946) viewed the environment as an essential influence on behaviour. He also emphasized that research should be driven by real-world problems and applied to solve real-world social problems. Roger Barker (1968) developed the concept of behaviour settings: small ecological units, such as the corner store and the high school basketball game. Barker observed remarkable consistency in the pattern of activity for

occupants in a given role in relation to the physical-spatial aspect of the behaviour setting.

The 1950s experienced an increase in research in “architectural psychology,” which focused on human interactions with the built environment. The primary goal of these studies was to improve human well-being and satisfaction by designing or altering built environments. A key example is the redesign of parts of a large, fortress-like mental hospital, as they were called in the 1950s. A team consisting of a psychiatrist, a psychologist, and an architect carefully considered the particular needs and behaviours of the patients in the re-design of the hospital at Weyburn, Saskatchewan (Osmond, 1957). This project might have been the very first time in which environmental psychology was consciously applied to the design of a building, and we will revisit this project below.

The 1960s saw rapid growth in environmental psychology. In a time of increased societal awareness and concern about the health of the natural world, researchers began to study environmental issues such as how human activity negatively influences the biophysical environment and how human-caused problems (e.g., noise and pollution) affect human health and well-being. These topics soon became an essential part of what environmental psychologists do.

In the late 1960s, environmental psychology became a named, distinct field (e.g., Proshansky, Ittelson, & Rivlin, 1970). Today, the field encompasses the study of environmental and architectural concerns. Environmental psychologists around the world tend to focus on research areas of specific concern to their country or region. Most large national and international psychology organizations have a section or division that is devoted to environmental psychology.

CURRENT ENVIRONMENTAL PSYCHOLOGY RESEARCH TOPICS

Based on the authors' experience as editors and editorial board members of journals in the field, and upon our knowledge of our own and colleagues' work, here is a list of current topics that environmental psychologists study:

- Ecological consequences of human actions
- Sustainability and climate change
- Psychological aspects of resource management
- Psychological and behavioural aspects of people and nature
- Place attachment and place identity
- Environmental risks and hazards: perception, behaviour, and management
- Personal and group-based perceptions and evaluations of buildings, and natural landscapes
- Design and evaluation of workplaces, schools, homes, public buildings, and public spaces
- Cognitive mapping, spatial cognition, and wayfinding
- Leisure and tourism behaviour in relation to their physical settings
- Stress related to physical settings
- Social space: crowding, privacy, territoriality, personal space

The interests of environmental psychologists continue to reflect the environment we live in, building upon the past and adapting to new conditions (e.g., the creation of virtual reality expands the notion of “environment”). The 21st century is an era of digital communication and artificial

intelligence as well as of ecological threats (e.g., Stokols, 2018). How do advances in new technologies change our experiences and relationships with our physical environment? Is the workplace or the school still a relevant conception of place when people can work, learn, shop, sight-see places around the world, or consult with a therapist, from just about any physical setting? How will we perceive, think, and behave in virtual reality, augmented reality, and “smart” buildings and cities? These will be the subjects of inquiry for environmental psychology in the near future.

RESEARCH METHODS

Environmental psychologists use both quantitative and qualitative approaches, choosing one that best fits the research question, or using multiple methods if resources allow. Many of the methods are commonly used in psychology and, thus, are introduced in most undergraduate research methods textbooks. Other techniques are specific to research in environmental psychology. The environmental psychologist’s job is to know which methods of gathering information will yield quality answers to the questions at hand, and to use these methods well.

Research methods and techniques commonly used in environmental psychology include:

- Self-reports, such as questionnaire surveys, attitude and other rating scales, and interviews
- Experiments conducted in a laboratory
- Field studies and quasi-experiments conducted in everyday physical settings
- Analyses of archival data, such as census data, police crime reports, park visitors logs.

- Naturalistic observation and recording of behaviours in an unobtrusive and systematic manner
- Physiological measurements (e.g., cortisol level, skin conductance to measure stress level)
- Case studies of particular places
- Content analyses of documents and messages (e.g., media reports)

Some techniques used specifically (or more often) in environmental psychology are:

- Behaviour mapping (i.e., keeping a visual record of people's behaviours in a space; for example, where visitors are distributed in an art gallery at a particular time)
- Cognitive mapping (i.e., drawing an individual's mental representation of a place in a sketch map)
- Analyses of physical traces, including accretion (i.e., the deposit of material, such as litter) and erosion (i.e., the selective wear of material, such as floor tiles)
- Environmental simulations, ranging from static photos to videos, physical mock-ups, computer-generated images, to computer games and virtual reality applications. These simulations are particularly useful for studying the responses of future users to environments that are yet to be built.
- Needs assessment (architectural programming, before the project is built) and post-occupancy evaluation (did the building design work as planned?),

Each of these methods and techniques has strengths and weaknesses. In most cases, using multiple methods and techniques that complement one another in order to gain a comprehensive picture of the person-environment

transaction under study is the wisest approach. As in any research involving human participants, the researcher has the responsibility to address any ethical concerns and to weigh the potential social benefits against the social costs of the research. Two advanced guides to research methods and techniques used in environmental psychology research are the books written by Zeisel (2006) and edited by Gifford (2016).

