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28 Conclusion: Summary, trends and future perspectives in environmental psychology

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28.1 SUMMARY AND KEY FINDINGS

The environment in which we live influences people's lives in many ways, but reciprocally this environment is also a product of human activities. **Environmental psychology** studies this reciprocal relationship between humans and the environment. This book aimed to provide an introduction into this rapidly evolving and dynamic field of research. In the 26 chapters that form the core of this book, more than 50 authors have documented the current state of the field of environmental psychology. The chapters have been organised into three parts. Part I includes 11 chapters discussing environmental influences on humans. Part II comprises 8 chapters focusing on factors that influence environmental behaviour. Part III includes 7 chapters discussing ways to promote pro-environmental behaviour.

In this concluding chapter, we will first summarise the main findings of each part of the book. Next, we will discuss some general **trends** and developments, followed by a discussion of key challenges for future research in environmental psychology.

Part I: Environmental influences on human behaviour and well-being

Part I starts out with two chapters on classic themes in environmental psychology: environmental risk perception and environmental stress. In both chapters, it is emphasised that examining people's perceptions continues to play a crucial role in understanding negative impacts of the environment on human behaviour and well-being. However, new developments, such as an increased recognition of the importance of emotions and ethical considerations to understanding environmental risk, are also discussed.

The next five chapters discuss the predominantly positive influences of the natural environment on humans. The extensive research activity in this domain is illustrative of the recent, more positive outlook of environmental psychology as a field that aims to create sustainable environments that support human well-being. Some notable findings in this area are the increased use of advanced geographical information systems for modelling visual landscape quality (Chapter 4), the growing evidence for stress-reducing and health-promoting effects of contact with nature (Chapters 5 and 6), an increased recognition and improved understanding of ambivalent responses and attitudes towards nature (Chapter 7), and the emergence of a new subfield that studies human dimensions of wildlife (Chapter 8).

The last four chapters of Part I focus on impacts of urban environments on human behaviour and well-being. These chapters illustrate the continuing importance of the residential environment for quality of life. Indeed, as noted in Chapter

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9 'even the most outdoors-oriented people spend most of their lives in one building or another'. Much of the more recent work in this domain has been aimed at translating insights from fundamental studies on the determinants of urban environmental quality into integrated practical models and approaches. For example, in Chapter 9, biophilic design and evidence-based design are discussed as two recent design approaches that aim to translate insights from environmental psychology into building designs that satisfy users' needs and improve their well-being. In Chapters 10 and 11, various multidimensional models for measuring and predicting residential satisfaction and quality of life are presented. Chapter 12 discusses how insights on the power of environmental cues, such as signs of littering, can provide new and powerful tools for developing interventions in favour of normative behaviour.

Part II: Factors influencing environmental behaviour

Part II opens with a review of ways to measure environmental behaviour (Chapter 13). In this review, new approaches to measuring environmental behaviour are presented and the importance of complementing behavioural measures with measures of environmental impact was emphasised. The next four chapters highlight values (Chapter 14), social norms (Chapter 15), affect (Chapter 16) and conflicts between individual and collective interests (Chapter 17) as key factors influencing environmental behaviour. Some notable findings include the growing evidence for biospheric values as predictors of pro-environmental behaviour (Chapter 14), the empirical demonstration that disorder (e.g. graffiti, littering) can rapidly spread via the principle of cross-norm inhibition (Chapter 15), the recognition of positive affective and symbolic motives as powerful determinants of pro-environmental behaviour (Chapter 16), and the expanding knowledge base regarding factors that promote cooperation in social dilemmas (Chapter 17).

Chapter 18 provides an integrative perspective on the preceding chapters by providing an overview of models that describe the combined influences of multiple determinants of environmental behaviour. This chapter illustrates the growing importance of multidimensional models and approaches in environmental psychology (see the next section for a further discussion of this issue). The last two chapters of Part II present two relatively new perspectives on environmental behaviour. First, Chapter 19 reflects on the habitual nature of many environmental behaviours, and presents different models and approaches to describe, explain, predict and change habitual environmental behaviours. Finally, Chapter 20 discusses environmental psychology from a Latin American perspective. This chapter shows that there is a growing interest in environmental psychology in Latin America, providing important insights in the applicability of relevant theories and methods in a different cultural context.

