

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

ENVIRONMENTAL PSYCHOLOGY

An Introduction

The only series
to be approved by
the **BRITISH
PSYCHOLOGICAL
SOCIETY**

Second Edition



Environmental Psychology

BPS Textbooks in Psychology

BPS Wiley presents a comprehensive and authoritative series covering everything a student needs in order to complete an undergraduate degree in psychology. Refreshingly written to consider more than North American research, this series is the first to give a truly international perspective. Written by the very best names in the field, the series offers an extensive range of titles from introductory level through to final year optional modules, and every text fully complies with the BPS syllabus in the topic. No other series bears the BPS seal of approval!

Many of the books are supported by a companion website, featuring additional resource materials for both instructors and students, designed to encourage critical thinking, and providing for all your course lecturing and testing needs.

For other titles in this series, please go to <http://psychsource.bps.org.uk>

Environmental Psychology

An Introduction

Second Edition

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

WILEY



The British
Psychological Society

This edition first published 2019

© 2019 John Wiley & Sons Ltd

Edition History

1e: 9780470976388

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by law. Advice on how to obtain permission to reuse material from this title is available at <http://www.wiley.com/go/permissions>.

The right of Linda Steg and Judith I M de Groot to be identified as the authors of the editorial material in this work has been asserted in accordance with law.

Registered Offices

John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial Office

John Wiley & Sons, Inc., 90 Eglinton Ave. E., Suite 300, Toronto, Ontario M4P 2Y3, Canada

For details of our global editorial offices, customer services, and more information about Wiley products visit us at www.wiley.com.

Wiley also publishes its books in a variety of electronic formats and by print-on-demand. Some content that appears in standard print versions of this book may not be available in other formats.

Limit of Liability/Disclaimer of Warranty

While the publisher and authors have used their best efforts in preparing this work, they make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives, written sales materials or promotional statements for this work. The fact that an organization, website, or product is referred to in this work as a citation and/or potential source of further information does not mean that the publisher and authors endorse the information or services the organization, website, or product may provide or recommendations it may make. This work is sold with the understanding that the publisher is not engaged in rendering professional services. The advice and strategies contained herein may not be suitable for your situation. You should consult with a specialist where appropriate. Further, readers should be aware that websites listed in this work may have changed or disappeared between when this work was written and when it is read. Neither the publisher nor authors shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

Library of Congress Cataloging-in-Publication Data

Names: Steg, Linda, editor. | de Groot, Judith I. M., editor.

Title: Environmental psychology : an introduction / edited by Linda Steg,
Groningen University, Netherlands, Judith I. M. de Groot, Bournemouth
University, Bournemouth.

Description: Second edition. | Hoboken, NJ : Wiley, 2019. |

Series: BPS textbooks in psychology | Includes index. |

Identifiers: LCCN 2018026889 (print) | LCCN 2018028741 (ebook) |

ISBN 9781119241041 (Adobe PDF) | ISBN 9781119241119 (ePub) |

ISBN 9781119241089 (pbk.)

Subjects: LCSH: Environmental psychology.

Classification: LCC BF353.5.N37 (ebook) | LCC BF353.5.N37 E585 2018 (print) |

DDC 155.9–dc23

LC record available at <https://lcn.loc.gov/2018026889>

Cover design by Wiley

Cover image: ©Tatiana Popova / Shutterstock

Set in 11/12.5pts Dante MT by SPi Global, Pondicherry, India

Brief Contents

1	Environmental Psychology: History, Scope, and Methods	1
PART I ENVIRONMENTAL INFLUENCES ON HUMAN BEHAVIOUR AND WELL-BEING		13
2	Environmental Risk Perception	15
3	Climate Change as a Unique Environmental Problem	26
4	Environmental Stress	36
5	Scenic Beauty: Visual Landscape Assessment and Human Landscape Perception	45
6	Health Benefits of Nature	55
7	Restorative Environments	65
8	Ambivalence Towards Nature and Natural Landscapes	76
9	Human Dimensions of Wildlife	85
10	Children and the Natural Environment	95
11	Appraising and Designing Built Environments that Promote Well-Being and Healthy Behaviour	104
12	Urban Environmental Quality	113
13	Environment and Quality of Life	123
14	Place Attachment	135
15	How Cues in the Environment Affect Normative Behaviour	144
PART II FACTORS INFLUENCING ENVIRONMENTAL BEHAVIOUR		155
16	Measuring Environmental Behaviour	157
17	Values and Pro-Environmental Behaviour	167
18	Social Norms and Pro-Environmental Behaviour	179
19	Emotions and Pro-Environmental Behaviour	189
20	Symbolic Aspects of Environmental Behaviour	198
21	Social Dilemmas: Motivational, Individual, and Structural Aspects Influencing Cooperation	207
22	Theories to Explain Environmental Behaviour	217

23	The Role of Group Processes in Environmental Issues, Attitudes, and Behaviours	228
24	Yesterday's Habits Preventing Change for Tomorrow? About the Influence of Automaticity on Environmental Behaviour	238
25	Environmental Psychology in Latin America	251
PART III ENCOURAGING PRO-ENVIRONMENTAL BEHAVIOUR		261
26	Informational Strategies to Promote Pro-Environmental Behaviour: Changing Knowledge, Awareness, and Attitudes	263
27	Encouraging Pro-Environmental Behaviour with Rewards and Penalties	273
28	Persuasive Technology to Promote Pro-Environmental Behaviour	283
29	Acceptability of Environmental Policies	295
30	Processes of Change	307
31	Simulating Social Environmental Systems	319
32	Environmental Issues in Low- and Middle-Income Countries	330
33	Conclusion: Summary, Trends, and Future Perspectives in Environmental Psychology	341
References		352
Index		407