SOME SIGNIFICANT RESEARCH STUDIES IN ENVIRONMENTAL PSYCHOLOGY

Several pioneers of environmental psychology have focused on our use of social space. The early work of Robert Sommer (e.g., his book *Personal Space: The Behavioral Basis of Design*, 1969) emphasized our need to keep particular, varying interpersonal distances (personal space) when we interact with different sorts of others, in different sorts of situations. He also examined the negative consequences that follow when others invade that space. In his book *The Environment and Social Behavior: Privacy, Personal Space, Territoriality, and Crowding* (1975), Irwin Altman described how we use our personal space, the territories we claim and maintain, and environmental and other means to maintain control over our interactions with other people (i.e., privacy). These concepts and principles have been influential to user-centred design.

Recall the mental hospital redesign project described earlier in the section about the history of environmental psychology. Based on the idea developed from that project, Robert Sommer formulated the concept of *social design* (Sommer, 1983). This approach to architectural design involves (a) working with people who use, or will use, the building rather than for them, (b) involving these people

who will use the building in planning and management of the spaces around them, and (c) educating them to use the environment wisely and creatively to achieve a harmonious balance between the social, physical, and natural environments.

The key benefit of this approach is serving the needs of the building occupants or potential users first. Architects often view their designs differently from laypersons (Gifford, Hine, Muller-Clemm, & Shaw, 2000), and the paying client (e.g., a school board) often does not communicate with those who occupy or will use the building (e.g., teachers and students). Social design emphasizes building users as active agents in the design process.

Post-occupancy evaluations are then conducted to provide feedback to the architects and the paying client as to the effectiveness of the design. In the end, architects and paying clients could benefit as well by avoiding mistakes that would be costly to remedy over the building's life (Reizenstein, 1982). However, some resistance to this approach occurs because of the extra effort of involving users and occupants, unrealistic expectations about the effectiveness of social design, and conflict among principal players. Those who take the longer-term view of the building's effects on employees for many years argue that these initial costs and efforts are well worth making (Brill, Margulis, Konar, & BOSTI Associates, 1984).

Significant contributions have been made to our understanding of what it is like to be living and working in extreme environments, including at both the Arctic and the Antarctic regions (Suedfeld, 1991). People in such environments experience not only extremely hostile physical conditions, but also psychological feelings of isolation and confinement with others in close quarters. Difficulty with communication and interpersonal conflicts

may occur, depending on the duration of stay. Preventive measures to minimize these problems might include selecting through vigorous physiological and psychological testing, capsule design, and countering boredom. Individuals who can do the required tasks, are emotionally stable, and are “sociable introverts” may be most suitable.

Capsule designs that incorporate color and variety, and some means for personalization and privacy, can help to reduce psychological stress. Individuals use different methods to fill unstructured time, injecting novelty into and reducing monotony in their lives in the capsule environment; some focus on the capsule or its surrounding environment (e.g., sunrise), whereas others focus on recreations of their far away home (e.g., a birthday party) (Suedfeld & Steel, 2000). These research findings have spurred an interest in investigating the possibilities for human habitation in space and other planets, and environmental psychology has contributed to such endeavours (Gifford & Lacombe, 2006; Suedfeld & Steel).

For a long time, the study of climate change was the territory of the natural sciences. However, in the last decade or so, social scientists have been successful to an increasing extent in convincing natural scientists and the public that they can play an important role in helping solve the problem. Both human solutions and technological solutions are necessary. After all, it is primarily human activities that have devastated much of our natural environment and as a result, it is our duty and responsibility to mitigate that impact through our individual and collective actions. Several environmental psychologists (Swim et al., 2011) served on the American Psychological Association’s Task Force on Climate Change, which compiled a report to guide future actions.

