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Environmental Perspectives on Ageing

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INTRODUCTION

According to Dannefer, context, broadly defined,[1] 'refers to the totality of the diverse range of phenomena, events and forces that exist outside the developing individual' (1992: 84). The assumption that ageing occurs in context has meanwhile become, implicitly or explicitly, a core feature of models of ageing in biology, as well as those in the social and behavioural sciences. How such context is defined more concretely and what kind of impact is attributed to context strongly depends on the meta-theoretical perspective on ageing behind each of these disciplinary approaches.

First, in current *biogerontological* theories, ageing is primarily viewed as an internal process of decline related to the flow of chronological age, ending in the event of death (Cristofalo et al., 1999). Environmental conditions are, however, expected to shape the survival time of ageing organisms, because it is generally acknowledged in models of longevity that genetic factors explain less than 30 per cent of variability in survival time in humans and in many other species (Vaupel et al., 2003). The understanding of context in biological models of ageing tends nevertheless to remain rather general, mostly referring to external physical properties such as temperature, kind and quantity of food, or environmental stress.

Secondly, the *social and behavioural sciences* have put major emphasis on the operation of historical, cultural, and societal contexts, and how these shape ageing processes. As has been convincingly argued, historical events along with societal expectations and norms play a critical role in the sequencing of the life course[2] from its very beginning to its very end (Baars et al., 2006; Dannefer, 1992; Elder, 1974). Hence, sociologists often focus on characteristics such as social class, cohort, and community-level variables to address the impact of contexts on older adults both today and in the future (e.g., see Phillipson, 2007).

Psychological models of human ageing have also argued that the contextual component of lifespan and adult life development is critical to understanding development and ageing (Baltes et al., 1980, 1998). As compared to social science perspectives, the emphasis is more on *micro* rather than *macro* levels of person–environment (p–e) interfaces. That is, a fundamental psychological challenge for ageing individuals is continuously to adjust their relationship with the environment that they inhabit. Such adjustments may be required, for example, by loss in functional capacity (implying the need to relocate to a barrier-free environment), or by major life events related to ageing, such as the experience of retirement (occasioning, for instance, changes in the use of everyday living space at home with a partner). Accordingly, a major research task of psychological gerontology is to describe and explain stability and change of p–e dynamics as people age.

An additional approach to defining context, which has evolved within gerontology, places major emphasis on the physical environmental sphere. Social gerontology has always acknowledged the critical role of physical surroundings on older people. This was illustrated by the detailed treatment of the role of housing for older people in one of the first handbooks in the field, edited by Tibbitts (1960). Alongside the evolution of social gerontology, a subdiscipline emerged with strong nurturance from Kleemeier's work (1959), which has been called '*environmental gerontology*' (other terms include 'the ecology of ageing'). This research arena, founded on the basic principle that

old age is a critical phase in the life course and can be characterized by the profound influence of the physical environment, was greatly expanded between the 1960s and 1980s by scholars such as Lawton (e.g. Lawton and Nahemow, 1973), Carp (1966), and Kahana (1982). Finally, the appearance of environmental psychology played a major role, with early contributions to ageing research illustrated in Barker and Barker's (1961) treatment of 'behaviour settings' in American and British towns. Partly inspired by Kurt Lewin's (1936) field theory, environmental psychology's emphasis on old people's physical environments also became instrumental in putting environmental gerontology high on the agenda of social and behavioural ageing research during the 1970s and 1980s (Wahl and Weisman, 2003).

This chapter focuses mainly on environmental gerontology as the preferred term in the field (Scheidt and Windley, 2006; Wahl and Gitlin, 2007). 'Environmental gerontology' indicates the necessarily interdisciplinary understanding of **person–environment (p–e)** interchange processes in ageing (Wahl, 2001; Wahl and Gitlin, 2007), involving disciplines such as psychology, sociology, architecture, social geography, occupational therapy, and urban planning. Furthermore, the term 'physical–social environment' is used in the rest of the chapter to acknowledge that there is no 'objective' environment 'out there' without social interpretation, cultural meaning, ongoing historical reassessment, and *Zeitgeist* influences. For example, the house is both a physical structure constructed through established cultural practices as well as a place infused with pronounced intimacy with one's partner, social interactions, and the symbolization of attachment, normalcy, and loss (Wahl and Gitlin, 2007). Moreover, new types of environmental change are being produced as the traditional view of 'ageing in place' has been challenged and we see an increasing proportion of older adults moving, for instance, to new places such as retirement communities or to southern European regions. It should finally be emphasized that, throughout the chapter, our focus will be on community-dwelling older people.

