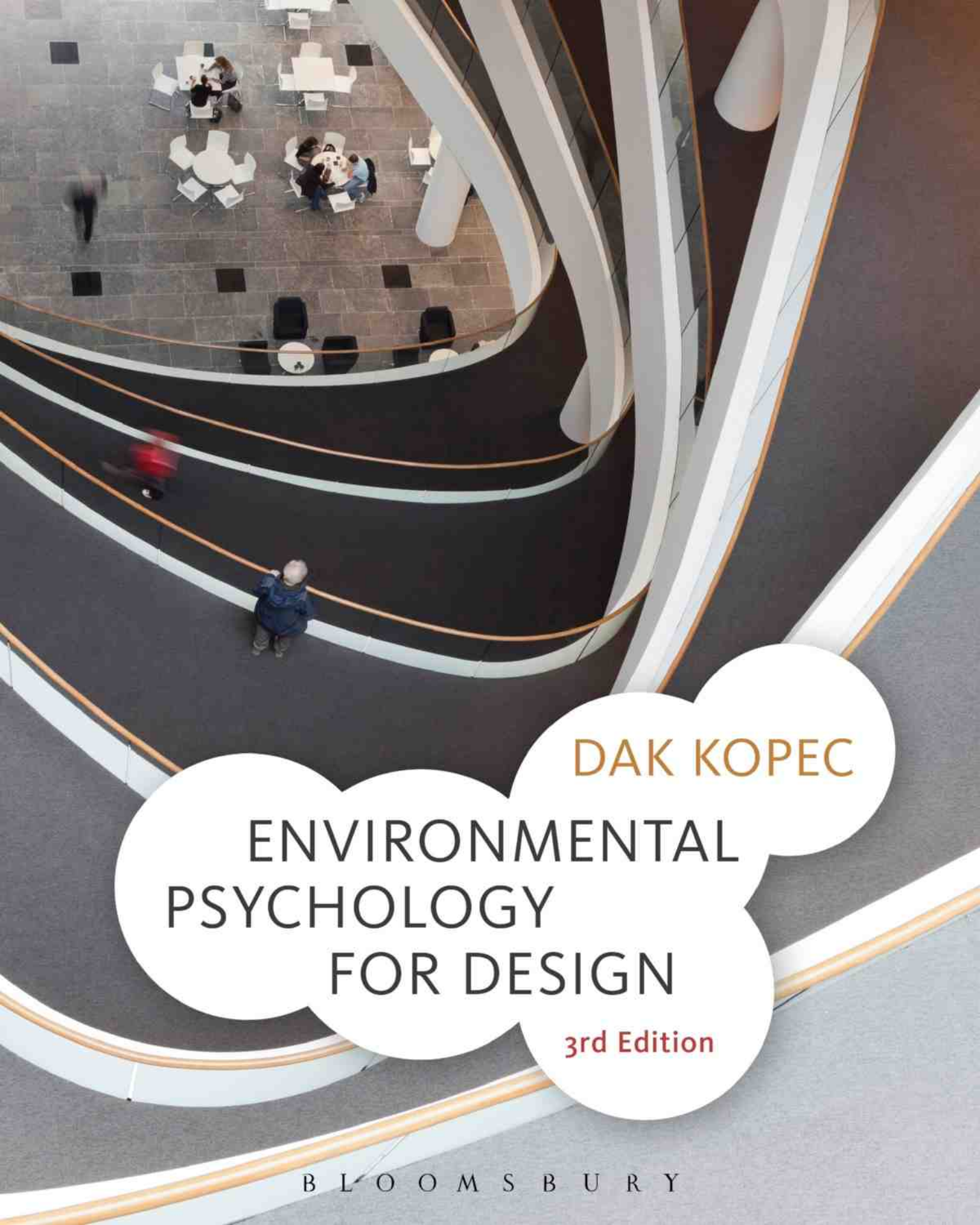

DAK KOPEC

ENVIRONMENTAL PSYCHOLOGY FOR DESIGN

3rd Edition

BLOOMSBURY

ENVIRONMENTAL PSYCHOLOGY FOR DESIGN

THIRD EDITION

DAK KOPEC

University of Nevada, Las Vegas

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As we proceed through life, we encounter some people who affect our lives in profound ways. For me, Dr. Ted Landsmark, former president, and Mr. Don Hunsicker, Dean of the School of Design Studies, of the Boston Architectural College are two such people. These men believed in my vision and supported my professional efforts in numerous ways. Because these two men have played such an important role in my life, I dedicate this book to Dr. Theodore Landsmark and Mr. Donald Hunsicker. Words can never express how thankful I am that you both came into my life!

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EXTENDED CONTENTS

FOREWORD

I met Dak Kopec many years ago at a meeting of interior designers and interior design educators. We were discussing the value of interior designers' knowledge of human behavior. Dak and I agreed on use of this knowledge in design programming and its importance in how designers shape people's interior environments, that is, how knowledge of human behavior can change people's lives. We discussed the need for interior designers to know about both social and psychological aspects of human behavior as well as the physical needs. Further, the dilemma, we suggested to other academics and designers in the meeting, was that interior designers and interior design students do not have easy access to this knowledge. Some folks said, "This is why students take sociology and psychology courses in their liberal education." Yes, we agreed, that is helpful, but where do they learn about human behavior theories that influence or are influenced by the physical environment? Further, where do they apply this theoretical knowledge? Other folks said, "Yes, but. . . students would need to take about 10 courses if they really gained and then applied knowledge about human behavior!" Secretly, I agreed. . . but Dak was undeterred. "Why doesn't someone write a book that brings together often-used human behavior theories and human psychology and integrate that with design. . . in fact, build on the foundation of environmental psychology, but specifically apply it to interiors?" "Why don't YOU do that?" I asked. And, he did!

From this initial discussion, Dak's mission was born. His academic background provided the knowledge of environmental psychology. His experiential design and design-related background gave him the strategies by which he could bridge theory and practice. Finally, his teaching experience moved him to create a pathway for students (and practitioners) to have access to this important knowledge and learn how to apply it in design problems and solutions. *Environmental Psychology for Design, 3rd* edition, is the best book Dak has written. It differs significantly from the first two editions in that the 3rd edition introduces new information on additional theories and psychological influences on human behavior.

Repeatedly, educators try to convince students that design decisions are not subjective, nor are they arbitrary. Students often think educators know a secret, which will remain hidden until graduation, and then, suddenly they will "get it;" they will find out the secret! Educators try to convince students that knowing how a design will work is not guesswork, that there is knowledge upon which they can base most decisions, and that they need to provide rationale for each decision based on their knowledge. The wait is over! Now, Dak is giving them the secret before they graduate! It's time for educators to solidly base interior designers' knowledge and decision making in human behavior theory. Dak provides the gateway to this knowledge in the 3rd edition of *Environmental Psychology for Design*.

Denise A. Guerin, PhD, FIDEC, FASID, F-IFI, IIDA
Morse-Alumni Distinguished Professor Emeritus
College of Design
University of Minnesota

PREFACE

Not all psychologists understand, or fully appreciate the role of the designed environment to support health, safety, and welfare; likewise, not all designers understand, or even fully appreciate, the role of social science within the process of design. The ways in which design and psychology overlap in a symbiotic relationship can be best understood according to a person's unique worldview and their methods of problem solving. Will the design of an environment solve a problem? Or will the environment serve as a facilitator for people to solve the problem? For this author, design always involves the actions and interactions of people who use the environment as cues for information that inform their actions, beliefs, and values. The relationship between designers and psychologist must therefore be acknowledged, understood, and mutually respected.

To better understand the built environment in relation to the human condition requires sets of sophisticated skills that enable the person to empathize, refrain from judgment, and visualize probable outcomes. These skills culminate in the ability to understand how a person might respond in a crisis situation, how a person might experience a life changing event such as an accident that impairs one or more of their abilities, or how one manages the natural growth and decline of the human body as a result of the natural aging process. The ability to empathize without judgment, predict probable outcomes, and design accordingly, enables the professional designer to identify supports and constraints of a design, and the means by which suggestions and alternatives can be put forth.

Just as a good Designer should be able to design a school, courthouse, hospital, or a residential setting, a good Environmental Psychologist should be able to predict the safest and most efficient design ideas to satisfy the needs of a given population. Hence, this third edition of *Environmental Psychology for Design* looks at the different layers of psychology and human behaviors that apply to an assortment of building types. My challenge to students and instructors is to link the psychological elements contained within this book with the design ideas and concepts developed as part of the designer's scope of practice. In short, future designers do need to understand the relationships between the designed environment and the human condition, and future psychologists do need to understand that the designed environment will have an impact on a person's psychological state. These relationships are based on genetics, what people are exposed to, and their interactions with the environment. This book addresses each of these layers through discussions focused on psychobiology, social learning, and from environmental reflections.

Coverage and Organization

Critical thinking skills are important to successful design. This book thus provides many application-based examples that serve as a foundation for thought, not necessarily a prescriptive answer. Unlike engineering, chemistry, and physics, which are exact sciences, design and psychology are subjective and require analysis and exploration. As such, this book

progresses from basic and foundational information to more specific situations and conditions that follow the human experience throughout the lifespan and within a wide range of abilities.

From this broad base of understanding, individual chapters progress from general knowledge contained within chapter one to the very specific natural and semi natural environments of chapter thirteen. To get us from these two points, the book's content takes us through a journey of basic research and evidence based design in chapter two through discussions of human biology and experience. In Chapter 2, Foundational Theories, there are discussions of hypothesis versus theories, and a brief overview of the more common, or foundational, theories that pertain to environmental psychology.

Chapter 3, The Human Condition, is when the book introduces more practical discussions of the human condition as it relates to design. Chapter 3 takes us beyond the foundation of theoretical frameworks to fundamental human aspects such a personality, gender, and beliefs systems that have come to define the human experience. These core human aspects lead to behavioral outcomes related to territoriality, personal space, and ideas of privacy and crowding.

Most readers will be able to relate to the different human conditions discussed in Chapter 3 which thus provides an associative foundation for the more specific content related to psychobiology found in Chapters 4 and 5. The argument of nature versus nurture has gone on for many decades and the argument is alive and well within the design disciplines. This book doesn't take one side or the other, but rather puts forth the notion that genetics provides the ink, what one learns provides the pen, and our environment provides the paper. With the ink (our genetics), pen (what we've learned) and paper (our environment) we have all of the ingredients required for a drawing (the behavior); but we still have to draw, or engage in, the behavior.

Chapter 4 Psychobiology of Behavior focuses more on brain development and learning along with the neuroscience of sensation, neurochemicals and hormones, and the biological responses to stress. Chapter 5, Biology of Sensation, builds upon discussions of neural pathways to the more specifics of sensory detection required for human interaction with the built environment. These sensations include the development, decline, and damage to the visual, auditory, tactile and olfactory systems. Basic sensory information is further distilled in Chapter 6, Sensation and Perception, to explain the process of sensation and perception related to cognition, or what we think we know.

Chapter 7, Cognitive Interpretations, moves away from nature and circles back to nurture through discussion of social learning. In this chapter, ideas of perception are filtered through the cognitive ideas of anthropomorphizing, aesthetic variations, symbolic meaning, and culture and religion as they relate to the formation of tradition and the impacts of design. While Chapters 4, 5, and 6 concentrate on biological factors of behavior, Chapter 7 provides explanation for behavioral outcomes based on sociocultural factors. Continuing with sociocultural factors, Chapter 8, Color and Wayfinding, blends information from psychobiology with sociocultural concepts in the real world practice of wayfinding and the role of color in as symbolic communication.

The remaining chapter of the book moves beyond foundational knowledge to specific populations. Beginning with Chapter 9 which is dedicated to infant-child development, and progressing to Chapter 10's discussion of senior citizens, and Chapter 11's focus on disabilities, these chapters discuss three of the more vulnerable populations. Fundamental arguments posed in these chapters are that design has the ability to promote and support physical, emotional, and intellectual development of children; design can slow declines associated with the natural aging process; and, through appropriate design accommodations, people with assorted and diverse disabilities can perform activities of daily living (ADL's) with minimal dependence on another person.

The final chapters of this book progress to the connections we form with the natural and designed environment. These chapters address human preferences

and value within a continual ebb and flow of social evolution. Concepts of place, attachment, and meaning of place we assign the different designed environments are discussed along with evolutionary and social trends toward nature-inspired design. The fundamental concepts the reader should glean from these chapters are that preferences, values, and trends are fluid and evolve with sociocultural evolution.

The overall tenor of this book can be likened to an hourglass because it moves from broad based viewpoints of environmental psychology, and it's relation to design, to the more narrow view points based on elements that comprise ideas found within nature versus nurture. The book then goes broad again with the introduction growth, development, decline, and differences in ability. The last chapters of the book conclude with ideas put forth in the preceding chapters from the broader viewpoints of place identity, place attachment, and the relationship between humans and the natural world.

Features

To assist the reader, several pedagogical features have been included in this edition. Each chapter begins with all new *Learning Objectives*, wherein the action verb is intended to provide a context and line of reasoning that the reader should retain and apply as they make their way through the chapter. Because the human condition is unique, there are also boxes titled *Cultural Connection* and *Sustainability Connection* that are intended to highlight the great diversity in the application of the subject ideas and concepts. Likewise, this author believes that no one person can be all knowing, and that many esteemed professionals can hold differing or complementary views. Hence, each chapter contains two different *Point of Views (POVs)* to highlight different professional opinions and practice beliefs. Two of the last features of this book include demonstration images that should be used for discussion and not solution, and many examples to help the reader better frame or understand the ideas being discussed. Examples are meant to provide context and further discussion. The hope is that the images and examples are critically analyzed and then discussed in terms of their authenticity in the application to a specific context.

