

Edited by **Linda Steg** and **Judith I. M. de Groot**

# ENVIRONMENTAL PSYCHOLOGY

An Introduction

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# **Environmental Psychology**

## **An Introduction**

Second Edition

**Edited by**  
**LINDA STEG**  
**and**  
**JUDITH I. M. DE GROOT**

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# 1 Environmental Psychology: History, Scope, and Methods

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## 1.1 INTRODUCTION

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This book aims to give an introduction in environmental psychology. We define **environmental psychology** as the discipline that studies the interplay between individuals and the built and natural environment. This means that environmental psychology examines the influence of the environment on human experiences, behaviour, and well-being, as well as the influence of individuals on the environment, that is, factors influencing environmental behaviour, and ways to encourage pro-environmental behaviour. This second edition of the book gives a state-of-the-art overview of theories and research on each of these topics.

In this introductory chapter we first give a brief overview of the history of the field of environmental psychology, followed by a discussion of characteristics of the field and a description of the main methods used in research. The chapter ends with an outline and rationale of the book.

## 1.2 HISTORY OF THE FIELD

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Environmental psychology has been recognized as a field of psychology since the late 1960s and is therefore a relatively ‘new’ field in psychology (Altman 1975; Proshansky et al. 1976; Stokols 1977, 1978). Hellpach was one of the first scholars who introduced the term ‘environmental psychology’ in the first half of the twentieth century (Pol 2006). Hellpach (1911) studied the impact of different environmental stimuli, such as colour and form, the sun and the moon, and extreme environments, on human activities. In his later work, he also studied urban phenomena, such as crowding and overstimulation, and distinguished different types of environments in his work, including natural, social, and historical-cultural environments (Pol 2006). Although the topics of Hellpach are typical of the field of environmental psychology as it has been practised from the 1960s onwards, it was still too early to speak of an independent field of systematic research into human–environment interactions.

Brunswik (1903–1955) and Lewin (1890–1947) are generally regarded as the ‘founding fathers’ of environmental psychology (Gifford 2007). Neither of these scholars had significant empirical work that we would classify today as environmental psychology. However, their ideas, such as the interaction between physical environment and psychological processes and studying human behaviours in real-life settings instead of artificial environments, were influential for many later studies on human–environment interactions (see Box 1.1).



## BOX 1.1 FOUNDING FATHERS OF ENVIRONMENTAL PSYCHOLOGY

Egon Brunswik (1903–1955) was one of the first psychologists who argued psychology should give as much attention to the properties of the organism's environment as it does to the organism itself. He believed that the physical environment affects psychological processes outside people's awareness. He strongly advocated research that includes all aspects of the environment of the person we are trying to understand rather than the fragmented and artificial environments that were more typical in psychological studies of the day.

Kurt Lewin (1890–1947) similarly argued that research should be driven by real-world social problems. He introduced the term 'social action research' including a non-reductionist,

problem-focused approach that applies theories in practice and thereby emphasizes the importance of discovering ways to conduct research to solve social problems (Benjamin 2007). Moreover, like Brunswik, Lewin conceptualized the environment as a key determinant of behaviour. He argued that behaviour is a function of the person and the environment (Lewin 1951). Lewin mostly focused on the social or interpersonal influences instead of the physical environment (Wohlwill 1970), but he inspired different students to continue and expand on his ideas. These students included Barker and Bronfenbrenner, who are both seen as forerunners of environmental psychology.

### 1.2.1 Towards 'Architectural' Psychology

Around the late 1940s and 1950s, systematic research in everyday physical settings and psychological processes slowly increased with some pioneering studies on, for example, human factors in work performance (Mayo 1933), the lighting of homes (Chapman and Thomas 1944), and child behaviours in natural settings (Barker and Wright 1955). So, it was not until the late 1950s and early 1960s that human-environment interactions slowly received recognition as a full discipline. As most of the studies focused on how different environments influence people's perceptions and behaviours, they were labelled as studies in 'Architectural Psychology' to show the distinction from the more traditional forms of psychology (Canter 1970; Pol 2007; Winkel et al. 2009).