TASKS, SCOPE, AND FUNDAMENTAL RESEARCH QUESTIONS OF ENVIRONMENTAL GERONTOLOGY

Environmental gerontology emphasizes the development of an in-depth understanding of the interrelations between ageing persons and their physical–social environments and how these relationships influence a variety of outcomes for

older people (Wahl and Gitlin, 2007; see also Wahl and Weisman, 2003). The overarching aim of environmental gerontology is thus to describe, explain, and modify/optimize the relationship between the ageing person and his/her physical–social environment.

With regard to sources of data and information, environmental gerontology places emphasis upon the day-to-day contexts of ageing individuals, reinforcing the importance of *natural settings* for gerontological research. The rationale is that older people spend most of their time (i.e. about three-quarters of their daytime) in the home and immediate home environment (Oswald and Wahl, 2005). As a consequence, housing has been a major focus of research in environmental gerontology (Oswald and Wahl, 2004). Moreover, older individuals tend to live a long time in the same place. For example, in the German Aging Survey, nearly one-third of those age 65 years and older have already lived for more than 40 years in the same home (Motel et al., 2000). Such long-term living and ageing at the same location often evokes rich cognitive and affective ties to the place one lives, known in German as *Heimat* (homeland). This is place identity and place attachment to the very specific genius loci of 'my place'. Seasonal changes occurring over the course of the year, such as those in lighting, temperature, weather conditions, smells, and noises, also contribute considerably to the environmental experience of the normal rhythm of life, and may be of particular importance for older people, as they provide orientation in space and time.

Explanation of behaviour (or development) has remained a major challenge of environmental gerontology. Theories have explored both the objective and subjective processes of ageing individuals interacting with their environments. Theories considering the objective dimension of p–e relations have primarily focused on level and type of competencies of ageing individuals in relation to design characteristics and the demands of physical environments (Lawton and Nahemow, 1973). Other approaches have posited a range of psychosocial processes by which ageing individuals form cognitive and affective connections, and have considered how these in turn impact on older individuals' lives. Yet, theoretical development has been uneven. In 1990, Parmelee and Lawton declared environmental gerontology to be languishing (1990: 483). Subsequently, European conceptual and empirical input from the field of environmental gerontology has been recognized as an increasingly important driver and innovator within the discipline (Phillipson, 2004, 2007; Scharf, 2000; Wahl and Iwarsson, 2007). Environmental gerontology's focus on *optimization* reflects an aspiration to contribute directly to the improvement of

quality of life in old age through means of intervention. Prototypical is the involvement of environmental gerontology in advancing evidence-driven modifications to the home, adding to the development of new housing solutions for the diversity of ageing individuals, or designing public spaces. Seen on a more general level, optimization of the physical–social environment has created one of the strongest bridges to application in social and behavioural gerontology at large (Windley and Weisman, 2004).

Against these tasks, we see at least three inter-related research questions and challenges for environmental gerontology:

1 *Understanding how ageing individuals are managing the opportunities and constraints of their physical–social environmental conditions.* To achieve this, the following questions are relevant: How far and under what conditions are older people able to exert control and influence over their physical–social environments? What do we learn about ageing at large when we observe *proactive* use and change of physical–social environments, such as goal-directed and creative redesigning of existing home environments or even the active selection of new environments?

2 *Clarifying connections between the objective and the subjective dimensions to individuals and their world* is especially important for environmental gerontology. Relevant questions include: Why is the distinction between objective and subjective physical–social environments important, and why might it be particularly critical for ageing individuals to always consider both dimensions? Do older people, to take one illustration, compensate for loss of accessible housing through strong subjective bonds to the environment, or could processes of place attachment also be maladaptive?