Robert Gifford (2011) has identified almost 40

psychological barriers that limit climate change mitigation and adaptation which he calls the “Dragons of Inaction.” These dragon “species” fall into several “genera,” such as (a) Change Unnecessary, (b) Conflicting Goals and Aspirations, (c) Interpersonal Relations, (d) Lacking Knowledge, (e) Tokenism, (f) Limited Cognition, (g) Government and Industry, and (h) Discredence (Lacroix, Gifford, & Chen, 2019). Understanding which barriers are strongest for which sorts of people is the basis for crafting interventions that will help people overcome their barriers.

HOW ENVIRONMENTAL PSYCHOLOGY MAKES A DIFFERENCE

Environmental psychologists help to improve the world in a variety of ways. Sometimes this impact is dramatic. Other times, it is more subtle. In this section, we celebrate a few of the ways in which environmental psychology has changed the world for the better.

PROMOTING SUSTAINABILITY

One of the most important challenges that environmental psychology is helping to overcome is to apply psychological knowledge to help preserve the natural environment. Many threats to environmental sustainability are caused by human behaviour, and so targeting human behaviour that has harmful effects is paramount for protecting nature and natural resources.

Among other activities, environmental psychologists identify behaviours that can and should be changed to improve environmental quality, determine which factors affect these behaviours, and develop and evaluate interventions to change them.

Most people have some concern for the environment, and this concern stems in part from egoistic, altruistic, and biospheric environmental values (e.g., Schultz, 2001). Knowing what individuals value helps environmental psychologists develop intervention policies: If a person or group's primary concern is egoistic, for example, interventions can be implemented that emphasize the personal benefits of caring for the environment, such as lower electricity bills. Some people hold hedonic values, favouring their immediate experiences (Steg, Perlaviciute, van der Werff, & Lurvink, 2014): For such individuals, interventions that focus on their own improved comfort or enjoyment might be most effective.

To add to the challenge, many individuals rebound from their pro-environmental behaviours. For example, people who reduce energy consumption in one area sometimes compensate by increasing consumption in another (Otto, Kaiser, & Arnold, 2014). Environmental psychologists seek not only to alter behaviour, but to ensure that this altered behaviour leads to real and lasting results. Studying how, and how much, rebound occurs is an area of active research with important policy implications (Santarius & Soland, 2018).

These are just a few ways in which environmental psychology intersects with conservation research and environmental policy change. Consider reading the reviews by Steg and Vlek (2009) for an in-depth review about how to encourage pro-environmental behaviour, or the chapter by Gifford (2002) that describes many ways that environmental psychology has already made a difference in the world.

ENVIRONMENTAL IDENTITY AND NATURE

How individuals think about themselves can be an

important predictor of pro-environmental behaviour. Those who identify as pro-environmental tend to engage in more pro-environmental behaviours (Whitmarsh & O'Neill, 2010). Environmental psychologists use this knowledge to help influence pro-environmental actions, such as using marketing strategies that encourage greener identity.

Emotional connection to the natural world is also an important predictor of well-being and ecological behaviour (Nisbet, Zelenski, & Murphy, 2009). By helping people develop bonds with nature, environmental psychologists promote sustainable behaviour and overall well-being.

RESTORATIVE ENVIRONMENTS

Another key point of interest in environmental psychology is the effects of natural settings on people. A growing number of environmental psychologists specialize in restorative environments, places that help people recover from day-to-day psychological overload. Nature walks, for example, can lead to stress reduction, improved attention, and decreased anger (Hartig, Evans, Jamner, Davis, & Gärling, 2003). Similarly, children whose homes feature nearby nature show fewer ill-effects from stressful life events (Wells & Evans, 2003). This research reveals the importance of preserving accessible green areas, and has implications for how we structure cities and homes.

PLACE ATTACHMENT

Place attachment is the bond between a person and a place. It is a complex reciprocal association involving cognition, affect, and behaviour (Lewicka, 2011; Scannell & Gifford, 2010). The bond can exist at very small scales (e.g.,

one's own room) through to neighbourhoods, parks, cities, regions, nations, and the globe.

With the rise of globalization and mobility, place attachment has become of particular interest as person-place bonds have become increasingly tenuous. This, in turn, can influence the perceived safety and pleasantness of an environment, and can lead to people being less protective of these places. Because of this, and because place attachment is associated with environmental risk perception, place attachment is important for understanding pro-environmental behaviour.

Place attachment can be a means of influencing behaviour in positive ways, for example by encouraging the use of public spaces such as national parks. Place attachment is also relevant for disaster psychology, and has been used to help understand and mitigate the grief experienced by those forced to relocate or, indeed, why people sometimes stay in a dangerous place when, rationally speaking, they should leave (e.g., Billig, 2006).