In this early period of the field of environmental psychology, much attention was given to the built physical environment (i.e. architecture, technology, and engineering) and how it affected human behaviour and well-being (Bonnes and Bonaiuto 2002). This focus on the built environment was largely guided by the political and social context of the time. Modern architecture tried to respond to post-war challenges (Pol 2006), such as decent housing. Questions like how homes, offices, or hospitals could best be built for their potential users and how environmental stressors (e.g. extreme temperatures, humidity, crowding) would affect human performance and well-being were the focus of many environmental psychological studies (Wohlwill 1970). Environmental psychology as a study to design buildings that would facilitate behavioural functions was officially born.

### 1.2.2 *Towards a Green Psychology*

The second period of rapid growth in environmental psychology started during the late 1960s when people increasingly became aware of environmental problems. This resulted in studies on **sustainability** issues, that is, studies on explaining and changing environmental behaviour to create a healthy and sustainable environment. The first studies in this area focused on air pollution (De Groot 1967; Lindvall 1970), urban noise (Griffiths and Langdon 1968), and the appraisal of environmental quality (Appleyard and Craik 1974; Craik and McKechnie 1974). From the 1970s onwards the topics further widened to include issues of energy supply and demand (Zube et al. 1975) and risk perceptions and risk assessment associated with (energy) technologies (Fischhoff et al. 1978). In the 1980s the first studies were conducted that focused on efforts promoting conservation behaviour, such as relationships between consumer attitudes and behaviour (Cone and Hayes 1980; Stern and Gardner 1981).

## 1.3 CURRENT SCOPE AND CHARACTERISTICS OF THE FIELD

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From the beginning of the twenty-first century, it has become evident that environmental problems such as climate change, pollution, and deforestation are major challenges threatening the health, economic prospects, and food and water supply of people across the world (IPCC 2013). It is also generally recognized that human behaviour is one of the main causes of these environmental problems. A continuing and growing concern of environmental psychology is to find ways to change people's behaviour to reverse environmental problems, while at the same time preserving human well-being and quality-of-life. To this end, a broad concept of sustainability, which encompasses environmental as well as social and economic aspects, has been widely adopted (World Commission on Environment and Development 1987). This broad concept of sustainability has increasingly become a central guiding and unifying principle for research in environmental psychology (Giuliani and Scopelliti 2009). Indeed, it has been suggested that, over the past decades, the field of environmental psychology has gradually evolved into a 'psychology of sustainability' (Gifford 2007).

Below, we discuss four key features of environmental psychology that characterize the field as it stands today: a focus on human–environment interactions, an interdisciplinary approach, an applied focus, and a diversity of methods.

### 1.3.1 *Interactive Approach*

As the definition of environmental psychology already indicates, environmental psychology is primarily interested in the interaction between humans and the built and natural environment; it also explicitly considers how the environment

influences behaviour as well as which factors affect behaviour that can help improve environmental quality. For example, environmental conditions such as the presence of nature in the environment of childhood may influence people's connectedness to nature and willingness to support nature conservation measures. In turn, people's support for nature conservation measures may influence environmental conditions such as biodiversity. As another example, the available infrastructure for public and private transport may influence the level of car use, while in turn, the level of car use may influence the seriousness of environmental problems such as air pollution and global warming. So humans and the environment are related in a reciprocal, dynamic way.

The reciprocal relationship between humans and the environment serves as a starting point for the structure of this book. Part I discusses the negative as well as positive influences of environmental conditions on humans, with a focus on environmental impacts on human health and well-being. Part II discusses factors that influence human behaviour that affect environmental quality, with a focus on pro-environmental behaviour. Part III discusses which factors affect the outcomes and acceptability of strategies to encourage pro-environmental behaviour for creating sustainable environments.

### **1.3.2 *Interdisciplinary Collaboration***

Many environmental psychologists work in interdisciplinary settings, and closely collaborate with scholars from other disciplines. Each discipline provides a different view on the phenomenon under study, while in combination, they provide a comprehensive picture on the problem in question. As outlined in the historical overview, interdisciplinary collaboration has mostly occurred in three domains. First, environmental psychology has always worked closely with the disciplines of architecture and geography to ensure a correct representation of the physical-spatial components of human–environment relationships (see Part I of this book). Second, theoretical and methodological development in environmental psychology has been influenced strongly by social and cognitive psychology (see Part II of this book). Third, when studying and encouraging pro-environmental behaviour (see Part III of this book), environmental psychologists have collaborated with environmental scientists, among others, to correctly assess the environmental impact of different behaviours.