Contents

List of Figures	xix
List of Tables	xxi
List of Boxes	xxii
List of Contributors	xxiv

1 Environmental Psychology: History, Scope, and Methods **1**

Linda Steg, Agnes E. van den Berg, and Judith I. M. de Groot

1.1 Introduction	2
1.2 History of the Field	2
1.2.1 Towards 'Architectural' Psychology	3
1.2.2 Towards a Green Psychology	4
1.3 Current Scope and Characteristics of the Field	4
1.3.1 Interactive Approach	4
1.3.2 Interdisciplinary Collaboration	5
1.3.3 Problem-Focused Approach	5
1.3.4 Diversity of Methods	6
1.4 Main Research Methods in Environmental Psychology	6
1.4.1 Questionnaire Studies	7
1.4.2 Laboratory Experiments	8
1.4.3 Computer Simulation Studies	8
1.4.4 Field Studies	9
1.4.5 Case Studies	9
1.5 Overview of the Book	10
Glossary	10
Suggestions for Further Reading	11
Review Questions	11

PART I ENVIRONMENTAL INFLUENCES ON HUMAN BEHAVIOUR AND WELL-BEING **13**

2 Environmental Risk Perception **15**

Gisela Böhm and Carmen Tanner

2.1 Introduction	16
2.2 What are Environmental Risks?	16
2.3 Subjective Risk Judgements	17
2.3.1 Heuristics and Biases in Risk Judgements	17
2.3.2 Temporal Discounting of Environmental Risks	19
2.3.3 The Psychometric Paradigm	19

2.4	Risk, Values, and Morality	19
2.4.1	Values	20
2.4.2	Morality and Ethics	21
2.5	Emotional Reactions to Environmental Risks	22
2.6	Summary	23
	Glossary	23
	Suggestions for Further Reading	24
	Review Questions	25
3	Climate Change as a Unique Environmental Problem	26
	<i>Janet K. Swim and Lorraine Whitmarsh</i>	
3.1	Introduction	27
3.2	Public Understanding of Climate Change	27
3.3	Assessing the Risk of Climate Change	28
3.3.1	Detecting a Problem	30
3.3.2	Interpretations of Problems	31
3.3.3	Accepting Responsibility and Taking Action	32
3.4	Summary	33
	Glossary	33
	Suggestions for Further Reading	34
	Review Questions	35
4	Environmental Stress	36
	<i>Elena Bilotta, Uchita Vaid, and Gary W. Evans</i>	
4.1	Introduction	37
4.2	Conceptualizations of Stress	37
4.3	Effects of Environmental Stress	38
4.3.1	Noise	38
4.3.2	Crowding	40
4.3.3	Poor Housing Quality	41
4.3.4	Poor Neighbourhood Quality	42
4.3.5	Traffic Congestion	42
4.4	Summary	43
	Glossary	43
	Acknowledgements	44
	Suggestions for Further Reading	44
	Review Questions	44
5	Scenic Beauty: Visual Landscape Assessment and Human Landscape Perception	45
	<i>Mari S. Tveit, Åsa Ode Sang, and Caroline M. Hagerhall</i>	
5.1	Introduction	46
5.2	Visual Quality Assessment	46
5.3	Theories Explaining Landscape Preferences as Innate or Learnt	47
5.4	Measuring and Mapping Scenic Beauty	50
5.5	Methodological Developments	51
5.6	Summary	52
	Glossary	52
	Suggestions for Further Reading	53
	Review Questions	54

6	Health Benefits of Nature	55
	<i>Agnes E. van den Berg, Yannick Joye, and Sjerp de Vries</i>	
6.1	Introduction	56
6.2	What is Health and How can it be Measured?	57
6.3	What is Nature and How can it be Measured?	57
6.4	Nature and Clinical Health	58
6.5	Green Space and Public Health	59
6.6	Mechanisms Linking Nature to Health	60
	6.6.1 <i>Air Quality</i>	61
	6.6.2 <i>Physical Activity</i>	61
	6.6.3 <i>Social Cohesion</i>	62
	6.6.4 <i>Stress Reduction</i>	62
6.7	Summary	63
	Glossary	63
	Suggestions for Further Reading	64
	Review Questions	64
7	Restorative Environments	65
	<i>Yannick Joye and Agnes E. van den Berg</i>	
7.1	Introduction	66
7.2	Restorative Environments Research	66
	7.2.1 <i>Stress Recovery Theory</i>	67
	7.2.2 <i>Attention Restoration Theory</i>	68
7.3	The Evolutionary Origins of Restorative Nature Experiences	69
7.4	Recent Theoretical and Empirical Developments	70
	7.4.1 <i>Perceptual Fluency Account</i>	70
	7.4.2 <i>Connectedness to Nature</i>	70
	7.4.3 <i>Micro-Restorative Experiences and Instorative Effects</i>	72
7.5	Applications and Implications	72
7.6	Summary	73
	Glossary	73
	Suggestions for Further Reading	75
	Review Questions	75
8	Ambivalence Towards Nature and Natural Landscapes	76
	<i>Agnes E. van den Berg and Cecil C. Konijnendijk</i>	
8.1	Introduction	77
8.2	Historical Overview	77
8.3	Emotional Impacts and Meanings of Natural Environment Experience	78
8.4	Views of Nature and Landscape Preferences	79
8.5	The Role of Biodiversity	80
8.6	An Existential-Motivational Account	81
8.7	Practical Implications	82
8.8	Summary	83
	Glossary	83
	Suggestions for Further Reading	84
	Review Questions	84