New to this Edition

Past editions of *Environmental Psychology for Design* were segmented according to common psychological concerns and typologies. While common psychological concerns remain an important thrust of this book, segmenting ideas and concepts according to typology limits the applicability. Many, if not all concepts found in psychology can be applied to some degree to most building types. Prisons, schools, and hospitals all share some core elements and require unique attributes that support the building's purpose; rehabilitation, education, or healing. Hence, a more holistic message for the application of environment psychology to the design professions needs to be conveyed and promoted within the design and psychology disciplines. In this edition, ideas such as neurobiological and social learning can be integrated and examined for their value within select situations or environments.

The most significant change between the second and third editions is the integration of ideas into concept driven chapters. The first and second editions segmented ideas according to typologies. However, by doing this, content was often redundant and the fear was that the subject of Environmental Psychology would start to look prescriptive. Through a more integrated approach, this edition gives greater analytic authority to the reader by reorganizing and clustering similar and overlapping concepts.

In addition to these organizational changes, continued evolutionary trends in society and the professions of design and psychology necessitate the inclusion of additional and more recent references. In this edition more than 25 percent of the references have been updated or changed out to reflect a different line of thinking. Some examples include neurobiological development and decline, and basic understanding of the nervous system, and discussion of hypothesis and

theories with an emphasis on the biophilia hypothesis. Also, with evolution comes greater emphasis on select topics germane to design or specific social phenomena. In this edition, there is greater discussion devoted to the Biophilia Hypothesis found in Chapters 2 and 13, and the social trends toward the devaluation of the feminine while prizing all that has been viewed as masculine in Chapter 3 and 12. With the rise of Evidence Based Design methods for practice, this edition also explains the relationship between a hypothesis, theory, and an outcome in Chapter 2. Each is discussed and shown its relationship to the evidence based processes in Chapters 2 through 13.

INSTRUCTOR AND STUDENT RESOURCES

Environmental Psychology for Design STUDIO

New for this edition is an online multimedia resource—*Environmental Psychology for Design STUDIO*. The online *STUDIO* is specially developed to complement this book with rich media ancillaries that students can adapt to their visual learning styles to better master concepts and improve grades. Within the *STUDIO*, students will be able to:

- Study smarter with self-quizzes featuring scored results and personalized study tips
- Review concepts with flashcards of essential vocabulary

STUDIO access cards are offered free with new book purchases and also sold separately through www.FairchildBooks.com.

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- Test Bank includes sample test questions for each chapter
- PowerPoint® presentations include images from the book and provide a framework for lecture and discussion

Instructor's Resources may be accessed through www.FairchildBooks.com.

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I wish to acknowledge Lucy Campbell who provided editorial and research services for this publication.

In addition, this book includes a series of *Point of Views* that are dispersed throughout this publication. The purpose of these *Point of Views* is to provide clarity, add to the information contained in the chapter, and to provide a point from which a critical discussion can ensue. I wish to acknowledge the valuable contributions of the different authors who took the time to express their point of view on a given topic. These authors include:

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CHAPTER 1

INTRODUCTION

Most of us are born into them, live within them, and when we die most of us will be placed into one. The built environment is our constant throughout life.

Chapter Objectives

By the end of this chapter you should be able to:

- **Analyze the action–reaction relationships of human interventions;**
- **Compare and contrast the different schools of psychology used to explain or understand human behaviors;**
- **Describe the influence of the five polarizing viewpoints found within psychology;**
- **List three confounding factors related to the Hawthorn Studies;**
- **Identify situations where designers might consult with Environmental Psychologists.**

INTRODUCTION

The human–environment relationship is symbiotic. The environment influences our behaviors and we, in turn, influence the environment. Whether out of fear, necessity, or in response to naturally occurring challenges such as droughts, floods, and extreme temperatures, we have adapted to a variety of environmental conditions. Early humans sought to increase their understanding of the natural world through efforts such as examining weather patterns, interpreting animal behaviors, and identifying fertile soils. These activities were the first environmental studies and the results prompted human responses such as stockpiling food and water, seeking shelter or high ground, and planting and harvesting crops.

ENVIRONMENT—BEHAVIOR

Beginning at about 10,000 BCE, humans moved from the natural world of trees, bushes, and savannahs to a world constructed by man (Scarre & Renfrew, 1995). Once we surrendered our nomadic lifestyle, we began the practice of *environmental modification*, altering our surroundings to better suit our needs. Examples include the infill of wetlands, irrigation of dry land to yield crops, and the damming of rivers to create lakes. While these actions allowed human civilizations to flourish, such interventions came with consequences. One example is the "Dust Bowl" in the 1930s central United States. Over-farming of the prairie lands combined with a lack of rain caused topsoil to literally blow away (see Figure 1.1).

We have also seen negative consequences from treating animals as *commodities* rather than living as nature intended. Commodities are raw materials that can be bought and sold. In the early twenty-first century, Great Britain was plagued with a disease originating from cattle called Mad Cow Disease. In over eleven years 200,000 cattle and 94 humans succumbed to the disease (Cowley et al., 2001). More recently we have become susceptible to strains of the influenza virus originating from birds and pigs. Known as Avian Flu and Swine Flu, these viruses posed little threat to humans until poultry and swine were farmed together (Smith et al., 2009). A characteristic of the flu virus is

Figure 1.1 Humans over-farmed the land to the point that when the mid west suffered a drought the land literally dried up and blew away.

Figure 1.2 Eskimos and people from Mongolia viewed home as a territory and shelter as something to be assembled and disassembled while living and working on the homelands.

its ability to continually mutate and transmit across species. Thus, a virus common to ducks can infect pigs and then mutate once again to infect humans. New flu viruses are introduced into the population every year. Mad Cow Disease and mutating flu viruses are results of human interventions in—and manipulations of—life's natural order. While these actions have negative effects on human health, they also provide us with learning opportunities so we can mitigate future negative consequences.

Over the millennia most human societies have evolved from small groups of nomadic hunter-gatherer clans into villages and, finally, into cities. In some parts of the world today there is evidence of the ways humans used to live. Some Mongols and Eskimos (see Figure 1.2), for example, continue to live a traditional *nomadic* lifestyle. Nomadic lifestyles are inherently sustainable because natural resources are not exhausted. Instead, people continually move allowing resources to replenish. Rather than labeling such societies as "primitive," or "uncivilized," we can study them for possible ways to be more supportive of our environment.

In the past 100 years, humanity's relationship to the environments we inhabit has undergone radical changes. We now spend most of our time inside, make products that linger in the environment, and live in megacities with massive populations. Many small cities today rival the great cities of the ancient world. For example, the population of the modern city of Bakersfield, California, is roughly equivalent to that of ancient Rome. With continued advancements, we are constantly going where our ancestors have never been in terms of population growth and what is required to support that growth. Many experts agree that the global human population has exceeded the Earth's capacity to sustain life. But could changing our ways allow larger populations to be supported?

Human technological advances have overcome many of nature's laws, including Darwin's theory of evolution by *natural selection*, which is the main process that brings about evolution. For example, at the age of 22, world-renowned physicist Stephen Hawking was afflicted with *Amyotrophic Lateral Sclerosis* **(ALS)**, commonly known as Lou Gehrig's Disease. ALS is a progressive degeneration of the motor neurons of the central nervous system. Had he contracted this disease in 1900, he would have most likely died in his twenties. Today, Stephen Hawking continues to live a productive life and is able to do so with the assistance of modern technologies.

These technologies have enabled the world to benefit from brilliant people such as Mr. Hawking whose mind is perfectly intact; it is only his body that has failed. We can now keep people alive longer, cure

POINT OF VIEW 1.1

EVOLUTION AND DESIGN

Donald McEachron, Ph.D.
Drexel University

Understanding the interactions between cultural/technological change and biological evolution is crucial to any effective design process. This may seem like a strange statement given that few, if any, engineers, architects, or other design professionals are knowledgeable about the processes and impacts that biological evolution has had on shaping human physiology and behavior. This lack of knowledge does not seem, at first, to have had any significant impact on the success experienced by professionals in the field and the march of civilization towards ever more sophisticated artificial environments. However, there is a dark side to this advancement, an under-current of problems and issues that lie below the surface of our homes and cities of which we are now slowly becoming aware. From the evolution of antibiotic resistance to the impact of sleep deprivation to the rise of obesity and chronic disease, all is not right with our new world and we need the insights that biological evolution can provide if we are to adequately address these problems.

At first glance, cultural/technological changes and biological evolution appear to be vastly different processes and, indeed, they are. However, there are similarities as well. Both processes must deal with physical reality—there's no magical 'vital substance' that differentiates biological entities from the rest of the universe. Thus, biological evolution and engineering design can result in similar answers to similar questions. Hence the shape of a bird's and aircraft's wings, the need for timing in computers and other devices, the evolution of biological clocks, and concepts underlying information systems are applicable to everything from biological evolution itself to the rise of social media, to how genetic systems function, to database design and finally, to information processing in the human brain. Additionally, engineering design and biological evolution must deal with both ultimate functions and proximate mechanisms, an ultimate function being the overall purpose of a device and the proximate mechanisms being the means by which that overall purpose is achieved. And, perhaps, here is where we encounter the single most fundamental difference between engineering design and biological evolution—the ultimate goal.

In engineering and architectural activities, there are multiple goals—developing a vehicle, for example, that transports humans from point A to point B effectively along paved surfaces in safety and comfort. There are other possible goals for such devices—low cost, style, etc.—but there is a primary outcome for each and every design. The penultimate or overall goal of all design activities, however, is to enhance human health, well-being, and/or productivity—to improve the lives of individual or human groups in some way. Thus, each individual design is a means by which to attain this ultimate goal focused on human life (Activities involving other organisms certainly exist but are not critical to this argument). Biological evolution is very different. The ultimate goal for biological evolution is informational—the stability of information in the form of genes through long-term propagation or copying. Organisms—including humans—are merely the means by which evolution attains this end. This generates an immediate disconnect between engineering design, whose goals involve individual organisms, and biological evolution, whose goal of genetic propagation operates on the principle that individual organisms are disposable mechanisms by which genetic propagation is achieved. While these contrasting goals are not necessarily incompatible—a healthy human may propagate more than an unhealthy one, for example—there is also no absolute necessity that evolutionary results generate outcomes humans would consider positive. From a biological point of view, human behavior and physiology has evolved to subserve genetic propagation, not human health, well-being, or productivity.

SUSTAINABILITY CONNECTION 1.1

A new social-political movement called ecofeminism contends there are similarities among the domination and abuse of nature, the devaluing and degradation of the feminine orientation, and global anthropocentric values. The premise of the movement is that the world and its resources are simultaneously seen as the gifts of *Mother Nature* and that by way of feminine association, it is not acceptable to assault, abuse, and essentially mistreat her for economic gain. This premise is compounded by attempting to change people's minds on their valuation and care of all things *non-human*.

Figure 1.3 Increased populations crowding our schools, hospitals, and prisons lead to loss of personal space and heighted emotional responses.

infertility, and even diagnose and treat congenital illness in the fetal stage. Modern technologies have also allowed for high-yield food production and mass production of pharmaceuticals, enabling longer and higher quality lives for many. However, these advancements have also increased populations and personal expectations. Although they may seem benign and even good, unintended consequences include overcrowding and loss of personal space in public and private environments such as schools, hospitals, and neighborhoods (see Figure 1.3).

Our *symbiotic*, or close association, between us and our environment causes researchers to struggle with the timeless question of which came first: the behavior or the environment (see Chapter 2). To get a better idea of the cause and effect symbiotic relationship between humans and their surroundings, consider this situation: Imagine yourself chewing gum as you walk down the street. You want to spit it out, but you see no trashcans. The absence of a trashcan in the environment causes you to wonder what to do with your gum: swallow it or spit it onto the ground. Ultimately you spit the gum onto the ground—a behavioral action—and you have now influenced the environment by littering. One could argue that it is within our nature to spit out the gum. However, it was social conditioning against littering that caused you to think about your action. Ultimately, however, it was the absence of the trashcan that caused conflict within you.

In another scenario, you spit the gum onto the ground but you unknowingly step on the gum when you have to turn around. You then track that gum into a friend's house making a mess on his floor. Your friend reacts with hostility, so you take offense and storm out of the house. In this situation a chain of unfortunate events began to unfold all because of something missing from the environment. This absence, coupled with your emotional disposition and your friend's emotional response, led to a chain reaction.

We must, however, remember to avoid attributing an effect (result) to a single cause because many social and biological factors can contribute. In the chewing gum example the cause and effect relationship begins with the absence of a trashcan. This lack of an environmental design feature begins the sequence of events, but it is the dispositions of interacting people that cause the situation to precipitate. All we can say for certain is that the absence of the trashcan led to gum being spit onto the ground and subsequently tracked into a home. The interplay between two people resulting from this event depends on the individuals.

This example illustrates why it is important to avoid engaging in *deterministic behaviors*, or acting on the notion that preceding events and conditions determine every succeeding event. Evans (2004) corroborated this position when he linked environmental conditions to social manifestations that influence social conditions.

The field of environmental psychology embraces multiple factors and rejects the single-variable approach. Although some fields, such as Western medicine and social services, rely on a single or *purist approach*, environmental psychology subscribes to *multimodal approaches* which consider many different approaches. It utilizes both social and physical science perspectives and argues that human–environment behaviors derive from a combination of social, cultural, and biological factors (see Chapter 2). The research and practice of environmental psychology is holistic, considering biological, social, and environmental causal agents (see Figure 1.4).