### **1.3.3 *Problem-Focused Approach***

Environmental psychologists do not conduct studies merely out of scientific curiosity about some phenomenon, but also to try to contribute towards solving real-life problems. This does not mean that environmental psychologists are not interested in theories. As evidenced in this book, a great deal of attention is paid to building and testing theories in order to understand, explain, and predict human–environment interactions. However, an important aim of theory development in environmental psychology lies in identifying the most effective solutions to real-life problems.

Environmental psychology studies human–environment interactions at different scale levels, from domestic surroundings and the neighbourhood to cities, nature reserves and countries, and even the planet as a whole. The problems and associated solutions that are studied vary across these levels. For example, at the local level, problems like littering and solutions like recycling may be a focus of research. At regional and national levels, problems like species loss and solutions like ecological restoration can be studied. At the global level, problems like climate change and solutions like the adoption of new technologies to combat climate change are of interest. Environmental psychology is concerned with problems at all scales, from local to global.

### 1.3.4 Diversity of Methods

Environmental psychology largely uses the same **quantitative** and **qualitative methods** as other psychological disciplines. However, whereas other psychological disciplines often have one dominant research paradigm, environmental psychology is characterized by the use of a wide diversity of methods (see Section 1.4 for an overview). Each research method has its strengths and weaknesses (see Table 1.1). Choosing a method typically involves a trade-off between **internal** and **external validity**. Internal validity reflects the extent to which cause–effect relationships can be established. External validity reflects the extent to which the results of a study can be generalized to other populations or settings. Low external validity of a finding may be problematic if the goal is designing an intervention to solve a specific applied problem. However, it may be less relevant if the purpose of the research is testing theory because in this case the main concern is to achieve a high internal validity. Ideally, environmental psychologists try to replicate the findings of the same phenomenon using different research designs. In this way, weaknesses of one research design may be compensated by the strengths of another, thereby optimizing internal and external validity.

## 1.4 MAIN RESEARCH METHODS IN ENVIRONMENTAL PSYCHOLOGY

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The main research methods used in environmental research include questionnaire studies, laboratory experiments, simulation studies, field studies, and case studies. Below we briefly discuss each of these methods. We first discuss methods that can be used independent of specific environmental settings, followed by methods employed in artificial settings. Finally, we discuss methods that are employed in real settings. The main strengths and weaknesses of each method are summarized in Table 1.1.

**Table 1.1** *Summary of main research methods in environmental psychology.*

| <b>Setting</b>                  | <b>Method</b>          | <b>Strengths</b>   | <b>Weaknesses</b>   | <b>Use</b>   |
|---------------------------------|------------------------|--|---|--|
| Environment independent setting | Questionnaire studies  | High external validity<br>Cost-effective method for reaching large populations | No manipulation of variables<br>Hard to make causal inferences            | Describing perceptions, beliefs, and behaviour<br>Studying relationships among variables |
| Artificial setting              | Laboratory experiments | High internal validity<br>Control of variables                                 | Low external validity<br>Artificiality                                    | Testing theories or hypotheses<br>Identifying causal relationships                       |
|                                 | Simulation studies     | Good balance between external/internal validity<br>Realistic visualization     | Requires advanced skills and equipment<br>Often perceived as 'fictitious' | Study complex human–environment dynamics<br>Visualize and evaluate future developments   |
|                                 | Field studies          | Good balance between external/internal validity<br>Replicable                  | Limited experimental control<br>Time-consuming data collection            | Studying current behaviour<br>Evaluating interventions                                   |
| Real setting                    | Case studies           | High external validity<br>Rich data  | Low internal validity<br>Time demanding<br>Limited generalizability       | Descriptions<br>Explorations<br>Developing hypotheses                                    |

### 1.4.1 Questionnaire Studies

Questionnaire studies aim to describe behaviours and to gather people's perceptions, opinions, attitudes, and beliefs about different issues. They are also widely used to establish relationships between two or more variables. For example, by asking people how often they engage in littering and how satisfied they are with the number of garbage bins in their neighbourhood a relationship can be established between both variables. However, typically, causality cannot be established which weakens internal validity. First, it cannot be excluded that a third variable (i.e. confound) has caused the relationship. For example, an area with many garbage bins may be inhabited by a particular group of residents (e.g. highly educated individuals) who may systematically differ from groups that inhabit areas with few garbage bins. Second, the direction of the relationship is not clear: does the municipality decide to place bins because people tend to litter a lot in certain areas or do people litter because there are no bins available?