9	Human Dimensions of Wildlife	85
	<i>Maarten H. Jacobs, Jerry J. Vaske, Tara L. Teel, and Michael J. Manfredo</i>	
9.1	Introduction	86
9.2	Early Work: Attitudes Towards Wildlife	86
9.3	The Cognitive Hierarchy	87
9.4	Wildlife Value Orientations	89
9.5	Predicting Norms and Attitudes Towards Wildlife	91
9.6	Emotions Towards Wildlife	91
9.7	Summary	93
	Glossary	93
	Suggestions for Further Reading	94
	Review Questions	94
10	Children and the Natural Environment	95
	<i>Karin Tanja-Dijkstra, Jolanda Maas, Janke van Dijk-Wesseliuss, and Agnes van den Berg</i>	
10.1	Introduction	96
10.2	Childhood Experiences with Nature	96
10.3	Nature and Children's Health and Well-Being	98
	10.3.1 Physical Health Benefits	99
	10.3.2 Mental Health Benefits	99
	10.3.3 Cognitive Benefits	100
10.4	Childhood Nature Experiences and Adult Environmentalism	101
10.5	Applications and Implications	101
10.6	Summary	102
	Glossary	102
	Suggestions for Further Reading	103
	Review Questions	103
11	Appraising and Designing Built Environments that Promote Well-Being and Healthy Behaviour	104
	<i>Robert Gifford and Lindsay J. McCunn</i>	
11.1	Introduction	105
11.2	Aesthetic Appraisals of Architecture	105
	11.2.1 Uniformities in the Appraisal of Built Space	105
	11.2.2 Observer Differences	107
	11.2.3 Meaning in Architecture	108
11.3	Three Building Design Approaches that Promote Well-Being and Healthy Behaviour in Buildings	108
	11.3.1 Social Design	108
	11.3.2 Biophilic Design	110
	11.3.3 Evidence-Based Design	111
11.4	Summary	111
	Glossary	111
	Suggestions for Further Reading	112
	Review Questions	112

12	Urban Environmental Quality	113
	<i>Mirilia Bonnes, Massimiliano Scopelliti, Ferdinando Fornara, and Giuseppe Carrus</i>	
12.1	Introduction	114
12.2	Urban Settings as a Source of Stress and Discomfort	115
12.3	Urban Settings as a Source of Well-Being and Restoration	116
12.4	Residential Satisfaction – A Multicomponent Concept	117
12.5	A Multidimensional Approach to Urban Environmental Quality	117
12.6	The Multi-Place Approach	120
12.7	Summary	121
	Glossary	121
	Suggestions for Further Reading	122
	Review Questions	122
13	Environment and Quality of Life	123
	<i>Goda Perlaviciute and Linda Steg</i>	
13.1	Introduction	124
13.2	QoL: Objective and Subjective Measures	125
13.3	QoL: Unidimensional and Multidimensional Measures	126
13.4	Environment and QoL: Research Overview	127
	13.4.1 Which QoL Aspects are most Important?	127
	13.4.2 To What Extent is QoL Sustained in Certain Situations?	129
	13.4.3 How Does QoL Differ with Varying Environmental Conditions?	130
	13.4.4 How Do Environmental Transformations Influence QoL?	131
13.5	Summary	133
	Glossary	133
	Suggestions for Further Reading	134
	Review Questions	134
14	Place Attachment	135
	<i>Lynne C. Manzo and Patrick Devine-Wright</i>	
14.1	Introduction	136
14.2	Theories and Models of Place Attachment	137
	14.2.1 Components of Place Attachment	137
	14.2.2 Types of Place Attachments	138
	14.2.3 Place Attachments Involve an Array of Emotions	138
	14.2.4 Place Attachments as Dynamic and Socially Produced	139
14.3	Applications of Place Attachment	140
14.4	Summary	142
	Glossary	142
	Suggestions for Further Reading	143
	Review Questions	143
15	How Cues in the Environment Affect Normative Behaviour	144
	<i>Siegwart Lindenberg</i>	
15.1	Introduction	145
15.2	Overarching Goals and their Relative Strengths	146
15.3	Environmental Cues that Directly Strengthen the Normative Goal	148