The biological factors that influence our behaviors may result from the absorption and secretion of neurochemicals or hormones within our brain or other bodily regions. The social factors that might influence beliefs and actions can derive from unique cultural, religious, social, and/or personal experiences. Environmental psychologists consider these biological and sociological influences in combination with environmental factors deriving from our surroundings. They use methods of environmental modification and design to enhance preferred actions and reduce undesirable behaviors.

Figure 1.4 Holistic psychological perspectives include all that one has been taught or learned, his or her spirituality and convictions, and neurobiological influences on behaviors.

Environmental psychology can solve problems related to the principles of learning, motivation, perception, attitude formation, and social interaction, to name a few. It can help explain why humans engage in particular behaviors in relation to their environments. In this sense, environmental psychology can benefit design disciplines such as architecture, interior design, (see Point of View 1.2) and landscape design by helping us understand the consequences of changing environments. To date, many authors have recognized the varied benefits environmental psychology can bring to the practice of architecture and design. Clare Cooper Marcus and Naomi Sachs discussed how landscapes could be therapeutic and restorative (2013). Elizabeth Brawley tackled the psychological and environmental aspects of designing for Alzheimer's disease (2006). Richard Louv's, *Last Child in the Woods*, revealed the strong link between exposure to nature and child mental health (2006) while the edited collection *Making Healthy Places* (2011) identifies a range of positive benefits from well-designed urban environments. This book outlines how the principles of environmental psychology can be applied to various aspects of design. "Designers need to consider how buildings affect the people using them by understanding both how design influences people and how we can modify the design to facilitate the function for which the setting is intended," (Bell, Greene, Fisher, & Baum, 2001).

PARADIGMS IN PSYCHOLOGY

Psychology has many governing *paradigms*, or thoughts that guide a line of thinking, to which different professionals subscribe. Although there are too many

POINT OF VIEW 1.2

THE RELIANCE OF INTERIOR DESIGN ON ENVIRONMENTAL PSYCHOLOGY

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Interior design began to be identified as a profession separate from architecture in the early 1950s (Martin, 2007). Younger than its allied professions of engineering and architecture, interior design is still moving toward recognition as a profession in public and legislative arenas. Interior design has achieved most of the characteristics of a profession including formalized education, experience, and examination; codes of ethics and conduct; and continuing education as required by regulatory bodies and membership organizations. However, legal recognition of the practice has yet to be broadly achieved though it is actively pursued.

As the interior design profession continues to raise the bar, elevating minimum qualifications for education, experience, examination, and continuing education, there remains a gap in its ability to stand fully independent. Interior design has yet to broadly develop and test its own practice-specific theories by which research can be guided and design decisions can be grounded. Instead, interior design largely borrows and adapts theoretical principles and constructs from other disciplines such as art, psychology, sociology, and education—and perhaps most often from environmental psychology. Environmental psychology is a natural, necessary anchor for interior design practice and research. As noted by the ***Journal of Environmental Psychology*** (2016), this field of research is addressed by "a wide range of disciplines who have an interest in the scientific study of the transactions and interrelationships between people and their physical surroundings (including built and natural environments. . .)," with a special focus on cognitive/psychological and behavioral interactions occupants have with their environments (e.g., way-finding, meaning of the physical environment, etc.).

Interior design practice begins with the practitioner's focus on the person, not the space. People's psychological, social, cultural, economic, sustainability, and functional needs are factors that interior designers address when designing the intimate space occupied by the person. Because of the intrinsic belief that human behavior and design are interactive, interior design is a profession very different from others. Designers base their design decisions on what is best for the people who use the space and they often use an environmental psychology lens to determine those factors—even though they may not consciously know that they are applying environmental psychology principles. There is a distinct overlap between environmental psychology and interior design.

For example, Kim, Lee, and Ha (2014) examined hospital design features (e.g., visual connection to the nurses' station or color code for way-finding) to determine those that meet needs of elderly patients. By doing so, they demonstrated the importance of the human behavior/design relationship. Findings indicated that interior designers'/architects' preferences for environmental features in terms of health, safety, and welfare were often prioritized differently than feature preferences identified by medical personnel who care for elderly patients. Environmental (and gerontological) psychology contributed to the researchers' initial identification of the elements during the literature review that were tested. Findings highlighted variations in perceptions of the importance of environmental elements by the two subject types (designer/architect and medical personnel) with implications for the design of elderly-friendly hospital space and the conversations that need to occur between designers and medical personnel during programming.

Interior designers increasingly demonstrate their understanding of how design decisions make life-influencing changes on the people who inhabit the interior environment, such as the link between classroom design and learning by children with autism (Martin,

(continued)

2014). Evidence of this level of engagement is apparent in the Council for Interior Design Accreditation's (CIDA) educational standards, the Council for Interior Design Qualification's (CIDQ) NCIDQ Examination, and as presented in *The Interior Design Profession's Body of Knowledge (BOK) and Its Relationship to People's Health, Safety, and Welfare* (Guerin & Martin, 2010) that documents knowledge areas that define the professional jurisdiction of interior design.

Of the BOK's six knowledge categories, most notable is the "Human Environment Needs" category. This category contains a knowledge area that clearly demonstrates interior design's reliance on environmental psychology: "theories about the relationship between human behavior and the designed environment" (p. 138). In addition, there are other human behavior knowledge areas such as human factors; ecological, socio-economic, and cultural contexts; and occupant well being and performance, to name a few.

The interior design profession's reliance on environmental psychology is a strength of the interior design practice. Human behavior factors as related to environmental psychology theory drive the programming phase of the design process and enable interior designers to recognize, understand, and successfully meet human needs via their design solutions. Together, as interior design and environmental psychology educators, researchers, and practitioners, it is our responsibility to ensure that those engaged in our disciplines recognize this critical relationship. The health, safety, and especially the welfare/well being of occupants of the interior environment hang in the balance.

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paradigms to discuss here, there are a few that must be understood in order to recognize where environmental psychology gains much of its information.

Neurobiology, which is a body of science that studies our actions, behaviors, and preferences in relation to genetics and our biological composition. Neurobiologists look to our DNA and physiological composition to try and understand behavioral actions (see Chapter 4) while other psychologists contend that our actions are learned. The sociocultural aspects of psychology focus on learned behavior (see Chapter 2). Social interactions such as gender roles, value afforded to the elderly, and family ethics are all determined by sociocultural factors. Consider male circumcision. For some groups, the practice is a time-honored tradition, others believe it is necessary for health reasons, and still others see it as the disfigurement of male genitalia. All beliefs are correct, but socio-cultural affiliations will determine which belief is more correct for each individual.

The branch of psychology that is most often of interest to designers is humanistic thinking. *Humanist* emphasizes subjective meaning and a concern for positive growth rather than direct cause and effect. It rejects deterministic thoughts and subjective

postulations, allowing for the greatest freedom of interpretation for the designer (see Table 1.1).

Within design, we can differentiate between the psychological thought processes by thinking of *cognition* as the process of figuring something out, **humanism** as the desire to match ones self-perception and world view, and **neurobiology** as one's natural proclivity to be a certain way. The schools of learned behavior and socio-cultural behavior are very similar. Where they differ is in influence. Sociocultural lessons are learned from society, while learned behavior is taught by trial and error. For example, a new mother brings her crying infant to a restaurant and the host makes her wait a long time for a table. When the new mother sits down, other patrons give her disapproving looks. Eventually, she learns it is socially inappropriate to bring a crying infant into a restaurant. This is an example of socio-cultural behavior because it is based on cultural norms (see Chapter 2 for social learning theory). One culture may view crying babies in restaurants as perfectly acceptable, while another may view them as highly inappropriate. The convergence of these two belief systems is what leads to conflict.

In reality, nothing related to the human condition is pure. Genetics and physiology provide the ingredients for a possible outcome, but it is our experiences that mix those ingredients together and our environments that provide the catalysts. Much like baking a cake, nothing happens if the ingredients are cooked separately. All requirements must be present to generate an outcome. This is why it is so important for Environmental Psychologists to adopt multidisciplinary paradigms of thought.

Because no one paradigm is more correct than another, the field of environmental psychology incorporates multiple paradigms into a holistic analysis. Contemporary psychologists tend to view each of the different paradigms as complimentary. An Environmental Psychologist, because of the multivariable paradigm (theoretical framework) characteristic of the field, views all situations in stages and incorporates each school of thought while analyzing aggregate behaviors in response to the environment.

Of the different schools of thought within psychology, neurobiology is the most consistent because it is based on physical sciences. This means that an action can be performed multiple times and continue to yield similar results. In the design fields, physical science stemming from neurobiology has tremendous implications. Neurochemical secretions, absorptions, and interactions are attributed to environmental design and provide the impetus for certain behaviors. For example, the *neurotransmitter* (neural chemical) serotonin is a chemical substance that is released at the end of a nerve fiber and is associated with mood. The body's natural response to overstimulation is to absorb serotonin as a means of coping; however, this can cause too little serotonin to be present in the brain, leading to poor sleep patterns, erratic behavior, and depression.

An environmental modification for an overstimulated person may include reducing environmental stimuli by decreasing lighting levels in the home and limiting visual complexity by reducing the number of items around such as knickknacks, artwork, and reading material. This idea is based on *environmental load*, determined by the aggregate of incoming stimuli that we need to process.

In contrast, the social sciences are based on the social world, and systems—culture, religious beliefs, and traditions—and study the social perspectives leading to certain outcomes. The social sciences are not as precise as the physical sciences because human interactions are not uniform and social trends are fluid. However, they do provide a high probability of accuracy when there are common variables of analysis. Human beliefs and notions change with the passage of time. For example, during the Victorian era, women behaved and dressed more conservatively than they do today.

Such trends make it difficult for social scientists to make absolute statements. They can predict with some certainty how most of the population will respond some of the time, but cannot state that every person will absolutely respond in a given way all of the time. Design is thus highly contingent on social

TABLE 1.1

PSYCHOLOGICAL PERSPECTIVES

Perspective	*Design Considerations*	*Illustration*
Neurobiology	Our actions are hardwired as a result of neurological or biological activity and therefore our behaviors result from both our genetic makeup and our physiological reactions to our environments. For example, because external stressors, such as noise, can stimulate the secretion of adrenaline, which causes a faster heart rate and increased blood pressure, many people need to control the occurrence and levels of these stressors within their environments.	
Learning/Behavioral	Our future behaviors are dictated by what we learn from past experiences of pleasure or pain. For example, by touching a hot stove burner and discovering that burner = hot = pain, we learn to avoid contact with stove burners.	
Sociocultural	Social conditions, such as status, gender norms, and expectations, operate in conjunction with cultural traits, such as ethnicity, heritage, and tradition, to produce certain behaviors. Fathers often teach their sons social morality so that their sons can grow up to be productive citizens.	
Cognitive	The process by which an organism gains knowledge or becomes aware of events or objects in its environment and uses that knowledge for comprehension and problem solving develops as a result of the relationship organisms have with their environment. This includes the processes people use to think, decide, and learn. For example, any child who wants something can usually figure out which parent to approach and how to ask.	
Humanistic	BBased on the notions of free will (the idea that we control our own destinies) and the desire for self-actualization (the idea that we aspire for more than basic survival). Its main premise is that a person's primary motivation in life is to fulfill his or her potential. For example, a person might seek personal improvement through self-help books.	

evolution and on scientific research into perceptions, preferences, interpretations, and worldviews that must be constantly examined to provide successful designs. For example, a home with both formal and informal living rooms was considered highly desirable in the 1960s and 1970s, but today the trend is to scale back. This typifies how design trends evolve over time and emphasizes the importance of social science as a collaborative component of design.

Conflicting Views

Just as there are multiple paradigms of thought within psychology, there are also multiple influences that affect our viewpoints. These influences are based on five polarizing phenomena, which are constantly being examined and challenged. Some of these viewpoints include the underlying causes of given phenomena, which are often polarizing in nature. These underlying viewpoints include:

- Person versus Situation
- Nature versus Nurture
- Stability versus Change
- Diversity versus Universality
- Mind versus Body

The differing views assign cause to either the individual person or to the given situation. Imagine a person losing his temper at the airport (see Chapter 2 for the Frustration-Aggression Hypothesis). Anger, aggressive behavior, and shouting are generally socially unacceptable in such an environment, and we thus ascribe blame to the person. However, in different environments that same person may be kind and gentle. It could be the situation that caused them to move from rational thought to irrational behavior. As designers, we cannot compensate for individual mental defects (i.e. the person). We can, however, influence situations through space planning, such as, wider walkways, larger bathrooms, ample seating, or adequate lighting. In airports, resources such as multiple check stands and boards informing travelers of wait times can be the difference between rational and irrational behaviors.

The nature versus nurture debate is one of the oldest arguments in psychology. Cause can be assigned either to genetic predisposition (nature) or social forces (nurture). In the airport scenario above, the nature viewpoint would contend that the person lost his temper because of some genetic predisposition to anger and hostility. The nurture viewpoint would assume the person lost his temper because they had never been taught anger management, or had learned at a young age that losing one's temper yields positive results. The nature-nurture debate is a slippery slope because of the implications. Consider that, if we are nothing more than the sum of our genetic codes, we are really saying we have no control over our behavior.

Stability and change are the contrasting beliefs that human behaviors are either relatively stable throughout successive generations or are constantly changing and adapting. The notion that women have always and will always want to nurture and care for children is an example of a stability viewpoint. Change, on the other hand, suggests it is possible for men to become more nurturing while women become more aggressive. Within design, we can see that while styles change throughout the years, spatial preferences based on gender generally remain stable (see Chapter 3). Males tend to prefer more open spaces with greater visual access. Interestingly, more and more women also prefer open spaces with greater visual access (Hasell, Peatross & Bono, 1993).