Part III: Encouraging pro-environmental behaviour

The first three chapters of Part III discuss informational strategies (Chapter 21), rewards and penalties (Chapter 22) and persuasive technology (Chapter 23) as three

key strategies for behaviour change. In Chapter 21, it is concluded that the provision of information alone, although still widely used, is not very effective in producing behaviour change. Several suggestions for improving the effectiveness of informational strategies, such as the provision of tailored information, are discussed. Policy makers often use environmental taxes and other monetary strategies to change people's behaviours. However, as shown in Chapter 22, there is a risk in providing monetary consequences for pro-environmental behaviours because these consequences may reduce people's moral motivation to act pro-environmentally. Chapter 22 provides guidelines for effectively announcing and delivering monetary interventions. Chapter 23 discusses persuasive technology as a relatively new type of intervention strategy that uses technology to give 'smart' feedback about environmental behaviour, or to provide immersive experiences that simulate the possible environmental consequences of behaviour. Building on the insight that interventions can only be successful if they are accepted by the public, Chapter 24 discusses factors such as procedural and distributive fairness that influence the public acceptability of policy measures for encouraging pro-environmental change.

The last three chapters of Part III address relatively new, and thus far understudied, topics in environmental psychology. In Chapter 25, a stage model of behaviour change is presented that integrates different psychological theories on the processes underlying behaviour change. Chapter 26 discusses agent-based modelling as a new computer-based technique that can be used to simulate changes in complex social environmental systems. Finally, Chapter 27 gives an overview of the application of theories, concepts and methods of environmental psychology in developing countries. A key finding is that behaviour programmes are nearly unknown in developing countries, which indicates that the problem-solving potential of environmental psychology is not tapped to its fullest potential in those parts of the world where it is most needed.

28.2 GENERAL TRENDS AND DEVELOPMENTS

In the previous section we have already identified many trends and developments within specific research areas of environmental psychology. In this section, we will discuss three more general, overarching trends and developments as they emerge from the whole of this book.

Positive interactions between humans and environments

Traditionally, environmental psychology has focused primarily on studying the negative impacts of the environment on humans (e.g. detrimental effects of crowding or

noise on health) and the negative impacts of humans on the environment (e.g. negative impacts of energy use on environmental quality). Applications of this research have been aimed mostly at the development of environmental and behavioural strategies to reduce these negative impacts. However, the growing concern for **sustainability**, as discussed in Chapter 1, has stimulated a trend towards studying positive transactions between humans and the environment, such as health-promoting effects of natural environments and positive contributions of pro-environmental behaviour to environmental quality and quality of life (Gifford, 2007b; Giuliani & Scopelliti, 2009). As part of this trend, interventions are increasingly aimed at supporting and encouraging pro-environmental behaviour, rather than on discouraging environmentally harmful behavioural changes.

The current, more positive outlook of environmental psychology is reflected throughout this book. In Part I, much attention is paid to the positive effects of nature and natural environments (Chapters 4 to 8) as well as to positive contributions of well-designed, liveable urban environments to quality of life (Chapters 9 to 12). In Part II the focus is on understanding pro-environmental behaviour by identifying positive behavioural determinants such as biospheric values (Chapter 14), pro-social norms (Chapter 15) and anticipated positive affect (Chapter 16). Indeed, the growing evidence that many people engage in pro-environmental activities because it makes them feel good, as discussed in Chapter 16, suggests that truly sustainable solutions that promote environmental quality without compromising human well-being can be achieved. Part III focuses on interventions, incentives and techniques that support and encourage pro-environmental choices. Some notable examples are monetary incentives that support people's moral obligations to behave pro-environmentally (as discussed in Chapter 22) and the use of interactive lighting feedback to make pro-environmental behaviour less demanding (as discussed in Chapter 23).