15.4	Environmental Cues that Directly Weaken the Normative Goal	149
15.5	Indirect Weakening of the Normative Goal by Environmental Cues that Strengthen the Gain Goal	150
15.6	Indirect Weakening of the Normative Goal by Environmental Cues that Strengthen the Hedonic Goal	151
15.7	Summary	152
	Glossary	152
	Suggestions for Further Reading	153
	Review Questions	153
PART II FACTORS INFLUENCING ENVIRONMENTAL BEHAVIOUR		155
16	Measuring Environmental Behaviour	157
	<i>Birgitta Gatersleben</i>	
16.1	Introduction	158
16.2	What to Measure? Behaviour or Impact	158
	16.2.1 <i>Environmental Behaviour</i>	158
	16.2.2 <i>Environmental Impact</i>	159
16.3	How to Measure Environmental Behaviour?	162
16.4	Multidimensional or Unidimensional Measures of Environmental Behaviour	163
	16.4.1 <i>Multidimensional Measures of Environmental Behaviour</i>	163
	16.4.2 <i>A Unidimensional Measure of Environmental Behaviour</i>	164
16.5	Summary	165
	Glossary	165
	Suggestions for Further Reading	166
	Review Questions	166
17	Values and Pro-Environmental Behaviour	167
	<i>Judith I.M. de Groot and John Thøgersen</i>	
17.1	Introduction	168
17.2	Values	168
17.3	Value Theories	169
	17.3.1 <i>Social Value Orientations</i>	169
	17.3.2 <i>Schwartz's Value Theory</i>	169
	17.3.3 <i>Four Key Values for Pro-Environmental Behaviour</i>	171
17.4	How Values Affect Environmental Behaviour	173
17.5	Related Concepts	174
17.6	Practical Relevance of Value Research	176
17.7	Summary	176
	Glossary	177
	Suggestions for Further Reading	177
	Review Questions	178
18	Social Norms and Pro-Environmental Behaviour	179
	<i>Kees Keizer and P. Wesley Schultz</i>	
18.1	Introduction	180
18.2	What is a Social Norm?	180
18.3	How Influential are Norms on Behaviour?	181

18.4	Why Do People Conform to Norms?	182
18.5	When Do Norms Influence Behaviour?	182
	18.5.1 Salience	182
	18.5.2 Group Size	183
	18.5.3 Reference Groups	184
	18.5.4 Personal Norms	184
	18.5.5 Norm Conflict and the Importance of Aligned Messages	185
18.6	Summary	187
	Glossary	188
	Suggestions for Further Reading	188
	Review Questions	188
19	Emotions and Pro-Environmental Behaviour	189
	<i>Danny Taufik and Leonie Venhoeven</i>	
19.1	Introduction	190
19.2	Emotions as a Motive for Action	191
19.3	Hedonic and Eudaimonic View on Emotions	192
19.4	Why Pro-Environmental Behaviour Elicits Positive Emotions: A Closer Look at the Eudaimonic View	194
19.5	Summary	196
	Glossary	196
	Suggestions for Further Reading	197
	Review Questions	197
20	Symbolic Aspects of Environmental Behaviour	198
	<i>Birgitta Gatersleben and Ellen van der Werff</i>	
20.1	Introduction	199
20.2	Identity	199
	20.2.1 Environmental Self-Identity and Behaviour	200
	20.2.2 Factors Influencing Identity	201
20.3	Impression Management	203
20.4	Summary	205
	Glossary	205
	Suggestions for Further Reading	206
	Review Questions	206
21	Social Dilemmas: Motivational, Individual, and Structural Aspects Influencing Cooperation	207
	<i>Chris von Borgstede, Lars-Olof Johansson, and Andreas Nilsson</i>	
21.1	Introduction	208
21.2	Defining Social Dilemmas	208
21.3	Types of Social Dilemmas	209
	21.3.1 Large-Scale Dilemmas	209
	21.3.2 Resource Dilemmas	209
	21.3.3 Public Good Dilemmas	210
21.4	Motives in Social Dilemmas	210
	21.4.1 Greed	210
	21.4.2 Efficiency	211
	21.4.3 Fairness	212

21.5	Factors Promoting Cooperation	212
21.5.1	<i>Group Size</i>	213
21.5.2	<i>Communication</i>	213
21.5.3	<i>Response Efficacy</i>	213
21.5.4	<i>Environmental Uncertainty</i>	214
21.5.5	<i>Social Uncertainty</i>	214
21.5.6	<i>Norms in Large-Scale Dilemmas</i>	214
21.6	Summary	215
	Glossary	215
	Suggestions for Further Reading	216
	Review Questions	216
22	Theories to Explain Environmental Behaviour	217
	<i>Linda Steg and Annika Nordlund</i>	
22.1	Introduction	218
22.2	Theory of Planned Behaviour	218
22.3	Protection Motivation Theory	220
22.4	The Norm Activation Model	221
22.5	The Value-Belief-Norm Theory of Environmentalism	223
22.6	Goal-Framing Theory	224
22.7	Summary	225
	Glossary	226
	Suggestions for Further Reading	227
	Review Questions	227
23	The Role of Group Processes in Environmental Issues, Attitudes, and Behaviours	228
	<i>Lise Jans and Kelly Fielding</i>	
23.1	Introduction	229
23.2	Why Should Environmental Psychologists be Interested in Group Processes?	229
23.3	How the Social Identity Approach Explains Environmental Conflict	230
23.4	Why Social Identity Guides Environmental Attitudes and Behaviours	231
23.4.1	<i>Group Norms Guide Environmental Attitudes and Behaviours</i>	232
23.4.2	<i>Group Members Influence Environmental Attitudes and Behaviours</i>	233
23.4.3	<i>Group Identification Influences Environmental Attitudes and Behaviours</i>	234
23.5	Why Social Identity can Affect Cooperation on Environmental Issues	234
23.6	How the Social Identity Approach Explains Environmental Group Formation	235
23.7	Summary	236
	Glossary	236
	Suggestions for Further Reading	237
	Review Questions	237