Diversity and universality are the opposing ideas that people are either fundamentally different or the same. Those who subscribe to diversity view all people as unique whereas those who ascribe to universality view all humans as fundamentally the same. From a design viewpoint, diversity means that every person has unique and individualistic design preferences. Conversely, universality suggests that people share common preferences, such as a view to the outdoors. These differences are at the core of what distinguishes universal versus user-centered design (see Chapter 11).

Mind versus body is the notion that behaviors are either psychological or biological. The idea that all people need to feel loved is psychological since love is an emotion. However, scientists have proven that the absence of love can stymy development of some regions of the brain (Luby et al., 2012). In this way, love is a biological need. In design, the notion of safety from a psychological construct helps people believe they are secure. However, lack of perceived safety can lead to stress-related illnesses, including sleep deprivation, sweating, elevated heart rate, and other similar reactions (Johnson, 2004, p.49).

Rather than subscribe to one of these viewpoints, many environmental psychologists concede that each has merit and, when considered together, can account for our wants and needs. An individual may be responsible for personal actions, but environmental or social situations can also incite certain behaviors (see Chapters 3, 4, and 13). This is partly because the individual is in a situation which they recognize as having no viable alternative, causing high levels of adrenalin secretion. The individual may respond with hostility, or perhaps frame a situation differently, but it will continue to be an annoyance. Because people are diverse, not all people respond in the same way. However, the situation will most likely be universally interpreted as frustrating. How the situation is handled depends upon the mind, but repeated exposure will likely affect the body by increasing stress levels.

ENVIRONMENT AND PSYCHOLOGY

The principles of observation and assessment—that is, observing the role of stimuli and tracking subsequent reactions—are at the core of every science. However, even today most social science fields, including the various disciplines of psychology, emphasize the role the environment plays when considering behavioral responses and outcomes. This wasn't always the case, but many early studies within the social science fields documented the effects of environmental phenomena. Psychologists in the 1800s examined the effects of environmental perception of variables such as light, sound, weight, and pressure on learning and behavior (Bell et al., 2001). Morgan's 1916 study examined how external distractions affected work performance. These pioneer studies were soon followed by others that examined the influence of workers' hours and the effects of ventilation on productivity (Vernon, 1919). In 1929, an influential study examined the relationship between the location of student seats within a classroom and the grades they earned (Griffith).

CULTURAL CONNECTION 1.1

Different cultures approach their role within the world and their relation to other life forms from different perspectives. However, with the march of globalization, some people are moving away from traditional interiors to embrace foreign styles and aesthetics. This is an example of the dynamic changes humans are capable of despite deterministic behaviors. For example, the influence of American culture in Southeast Asia extends beyond lifestyle (music and food) to design (objects and architecture) (Downey, 2014). By contrast, America has seen increased interest in Asian culture and design aesthetics as exemplified by "pet architecture," the Tiny House Movement (Bow-Wow, 2001), and the ramen noodle craze of 2014 (K.A, 2014). Perhaps one explanation for increased aesthetic diversity is provided by Alain de Botton, who has argued that people crave those qualities and styles which are deficient in our own lives or societies (2006, 127). Curiosity and fascination with the unknown can result in perception of foreign cultural ideals as inherently better.

Among the most famous analyses conducted of the human–environment relationship were the 1924–1932 Hawthorne studies, which analyzed the effects of lighting on work performance (Snow, 1927) (see Figure 1.5). The researchers hypothesized that increased lighting would correlate with increased worker production. To test this premise, they placed a group of workers in a room where they performed job duties. Each day, the researchers brightened the room with higher-wattage light bulbs. As hypothesized, worker performance increased. However, to cross-check results, the researchers decided to decrease brightness, the idea being that worker production should decrease with lower lighting levels. Instead, worker production continued to increase as a result of other variables. Because of these findings, many scientists regarded the Hawthorne studies as a failure. However, these studies taught us the importance of controls (referred to as the Hawthorne Effect) in research, and produced the following three important findings:

1. The effects of physical environments are buffered by perceptions, beliefs, preferences, experiences, and personality (i.e., a new bulb must be an improvement; consequently, the workers perceived that this must be a better environment);
2. One environmental variable can be more important than the subtler variations (i.e., the employees who were selected for the study felt that they were special);
3. Physical environment can change social dynamics (i.e., the study room layout facilitated more social contact among the workers; thus they were "happier").

Figure 1.5 The Hawthorn studies revealed that there is a symbiotic relationship between environmental and social conditions when it comes to worker performance and satisfaction.

These results are important for designers because they illustrate the importance of environmental variables. Theoretically, designers should be able to increase worker performance simply by making workers believe their environment is better than others and they are therefore valued and special. Along with other early studies, the Hawthorne studies illustrated that the environment we occupy dramatically influences how we perceive the world around us, how we see ourselves in relation to the greater social hierarchy, and how the environment affects our social behaviors. Understanding this symbiotic relationship is essential to the practice of environmental psychology.

Egon Brunswik, considered by many to be the founder of environmental psychology, is credited with coining the term in 1943 to describe the field of human–environment relations (Brunswik, 1943). Other researchers who have contributed to the study of the human–environment relationship come from the fields of behavioral geography and urban sociology. Kurt Lewin, a social ecologist, regarded the environment as a significant variable in the determination of behaviors and is credited with the idea of integrating information obtained from research with that of social practices, otherwise known as *action research* (Lewin, 1943). Roger Barker, another notable contributor, was an ecological psychologist widely regarded as the developer of behavior settings. In 1947, Barker and his colleagues formed the Midwest

Psychological Field Station in Oskaloosa, Kansas. They observed that two children in the same place behaved more similarly than one child in two places, concluding that the surrounding environment exerted a great deal of control over behavior (see Chapter 9 for more on child development). Eventually, Barker and his colleagues would document this phenomenon, ultimately concluding that our environments create behavior settings.

Other important names in environmental psychology include Abraham Maslow, William Ittelson, and Harold Proshansky. Maslow conducted a study with photographs of people and found that observers responded more positively to the images when they were in beautiful rooms and more negatively when in ugly rooms (Maslow, and Mintz, 1956). Although this research may seem trivial, when we consider the behaviors that likely manifest from a positive environmental experience, we may theorize that beautiful environments evoke happy or pleasant feelings, whereas ugly rooms evoke annoyance or discomfort. This kind of information can help designers increase customer satisfaction in government or institutional environments (see Chapter 12 on place identity and place attachment). Ittelson and Proshansky not only conducted extensive research relative to theory, methodology, and application in real-world settings, but also developed the first Ph.D. program in environmental psychology at the City University of New York (CUNY), which awarded the first doctorate in environmental psychology in 1975. The 1974 text, titled *Introduction to Environmental Psychology*, written with Leanne Rivlin and Gary Winkel, was the first textbook in this new field.

The work of these early environmental psychologists serves to highlight not only the incredible impact that buildings, interior spaces, and landscapes have on us, but also the capacity humans have to understand that taking care of our physical environments (environmental consciousness) is the same as taking care of ourselves.

DEFINING THE PROFESSION

Environmental psychology looks broadly at how environments affect humans. It is particularly relevant to designers because so many of the spaces we inhabit today are man-made. More precise terms such as architectural psychology, design psychology, and design therapy describe areas of expertise within the broader field of environmental psychology.

Unfortunately, there is no way to ascertain the level of competence a title such as Architectural Psychologist, Design Psychologist, or Design Therapist. Thus, professionals trained in the clinical fields of healthcare may desire a career change and attempt to reinvent themselves as designers without any formal design education, and may be unaware of important building factors such as load bearing walls, codes governing exterior lighting, or building permit requirements. This problem is exacerbated by design education, which provides little information related to neuroscience, human anatomy, physiology, or behavioral psychology.

Professional associations such as the American Occupational Therapy Association (AOTA), the American Society of Interior Designers (ASID), and the American Institute of Architects (AIA) have developed guidelines that govern their respective professions. They establish baseline competencies and ethical standards for professionals within their fields. However the American Psychological Association (APA), the governing body of psychological sciences, has yet to acknowledge architectural and design psychology as a professional division within the field.

These issues mean environmental modification for health and well-being is today addressed by multiple professions. No profession currently exists that provides appropriate depth for adequate interventions. Environmental design for health and well-being remains a peripheral specialty topic within many fields (Gifford, 2014, p. 5). To exemplify this division of expertise, consider lighting. The Architect knows the spatial benefits of bringing natural light

into a building. The Interior Designer knows that color contrast is important for object discrimination in environments with high levels of natural light. The Occupational Therapist knows how the body moves, and the Psychologist knows that windows with UV filters inhibit full spectrum light which is required for serotonin (the neurotransmitter related to the positive effects of mood).

Consider the following hypothetical situation. An architect design's a building with operable windows in an attempt to make it more "sustainable." However, after three months of occupancy, employees start to complain of asthma-like symptoms. The designer assumes the issue is occupational asthma and brings in plants known to mitigate the off-gassing of carpets and other building materials (environmental toxins), and occupants are instructed to keep windows open to create more air exchanges (the assumption being that there might be high VOC levels compromising the indoor air quality). Then, one day an employee suffers a severe asthma attack and is rushed to the emergency room. Further analysis reveals the employee suffered from allergic asthma and the additional plants coupled with open windows that faced a pine tree forest created a potentially dangerous situation. The employee sues the employer who, in turn, sues the licensed architect because a professional consultant was not brought in to analyze the site and address the concerns. For the most part, the courts hold licensed professionals liable for errors when those errors are part of the regular scope of services. If the work performed is out of the respected professional's scope of service the professional will be held liable for errors, and their practice insurance may not cover the litigation. Hence, it behooves design professionals to seek out professional guidance in those areas in which they lack a firm knowledge base. In this hypothetical case, a specialist in healthcare design could have been part of the team assessing the problem.

Formal education isn't the only way to acquire knowledge; it can also be attained through apprenticeships or self-education. The most important factor in both traditional and non-traditional education is that knowledge be acquired from reputable sources, for example a licensed architect or designer certified by the National Council for Interior Design Qualification (NCIDQ). When it comes to issues of physical or psychological health and safety, licensed Occupational Therapists, Psychologists, or those who have been certified by the National Commission for Health Education Credentialing (NCHEC) should be consulted. It is important to understand, however, that licensure or certification in a specific area does not equate to omnipotence. Other experts should be consulted. Interdisciplinary team approaches will yield better and more comprehensive results.

Mass media has facilitated a growing interest among the general population in the way our built environment affects our lives. However popular formats offer only sound bites or brief overviews. The environmental psychology field, along with the design professions, must take the necessary steps to provide meaningful education. Currently, environmental psychology is the only recognized academic disciple that bridges design and psychology.

ENVIRONMENTAL PSYCHOLOGY TODAY

Environmental psychologists study a range of issues related to the human–environment experience and, as a result, can predict with some certainty many emotional and physical reactions to environmental attributes. They analyze environmental cues that contribute to perceptions about a community, including:

- infrastructure quality,
- the condition of city-owned buildings,
- the types and condition of local businesses,
- the availability and maintenance of green spaces,
- owner-to-renter ratios.

Other cues are also informative, for example advertising messages, methods, and placement. Signs on poles or roofs along a commercial street indicate a drive-through community, whereas signs along sidewalks indicate walkability (see Chapter 8 on

way-finding). Advertising messages indicate community behaviors and can inspire stereotypical or negative images when limited to certain areas. For instance, the parents of teenage girls may decide against purchasing a home in an area plastered with anti-teen-pregnancy campaign ads because the ads invoke a site-specific judgmental reaction: "Our daughters would be at risk in this neighborhood." However, if those ads were all over town, the parents would consider teen pregnancy a common concern rather than site-specific.

Large-scale gathering areas, such as corporate offices, schools, and resorts, are ideal settings for analyzing the environment to identify factors contributing to or detracting from desired behaviors. For example, the occupants of corporate offices working in cubicle spaces or open plan offices tend to exhibit greater levels of stress and lower productivity (Paul, 2012). As a result, employee turnover rates are higher than those who are able to complete their work in private workspaces.

Environmental psychologists examine the physical attributes of gathering places, such as lighting, size, color, acoustics, ancillary rooms (lunchrooms or lounges), wall and floor coverings, and placement of work/study stations and equipment (see Chapter 8 for more on light and color). They also study the relationships between employees, supervisors, and management to analyze behaviors and outcomes.

In home environments, environmental psychologists analyze occupant behaviors to develop homes that facilitate desired activities. Environmental psychology is especially important during the initial development or selection of residential properties. For example, if occupants work nine-to-five jobs, the worst position for the kitchen is situated toward the southwest. Occupants are already stressed from the day's activities, and the evening sun adds glare and heat while cooking dinner further heats the room. These combined factors can agitate occupants and even lead to arguments (see Chapter 12 for more on designing home environments).

People who are challenged by physical, psychological, and age-related illnesses and injuries, and the stress and anxiety related to daily life or end-of-life issues, as those detailed in chapters ten and eleven also benefit from the knowledge gained from environmental psychology.

EDUCATIONAL OPPORTUNITIES

For many people, the discipline of environmental psychology is virtually unknown. This is partly because no proactive media campaigns educate the public about the field, its research focus, or the importance of the discipline. Only a handful of schools in the United States offer stand-alone degrees in environmental psychology, and the vast majority of students matriculating find themselves in academia because the degree is available almost exclusively at the graduate level. Generally, only a small percentage of students who graduate with a degree in environmental psychology move on to work in the field, either for a design firm or as independent consultants. Because the discipline itself is quite broad with currently only a few opportunities for higher education, individual interests within the field further distinguish practitioners of environmental psychology.