Questionnaire studies are popular in environmental psychology for several reasons. First, manipulation of environmental conditions (as in experimental research), is often unethical or impossible. For example, when studying the

effects of transport pricing on car use, it is mostly not feasible to double fuel prices in one area, but not in another area. Furthermore, external validity of questionnaire studies tends to be high, which is often regarded as crucial in studies on environmental issues. Finally, questionnaire studies are relatively easy to apply at low cost.

### 1.4.2 *Laboratory Experiments*

Laboratory experiments are conducted in a controlled, mostly artificial, environment created for the purpose of the research. Laboratory experiments enable the establishment of causal relationships between variables, because of two basic features of experiments: manipulation and random assignment. Imagine that a researcher would like to examine whether variable X (independent variable, e.g. presence versus absence of garbage bins) influences variable Y (dependent variable, e.g. littering). When only the independent variable is manipulated and all other variables are kept the same, it can be concluded with reasonable certainty that any differences in responses between conditions are due to the manipulation. That is, in the example, if there is a difference in the amount people litter with and without a garbage bin, one of the causes for littering has been identified: the presence of bins. Because of this feature, internal validity of laboratory experiments is high.

Randomization implies that all participants in the experiment have an equal chance of being assigned to each experimental condition. Randomization minimizes the chance that differences between experimental groups are caused by confounding individual factors such as differences in socio-demographics or personality types. For example, if only male participants are assigned to the garbage bin condition and only females to the condition without the garbage bin, then differences between the conditions may be caused by gender rather than the presence or absence of a bin.

The strong control in experimental settings generally creates artificial situations. Therefore, true experiments are often low in external validity, that is, the result may not easily be generalized to what typically happens in the real world.

### 1.4.3 *Computer Simulation Studies*

Sometimes it is impossible to conduct research with real individuals or realistic environmental stimuli. Examples are studies that aim to learn about complex systems that involve thousands of people or studies on how people evaluate future environmental scenarios. Environmental psychologists are increasingly using environmental simulations for this reason. In this type of research aspects of environments and/or humans are simulated as accurately and realistically as possible. Simulations may include immersive virtual environments, created with computers, that give the participant a realistic impression of what it would be like to experience particular environments or events (e.g. De Kort et al. 2003,; also see Chapter 28), 3D visualization of data in Geographical Information Systems (see Chapter 5), or agent-based models of land use or resource use

(see Chapter 31). In general, simulations make it possible to keep some control over the environment, thereby increasing internal validity, while external validity is not compromised too much.

#### **1.4.4 Field Studies**

In order to achieve high external validity without compromising too much on internal validity, many environmental psychologists use field studies and experiments. As field experiments are conducted in real-life settings, they are relatively high in external validity. Yet, internal validity is relatively high as well, as the experimenter tries to control the situation by systematically manipulating independent variables (e.g. placing or removing a bin in the environment), and/or by trying to randomly assign participants to different study conditions (e.g. environments with and without bins). By doing so, researchers can be reasonably sure that any differences between conditions are due to the manipulations (and not to, e.g. individual differences), securing internal validity. Nevertheless, because field experiments take place in real settings, it is difficult to control for possible confounding variables, such as changing weather conditions or unexpected interruptions. Furthermore, in many situations, random assignment is not possible.

#### **1.4.5 Case Studies**

A case study is an in-depth study of a particular situation. It is a method used to narrow down a very broad topic of research into one single case, i.e. a person, setting, situation, or event. For example, the broad topic of urban environmental quality may be studied in one particular neighbourhood where the municipality has recently installed garbage bins to tackle littering. Rather than employing a strict protocol and close-ended questions to study a limited number of variables, case study methods involve an exploratory, qualitative examination of a single situation or event: a case. Qualitative research uses words or other non-numerical indicators (such as images or drawings) as data. The main purpose of case studies and other types of qualitative research is to explore and understand the meaning that individuals or groups ascribe to a phenomenon. In a case study, people or events are studied in their own context, within naturally occurring settings, such as the home, playing fields, the university, and the street. These settings are 'open systems' where conditions are continuously affected by interactions with the social, physical, historical, and cultural context to give rise to a process of ongoing change, including ethnography, grounded theory, and phenomenology (see Wolcott 2001). Although there will not be one objective truth of the interpretation of the phenomenon (Willig 2001).