Although this book is mostly based on research in Western, industrialised countries, there are indications that the trend towards studying positive human–environment interactions also applies to other parts of the world. A review of more than 100 publications in Latin American countries, as discussed in Chapter 20, reveals that the focus of environmental psychology research in this region has also shifted from an early focus on the negative influence of environmental conditions on well-being and behaviour, to a focus on the positive effects of environmental conditions and the gratifying impact of pro-environmental behaviour.

Integrative approaches

A second trend that is reflected in every part of this book is the development of integrative models and approaches. Whereas in the early years of environmental psychology the focus was often on studying relationships between single environmental conditions (e.g. crowding) and single outcome variables (e.g. physiological stress), contemporary research strives for integrative models and approaches that combine multiple influences and relationships among environmental and human conditions. This trend can be related to a growing interest in understanding and

solving complex societal problems, which is increasingly replacing the traditional focus on individual problems (Bonnes & Bonaiuto, 2002). In general, for research to be applicable to 'real-world problems', it is important to provide a comprehensive picture that integrates the manifold environmental, social and psychological aspects of these problems.

The trend towards integrative models and approaches is clearly illustrated in the chapters on urban environmental quality (Chapter 10) and quality of life (Chapter 11) of Part I of this book. In these chapters, multidimensional measures are presented that comprise comprehensive sets of positive and negative aspects of urban environmental quality and quality of life. The trend towards integrative approaches is also echoed in the fact that this book does not include any chapters on single (negative) aspects of environmental quality, such as noise or crowding, which used to figure prominently in previous introductions to environmental psychology (e.g. Bell, Greene, Fisher, & Baum, 2001; Gifford, 2007a). The new, integrative approach is also gaining ground in research on factors that determine environmental behaviour, as discussed in Part II. In particular, Chapter 13 discusses multidimensional measures that integrate different environmental behaviours, while Chapter 18 discusses theories such as goal framing theory that integrate different determinants of environmental behaviour. In Part III of the book, an integrated self-regulation model of behaviour change is presented that links different intervention types to different stage-specific change mechanisms (see Chapter 25).

From one psychology to multiple psychologies

A third overarching trend is the development of multiple subfields or 'psychologies' within environmental psychology. This trend, which has also been described by Giuliani and Scopelliti (2009), can be considered as a **counter-trend** against the more unifying trends towards sustainability as a central guiding principle of the field and the development of integrative approaches. This counter-trend involves the development of more or less independent subfields with their own research topics and theoretical and empirical paradigms. Some notable examples of psychologies as discussed in this book include the research on risk perception (Chapter 2), scenic beauty (Chapter 4), restorative environments (Chapter 6), human dimensions of wildlife (Chapter 8), urban environmental quality (Chapters 10 and 11), environmental behaviour (Part II, particularly Chapter 18), social dilemmas (Chapter 17), habits (Chapter 19) and strategies for behaviour change (Chapters 21 and 22). In addition, several emerging subfields, such as the study of environmental cues (Chapter 12), persuasive technologies (Chapter 23) and agent-based modelling (Chapter 26) can be identified.

The development of new psychologies within environmental psychology has many positive consequences, such as a more in-depth analysis of the specific phenomenon of interest, the development and test of sound theories, a refinement of methods, and a stimulation of collaborations with other disciplines. For example, the recent emergence of the subfield of restorative environments research has yielded

new insights into and theories on the psychological mechanisms underlying recovery from stress and mental fatigue, it has led to the development of a new paradigm for studying and measuring restorative processes, and it has stimulated a collaboration with medical scientists to properly measure and diagnose stress (see Chapters 5 and 6). As another example, research on environmental behaviour has yielded important insights into how pro-environmental actions can be promoted via the strengthening of values and norms, it has led to the development of new methods for assessing environmental behaviour (i.e. the Campbell paradigm and measures of direct and indirect energy use of households), and it has stimulated collaboration with environmental scientists for assessing the environmental impacts of behaviour, thereby increasing the potential societal impact of this research (see Chapters 13, 14, 15, 18 and 21).

However, as noted by Giuliani and Scopelliti (2009), a drawback of the development of psychologies within environmental psychology is that it impedes the realisation of a coherent and unifying theoretical framework as previously auspicated by pioneers of environmental psychology such as Craik (1973), Wapner (1995) and Proshansky (1987). Moreover, fragmentation of the field can lead to a decreased collaboration and weakening of the networks within environmental psychology. This latter issue may be partly countered by organising more joint activities that facilitate collaboration and exchange, such as the publication of this book and the organisation of international conferences and summer schools.