Most institutions house their environmental psychology program in schools of architecture, design, psychology, human or social ecology, or arts and sciences. This limits uniformity within the field, as a clinical psychologist teaches environmental psychology very differently from an architect. However each approach is valuable because it contributes a different perspective to the total body of knowledge. The diversity of the discipline is both its strength and its weakness. Not all environmental psychologists share an interest in a particular specialization, but they do share the belief that the environment plays a crucial role in human behavior. The American Psychological Association (APA) recognizes environmental psychology under Division 34, the Society for Environmental, Population and Conservation Psychology (American Psychological Association, 2015). Its website lists the following areas of research interest:

- Behavior and the built environment. The relationship between human behavior and the socio-physical environment.
- Conservation psychology. The reciprocal relationship between humans and nature.
- Ecopsychology. The relationship between human mental health and the health of natural environments.
- Psychology and population. The relationship between population density and psychology.

Common subspecialties or concentrations within environmental psychology include, but are not limited to, the following:

- diversity, exclusion, and the environment;
- housing issues and policy;
- the meanings and experiences of the home and homelessness;
- conflicts and contradictions in urban planning;
- neighborhood and community participation;
- open space planning and use;
- human mobility and transportation;
- design, use, and evaluation of public institutions;
- participatory research and design;
- gender and space;
- political ecology and development;
- environmental justice;
- supportive environments for people with disabilities;
- elderly people and the environment.

The scope and practice of environmental psychology has a direct and symbiotic relationship with the design industries. Gifford (2014) has identified three levels of analysis for study of the human–environment relationship:

1. Fundamental psychological processes of perception, cognition, and personality as they filter and structure each individual's experience of the environment
2. Social management of space related to personal space, territoriality, crowding, and privacy
3. The effect of the physical setting on complex but common behaviors in everyday life (such as working, learning, and participating in daily activities in the home or community) and our relationship with the natural world

These levels demonstrate that environmental psychology is the study of symbiotic relationships between humans and their environments. It is this holistic approach that separates environmental psychologists from other professionals within the fields of design and social science.

PRACTICAL APPLICATIONS

Because environmental psychology is a science that examines human behaviors in relation to their environment, much of the research has broad practical applicability within the human experience. In 1954, Maslow unveiled a model depicting a hierarchy of needs, based on natural instincts present in all animals (see Figure 1.6).

Maslow, a humanist psychologist, proposed that all humans have fundamental needs and that they move up the hierarchy as each need is met. When an

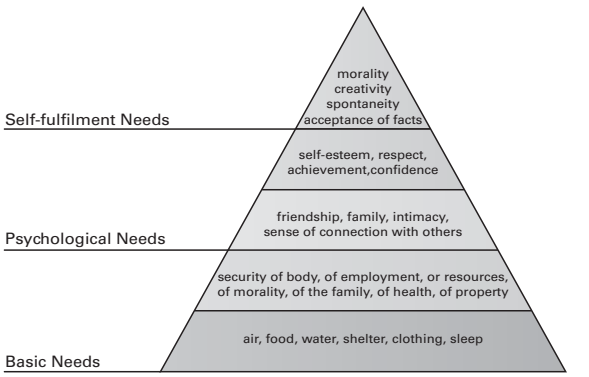

Figure 1.6 Maslow believed that human needs are based on a linear ordering system in which food and shelter are the most basic of needs. When all needs have been satisfied, we strive for self-actualization.

individual's environment is not "right" or appropriate for their needs (as is frequently the case), they fail to proceed up the hierarchy. This failure to advance causes psychological and emotional dysfunction.

Almost from inception, Maslow's model came under scrutiny. Critics claimed it lacked scientific basis, conceptual structure, or supportive evidence, meaning the concept ultimately lacked validity. If we were to accept Maslow's notion of the hierarchy of needs, along with the premise that the environment serves no other purpose than to fulfill hedonistic desires, the traditional human–environment relationship would be at the top of the pyramid as an aspect of self-actualization. However, human–environment research proves that our environments have a tremendous impact on how we feel, respond, and cope in daily life. Because the environment plays an intricate role in the overall physiological health and responses of the human psyche, concern for our surroundings is a component not only of self-actualization but also of safety and physiological needs.

For example, a child facing a novel environment may react with fear, resulting in child-related stress (Degnan, Almas & Fox, 2010). Fear and stress can lead to the fight-or-flight response, which is characterized by sympathetic nervous system activation that secretes chemicals such as adrenaline into the bloodstream and mobilizes a behavioral response (Johnson, 2004). If a child repeatedly responds negatively to certain environmental conditions, a physician may prescribe medication and a counselor or therapist may pursue behavior-modification techniques. However, an environmental psychologist will instead modify the environment by eliminating sources of stimulation (see Chapter 9 for more on child development and the environment).

Human–environment interactions are based on our psychological processes in relation to our surroundings. Our environments are made up of physical stimuli (noise, light, and temperature), physical structures (walls, furniture, and natural structures), and symbolic artifacts (the meaning or image of a setting). The fundamental psychological processes of *arousal*, *overload*, *affect*, *adaptation*, and *personal control* are integral to human–environment interactions.

- **Arousal** can be defined as excitement or stimulation to action or physiological readiness for activity.
- **Overload** is the negative mental state that results from excessive stimulation and arousal.
- **Affect** encompasses emotional reactions to the environment.
- **Adaptation** describes the process of adjustment to environmental conditions.
- **Personal control** is the ability to control an environment or a situation.

These processes lead to outcomes that can be assigned the categories of performance, interpersonal relationships, satisfaction, and health or stress. The positive relationship between human performance and the attention given to the individual, as well as the effects of space and external stimuli, affect performance. For example, if a teacher pays more attention to student X, student X should do better

CULTURAL CONNECTION 1.2

Children of all cultures are resilient and curious about their environments. They learn from the world via textures, colors, materials, and spatial arrangements. However, the complexities of social aspects can be difficult for them, such as the dynamics of their placement among siblings, parent interactions, familial composition, and economic stressors. Given this, an environmental psychologist could create a space of private refuge for a child to mitigate stress.

in school. However, this one-dimensional approach assumes that variable Y (the teacher's attention) influences human performance, which equals the behavioral output. The field of environmental psychology has evolved to approach behavioral science research in a multidimensional manner. This means that student X, when factored with situation Y and personality Z may develop behavioral response XYZ. In other words, if a teacher gives added attention to a student who has (1) eaten a proper breakfast, (2) received enough sleep, and (3) is not stressed at home, and we (4) decrease the density within the classroom, (5) increase natural full-spectrum lighting, and (6) decrease external stimuli such as noise, then the student's academic performance will be optimized. The level of optimization, however, is contingent on all of these factors.

Summary

Our symbiotic relationship with the environment causes researchers to struggle with the timeless question of which came first: the behavior or the environment? The premise behind the research and practice of environmental psychology is a holistic thought process that considers biological, social, and environmental causal agents. Environmental psychologists not only consider these biological and sociological influences, but also use methods of environmental modification and design to enhance preferred actions and reduce undesirable behaviors.

Within design, we can differentiate between the psychological perspectives by thinking of cognition as the process of figuring something out, humanism as one's desire to match self-perception with world perception, and neurobiology as the compulsion to behave a certain way because it is natural. Social sciences are based on the social world and systems (e.g., culture, religious beliefs, and traditions) and tend to study the social perspectives that lead to certain outcomes.

Including multiple disciplines in design is essential. Environmental psychology recognizes that one person cannot possibly know everything, and is the only recognized academic disciple that bridges design and psychology. The environment plays an intricate role in the overall physiological health and responses of the human psyche—concern for our surroundings is a component not only of self-actualization but also of safety and physiological needs.

Activities

1. Identify a design feature of interest that was initiated for a specific purpose (i.e. revolving doors to conserve energy) then, find a place to sit and see if the intended design initiative inspired an unintended behavioral action (i.e. forcing the revolving door to move faster, using the accessibility door more, or squeezing more people than was intended in each of the compartments of the revolving door).
2. Develop a chart with four columns. In the first column identify the psychological paradigm (i.e. humanistic psychology). In the second column describe the basics of that paradigm. In the third column identify the strengths of that column to the design professions. Then, in the fourth column identify the issues that might arise from this paradigm to the designer. Once completed, compare the strengths with weaknesses between each paradigm of thought to determine where and how each paradigm might best support a particular design initiative.

3. Describe, in an essay, the influence of the five polarizing viewpoints found within psychology and discuss those viewpoints in relation to the development of a design for a public lobby space.

4. Describe, in an essay, the Hawthorn Studies and explain why the three confounding factors biased the results. Then, describe how the study could have been implemented differently so that the results could have been more accurate.

5. Consider the design of a group home for people with Alzheimer's disease. Then develop a list of all of the professions that work with this group of end-users. After reviewing each profession, identify what pieces of information that profession has that would help the designer to design a better group home for people with Alzheimer's disease.

Key Terms

Action research
Adaptation
Affect
Amyotrophic Lateral Sclerosis
Arousal
Cognition
Environmental load
Environmental modification
Deterministic behaviors
Humanist
Multimodal approaches
Natural selection
Neurobiology
Neurotransmitter
Overload
Paradigms
Personal control
Purist approach
Symbiotic

CHAPTER 2

FOUNDATIONAL THEORIES

A theory pertaining to human behavior is a belief about a truth that applies to a select group of people, within a given socioeconomic and political era, and within the generally accepted beliefs of that time.

Chapter Objectives

By the end of this chapter you should be able to:

- **Explain why pre-design research is an important part of the design process.**
- **Discuss the role of theory in the design process.**
- **Compare and contrast the differences between a hypothesis and a theory.**
- **List common environment and behavior theories.**
- **Develop an argument for a particular design based on a specific theory.**

INTRODUCTION

Environmental psychology is one of the few sciences recognized in the United States that exclusively examines the relationship between humans and their environments. Unfortunately, the environment is not often recognized as a *cause* of human health or behaviors. One reason may be because we seek to remedy physical and social issues we do not completely understand with pharmaceuticals, surgery, and person-to-person therapies, while erroneously concluding that we understand the totality of how environments affect and influence the human condition.

Humans have long been able to dominate our environments, but medicine and the human psyche continue to remain relative enigmas. Therefore, when we encounter assorted issues pertaining to the human condition, we tend to seek solutions in the clinical fields. As designers of the built environment we must consider the environment as a co-variable in prevention and compensation, and reject the **magic bullet approach**, or the simple deduction of one variable or intervention equals the outcome of desire or cure. For example, a person suffering from a headache often takes a pill rather than considering the social or physical conditions that may have caused that headache. High **stimulation** levels from the combined effect of the environment and social situations are disproportionate to the **environmental loads,** which are the quantity and intensity of environmental elements. Excessive glare is an example of an element that contributes to environmental loads that can be addressed to prevent a headache, and treat symptoms (see Chapter 6 for a discussion of stimulus response).

When addressing the human–environment relationship, environmental psychologists often speak in terms of theories in order to help them conceptualize the relationship. These theoretical concepts do not provide answers but rather help guide the research process. Research then generates knowledge, which informs the application of design solutions. This chapter explores various theories that help explain the human–environment relationship and environmental perception. These theories are applied throughout the text as a means of developing thoughtful design, which can be evaluated in relation to occupant profiles, differences

in climates, and other factors that lead to differences in perception, cognition, and behavior.

RESEARCH IN PSYCHOLOGY

Environmental psychology is rooted in scientific methods related to the acquisition of theory, pursuit of knowledge, and practical application. However, in the minds of many practitioners, theory and knowledge are blurred. Many theories are passed along as if they were knowledge rather than ideas to guide research. Knowledge is the truth that has been obtained through research. Think of a matador waving a red cape to entice a bull to charge. The theory that the color red causes aggression was generally accepted until research proved that most animals are color-blind! The movements of the cape cause the bull's arousal. Even with this knowledge, matadors continue to use red capes because of important variables affecting the practice: **culture** (the values, norms, and artifacts of a group of people) and **tradition** (a custom or practice that has been passed down from generation to generation). Humans tend to embrace these variables until they prove harmful or inconvenient. In other words, we maintain cultural and traditional behaviors as long as they do not negatively affect health and well-being.

Although practice can be based on a supposition or a collection of ideas intended to explain something (i.e. **theory**, researchers who contribute to the practice of environmental psychology are obligated to pursue scientific truths). One major challenge to this responsibility is the dynamic nature of the human–environment relationship. Wherever there is life there is change, as demonstrated by the evolving spaces humans inhabit. Consider residential floor plan preferences of the 1700s. They were highly segmented with many small rooms and kitchens were commonly visually and physically separated from the dining areas (see Figure 2.1).