WAYFINDING

Knowledge of how people find their way in the built and natural environment has a wide range of applications. For example, psychologists have used this research to help catch criminals (Canter & Larkin, 1993) and locate persons lost in urban areas and the wilderness (Heth & Cornell, 1998; Cornell & Hill, 2006). It has also been used to discover ways to more quickly evacuate dangerous areas, such as a burning hotel (Kobes et al., 2009) or a smoky railway tunnel (Cosma, Ronchi, & Nilsson, 2016). Wayfinding research has also helped to develop head-mounted displays that can aid firefighter navigation in emergencies (Wilson & Wright, 2009).

ENHANCING BUILDING DESIGN

Environmental psychology first started making its mark in the world of architecture. For decades, environmental psychologists have been working to improve buildings by focusing on the human dimensions of building design. Here are a few examples of how environmental psychologists have improved the lives of users in several types of built settings.

Offices

Offices have been a popular setting for environmental psychologists to study because many people work in them and because they are comparatively accessible sites for field research that are relatively easy to simulate in a laboratory setting (Sundstrom, 1987; Veitch, 2012). Organizations probably benefit from paying greater attention to the behavioural effects of workplace conditions on employees because the costs of employees make up approximately 80% of workplace expenses, whereas the building and its operation consume approximately 8% (e.g., Brill et al., 1984). Poorly designed environments can trigger ill effects such as excess fatigue and psychological distress (Evans, Becker, Zahn, Bilotta, & Keese, 2012). Conversely, for example, greater well-being in the form of satisfaction with one's performance, and fewer physical symptoms at the end of the workday, have been associated with working under lighting conditions that one appraises as comfortable (Veitch, Newsham, Boyce, & Jones, 2008).

Long-term care centres

Environment-behaviour researchers (who encompass people with professional training in a variety of related social sciences, architecture and design, whose interests overlap) have played a role in the planning and evaluations of long-term care facilities for elderly residents with Alzheimer's disease.

For example, in five home-like residential care facilities in Canada and the US, environmental gerontologist Milke, Beck, Danes, and Leask (2009) observed that the activity patterns did not conform to the architects' expectations. Residents in each house did not form a "household" as the architects had thought but, instead, small groups gathered for eating and other activities based on naturally formed friendships and other factors. Demonstrating how unexpected "other" factors can influence use of space, the central common area between houses in one facility where the residents had lower-level functioning was used for meal-serving because the staff wanted to keep an eye on the residents.

In another assisted living treatment residence, the facility was designed to ensure that residents were safe from wandering and that they could function on their own and maintain their sense of self through the incorporation of familiar images, events, and sensory stimuli (Zeisel, 2006).

Health care facilities

Environmental psychologists have conducted research to evaluate the physical design of health care facilities, including hospitals and the doctor's office, in order to improve the health care experiences of patients. The physical surroundings of these settings can include any space from the parking lot, to the layout of exam rooms,

to waiting rooms and furnishings. Some research in this area has explored the effects of positive distractions in the doctor's office (Devlin, 2014). In a multi-site study of five hospital units, the more favorable the design features in a hospital room, the less stress patients reported experiencing after surgery. The physical environment of a hospital room can provide the patient with greater sense of control (e.g., adjustable temperature), facilitating social support (e.g., chair for visitor), and providing distractions (e.g., TV; Andrade, Devlin, Pereira, & Lima, 2017).

Alternative floor numbering systems (floors below ground numbered as "Sub 1" and "Sub 2" rather than simply Floors 1 and 2) can make hospitals easier to navigate for patients and visitors (Carpman, Grant, & Simmons, 1983). In smaller healthcare settings, the impression given by a doctor's waiting room matters. College students and seniors rated the quality of care provided by a doctor as higher when the waiting room was nicely furnished, well-lighted, warm in appearance, and containing artwork than when the waiting room was dark and cold in appearance, had outdated furnishings, and contained no artwork or poor-quality reproductions (Arneill & Devlin, 2002).

Classrooms and learning spaces

Researchers have conducted research in learning spaces in educational settings. Sommer and Olsen (1980) designed a "soft classroom" by adding semicircular, cushion-covered bench seating, adjustable lighting, carpeting, and fabric wall decorations to a university classroom. The addition of these features significantly increased student participation. Interestingly, the soft classroom continued to facilitate increased student engagement even after 17 years despite

wear-and-tear on the furnishings (Wong, Sommer, & Cook, 1992).

Researchers have also examined how acoustics affect students using informal learning spaces in universities. In one study, students perceived that spaces with lower background sound levels (e.g., from ventilation systems), higher people-generated sound levels, and more reverberation (which presumably provides greater conversational privacy) were more suitable for engaging in such activities as small-group discussions and socializing than other spaces (Scannell, Hodgson, Jorge, & Gifford, 2016).