28.3 CHALLENGES FOR FUTURE RESEARCH

Although the field of environmental psychology has steadily advanced over the past years to the stage where it has become an active contributor to a more sustainable society, many challenges for future research still exist. In this last section of the book, we discuss three major challenges that apply to the field as a whole. These challenges address the needs for further integration, further development of theories and models, and further engagement of environmental psychologists with environmental problems.

Further integration

An important issue on the research agenda of environmental psychology is the need for further integration within and between the different subdomains that study environmental influences on behaviour (see Part I) and human influences on the environment (see Parts II and III). In each of these domains, integrative models and solutions have focused either on combining multiple (positive and negative) environmental

determinants of human well-being (e.g. Chapter 10) or on combining multiple (positive and negative) individual determinants of environmental behaviour (e.g. Chapter 18). However, further steps towards integration within and between these domains can and need to be taken.

Within the domains that study influences of the environment on humans, and influences of humans on the environment, further integration can be achieved by considering the combined influence of 'people and place components' at different scale levels (Stamps, 1996; Winkel, Saegert, & Evans, 2009). To this end, **multilevel models** have become widely available that enable the effects of contextual and individual factors and their interaction on variables of interest to be studied. Such models are still rarely used in environmental psychology. So far, the application of multilevel modelling in environmental psychology has mostly been restricted to studies in the areas of landscape preferences and health benefits of nature (see Chapters 4 and 5) and studies on neighbourhood perceptions and place attachment (see Chapters 4 and 10). In research on environmental behaviour, the combined influence of individual and contextual studies has hardly been studied (see Steg & Vlek, 2009a, for some exceptions), and not been studied via multilevel modelling.

Between the domains of environmental influences on humans and human influences on the environment, the challenge for further integration lies in identifying and encouraging human–environment interactions that contribute to environmental quality as well as to human well-being. In this book, this challenge is addressed by research showing that environmental policies may safeguard quality of life (Chapter 11), research on affective dimensions of environmental behaviour which reveals that engaging in behaviours that are good for the environment can also make people feel good (Chapter 16), and in research on persuasive technologies in which solutions are proposed that alleviate the cognitive demand of monitoring environmental behaviour (Chapter 23). A further example of cross-domain integration is provided by recent Dutch research on design interventions (involving lighting or music) that improve human well-being by decreasing the waiting time at train stations while at the same time stimulating the pro-environmental choice for public instead of private transport (Van Hagen, 2011). Another example concerns the stimulation of contact with nature (especially in children) as a means to stimulate biospheric values and connectedness to nature, which in turn can foster pro-environmental behaviour (Kals, Schumacher, & Montada, 1999; see also Chapter 14).

Further development of theories and methods

Another major challenge for environmental psychology is to connect with theoretical and methodological developments within mainstream psychology. Three developments seem particularly promising with regard to human–environment transactions. First, a substantial body of research has ascertained that much of human behaviour is driven by automatic, presumably largely unconscious processes (Bargh & Ferguson, 2000). This research has yielded important new models and theories about the implicit regulation of behaviour (Strack & Deutsch, 2004), along with innovative

methods to study implicit processes (Gawronski & Payne, 2010; Greenwald & Banaji, 1995). These developments are beginning to find their way to environmental psychology (see Chapters 12, 15, 19 and 23). However, the full potential of theories and methods for studying implicit processes has not yet been realised.

Second, there has been a shift from theories that emphasise ‘cold’ cognitive determinants of behaviour to theories that emphasise ‘hot’ emotional influences (Loewenstein, 1996). The role of emotion in behaviour continues to be highly debated. Nevertheless, it is clear that a comprehensive account of human behaviour should address the fact that people’s choices and decisions are often influenced by their passions and emotional impulses. The importance of emotions to understanding human behaviour is increasingly recognised in environmental psychology, as illustrated, for example, in Chapter 2 on risk perception, Chapter 7 on ambivalence towards landscapes, Chapter 8 on human dimensions of wildlife and Chapter 16 on affect and environmental behaviour. However, especially the research on environmental behaviour still remains dominated by rational-decision making models (see Steg & Vlek, 2009a, for a review). A major task for research on environmental behaviour is to develop models that incorporate emotions without losing the rigour and structure that are the main strengths of existing models (cf. Loewenstein, 1996).