Contemporary designs, as showcased online by Houzz.com and Pinterest, indicate that today open

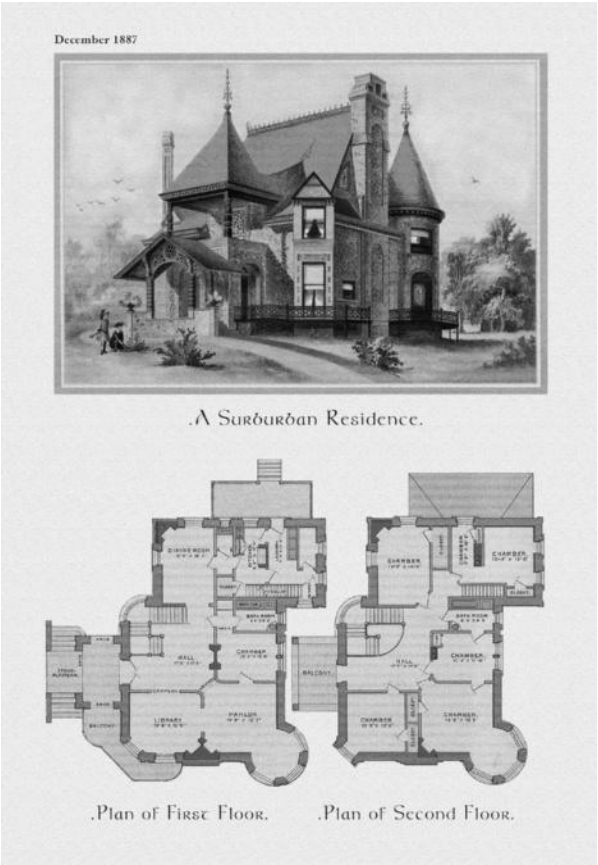

Figure 2.1 Notice in this highly segmented floor plan how the kitchen, dining room, and living room (parlor) are separated from each other. This was common in nineteenth- and early twentieth-century homes.

floor plans merging kitchen, dining, and living spaces are preferred over segmented floor plans (Sparke, Massey, Keeble & Martin, 2009). Research conducted in the 1700s would have yielded very different *truths* from identical research conducted in the twenty-first century. One **hypothesis** is that people in the 1700s spent more time outdoors and therefore enjoyed many opportunities to gaze upon expansive views. A hypothesis is a proposed explanation that must be proven or disproven in order to establish a theory. Today, cities are taller and denser and we spend more time inside. Hence, we naturally crave greater

openness. However, this is just a hypothesis. Chapter 12 discusses the environmental psychology of home design in greater detail.

Incorporating environmental psychology into the design fields offers unique opportunities. Designers can make use of tools such as user needs assessments, known within the design fields as **Pre-Design Research (PDR)**, to evaluate client requirements prior to design, construction, or occupancy. This information can be coupled with creative scholarship (see POV 2.1). At a very basic level, creative scholarship is defined as using media in innovative ways with the intention of answering a specific question that adds a new dimension to an existing solution. Creative approaches often require deeper and multidimensional understanding of an issue, and are often answered through metaphorical or non-direct approaches.

Early needs assessments were conducted primarily by academicians who focused on settings such as housing, college dorms, and residential institutions (Heft, 2005). An **Occupancy Evaluation**, or assessment conducted during occupation, is another useful tool developed by social scientists, designers, and planners interested in understanding user experiences within buildings (Gifford, 2014). Evaluating for intended future users is not a novel idea; many architects have also adopted the practice, calling it behavior-based architectural programming. Similarly, in medicine and psychology the same formative evaluation occurs and is termed an **intake assessment**. Research methods include reviewing current literature, observing similar populations in similar environments, surveying individuals via personal interviews or written surveys, and developing focus groups. When this preliminary research is factored in, completed developments tend to have fewer problems and greater appeal. Ideally, a needs assessment should be augmented by an occupancy evaluation of a similar environment. As a final step, a **Post-Occupancy Evaluation (POE)** should be performed in order to assess the human–environment relationship. This is useful because design ideas and concepts may be revealed as inappropriate when applied to actual settings (Zengel & Kaya, 2011). A POE can also determine if occupants have modified the environment in a way that negatively affects building performance. For example, an office's air circulation may be blocked if the employees were to pile storage boxes atop strategically placed furnishings or pony walls (see Figure 2.2). The POE evaluates an overall design and is usually the final phase of the design process, enabling the designer to learn from previous mistakes and ensure better plans for future projects.

To recap, there are three levels of research that a designer can engage with in order to ensure that the environments they design meet the needs of the end users.

1. Pre-design—research that takes place to inform design.
2. Occupancy Evaluation—research done on end-users to determine design needs for improvement.
3. Post occupancy evaluation—research done after the design has been conceptualized and implemented to see how well it met the end users needs.

Environmental psychologists are trained to use the methods and tools necessary for quick and cost-effective pre and post occupancy assessments to verify if user needs are adequately addressed. They can therefore help architects, city planners, and interior and landscape designers to develop environments best suited to specific needs. The scenario described in "Needs Assessment (Pre-Design Research)" illustrates the value of a user needs assessment or pre-design research. Consider this scenario: A designer from a prestigious design firm in Seattle, Washington, is secured to develop a continuing care retirement community to be located in Palm Springs, California. The Lead Interior Designer has never lived in a desert community and her only exposure comes from several short visits to the site.

Back at the firm the design team comes up with a beautiful design that includes indoor–outdoor spaces, large windows to maximize the natural light,

POINT OF VIEW 2.1

FROM THE FRONT LINE: AN OVERVIEW OF CREATIVE SCHOLARSHIP

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The Process of Design

Denise Scott Brown, one of the most influential architects of the twentieth century, was also a theoretical writer and educator. In one of her articles, Brown (1995) remarked:

> We write as professionals, not scholars, mainly to clarify our own thoughts and to help ourselves to continue designing. But the realities and emergencies of day-to-day practice make our essays read like letters from the front line. Our daily battle prods our theories and pushes our designs. (p. 47)

She advocated for a mix of scholarship and practice and criticized the academy, stating they, "seem to lack an understanding of the circularity of the creative process and of the design process that grows out of it" (p. 47). In his seminal book *The Reflective Practitioner*, Donald Schön (1983) explained that, "doing and thinking are complementary. Doing extends thinking in the tests, moves, and probes of experimental action, and reflection feeds on doing and its results" (p. 280). His construct of examining practice by being both reflective and reflexive is captured in the essence of Brown's statement and echoed by scholarly practitioners of current generations; and it serves as the underpinnings of what is referred to as creative scholarship today. This form of scholarship is often based on methods of inquiry similar to traditional research, but it may be the design process itself that shapes its methodology (Guerin & Birdsong, 1995, p. 46).

Creative Scholarship Defined

A major design educators' council described creative scholarship as "an original activity in design and the arts that defines and expands the body of knowledge of the discipline in order to advance the quality of life and human performance in the designed environment" (Guerin & Birdsong, 1995, p. 46). The council agreed that it should meet the following criteria:

1. contribute to the expansion or application of knowledge of . . . design,
2. meet the rigors of peer review indicating significance to the discipline, and
3. be able to be disseminated in a format that can be cited and retrieved. (Guerin & Birdsong, 1995, p. 46)

If design is the method, then the outcome can be a designed object, exhibition, or environment (built or hypothetical); but it may also be the development of a theory used for a creative project, a critique of a designed work, or a case study analysis. The spectrum may extend to innovative consultative reports, the identification and assessment of issues and needs, and the findings uncovered through a creative work (Guerin & Birdsong, 1995, p. 47).

Creative Scholarship as Research

Whether or not creative scholarship qualifies as research is highly debated. While some designers do go on to pursue doctoral degrees, it could be said that many lack the training in how to conduct scientific research. But this also begs the question of whether or not traditional research is the singular path and the best fit for design disciplines. There was a shift at the end of the last century when qualitative work in grounded theory, which is directly opposed to positivist or quantitative research, began to be legitimized. This sparked new connections and types of inquiry

(continued)

in areas such as anthropology, history, ethnography, and philosophy. More recently, an evolution has occurred in creative fields where scholars are drawing inspiration from phenomenology and hermeneutics, the theory of interpretation, to engage in reflective practice. Notably, creativity is based on originality, which is essential for new and innovative works, but it is precisely this premise that goes against positivist research standards that require proof of validity and the ability to be replicated. On the contrary, qualitative research is strengthened by its originality rather than its replicability. It is within these areas of investigation that the emergent idea of "Design as Research" is gaining acceptance (Armstrong, 2000).

Evaluating Creative Scholarship

Dr. E. Paul Torrance who dedicated his career to testing creativity stated:

> Creative thinking is the process of sensing difficulties, problems, gaps in information, missing elements, something askew; making guesses and hypotheses about the solution of these deficiencies; evaluating and testing these hypotheses; possibly revising and restating them; and finally communicating the result. ("Test," n.d., para. 4)

It is this last step that leads to the outcomes upon which creative scholarship is evaluated. The act of doing is not sufficient for a creative work to be elevated to scholarship. It requires documentation, through written and visual means, to convey how it contributes to the greater body of knowledge. It is then by a process of anonymous peer review, the same method used for positivist and qualitative research alike, that it may be validated. This can take many forms, including publication in referred journals, conference presentations/proceedings, public exhibitions, published reviews by critics, and juried awards (Guerin & Birdsong, 1995, p. 47). It is only when the work enters the public realm that it can further the discourse and contribute to the field at large.

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and picturesque landscaping with meandering paths and natural vegetation. Figure 2.3 gives an example of the type of design generated. Unfortunately, brief visits provide the person with information based on snapshots in time. The design team did not take into consideration that Palm Springs can reach temperature of 115 degrees Fahrenheit in the summer, has well over 300 days of clear, (no clouds) unobstructed sunshine, and desert landscaping is composed primarily of cacti and plants with thorns. All of this equates to thermal gains and excessively bright interiors, thus leading to a possible safety hazard, and foliage that could lead to puncture wounds should a person accidently fall. Hence, global and national design firms have a vital role to fill; locally sourced designs from local designers tend to have better overall outcomes.

Because environmental psychologists are uniquely trained and qualified to understand the thoughts and emotional processes that produce or shape human desires, they can help people understand the

Figure 2.2 Ventilation systems within the built environment are designed to maximize airflow and circulation. Through the introduction of environmental accessories, designers can inadvertently block that airflow. Hence, caution should be used when space planning so as to not impede airflow and circulation.

differences between present and future oriented needs. They can also ascertain the primary, secondary, and tertiary functions of environments so they can be designed to fulfill human needs (see Chapter 12). Some methods an environmental psychologist might employ techniques such as:

- **Covert Observation**—The observation of people within an environment for several hours and over an extended period of time without their knowledge.
- **Overt Observation**—The observation of people within an environment for several hours and over an extended period of time with the knowledge that they are being observed.
- **Participant Observation**—Adopting a role within a given setting to gain first-hand knowledge of situations and circumstances.
- **Active Expert Interviews**—Taking an individual on a tour of similar buildings to identify strengths and weaknesses.
- **Surveys**—Asking questions about common uses, supports, constraints, and needs for a given project.
- **Design parties** and brainstorming sessions similar to a design charette. These are an effective method to find out what people want from their environments.
- **Design charette** is basically a gathering of different stakeholders of a project in an attempt to resolve conflicts and identify solutions.

The difference between a design party and a design charette is that that the stakeholders are more interested in the person's happiness with the outcome as opposed to the success of the design as a whole.

HYPOTHESIS

A hypothesis is a supposition or principle that is not proved but assumed (McKechnie & Webster, 1979). In some situations, a hypothesis and theory are considered the same. However, the two terms are very different. A hypothesis is a testable idea within a relatively short period of time, while a theory typically endures for decades or centuries and has been verified (McKechnie & Webster, 1979). To get a better idea of the differences between a theory and a hypothesis we'll take a look at three important hypotheses related to design: **Biophilia**, **Frustration-Aggression**, and **Pleasure-Arousal-Dominance**.

Biophilia Hypothesis

Wilson (1984) and Kellert (1996) have promoted the Biophilia Hypothesis, which is based on an assumption that humans have a genetic need to be among other living organisms (Louv, 2011). This could mean being surrounded by trees and foliage, animals and

Figure 2.3 As we spend more time inside, some contend that bringing nature indoors will satisfy our need to be connected to nature.

other people, or aquatic life (see Figure 2.3). So, while there is much research to support the therapeutic benefits of natural environments on Attention Deficit Hyperactivity Disorder (ADHD) (e.g. Faber Taylor & Kuo, 2011; Louv 2008) and the role of comfort animals in treating anxiety and depression, there are still many questions that remain; such as the value of a water wall or simulated waterfall in a classroom dedicated to autistic children. Biophilia is discussed further in Chapter 13.

Frustration-Aggression Hypothesis

Another hypothesis pertaining to design is the Frustration–Aggression Hypothesis developed by Dollard et al. (1939). This hypothesis is based on an idea that when a person's goal attainment is interfered with he or she will become frustrated and aggression will ensue (Priks, 2010). Consider a situation in which your flight arrives late at an airport and you have a limited amount of time to catch your next flight (see POV 2.2). Your goal is to find and get to your next gate as soon as possible. Unfortunately, an airport can be a very crowded place with people aimlessly meandering about. Navigating through the crowds could be the source of frustration (see Figure 2.4). Yelling or pushing so that people will get out of your way is a form of aggression. What would you do? Remain patient and possibly miss your flight, or become aggressive to increase your chance of catching your connection?

Pleasure-Arousal-Dominance Hypothesis

Albert Mehrabian and James A. Russell postulated that humans have three primary emotional responses to an environment—pleasure (positive feelings), arousal (excitement or challenge), and dominance (control over the setting or situation)—based on the viewpoint that emotion is a mediator between our environments, our personalities, and our behavior (Mehrabian and Russell, 1974). Russell later rejected dominance as a primary response. His modified pleasure-arousal hypothesis claims we are most attracted to settings that are moderately arousing and maximally pleasurable, but that in unpleasant environments, moderately arousing settings are the least desirable (Gosling et al., 2003).

Russell's revised model is represented by a circumflex (i.e., a circular ordering or pattern of environmental evaluations) consisting of polarized emotional dimensions: arousing–not arousing and pleasurable–not pleasurable. Using this model, an observer can

Figure 2.4 When a person has a goal, but there are many obstacles or impediments to attaining that goal he or she will first become aggressive, then frustrated.