Teachers are also affected by the physical environment in schools. For example, changing a traditional library design toward a more social and technologically-focused “learning commons” model can affect the perceptions and behaviours of teachers using these spaces in secondary schools (McCunn & Gifford, 2015).

Daycare centres and playgrounds

Preschoolers and school children spend much time in daycare centres and playgrounds. The design, layout, and the type of ground surface, in open areas of a daycare can influence the physical activity level of preschoolers. Hard surfaces and curvy pathways are conducive to such physical activities as running and playing with wheeled toys. By contrast, soft, sand-covered ground surfaces in playgrounds inhibit higher levels of physical activities (Cosco, Moore, & Islam, 2010). As noted by Cosco et al., this has important implications for playground design. Ground coverings are often chosen for safety, but it could be that associated levels of physical activity should also be considered when selecting a ground covering.

The design of playgrounds can also influence not only the development of motor skills, but also the social and emotional skills of school children. Because different children use different parts of a playground for different activities, and at different times, a good playground should have a wide variety of equipment, open areas, and play structures (Ledingham, 1998). The design of playground equipment can also facilitate different types of play. When outdoor playground equipment has enclosed spaces, nodes and connector spaces, and stage-type spaces, preschool children tend to engage in fantasy play. When children are able to use loose parts to construct their own spaces (constructive play), they are more likely to engage in dramatic play (e.g., “play house”) as well (Maxwell, Mitchell, & Evans, 2008).

Galleries and museums

Stephen Bitgood has studied visitors’ behaviours in exhibition centres (museums, science centres, and zoos) extensively. Which types of exhibits (e.g., interactive, text-based) do visitors pay attention to, and for how long? How do visitors circulate among the exhibits? Based on his findings, Bitgood has offered practical advice to museum professionals about how to increase the impact of exhibits on the visiting public (e.g., by increasing readability of exhibition texts), how to arrange exhibits in a way that lessens visitor crowding and maximizes circulation, and how to assess whether changes to exhibits influence patterns of visitor behaviour (Bitgood, 2011).

Retail environments

Why do we keep going back to a particular store? Mehrabian and Russell (1974) proposed that the relations

between aspects of a physical environment (e.g., the décor, music played in a store) and behavioural responses (e.g., approach versus avoidance tendencies) are mediated through three emotional states: pleasure, arousal, and, to some extent, dominance. Their model caught the attention of marketing researchers and has been applied extensively to the study of *store atmospherics* in retail environments (e.g., Michon, Chebat, & Turley, 2005).

Correctional environments

For thirty years, Richard Wener has researched jail and prison environments, beginning with evaluations of new jails created by the US Bureau of Prisons. The novel design involving decentralizing management of functional living units of smaller groups of inmates was intended to provide a non-traditional and safe environment for pre-trial inmates. Interviews with staff and inmate populations, the relative absence of weapons, and increased interaction between staff and inmates point to the success of this design.

In his environmental and contextual model, Wener (2012) described the ways in which the environment influences the chance of violence occurring in correctional settings. The non-institutional design of the living units (e.g., colour, lighting, furnishings) can affect inmates' mood and communicate the expectation of no vandalism. Reducing crowding, isolation, and noise helps to lower stress, tension, and the chance of aggressive behavior occurring. Easier access to important resources (e.g., toilet paper, TV lounge, telephones) reduces competition that may lead to aggression.

The openness of the design, the presence of staff, and consistent staff-inmate contact increase the chance that any assaults will be noticed and attended to by staff. All of these

factors help to communicate the expectation of non-violence within the correctional setting. Wener's book *The Environmental Psychology of Prisons and Jails* (2012) serves as a guide to best practices for professionals in the fields of architecture and design, social work and psychology, and criminal justice and criminology.

Cities

Modern planners and city officials are often keen to understand why people use urban spaces in particular ways so that public dollars can be used wisely. Environmental psychologists have emphasized that city and community planning should be approached from psychological and public health perspectives, citing extensive evidence that the physical environment, and its organization, influence attitudes, health, and well-being on large and small scales (McCunn & Gifford, 2014; Wells, Evans, & Yang, 2010). For example, noise has well-understood effects on cardiovascular health and on children's reading acquisition, and this evidence should be taken into account when planning the locations of hospitals and schools in relation to roads with heavy traffic and railways.