24	Yesterday's Habits Preventing Change for Tomorrow? About the Influence of Automaticity on Environmental Behaviour	238
	<i>Christian A. Klöckner and Bas Verplanken</i>	
24.1	Introduction	239
24.2	Theoretical Background: How Habits are Acquired	240
24.3	Narrowing Down Decision-Making: How Habits Affect Information Use	241
24.4	Measuring Habits: A Challenge for Research	243
24.5	Breaking Bad Habits, Creating Good Habits: Interventions Changing Routine Behaviour	246
24.6	Summary	248
	Glossary	248
	Suggestions for Further Reading	249
	Review Questions	250
25	Environmental Psychology in Latin America	251
	<i>Javier Urbina-Soria and Emilio Moyano-Díaz</i>	
25.1	Introduction	252
25.2	Latin American Background	252
25.3	Past Reviews on Environmental Psychology in Latin America	253
25.4	Recent Developments in Environmental Psychology in Latin America	254
25.5	Key Issues for the Development of Research in Latin America	256
	25.5.1 <i>Lack of Collaboration</i>	256
	25.5.2 <i>Few Possibilities to Publish in Spanish or Portuguese</i>	257
	25.5.3 <i>Academic Training in Environmental Psychology</i>	257
25.6	Summary	258
	Glossary	258
	Suggestions for Further Reading	259
	Review Questions	259
PART III	ENCOURAGING PRO-ENVIRONMENTAL BEHAVIOUR	261
26	Informational Strategies to Promote Pro-Environmental Behaviour: Changing Knowledge, Awareness, and Attitudes	263
	<i>Wokje Abrahamse and Ellen Matthies</i>	
26.1	Introduction	264
26.2	Interventions: From Research to Implementation	264
26.3	Informational Strategies	265
	26.3.1 <i>Provision of Information</i>	265
	26.3.2 <i>Goal Setting</i>	266
	26.3.3 <i>Commitment</i>	267
	26.3.4 <i>Prompting</i>	268
	26.3.5 <i>Feedback</i>	268
26.4	Intervention Research: Some General Issues	269
26.5	Summary	270
	Glossary	271
	Suggestions for Further Reading	271
	Review Questions	272

27	Encouraging Pro-Environmental Behaviour with Rewards and Penalties	273
	<i>Jan Willem Bolderdijk, Philip K. Lehman, and E. Scott Geller</i>	
27.1	Introduction	274
27.2	Analysis of Consequences	274
27.3	Natural Versus Extra Consequences	276
27.4	When is it Appropriate to Apply Extra Consequences?	277
27.5	How Should Extra Consequences be Announced and Delivered?	278
	27.5.1 <i>Negative Versus Positive Consequences</i>	279
	27.5.2 <i>Monetary Versus Non-Monetary Consequences</i>	279
27.6	Summary	281
	Glossary	281
	Suggestions for Further Reading	282
	Review Questions	282
28	Persuasive Technology to Promote Pro-Environmental Behaviour	283
	<i>Cees Midden and Jaap Ham</i>	
28.1	Introduction	284
28.2	Technology and Behaviour	284
28.3	Persuasive Technology	285
28.4	Approaches to Applying Persuasive Technology	286
28.5	Social Influence through Smart Systems	287
	28.5.1 <i>The Role of Social Cues</i>	287
	28.5.2 <i>Reactance</i>	288
28.6	Providing Persuasive Experiences	289
28.7	Persuasive Technology as a Tool to Promote Behaviour Change	289
	28.7.1 <i>Ambient Persuasion</i>	290
	28.7.2 <i>Group Interventions</i>	291
28.8	Summary	292
	Glossary	293
	Suggestions for Further Reading	293
	Review Questions	294
29	Acceptability of Environmental Policies	295
	<i>Geertje Schuitema and Cecilia J. Bergstad</i>	
29.1	Introduction	296
29.2	Acceptability as a Social Dilemma	296
29.3	Theoretical Framework to Explain the Acceptability of Policy Measures	297
	29.3.1 <i>Individual Policy Outcomes</i>	298
	29.3.2 <i>Collective Policy Outcomes</i>	298
	29.3.3 <i>Fair Distribution of Policy Outcomes</i>	300
29.4	Procedural Fairness and Acceptability of Environmental Policies	302
29.5	How can Public Support Increase Over Time? An Illustration	303
29.6	Summary	305
	Glossary	305
	Suggestions for Further Reading	306
	Review Questions	306

30	Processes of Change	307
	<i>Sebastian Bamberg and Maxie Schulte</i>	
30.1	Introduction	308
30.2	Lewin's Theory of Change	308
30.3	Behavioural Change: A Self-Regulation Process Steered by Feedback Loops	309
	30.3.1 <i>Goals as Reference Values in a Feedback Loop</i>	309
	30.3.2 <i>Hierarchical Organization of Goals and Feedback Loops</i>	309
	30.3.3 <i>The Importance of Self-Focus</i>	311
30.4	Behavioural Change: It Takes Time to Overcome Resistance to Change	311
30.5	The Stage Model of Self-Regulated Behavioural Change	312
30.6	Implications for Interventions	314
30.7	Empirical Validation of the SSBC	315
30.8	Summary	316
	Glossary	317
	Suggestions for Further Reading	318
	Review Questions	318
31	Simulating Social Environmental Systems	319
	<i>Wander Jager and Nick Gotts</i>	
31.1	Introduction	320
31.2	An Introduction to Social Complexity	320
31.3	Social Simulation as a Methodology	321
31.4	Social Simulation of Environmental Behaviour	322
	31.4.1 <i>Using Theory in Simulation Models: Formalizing Processes of Attitude Change</i>	322
	31.4.2 <i>Using Theory and Data in Models: Diffusion of Environmental Innovations</i>	323
31.5	Integrating Social Simulation into Environmental Modelling	324
	31.5.1 <i>The Lakeland Study</i>	324
	31.5.2 <i>Companion Modelling: A Study of Rice Production and Labour Migrations in North-East Thailand</i>	325
	31.5.3 <i>Integrating Multiple Models of a Socioenvironmental System: Water Use in the Danube Basin</i>	326
31.6	Key Steps in Building Agent-Based Models	327
	31.6.1 <i>Development of Models</i>	327
	31.6.2 <i>Using Models</i>	327
31.7	Summary	328
	Glossary	328
	Suggestions for Further Reading	329
	Review Questions	329
32	Environmental Issues in Low- and Middle-Income Countries	330
	<i>Nadja Contzen, Hans-Joachim Mosler, and Silvie Kraemer-Palacios</i>	
32.1	Introduction	331
32.2	Environmental Risk Perception, Environmental Concern, and Climate Change Perception	331