POINT OF VIEW 2.2

THE FRUSTRATION-AGGRESSION MODEL: AN AIRPORT PERSPECTIVE

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From check-in with the airline to arrival at the final destination, airports can be a source of frustration and aggression for many travelers. Long lines, unfriendly technology, poor signage, inconvenient services, and personal travel anxiety influence the airport experience. Stress levels generally crescendo at the airport for many but can last long after travel if they have a negative experience (Harrison, 2015). Check-in can be the first source of anger with long queues and minimal signage. Passengers with different needs, from simple boarding pass printing to complicated seat reassignment or baggage checks, should have different queue options to address their issues but also their technology savvy, by using self-service kiosks and mobile apps to reduce wait times and anxiety. Many passengers who do not show anger toward individuals who cut in line often take it out on the person directly behind the violator or the agent behind the counter (Minton, 2008). An increase in travel security brings more anxiety as passengers proceed toward their gates. Waiting in security lines makes travelers uncomfortable while also testing bounds of personal space. People have the sense that another line is moving faster than the one they are in (Maister, 1985). To reduce stress, different lines should be discernable, wait times displayed, and a re-composure zone should immediately follow screening. Airport services can also lead to frustration and anxiety. Chung et al. (2013) explain that passengers in the airport are a "captured audience." This phenomenon itself can lead to stress. Designers must remember to allot enough space to support services with clear signage and quick access so passengers with minimal time may get what they need in a stress-free manner (Harrison, 2015; Walsh, 2010). Passenger stress levels are often highest until they reach their boarding gates (Walsh, 2010). Passengers need a variety of comfortable seating options, entertainment with TVs, and places to plug in their electronic devices. Lack of access to these amenities can lead to higher levels of frustration. Following the flight, the baggage claim can influence the behavior of passengers toward one another, especially in crowded spaces, and tests personal space boundaries. Good airport design can mitigate each of these issues by providing environments that are relaxing and convenient, two things passengers require in order to keep their frustration and aggression at bay.

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evaluate an environment by plotting its characteristics along each of the continuums.

Variables that affect a person's response to these dimensions include, but are not limited to, environmental factors (light, temperature, and objects or cues) and individual personality characteristics (introvert–extrovert and internal–external locus of control). The interaction of environmental and personal variables manifests in emotions, which affect work performance, interpersonal relations, and other behaviors.

The studies of Russell, Mehrabian, and others indicate that the emotional impact of an environment is systematically related to behavior in it. Because the opposite of dominance is vulnerability (which leads to uncertainty), the original pleasure–arousal–dominance hypothesis is wholly applicable to environmental design because people need to feel they have at least some measure of control over their circumstances (Russell, Ward, & Pratt, 1981). Meeting all three emotional needs will result in user or consumer satisfaction, particularly within the retail, service, and hospitality industries.

The biophilia, frustration-aggression, and pleasure-arousal-dominance hypotheses contribute much to research by testing veracity and applicability within a multitude of different settings as they pertain to different scenarios over extended periods of time. This need and ability is measured against variables such as time, place, and culture. A hypothesis may be proven or disproven over time. By contrast, a theory often remains to be tested and modified for decades or centuries.

THEORIES

Many of the theories found within social sciences are based on phenomenology. When we study the elements and variables of an experience or a way of thinking we are looking at a phenomena. Hence, phenomenology can be understood as the study of things as they appear in our experience or the ways we experience things.

A theory is an explanation for some given situation or phenomena. It might be supported, rejected, or modified by the evidence presented in new research. Some of the more utilized theories used within human–environment research include:

- integration (also called integral)
- stimulation
- control
- behavior-setting

Integration theory maintains that a combination of design features will influence people to behave and act in the most appropriate manners. **Stimulation theory**, by some accounts, has the broadest and most diverse implications related to environments. Consider the stimulation needs of a casino versus a surgical recovery ward. A casino benefits from maximized environmental stimulation, whereas a surgical recovery ward ideally reduces stimulation and encourages calm. Stimulation theory overlaps with **Environmental Load Theory**, which states that humans have a limited ability to handle environmental stimuli (Choi, van Merriënboer & Paas, 2014).

Most built environments have controls, but some have more than others; for example prisons. Designs that support behavior settings also establish **behavioral controls**, such as automatically refraining from potentially disturbing behaviors in a library. The way humans behave in environments also depends on social controls, as described by social learning theories, which contend that we learn socially acceptable actions and behaviors by observing others.

Social Learning Theories

Social or **observational learning** theories differ from human–environment theories because they declare that we learn first by observing others and then by reproducing those actions. Social learning theory emphasizes the following three precepts (Rotter, 1982; Rotter, Chance, & Phares, 1972):

1. People are intrinsically motivated to seek reinforcement, such as positive stimulation, and avoid unpleasant stimulation.

2. Personality represents an interaction of the individual with the environment (for example, the stimuli that a person is aware of and responds to) and is a relatively stable framework for responding to situations in a particular way.
3. To understand behavior, we must first consider an individual's life history and learning experiences as well as the environment because our subjective interpretation of the environment determines our behavior.

Albert Bandura, a proponent of social learning theory (Bandura, 1977, 1986), agreed that personality is an interaction between environment, behavior, and psychological processes—and that environment and behavior affect each other. This concept is called **reciprocal determinism**. However, Bandura's theory also stressed the importance of observational learning or modeling as a primary means of obtaining reinforcement. This is because humans generally observe, process, and imitate the behaviors, attitudes, and emotional reactions of other people to gain approval, acceptance, or reward. **Behavior modeling** is intrinsic to all behavior settings (physical or psychological environments) that elicit or support certain patterns of behavior based on the environmental design and learned through operant conditioning. Operant conditioning is the social process that teaches and reinforces acceptable/desirable behaviors. Behavior modeling is fundamental to child development, widely used in training programs, and crucial to the success of commercial advertising. Consider the influence of promoting ideas such as, "If I buy that car, then I will be popular too." Behavior modeling can also encourage damaging behavior. When society accepts deviant behaviors, for example identifying graffiti as a form of art (see Figure 2.5), it sends a message that modeling deviant behavior is acceptable.

Figure 2.5 Some argue that the inclusion of graffiti art in schools is a bad form of behavior modeling because graffiti art communicates that all forms of graffiti are acceptable.

Integration (Integral) Theories

Robert Gifford uses the term **integral theories** to describe a group of models used to understand the complexity of the human–environment relationship (Gifford, 2014). Isidor Chein first described the five major elements of the integral framework in 1954:

1. **Global environment**. Generalized characteristics of an environment.
2. **Instigators.** Stimuli that trigger particular behaviors.
3. **Goal objects and noxients**. Situations that cause satisfaction or produce unpleasantness.
4. **Supports and constraints**. Environmental aspects that facilitate or restrict.
5. **Directors.** Features that tell us where to go and what to do.

Understanding an environment in this context allows for greater understanding of individual behaviors (Gifford, 2014).

Other forms of integration theory include interactional, transactional, and organismic theories. The **interactional theory**, the simplest form of integration theory, declares that people and the environment are separate entities constantly interacting (Gifford, 2014). It is based on the philosophical notion that circumstances have an absolute causal relationship to events, also known as **deterministic theory**. Many people subscribe to a system of **separatism** that presupposes one entity must dominate another. One example of interactional theory at work is the story of the vacant city-owned lot (see Figure 2.6). For the city a vacant lot represents lost revenue, so the obvious solution would be an infill project. However, the lot was also a significant play area for neighborhood children, and the infill project forced them to play elsewhere, either on the streets or in front of businesses. That vacant lot represented much more than the single "lost revenue" identifier. It had meaning and specific community purpose.

This idea leads to **transactional theory** that contends the human–environment relationship is mutually supportive. In the story of the vacant lot, a transactional approach would look at the benefits of the lot as a means of supporting the community by providing space for kids. Transactional theory focuses on relationship patterns and supports the idea that environments affect users just as users affect environments.

The **organismic theory** (Wapner, 1981) takes the whole human–environment relationship a step further by looking at how the social, societal, and individual characteristics intertwine with the environment in a complex symbiosis. The organismic theory recognizes multiple contributing factors (e.g., experiences on a given day, current health, state of mind, and mood or disposition of others), which combine with the environment to induce a particular behavior. If we again consider the vacant lot, we can identify many positive and negative attributes that may manifest differently depending on other factors. Community constituency, specific location, and time of year are three examples. It is important to note that design can influence environmental behaviors. To illustrate: A person's recycling behavior can be influenced by the convenient presence of recycling bins, but the bins themselves cannot address the motivation to recycle.

Figure 2.6 In a simple interactional relationship, one might deduce that a vacant lot equals lost tax revenue. In a transactional relationship, the vacant lot may give back to the city by way of providing a place for children to engage in constructive play.

Control Theories

Having a sense of control over our world and our place in it is crucial to our well-being. Some forms of control involve one person's control over another, such as schools or hospitals. Another form is control of our environment, such as interior home design. In some situations, people control other people's ability to control their environment. An example is when a supervisor forbids an employee to change the temperature in the workspace, or a hospital staff member determines who can enter a patient's room and for how long. In these examples, the employee or patient may feel disempowered because of a lack of social or environmental control. James Averil (1973) has suggested we have three types of control over our environments:

1. **Behavioral control** is the ability to change the environmental event.
2. **Cognitive control** is the ability to change the way in which we think about an environment.
3. **Decisional control** is the ability to choose a response.

There is also primary and secondary control. Primary control is overt while secondary control allows for more accommodation to the reality of a given situation (Weisz, Rothbaum, & Blackburn, 1984). If an individual were too warm at work, a primary control response would be to reduce the ambient temperature by adjusting the HVAC controls (heating, ventilation, and air conditioning). If this is not a viable option, the individual could opt for a secondary control response by removing clothing. However, many examples, including this one, are complicated by social controls. In the United States, current and prevailing sexual discrimination with regard to corporate dress codes preclude secondary control options for many men. Unlike women, men are typically not allowed to wear sleeveless shirts, expose their bare legs, or wear open toed shoes (sandals). The solution for designers is to afford as many primary controls for building occupants as possible. Individual workstation temperature controls not only save on energy consumption but also allow each employee a level of personal control over thermal comfort and spatial air quality.

Personal environmental control relates to both our freedom of action and the level and type of stimulation to which we are subjected. Moreover, our actual or perceived influence or control directly affects our feelings within and about our environments. Most people have the ability to adapt to various levels of stimulation, have more control in certain settings than others (e.g., at home as opposed to at work), and attempt to establish personal control using the psychological mechanisms of personal space and territoriality (Altman, 1975). When this ability is compromised, for example, we feel or even anticipate that our freedom may be constrained, we respond by attempting to reassert control. This phenomenon is referred to as **psychological reactance** (Brehm, 1966). However, when people believe they cannot control distressing factors within their environments, or experience repeated failed efforts to establish or regain control, they may create physical or psychological barriers (i.e., engage in social withdrawal behaviors) and eventually give up, succumbing to **learned helplessness** (Seligman, 1992). Learned helplessness results in situations where there is no possibility of escape from harm or pain. Individuals may conclude there is no point in trying to improve the situation and, instead, succumb to fatalism and resignation. This is a common problem for senior citizens and people with disabilities, as outlined in Chapters 10 and 11.

Behavior-Setting Theories

Some behaviors are considered appropriate in certain environments but not in others. While it is socially acceptable to dress and act provocatively at a nightclub, we have very different expectations in a place of worship. Roger Barker conceived of the **behavior-setting theory** in 1968, defined as public places or occasions that evoke particular behavioral patterns (see Figure 2.7). The theory proposes that behavior must be studied in its natural context. These behavior settings are small-scale social systems composed of people and physical objects arranged in such a way as to carry out routine actions within a specified time and place. Examples include spaces such as schools, theaters, and nightclubs, as well as occasions such as graduations, weddings, and funerals. Through operant conditioning (the use of consequences to modify the occurrence and form of behavior), we learn at an early age the behaviors expected of us within various environments and act accordingly.

Thus, we can say that certain environments bring about specific behaviors. An important viewpoint within the behavior-setting theory is **synomorphy.** This is the principle that physical and social aspects of an environment should fit together (Gifford, 2014). However, behavior settings are impermanent and evolve according to the supports and constraints of

Figure 2.7 We get used to certain levels of stimulation. Hence, when those levels change we begin to take notice. Some museums will use different colors to display artwork as a means to renew a visitor's attention.

society over time (Wicker, 1987). For example, the Soviet regime in Russia (1922–1991) opposed the practice of religion and converted many ancient churches to bathhouses, gymnasiums, and warehouses. However, activities associated with bathhouses and gymnasiums are contrary to those associated with churches. Thus, the buildings and activities lacked synomorphy.

Most behavior settings are public environments that contain the following three components:

- Physical properties
- Social components
- Environmental settings

A novice designer attempting to develop a behavior setting through design alone would be fulfilling only one of Barker's criteria if they failed to consider the social components or environmental setting. In this case, the designer would be engaging in a concept known as **architectural determinism** (Pop, 2014), which is a direct and absolute relationship between the designed environment and a particular behavior. Many academicians do not subscribe to architectural determinism, which taken to the extreme contends it is the environment alone that causes behavior. However certain environmental design components do serve as learned-behavior cues. For example, a picture of a holy icon may or may not signify a holy site, but the picture commands respect from those who worship that icon. It should be noted that many social workers and public health agencies operate on the premise of **social/educational** determinism, meaning that social services and/or education can have a direct effect on behavior. This ideology is valid yet equally flawed.

Neurobiological research may one day firmly establish architectural determinism as the cause of specific behaviors. For example, casinos, cruise ships, and disorderly neighborhoods are environments which bombard our senses with environmental stimuli, prompting our natural human desire to minimize stimulation. If we do so by ingesting a neurological depressant such as alcohol, has the environment created a situation that promotes alcoholism? Research shows that behaviors can indeed be activated by environmental cues without conscious thought (Hongxia et al., 2015). The behavior manifested is often unconscious, and the person is unaware of the potential influence of the stimulus in shaping behavior (Bargh, 2014). Because people differ in their everyday motivations, differences arise over time in the same way that unconscious behaviors manifest. More research is needed to assess the ethical implications of developing environments that elicit or instigate certain behaviors.