Environmental psychology can also improve the habitability of buildings and enhance urban neighbourhoods and parks. One classic example is the application of cognitive mapping principles to the urban design of Ciudad Guyana, a planned Venezuelan city that was created to centrally amalgamate several existing small towns (Appleyard, 1976). More recently, McCunn and Gifford (2017) found associations between feeling a sense of place in urban settings and the various navigational strategies that city dwellers use to find their way around their town. When recalling settings for which they felt a

strong sense of place, participants recalled cognitive paths through those settings more readily.

POLICY-MAKING

Environmental psychology researchers add to our understanding of people-environment relations; much of what they learn has practical applications. Sometimes this occurs by studying a specific building, examples of which are in the “Careers” section below. Often, it is at the level of policy where the field can have a broader influence on society. For example, since the 1970s, environmental psychology has had an influence on US energy policy (Stern & Gardner, 1981) with both empirical and review papers contributing to public debate about how best to promote energy conservation measures.

Energy and environmental decision-making continue to be a focus of efforts to make public servants, politicians, and the public aware that by applying psychological knowledge, we can design programs that are more likely to achieve their stated goals (e.g., Weber, 2013). In rare instances, environmental psychologists quickly and directly influence government policy, as in the case of Christine Kormos’ (2016) work on incentives for the acceptance of plug-in electric vehicles, which influenced government policy in British Columbia.

Another level at which psychologists can have influence is one that builds guidelines, standards, and regulations. The need for updated systems and guides to help the designers and operators of buildings to make good decisions has come along with the modern emphasis on energy efficiency. In North America, the most common of these sustainable building certifications is the Leadership in Energy and Environmental Design (LEED) system, in which points are

awarded for using environmentally-friendly materials, environmental quality systems, and other design features (U.S. Green Buildings Council, 2018). Such buildings are labeled according to the performance level achieved (Certified, Silver, Gold, or Platinum).

Although the system is intended also to achieve interior environments that have comfortable temperatures, reduced levels of air pollutants, and access to daylight, environmental psychologists have shown that the evidence that occupants experience these environments as being better is mixed. Newsham et al. (2013) found that occupants in green buildings (which had been certified on one or another rating scheme) reported higher levels of overall environmental satisfaction, satisfaction with temperature, more positive moods, and higher levels of night-time sleep quality than did occupants of matched conventional buildings. However, McCunn & Gifford, (2012) evaluated buildings on an objective scale of green attributes and found no correlation between green attributes and employee engagement – and a negative correlation between general office impressions and green building attributes. Certification systems are complex sets of criteria, and each building has a unique combination of features leading to their certification. This can make it challenging to identify the connection between overall certification levels and multi-factorial outcomes like satisfaction.

Researchers who study these processes influence the LEED point system either indirectly, with their publications or conference presentations, or directly, by serving on volunteer committees that write the program requirements. Working directly on these committees can result in the programs explicitly including the environmental features that research shows to be best for occupants. These

approaches have the potential to positively influence many buildings in many places.

CAREERS

Graduates of post-secondary environmental psychology programs work in different settings. Some possibilities include joining an established environment-behaviour consulting firm, starting one's own firm, joining a research institute or organization, a government department or agency that deals with regional, city, or building planning, a non-governmental, non-profit, or international organization in some research capacity, becoming a facilities manager for an organization and, of course, teaching and researching as a professor.

Compared to some other applied subfields of psychology, such as clinical psychology, the number of positions is small. However, the number of environmental psychology graduates is also small. Because environmental psychology is still a relatively new discipline, finding a job and establishing a career depends more on one's ability and initiative. The good news is that employers, and the public, are becoming more aware of the contributions from environmental psychologists. Although some job advertisements explicitly request an "environmental psychologist," many positions open to environmental psychologists have other titles, such as facility planner, design programmer, or design researcher, and so on.

RESEARCH POSITIONS IN GOVERNMENT AND OTHER AGENCIES

The National Research Council of Canada is a federal government research and development agency devoted to

work that addresses government priorities, supports business innovation, and adds to scientific knowledge. Its Construction Research Centre is devoted to studying the built environment, primarily from an engineering perspective. However, it has several environmental psychologists who study how the built environment influences us. Chapter author Jennifer Veitch has spent her professional career at the NRC.

Current NRC environmental psychology research topics include evacuation from emergency situations, how to use energy-efficient technologies in buildings to improve well-being, and risk perception of indoor air quality hazards. The research is funded by a mixture of funding from other government departments (federal, provincial and municipal), contracts with business, and internal NRC sources. The results are reported to the funders, published in journals, presented at conferences, and built into recommendations, guidelines, standards and codes by participation in these decision-making processes.