32.2.1	<i>Environmental Risk Perception</i>	331
32.2.2	<i>Environmental Concern</i>	332
32.2.3	<i>Climate Change Perception</i>	332
32.3	Residential Environment and Well-Being	333
32.3.1	<i>Slums and Public Housing</i>	333
32.3.2	<i>Communal Spaces</i>	334
32.3.3	<i>Rural Communities</i>	334
32.4	Behaviour and Behaviour Change	334
32.4.1	<i>Resource Conservation</i>	335
32.4.2	<i>Sustainable Transportation</i>	335
32.4.3	<i>Recycling</i>	335
32.4.4	<i>Water, Sanitation, and Hygiene</i>	337
32.5	Summary	338
	Glossary	339
	Suggestions for Further Reading	339
	Review Questions	340
33	Conclusion: Summary, Trends, and Future Perspectives in Environmental Psychology	341
	<i>Agnes E. van den Berg and Linda Steg</i>	
33.1	Summary and Key Findings	342
33.1.1	<i>Part I: Environmental Influences on Human Behaviour and Well-Being</i>	342
33.1.2	<i>Part II: Factors Influencing Environmental Behaviour</i>	343
33.1.3	<i>Part III: Encouraging Pro-Environmental Behaviour</i>	344
33.2	General Trends and Developments	345
33.2.1	<i>Positive Interactions Between Humans and Environments</i>	345
33.2.2	<i>Integrative Approaches</i>	346
33.2.3	<i>From One Psychology to Multiple Psychologies</i>	346
33.3	Challenges for Future Research	347
33.3.1	<i>Further Integration</i>	348
33.3.2	<i>Further Development of Theories and Methods</i>	349
33.3.3	<i>Further Engagement</i>	349
	Glossary	351
	Suggestions for Further Reading	351
	Review Questions	351
	References	352
	Index	407

List of Figures

Figure 2.1	Emotional reactions to environmental risks. Display of a multidimensional scaling of hazards based on emotional reactions to them. Vectors fitted into the configuration constitute emotion types.	22
Figure 3.1	Clusters of the public into identifiable opinion groups based on policy support towards climate change actions (see Box 3.1).	30
Figure 6.1	Intake of doses of strong painkillers among patients recovering from gallbladder surgery in rooms with a view of nature or a view of a brick wall.	59
Figure 6.2	Schematic representation of relationships among nature, health, and underlying mechanisms. Solid lines represent established relationships; dashed lines represent weaker or inconsistent relationships.	61
Figure 7.1	Examples of fractal patterns in nature.	71
Figure 8.1	An experiment among 48 university students showed that reminding participants of their own mortality weakened their aesthetic preference for wild over managed nature as compared to a neutral control group.	82
Figure 9.1	The cognitive hierarchy framework.	88
Figure 12.1	Affective quality of places.	119
Figure 13.1	Cartesian plane.	130
Figure 13.2	Expected changes in QoL aspects if costs for car use were doubled ($N = 490$). Responses were given on a 7-point scale ranging from -3 'Would decrease dramatically' to 3 'Would increase dramatically'.	132
Figure 15.1	The mechanisms by which cues in the environment affect the relative strength of the normative goal.	147
Figure 16.1	Perceived (upper panel) and estimated (lower panel) environmental impact of household activities.	161
Figure 17.1	The motivational types of values placed into a two-dimensional space (Bilsky and Schwartz 1994).	171
Figure 17.2	Myths of nature. The line symbolizes the landscape and the vulnerability of nature; the ball symbolizes environmentally risky behaviour. See Steg and Vlek (2009) for a full description of the myths of nature and how they are applied in research.	175
Figure 18.1	Percentage of participants littering a clean environment as a function of descriptive norm salience.	183
Figure 18.2	Impressions of the experimental conditions for testing the cross-norm inhibition effect (See Box 18.1).	186

Figure 22.1	A schematic representation of the TPB.	219
Figure 22.2	Protection-motivation theory.	221
Figure 22.3	A schematic representation of the VBN theory of environmentalism.	223
Figure 23.1	Interaction between political identity salience manipulation and political orientation on perceptions of human contribution to climate change.	233
Figure 24.1	Mean number of inspected information items across 27 trials for the control conditions (top panel), and the enhanced attention condition (in which participants had to justify their decision afterwards; bottom panel).	244
Figure 28.1	The iCat, an animated robot capable of expressing emotions and providing spoken factual and social feedback.	288
Figure 28.2	Eco-Island providing group and individual comparison feedback.	292
Figure 29.1	Overview of comparisons used to evaluate policy outcomes.	301
Figure 29.2	Beliefs about the outcomes of the congestion charge in Stockholm before and after implementation.	304
Figure 30.1	Lewin's three-step change theory.	309
Figure 30.2	Three-level hierarchy depicting the organization of goals and control processes.	310
Figure 30.3	The temporal dimension for the stages of change postulated by the transtheoretical model.	312
Figure 30.4	A self-regulation model of voluntary behavioural change.	313
Figure 32.1	Riverbank next to the scenic 14 falls near Thika, Kenya.	336
Figure 32.2	Women and children fetching water at a borehole in Kancharo, Borana Zone, Ethiopia.	338