Stimulation Theories

Every living thing on earth reacts to sensory stimulation. **Stimulation theories** serve to conceptualize and explain the environment as a source of sensory information derived from sight, sound, touch, taste, and smell (Wohlwill, 1966). A chocolate factory line worker may call upon each of the five senses in relation to the production of chocolate candy. Surrounded by sounds of machinery, chocolaty smells, the feel of individual candies, and the taste of an occasional morsel (for quality control purposes, of course), they would experience an assortment of stimuli affecting all five senses. However, unlike a chocolate factory, most environments stimulate only sight, sound, and smell. Examining the sensory information within an

environment enables us to assess stimulation levels (see Chapter 6).

Each of our five senses can be overstimulated (hyperstimulated) or understimulated (hypostimulated). An important concept to understand is that of **threshold**, the point at which too much or too little stimulation is available. At one end of the threshold spectrum is the absolute minimal intensity of stimulus we can perceive and at the other is the maximum amount of stimulation we can cope with effectively. When accustomed to a certain level of stimuli, we do not consciously notice it until it changes. Our level of perception often dictates the degree of change required for stimulation to be noticeable.

The **Weber-Fechner Law** states that when we become familiar with a certain level of stimuli, we need increased intensity in order to notice change (Takahashi et al. 2011). This concept is useful for designers who wish users to pay attention to something important. By decreasing the level of stimulation associated with other scenes involved in an experience, attention can be directed to the more stimulating and captivating scene. For example, if a designer seeks to draw attention to a particular museum exhibit they may use neutral tones for all displays except the important one, which may utilize deeply saturated colors. According to the Weber-Fechner Law the contrasting color values will cause visitors to notice the display. Chapter 8 addresses color and design.

Another related theory that serves to explain the relationship between the environment and behavior is **Arousal Theory**. This theory states that the environment itself causes automatic physiological responses such as increased heart rate, blood pressure, respiration, adrenaline secretion, and neural activity. In this way, architectural determinism does play a role in environmental design. Arousal has been described as being somewhere along a continuum between sleep and excitement (Berlyne, 1960). In the cliché, "It sparked my curiosity/imagination/interest)," the "spark" is arousal, which prompts the person to pursue the next step and satisfy that curiosity. The level of arousal we experience is often directly correlated to the level of stimulation provided by the environment. An excited child is over aroused, while a bored child is under aroused. Optimum arousal is an important factor in successful learning and productivity, whereas over arousal can lead to cognitive chaos ("I have so

Figure 2.8 a and b Buildings of the past were based on craftsmanship and art. Today they are based on technology and geometry.

many ideas flooding my head that I don't know where to start"), under arousal can lead to inaction ("My mind is blank, and I don't know where to start") or even apathy ("I can't think, and I don't care"). Simply stated, arousal is a component of the human psyche and is dependent on stimulation. Design cannot affect arousal directly, but it can serve to modify the stimulation levels that affect arousal.

The terms 'overstimulation' and 'environmental load' are often used interchangeably. Both assume that humans have a limited ability to process incoming information and experiencing too much information can lead to overload (Blair, 2010). However, just as we can be over stimulated, we can also be under stimulated. Anxiety, depression, and other psychological problems can occur when individuals are deprived of sensory stimuli (Grassian, 2006). Although there is much controversy about the effects of under stimulation, studies suggest a negative connection between under stimulation and child development (Sapolsky, 1997; Carlson & Earls, 1997). A key factor to understanding the effects of stimulation is whether stimulation is desired. A bored child is more likely to act out, and if the stimulation produced is pleasant, it may add to memorization skills. Sensory stimulation is a complex web of positive and negative interactions that aggregate to form environmental load (see Chapter 6). This is why it is important for designers to be knowledgeable about the greater environment in relation to lesser ones.

Adaptation level theory states that as a person becomes accustomed to a variable within an environment, its influence reduces. The survival mechanism of the human psyche can adapt to a wide variety of stimulation levels, but there are both positive and negative implications. An individual with an optimal high stimulation level will experience the negative effects of under stimulation when thrust into an environment with average stimulation levels. The same is true of the reverse. To illustrate this point, think of two business executives, one from New York City and the other from Prescott, Arizona. Both have relocated to Los Angeles and are experiencing the negative effects of stress, but for different reasons. The former New Yorker desires more intensity, which is why the "laid-back" environment of Los Angeles becomes a source of stress. However, the Prescott native is used to a more conservative style and slower pace of life and the seemingly fast pace of life in Los Angeles is a source of stress. Although these people experienced stress related to over and under stimulation differently, the adaptation level theory states that over time both will adapt to the stimulation level of their new environment.

The adaptation level theory can be applied to preferences in design styles. Imagine the reaction of Catherine the Great of Russia if she were to find herself in a Frank Lloyd Wright home. How would she perceive the design? Considering the opulent display of wealth and artistry in her royal estates, the Hermitage and Summer Palace, she would probably view Wright's clean lines and blending of design materials with the environment as boring and mundane. However, in time she might adapt to a different way of thinking and eventually change her thoughts. Hence design styles based on the technology of the day have a tremendous effect on judgments (see Figure 2.8 a and b). Unfortunately, many contemporary designers devalue the ornate and decadent design styles of the 1800's as gaudy. Such value-laden judgments are a severe weakness in design.

Attention Restoration Theory

Attention restoration theory, developed by Rachel and Stephen Kaplan is based on voluntary and involuntary attention (Gifford, 2014). It maintains that situations requiring mental effort cause us to engage in **directed attention** (voluntary, intention- or goal-based attention), which requires more exertion over time. Like overworked muscles, directed attention can fail, causing **attentional deficit**, or an inability to concentrate (i.e., we need more time and energy to understand, retain, and recall information). Recovery requires rest. However, excessive attentional fatigue may require more than just good sleep. A periodic episode of involuntary **effortless attention**, such as a walk in the woods or along the beach, serves as a powerful and effective means for restoring attention

Figure 2.9 Human strive for balance. Hence a person working in a chaotic environment will likely prefer a more austere home.

Figure 2.10 In this hotel floor plan we can see that hallways serve as the paths, the edges are the walls, and the districts are the various conference rooms with the nodes being the restrooms and workspaces. The landmarks are the reception area and lounge because they are easily identifiable and a point to travel to and from.

capacity. The word effortless is crucial. Navigating a crowded beach to avoid hazards in the sand and surf requires directed attention. When we need physical, psychological, and energy restoration. We are drawn to nature and the presence of nature in our environment has a profound effect on reducing levels of stress, thereby helping to restore attentional capacity (Ulrich, 1979, 1984, 1986, 1987; Ulrich et al., 1991; Louv, 2011). The benefits of natural environments are discussed in Chapter 13. The attention restoration theory asserts that **restorative experiences** occur in settings where we can function primarily in the involuntary mode, by observing or surrounding ourselves with involuntary interesting stimuli.

The three aspects of stimulation theories—arousal, environmental load, and adaptation—interact dynamically. Consider a man who has spent his whole life in a high-stimulus environment. He has adapted to a high level of stimulation, and likely finds it arousing and pleasurable. It would therefore take a great deal of stimulation to overload him; however, he also would be very susceptible to stress from under stimulation. Understanding how stimulation affects each individual and the source of that stimulation is important for design professionals. One could hypothesize that a person who is overstimulated in the workplace might desire a home with little or low environmental stimuli (see Figures 2.9 and 2.10) and a person who thrives on stimulation would want a high-stimulus home as an adjunct to their high-stimulus career. By the same logic, people who are under stimulated at work may want higher stimulation levels in their homes. There are differing aspects of stimulation that affect the design process. By understanding these fundamental

SUSTAINABILITY CONNECTION 2.1

Although many people associate the health issues of our planet with objects and human artifacts (e.g., industrial waste, trash, toxic chemicals, burning fossil fuels), the primary causes can be attributed to ***human behavior*** (Koger & Scott, 2007) and ***motive***. For example, people are motivated by the personal benefits they receive through excessive use of resources, and so behave gluttonously, lacking interest in resource conservation. Psychologists and environmental scientists can take a more proactive approach to the education of the next generation and reduction of negative impacts related to environmentally dangerous human motives and behaviors.

psychological processes and their behavioral outcomes, designers can enhance the environment.

Theories of Environmental Perception

The human–environment experience is complex and important. Researchers have attempted to explain the relationship from various viewpoints to better comprehend how individuals perceive their environments.

Brunswik's Probabilistic Lens Model

Egon Brunswik is among a group of researchers termed **functionalists** (Bell et al., 2001) who theorized that environments contain abundant cues and people must make sense of the important cues in order to function effectively. Brunswik's probabilistic lens model (1943, 1956) considers the human–environment relationship holistically and can be used to analyze subjective interpretations of an environment's beauty or usefulness. His theoretical framework likens the process of perception to a lens through which stimuli are perceived. However, environmental cues have only a certain probability of being useful. This concept is called **probabilism**. The probabilistic lens model uses sets of predetermined objective criteria that lead to actual beauty and a different set of subjective (judgment-based) criteria that lead to perceived beauty.

Brunswik's theory differentiates between distal cues, which are characteristics of the setting, and proximal cues, which are the observer's subjective impressions. It relies on the concept of ecological validity, that is, the relationship between an environment and its cues that leads to an accurate perception of the environment. Because our understanding of an environment is affected by our perception of and familiarity with its individual components, Brunswik suggests problems arise when we encounter environments containing components or patterns unfamiliar to us. In these environments, we may come to incorrect conclusions such as size, height, color, or angle.

The lens model further suggests that observers infer personality judgments about occupants based on environmental cues. The accuracy of those judgments is based on **cue validity**—whether the cue provides good information—and **cue utilization**—how the observer weights the cues (Gosling, Ko, Mannarelli, and Morris, 2002). How would you characterize a person who prefers a pink sitting room with scented flowers on the coffee table? For most of us, pink suggests an environment with strong feminine characteristics. However, depending on the cue validity and cue utilization, that conclusion may be incorrect. The room may in fact belong to a man who, secure with his sexuality, rejects stereotypical norms related to gender. If that is the case, does the man truly prefer pink perfumed flowers or are his choices a statement that ascribing gender assignment and sexual orientation based on color, objects, and smell are just plain dumb?

Gibson's Affordances

James J. Gibson's **affordance** is a viewpoint that takes an ecological approach to perception. Affordance suggests that rather than perceiving individual features within an environment, we organize them into recognizable patterns based on the arrangements of cues that provide immediate perceptual information (Gibson, 1976, 1979). Gibson further suggests that humans (among other organisms) actively explore their environments and perceive objects in a variety of ways. As such, we experience different objects differently; the functional properties of those objects as they are encountered are termed affordances. In Gibson's theory, the world is composed of substances, surfaces, and textures, the arrangement of which provides cognitive affordances, or instantly recognizable functions, of environmental features.

In contrast to Brunswik, Gibson believes that rather than perceiving individual features or cues, humans respond to an ecologically structured environment. We do this by examining environments for those components that are useful or meaningful to us. For example, a flower garden may afford a quiet place to meditate,

a source for freshly cut flowers, a place to work, and a home and food source for many insects. Many architects and designers strive to create environments that afford more than just shelter. They attempt to develop environments that suit the unique needs of individuals while considering issues of sustainability, conservation, and culture (neighborhood support and community connections).

Although many design elements have instantly recognizable functions, some are so similar that cognitive processes (recalling what has been learned or is known) are necessary to make sense of them (Kaplan and Kaplan, 1982a). For example, a tired child visiting a museum with their father may sit on an antique chair, perceiving it as a good surface for sitting and resting. According to Gibson's affordances the child is correct, but the father knows from the chair's appearance and placement that it is not intended for use. The child, not yet properly socialized to understand this environmental cue, does not make the same cognitive connection.

BERLYNE'S COLLATIVE PROPERTIES

Daniel Berlyne was one of the first psychologists to develop a model of aesthetics. His theory of Collative Properties states that we respond to aesthetics based on systematic comparison of properties such as novelty, complexity, incongruity, and surprise, which elicit perceptual conflict with other present or past stimuli (Berlyne, 1971, 1974).

- **Novelty** refers to anything new, such as innovative ideas, or materials used in different ways. For example, a few years ago in South America I saw glass bottles utilized as building blocks to form a physical structure.
- **Incongruity** refers to design features that seem out of place or context. Designers sometimes violate neighborhood congruity by incorporating modern buildings into neighborhoods dominated by early twentieth-century styles. Incongruity is perceived negatively, while novelty is perceived positively.
- **Complexity** refers to the variety of items in an environment. For example, many old world designs are extremely complex compared to the simpler designs of today.
- **Surprise** refers to the unexpected. For example, a home built around a large tree or a bathtub situated in a living room.

From the viewpoint of this author, Berlyne's collative properties provide a great framework for creative scholarship because they create perceptual conflict. How we resolve that conflict results in an aesthetic evaluation.

Berlyne believed the above properties influence the perceiver's aesthetic judgments by following two psychological dimensions:

CULTURAL CONNECTION 2.1

With easier travel, our world is seemingly getting smaller. People around the globe can now visit places their ancestors never could. However, while distance is no longer a deterrent, verbal and visual language can still create separation. Designers can help reduce language barriers by adding environmental cues. For instance, sometimes there is an interactive element that begs to be engaged with, but is forbidden. To help deter people from engaging with that element it can be separated from another element that can be interacted with through the use of color or soft barriers such as ropes.