ARCHITECTURAL AND SUSTAINABILITY CONSULTING

In recent years, some architects and design professionals have advocated the use of evidence-based design. They strive to consider the best evidence from research and practice and include the client, and in some cases social scientists, in making critical decisions about each project (Hamilton & Watkins, 2009). Design professionals of health care facilities are particularly keen on this idea. Enterprising individuals might find a career path by joining such firms.

Even more enterprising individuals run their own consultancy companies. For example, for many years, Ben Barkow has offered consultancy services akin to what Robert Sommer called 'social design' through his firm in Toronto,

Ontario. His team identifies and communicates the needs of users to architects, designers, and developers before construction, to ensure that a facility is suitable for its occupants and their purposes. Their services have been used for new or high-tech workspaces, public facilities (e.g., stadiums, concert halls, and parks), retail spaces, and many others.

On the sustainability side, Doug McKenzie-Mohr actively consults on fostering improved management of natural resources through his community-based social marketing firm. Among his offerings are seminars that train individuals and organizations to use the principles of applied psychology to increase sustainability.

Of course, one might choose to combine an academic career with one as a consultant. Chapter author Robert Gifford has done this with his firm. Another author of this chapter, Lindsay McCunn, also began working for an architectural programming firm during her graduate studies in environmental psychology. She started her own firm soon after becoming a professor of psychology at a university.

As noted in the introduction, projects that call for an environmental psychologist are sometimes less theoretical and more practical and immediate. Depending on the project, and what the data will be used for, the environmental psychologist decides whether to use her expertise as a consultant to analyze data and provide recommendations through the firm or to take the work further as a scholar and contribute to academic journals with a more empirical approach.

For example, if an architecture firm asks for help to complete a post-occupancy evaluation on buildings it has designed, but no data exists from before construction to statistically compare how people think about or use the spaces after they have been built, that would be a consulting

project intended to determine how the building performs in the eyes of its occupants. If meaningful comparison data exist, it might also be possible to take a more scholarly approach from which to develop generalizable knowledge. Both career options contribute to the body of knowledge in environmental psychology, but differ in the kinds of relationships formed among team members, communities, and organizations, as well as the ways in which a project's results are communicated.

EDUCATION AND TRAINING

As with all forms of applied psychology, undergraduate and graduate training are necessary to become an environmental psychologist. At the undergraduate level, a course in environmental psychology is very desirable. The name of the course might vary slightly: The obvious name is Environmental Psychology, but it might be called Environmental Problems or Psychology for Design, or something similar. Instructors' backgrounds and interests will influence how much emphasis they place on spatial cognition, human factors, social psychology, behaviour modification, and so on. However, one need not be overly concerned if one's college or university does not offer such a course because most graduate program supervisors are aware that students are often unable to take an undergraduate environmental psychology course. In any case, consider taking related courses such as urban geography, environmental sociology, introductory architecture, urban planning, human ecology, organizational behaviour, engineering, or environmental studies. Often, new graduate students take the environmental psychology course in their new school.

For graduate school, you will need good-to-excellent

grades for entry into competitive psychology programs (and you must meet various other requirements, such as the Graduate Record Exam, depending on the school). Examine each school's website for program requirements and resources and consider the interests of individual professors to find the best match with your own interests. Check out the environmental psychology brochure at <https://tinyurl.com/BookletEP> for a list of prominent environmental psychology professors and their research interests.

You also need to decide what sort of program suits your interests. A few graduate schools offer full programs in environmental psychology; that is, an entire set of prescribed courses, including several faculty members who specialize in environmental psychology or closely related disciplines, and classes with at least several other students. Many other graduate schools have only one or two faculty members who specialize in environmental psychology. In these schools, you and your supervisor design the "program" (courses to take, projects to complete, etc.) to suit your interests and needs. The few other graduate students with your interests are likely to be at different stages of their degree programs.

Both types of programs have their relative advantages. In a full program, one has the opportunity to gain from the expertise of several professors and numerous like-minded students. The individualized program offers more personalized education and may be the only way to study with that certain professor who was recommended to you, or whose work you admire.

Whether you enter a full or an individualized program, you will be in class for less time per week than in your undergraduate years, but you will do much more reading and research on your own. You will have a supervisor and a committee of two or three other faculty members who will

officially monitor your progress. You will do major original pieces of research under the committee's guidance: these are the Master's thesis and, later, if things go well, a doctoral dissertation. You will also be encouraged to undertake additional research projects, either together with your advisors or on your own, and to submit this work for publication or presentation. This added experience will augment your skills and make you a more attractive job candidate, even for applied positions, because it demonstrates the breadth of your knowledge.