Many different strategies can be used in case studies. Qualitative research methods like case studies are gaining in importance in academic journals, while quantitative research methods (that use numbers rather than words as data) still dominate in environmental psychology. This is evidenced in this book, which relies mostly on quantitative research.



## 1.5 OVERVIEW OF THE BOOK

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This book aims to introduce students, professionals, and the general audience to key topics in contemporary environmental psychology. The book comprises three parts. After this general introduction, the first part, comprising Chapters 2–15, provides an overview of research on the positive and negative influences of environmental conditions on experiences, well-being, and behaviour, as well as ways to promote well-being via environmental changes. Key topics include risk perception, environmental stressors, nature experience, health effects of nature, architecture, urban environmental quality, and quality-of-life effects of environmental conditions. In addition, in this second edition, two new chapters have been added addressing the topics of climate change risks and the importance of nature for children.

The second part, comprising Chapters 16–25, focuses on understanding environmental behaviour. Various ways to measure environmental behaviour and factors influencing this behaviour, such as values and norms, are discussed. Specifically, in this second edition, the newly added Chapter 19 is dedicated to the significant role emotions can play in people's engagement in pro-environmental behaviour, while Chapter 20 discusses symbolic aspects of environmental behaviour. Furthermore, newly added Chapter 23 reviews how group memberships and the group processes associated with these memberships can affect environmental behaviour. The chapters in Part II present different theories to explain environmental behaviour, among which are norm theory, value theory, theories on affect, social dilemma theory, social identity theory, the theory of planned behaviour, the norm activation theory, the value-belief-norm theory of environmentalism, and habit theory. Also, a Latin American perspective on studying interactions between humans and the environment is provided.

The third part of the book, comprising Chapters 26–32, discusses ways to encourage pro-environmental behaviour and well-being via informational strategies, changing the incentives, and technological innovations. It also discusses factors influencing the acceptability of policies, processes of change, and social simulation of behaviour changes. Besides, special attention is paid to encouraging pro-environmental actions in developing countries.

In the final chapter of this book, we draw some general conclusions, identify trends, and suggest viable avenues for future research.

## GLOSSARY

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**environmental psychology** A subfield of psychology that studies the interplay between individuals and the built and natural environment.

**external validity** The extent to which the results of a study can be generalized (applied) to other populations (population validity) or settings (ecological validity). External validity is also known as generalizability.



**internal validity** The extent to which it can be concluded that an observed effect is caused by an independent variable.

**qualitative methods** Methods of analysis that use data in the form of words or other non-numerical indicators (e.g. images, drawings).

**quantitative methods** Methods of analysis that use data in the form of numbers.

**sustainability** Using, developing, and protecting resources at a rate and in a manner that enables people to meet their current needs and also ensures that future generations can meet their own needs; achieving an optimal balance between environmental, social, and economic qualities.

## SUGGESTIONS FOR FURTHER READING

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- Bell, P.A., Green, T.C., Fisher, J.D., and Baum, A. (2001). *Environmental Psychology*, 5e. Belmont, CA: Wadsworth/Thomson Learning.
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## REVIEW QUESTIONS

1. What is environmental psychology? Give a short definition.
2. Describe four key features of environmental psychology.
3. Which concept has increasingly become a guiding and unifying principle for research in environmental psychology? Define this concept.
4. Give three examples of problems studied by environmental psychologists.
5. Why do environmental psychologists use a diversity of research methods?



# Part I

## Environmental Influences on Human Behaviour and Well-Being



- |  |   |
|--|---|
| <b>2</b> Environmental Risk Perception   | <b>9</b> Human Dimensions of Wildlife   |
| <b>3</b> Climate Change as a Unique Environmental Problem                          | <b>10</b> Children and the Natural Environment  |
| <b>4</b> Environmental Stress  | <b>11</b> Appraising and Designing Built Environments that Promote Well-Being and Healthy Behaviour |
| <b>5</b> Scenic Beauty: Visual Landscape Assessment and Human Landscape Perception | <b>12</b> Urban Environmental Quality   |
| <b>6</b> Health Benefits of Nature   | <b>13</b> Environment and Quality of Life   |
| <b>7</b> Restorative Environments  | <b>14</b> Place Attachment  |
| <b>8</b> Ambivalence Towards Nature and Natural Landscapes                         | <b>15</b> How Cues in the Environment Affect Normative Behaviour                                    |



# 2 Environmental Risk Perception

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