List of Tables

Table 1.1	Summary of main research methods in environmental psychology.	7
Table 5.1	The preference matrix.	49
Table 10.1	Typologies of impressive childhood nature experiences (Based on Verboom and De Vries 2006).	97
Table 13.1	Three types of sustainability criteria and examples of indicators.	125
Table 17.1	Examples of definitions of four motivational types expressed in Schwartz's (1994) value theory.	170
Table 20.1	Environmental self-identity (means) for participants reminded of different types of behaviour.	202
Table 20.2	Correlations between values and perceived status value of different behaviours.	205
Table 24.1	Characteristics of deliberate and automatic decision-making.	242
Table 30.1	Stage-tailored intervention strategies.	315

List of Boxes

Box 1.1	Founding Fathers of Environmental Psychology	3
Box 2.1	Framing and Environmental Decisions	18
Box 2.2	Psychometric Study of Environmental Risks	20
Box 2.3	Deontological Reasoning, Protected Values, and Environmental Decision-Making	21
Box 3.1	Typologies of Climate Change Beliefs	29
Box 4.1	Effects of Noise on Reading Acquisition	39
Box 4.2	Effects of Crowding on Social Withdrawal	41
Box 5.1	Five Models of Visual Landscape Quality	48
Box 5.2	The Preference Matrix	49
Box 6.1	Historical Background	56
Box 7.1	The Experimental Paradigm in Restorative Environments Research	67
Box 7.2	Perceived Restorativeness	69
Box 8.1	Views of Human–Nature Relationships	80
Box 9.1	Typology of Attitudes towards Wildlife	87
Box 9.2	Measurement of Wildlife Value Orientations	90
Box 10.1	Effects of Nature on School Performance	100
Box 11.1	Decoding Modern Architecture	106
Box 11.2	Six Goals of Social Design	109
Box 12.1	Perceived Residential Environment Quality Indicators	118
Box 12.2	The Multi-Place Approach to Studying Neighbourhood Quality	120
Box 13.1	Description of 22 Quality of Life (QoL) Aspects	128
Box 13.2	Effects of Environmental Sustainability Programs on QoL	131
Box 14.1	Displacement and Place Attachments	140
Box 15.1	Cues of Care for Each Other Strengthen the Normative Goal	148
Box 16.1	Biases in Assessments of Environmental Impact of Behaviours	160
Box 17.1	Biospheric Values	172
Box 18.1	The Cross-Norm Inhibition Effect	185
Box 18.2	Aligned Norms Make an Effective Intervention	187
Box 19.1	Warm Glow Feelings of Pro-Environmental Actions	195
Box 20.1	How can Initial Pro-Environmental Actions Strengthen Environmental Self-Identity and Spill-Over?	202
Box 20.2	The Symbolic Value of Different Goods and Value Orientations	204
Box 21.1	Greed Efficiency Fairness Hypothesis	211
Box 21.2	Factors Influencing Cooperation in Social Dilemmas	213
Box 22.1	Extending the TPB with Personal Norms	220
Box 22.2	Testing Causal Relationships in the NAM	222
Box 23.1	Political Identity and Climate Change	232
Box 24.1	Habits	239

Box 24.2	The Connectionist Approach	241
Box 24.3	Script-Based Approach	241
Box 24.4	Habits and Information Processing	243
Box 24.5	The Response Frequency Measure (RFM)	245
Box 24.6	Self-Report Habit Index (SRHI)	245
Box 24.7	The Compound Measure of Habit	246
Box 25.1	Overview of Topics Studied in Environmental Psychology in Latin America	255
Box 26.1	A Successful Intervention Program Using a Combination of Group Goals and Incentives	267
Box 27.1	Refunds for Beverage Containers	275
Box 27.2	Effects of a Temporary Free Bus Ticket	277
Box 27.3	Changing Driving Style via Motivational Interventions	278
Box 27.4	A Fine Is a Licence to Misbehave	280
Box 28.1	Ambient Persuasive Technology: The Role of Colour Associations	290
Box 29.1	Push Versus Pull Measures	299
Box 30.1	The Feedback Loop	310
Box 30.2	Evaluation of an SSBC-Based Social Marketing Campaign to Reduce Car Use	316
Box 31.1	An Example of a Simple Simulation Model	322
Box 32.1	Handwashing Promotion in Ethiopia	337