The oldest established environmental psychology program is at the Graduate Center of the City University of New York, dating from 1968. Some of the top full programs around the world include Colorado State University (USA), University of Surrey (UK), University of Groningen (the Netherlands), Lund University (Sweden) and University of Victoria (Individualized program).

Psychology departments that offer programs with some environmental psychology content include the departments of psychology at Carleton University, Vancouver Island University, and the University of Utah. A few architecture departments offer programs with an environment-behaviour focus: Université Laval in Québec, and University of California (Berkeley) and Georgia Institute of Technology in the United States. The Design and Environmental Analysis group at Cornell University is a prominent interdisciplinary graduate program. For a full list of programmes around the world, see the Resources section at the end of this chapter.

To prepare yourself for a non-academic career, try to gain relevant experience. If you can, take a work term as a co-op or summer student in a non-academic setting to learn first-hand about your career options. You might find opportunities to conduct an applied project or two in

collaboration with officials at various levels of government, architecture and engineering firms, municipal urban planning departments, housing authorities, or non-profit organizations that focus on environmental issues.

These relationships offer opportunities to hone your skills in presenting to a general audience, writing a proposal for government officials, and working with researchers and specialists from multiple disciplines. Another strategy is to search out opportunities to sit on committees to get a sense of your local government's leadership structure and get to know "who's who" in your area. Finally, strong skills in social scientific writing, research design, and statistics are important. Very likely, you will not work with colleagues with whom you can consult on these matters when you are the only environmental psychologist in an organization or on a project team.

CONCLUSION

Environmental psychology is a small field within the larger discipline of psychology, but its scope is broad and includes some of the most important problems that challenge humans in our time. If your career goal is to work with others to make a positive difference in the world, this may be the field for you. Indeed, there is no shortage of topics and problems that await your attention. As a recent major review of the field was titled, *environmental psychology matters* (Gifford, 2014).

ADDITIONAL RESOURCES

Suggested Readings

Clayton, S. D. (Ed.) (2012). *The Oxford handbook of*

environmental and conservation psychology. New York: Oxford.

Gifford, R. (2014). *Environmental psychology: Principles and practice* (5th ed.). Colville WA: Optimal Books.

Gifford, R. (2014). Environmental psychology matters. *Annual Review of Psychology*, 65, 541-580.

Gifford, R. (Ed.) (2016). *Research methods in environmental psychology*. Wiley-Blackwell.

Sommer, R. (1983). *Social design: Creating buildings with people in mind*. Englewood Cliffs, NJ: Prentice Hall.

Steg, L., & de Groot, J. I. M. (Eds.) (2019). *Environmental psychology: An introduction* (2nd ed.). New York: Wiley.

SCHOLARLY JOURNALS

- The Journal of Environmental Psychology (the major journal in the field): <http://www.journals.elsevier.com/journal-of-environmental-psychology>
- Environment and Behavior:
<http://journals.sagepub.com/home/eab>

GRADUATE PROGRAMS

- Graduate Programs in Environmental and Conservation Psychology. (2017). Retrieved April 15, 2018, from <http://www.apadivisions.org/division-34/about/resources/graduate-programs.aspx>

CAREER RESOURCES AND OVERVIEWS

- <https://tinyurl.com/BookletEP>
- <https://www.environmentalscience.org/career/environmental-psychologist> (US)

- <https://careersinpsychology.org/degree/environmental-psychology/>
- <http://www.eco.ca/career-profiles/environmental-psychologist/>

PROFESSIONAL ORGANIZATIONS

- International Association of Applied Psychology (IAAP), Division of Environmental Psychology (Global)
<https://iaapsy.org/divisions/division4/>
- International Association for People-Environment Studies (IAPS) www.iaps-association.org
- American Psychological Association (APA) Division 34: Environmental, Population and Conservation Psychology www.apadivisions.org/division-34/
- Environmental Design Research Association (EDRA) www.edra.org
- Fachgruppe Umweltpsychologie (DGPS) (Germany) <http://fachgruppe-umweltpsychologie.de/>
- Association pour la Recherche en Psychologie Environnementale (ARPENV) (France) <http://arpenv.weebly.com/>
- Canadian Psychological Association, Section on Environmental Psychology (CPA) www.cpa.ca/aboutcpa/cpasections/environmentalpsychology/
- Man-Environment Relations Association (MERA) (Japan) www.mera-web.jp
- The Environmental Psychologists Global Census: A list of around 1000 researchers who identify partly or wholly as environmental psychologists. Check out their location and interests at <http://web.uvic.ca/~epcensus/>

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