Third, a biological revolution has taken place in many areas of psychology, with an increasing emphasis on the use of **neuroscience** methods to study brain processes that underlie people’s thoughts and behaviour (Heatherton & Wheatly, 2010). Among other things, this revolution has led to a widespread use of **neuroimaging** techniques for mapping which areas of the brain are activated when people engage in certain behaviours. Neuroimaging techniques can provide valuable insights into the location and functions of brain areas that are associated with human–environment transactions, such as the perception of natural or urban environments, or the experience of guilt when engaging in environmentally harmful behaviour. However, so far these methods have been little applied in environmental psychology.

Further engagement

A final and perhaps most urgent challenge for environmental psychology is to move towards a greater engagement with the problems that are studied (Gifford, 2007b, 2008). As demonstrated in this book, environmental psychology has increasingly embraced sustainability as a central focus of research, delivering many valuable insights and tools for promoting sustainability at local and global levels. However, environmental psychology is not yet a major player in sustainability science. To really make a difference in the struggle to save the planet from environmental and societal degradation, environmental psychologists need to become more engaged.

There are several lines of actions that environmental psychologists can take to strengthen their position in the sustainability debate. One is to improve and expand the academic infrastructure for education and research so that more and better research can be done. Since an academic infrastructure for environmental psychology is still lacking in most countries of the world, there is much to be gained from this

endeavour. Attempts to establish or strengthen the academic infrastructure of environmental psychology are probably most effective in those countries and regions of the world where the consequences of environmental problems are most strongly felt and sustainable solutions are most needed, in particular the developing countries (see Chapters 20 and 27).

Another line of action for environmental psychologists is to further increase the political relevance and applicability of their work. For example, by modelling the outcomes of different policy choices, environmental psychologists can directly inform policy makers of the effectiveness of environmental policies, thereby increasing the chances that the most effective and sustainable policies are implemented (see Chapters 21, 22, 23 and 26). Moreover, by examining factors influencing the acceptability of environmental policies, environmental psychologists can advise policy makers on how to increase public support needed to successfully implement such policies (see Chapter 24). By publishing research outcomes in professional journals or magazines for a general audience, environmental psychologists can increase the chances that their findings are actually adopted and applied. Environmental psychologists may even enter the political arena themselves and become 'green lobbyists' (Gifford, 2007b, 2008). However, such a direct political engagement may be one step too far for many environmental psychologists who strive to maintain a more objective position.

Finally, we would like to draw attention to initiatives at the interface of science, politics and society, such as the establishment of an international forum that brings together knowledge on the behavioural determinants of global environmental problems (Ehrlich & Kennedy, 2005). Such initiatives can play a crucial role in engaging groups of citizens and policy makers globally to explore the moral elements and the consequences of choices about environmental change. By taking a leading role in these initiatives, environmental psychologists can show their engagement and contribute to interdisciplinary and transgovernmental solutions that truly make a difference for present and future generations.

GLOSSARY

counter-trend A trend that goes against the general direction in which a discipline or something else is moving.

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

multilevel models Statistical models of parameters that vary at more than one level (e.g. individual and contextual factors). Also known as hierarchical linear models.

neuroimaging The use of techniques such as functional magnetic resonance imaging (fMRI) or positron emission tomography (PET scans) to image or 'map' the structure and/or function of the brain.

neuroscience The scientific study of the nervous system.

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.

trend The general direction in which a discipline or something else tends to move.

SUGGESTIONS FOR FURTHER READING

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REVIEW QUESTIONS

1. Describe three major trends in environmental psychology.
2. Describe three main challenges for environmental psychology.
3. Give an example of a case or problem in which the influences of individual and contextual factors on perceptions, evaluations or behaviour are examined simultaneously.