List of Contributors

WOKJE ABRAHAMSE

Victoria University of Wellington, New Zealand

SEBASTIAN BAMBERG

FH Bielefeld University of Applied Science, Germany

CECILIA J. BERGSTAD

University of Gothenburg, Sweden

ELENA BILOTTA

Sapienza University of Rome, Italy

GISELA BÖHM

University of Bergen, Norway

JAN WILLEM BOLDERDIJK

Rijksuniversiteit Groningen, the Netherlands

MIRILIA BONNES

Sapienza University of Rome, Italy

GIUSEPPE CARRUS

University of Rome Tre, Italy

NADJA CONTZEN

University of Groningen, the Netherlands

JUDITH I. M. DE GROOT

University of Groningen, the Netherlands

PATRICK DEVINE-WRIGHT

University of Exeter, United Kingdom

SJERP DE VRIES

Wageningen University and Research, the Netherlands

GARY W. EVANS

Cornell University, USA

KELLY FIELDING

University of Queensland, Australia

FERDINANDO FORNARA

University of Cagliari, Italy

BIRGITTA GATERSLEBEN
University of Surrey, United Kingdom

E. SCOTT GELLER
Virginia Polytechnic Institute and State University, United States

ROBERT GIFFORD
University of Victoria, Canada

NICK GOTTS
Independent Researcher, United Kingdom

CAROLINE M. HAGERHALL
Swedish University of Agricultural Sciences, Sweden

JAAP HAM
Eindhoven University of Technology, the Netherlands

MAARTEN H. JACOBS
Wageningen University, the Netherlands

WANDER JAGER
University of Groningen, the Netherlands

LISE JANS
University of Groningen, the Netherlands

LARS-OLOF JOHANSSON
University of Gothenburg, Sweden

YANNICK JOYE
University of Groningen, the Netherlands

KEES KEIZER
University of Groningen, the Netherlands

CHRISTIAN A. KLÖCKNER
Norwegian University of Science and Technology, Norway

CECIL C. KONIJNENDIJK
University of British Columbia, Canada

SILVIE KRAEMER-PALACIOS
EAWAG, Switzerland

PHILIP K. LEHMAN
Salem VA Medical Center, USA

SIEGWART LINDENBERG
University of Groningen, the Netherlands

JOLANDA MAAS
Vrije Universiteit Amsterdam, the Netherlands

MICHAEL J. MANFREDO
Colorado State University, United States

LYNNE C. MANZO
University of Washington, Seattle, WA, United States

ELLEN MATTHIES
Otto von Guericke University, Germany

LINDSAY J. MCCUNN
University of Washington Tacoma, United States

CEES MIDDEN
Eindhoven University of Technology, the Netherlands

HANS-JOACHIM MOSLER
EAWAG, Switzerland

EMILIO MOYANO-DÍAZ
Talca University, Chile

ANDREAS NILSSON
University of Gothenburg, Sweden

ANNIKA NORDLUND
Umea University, Sweden

GODA PERLAVICIUTE
University of Groningen, the Netherlands

ÅSA ODE SANG
Swedish University of Agricultural Sciences, Sweden

GEERTJE SCHUIITEMA
University College Dublin, Ireland

MAXIE SCHULTE
FH Bielefeld University of Applied Science, Germany

P. WESLEY SCHULTZ
California State University, United States

MASSIMILIANO SCOPELLITI
Libera Università Mariae Ss Assunta, Italy

LINDA STEG
University of Groningen, the Netherlands

JANET K. SWIM
Pennsylvania State University, USA

KARIN TANJA-DIJKSTRA
Vrije Universiteit Amsterdam, the Netherlands

CARMEN TANNER
University of Zurich, Switzerland

DANNY TAUFIK
Wageningen University and Research, the Netherlands

- TARA L. TEEL
Colorado State University, United States
- JOHN THØGERSEN
Aarhus University, Denmark
- MARI S. TVEIT
Norwegian University of Life Sciences, Norway
- JAVIER URBINA-SORIA
National Autonomous University of Mexico, Mexico
- UCHITA VAID
Cornell University, USA
- JERRY J. VASKE
Colorado State University, United States
- AGNES E. VAN DEN BERG
University of Groningen, the Netherlands
- ELLEN VAN DER WERFF
University of Groningen, the Netherlands
- JANKE VAN DIJK-WESSELIUS
Vrije Universiteit Amsterdam, the Netherlands
- LEONIE VENHOEVEN
University of Groningen, the Netherlands
- BAS VERPLANKEN
University of Bath, United Kingdom
- CHRIS VON BORGSTEDE
University of Gothenburg, Sweden
- LORRAINE WHITMARSH
Cardiff University, UK

1 Environmental Psychology: History, Scope, and Methods

Linda Steg

University of Groningen, The Netherlands

Agnes E. van den Berg

University of Groningen, The Netherlands

Judith I. M. de Groot

University of Groningen, The Netherlands

CHAPTER OUTLINE

1.1 INTRODUCTION 2

1.2 HISTORY OF THE FIELD 2

1.2.1 Towards 'Architectural' Psychology 3

1.2.2 Towards a Green Psychology 4

1.3 CURRENT SCOPE AND CHARACTERISTICS OF THE FIELD 4

1.3.1 Interactive Approach 4

1.3.2 Interdisciplinary Collaboration 5

1.3.3 Problem-Focused Approach 5

1.3.4 Diversity of Methods 6

1.4 MAIN RESEARCH METHODS IN ENVIRONMENTAL PSYCHOLOGY 6

1.4.1 Questionnaire Studies 7

1.4.2 Laboratory Experiments 8

1.4.3 Computer Simulation Studies 8

1.4.4 Field Studies 9

1.4.5 Case Studies 9

1.5 OVERVIEW OF THE BOOK 10

GLOSSARY 10

SUGGESTIONS FOR FURTHER READING 11

REVIEW QUESTIONS 11

1.1 INTRODUCTION

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

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).