3 *Examining the contribution of the p–e perspective to understanding the course and outcomes of ageing.* Such outcomes include well-being, autonomy, the preservation of self and identity, and somatic and mental health. It remains as yet unclear whether there is sufficient empirical evidence to drive interventions such as home modification or the reshaping of city districts or even the infrastructure of whole countries.

These are complex questions, and the available data is as yet incomplete. Unfortunately, the inclusion of variables targeting the physical–social environment (e.g., an intensive data protocol on objective and perceived housing characteristics) has remained the exception in major gerontological, particularly longitudinal, data sets. Thus, a commonly rich empirical research resource of primary and secondary data analysis for areas such as cognitive ageing, personality, social relations, or mental health is scarce when it comes to the understanding of the interface between ageing individuals and their physical–social context.

Given that persons with declining competencies are especially vulnerable to their physical–social environments, a particular focus of environmental gerontology has been on p–e attributes such as safety, accessibility, orientation, privacy, autonomy, and personal control among the very old and among individuals with a high prevalence of physical and cognitive impairments and chronic illnesses. Nevertheless, the scope of environmental gerontology reaches across the continuum of wellness, from the highly competent to the very frail. Furthermore, environmental gerontology considers the full scope of physical–social environments on the micro (e.g., traditional housing, the variation of purpose-built housing from assisted living to retirement care communities), meso (e.g., neighbourhoods, infrastructure, city districts), and macro level (e.g., urban versus rural, ageing in specific regions or countries, globalization).

From this review of the background to environmental gerontology, and some key questions for research, we turn to consider some of the main theoretical perspectives developed within the discipline.

MAJOR THEORETICAL PERSPECTIVES OF ENVIRONMENTAL GERONTOLOGY

Theorizing in environmental gerontology starts with the fundamental idea that human development over the life span, which includes old age, is driven by an ongoing interchange between individuals and their social and physical environment. According to Bronfenbrenner's (1999) bioecological model of lifelong coping with environmental conditions, different layers of p–e interchange must be considered, including:

- the *microsystem* (the interpersonal interactions within the immediate environment)
- the *mesosystem* (two or more microsystems directly affecting the developing individual)
- the *exosystem* (linkages between subsystems that indirectly influence the individual), and
- the *macrosystem* (values, norms, and legislation of a given society).

Furthermore, life-span development is seen as a never-ending sequence of ecological transitions in which new p–e territories are continuously conquered, while other p–e territories are left behind.

Prototypical examples include the transitions from school to the labour sphere, from the labour world to retirement, and from community-dwelling living to nursing home, assisted living, or retirement community.

Against this general ecological understanding of human development, the discussion moves to a more fine-tuned view of p–e interchange as people age. In order to address the complexity of p–e dynamics, Figure 8.1 outlines a conceptual framework that refers to two key processes of p–e interchange in later life, p–e belonging and p–e agency. These two constructs can be said to provide a useful basis for integrating the major theoretical approaches developed in environmental gerontology (Oswald and Wahl, 2005; Scheidt and Windley, 2006; Wahl, 2001; Wahl et al., 2004).

Processes of *belonging* account for the full range of p–e experiences; processes of *agency* emphasize the full range of goal-directed p–e cognitions, behaviours, and social practices. Processes of belonging entail mainly the cognitive and emotional evaluation and representation of physical environments, as well as processes of attachment to places over time, leading to patterns of place meaning. One aspect of p–e belonging is the individual's cognitive orientation towards her own environmental past, present, and future, verbalized as home-related reminiscence or housing plans. Processes of agency, in contrast, deal with the exertion of cognition, specifically physical environment-related cognitions such as the perceived controllability of one's physical environment. On the behavioural level, the interplay between being subdued by the demands of physical environmental conditions ('docility') versus active use, compensation, adaptation, retrofitting, and creation of places ('proactivity') is particularly important. Moreover, the physical environment may or may not fit to the older individual's functional impairments and needs, echoing another facet of p–e agency with respect to enhancing or constraining conditions. Processes of p–e agency are considered to be especially important in old age due to the decrease in functional capacity and behavioural flexibility as people age. Furthermore, these two interrelated processes of p–e interchange are linked to major developmental outcomes as people age. These outcomes mainly echo what are often considered to be fundamental developmental tasks in later life – namely, to remain independent for as long as possible as well as to maintain one's integrity in terms of identity. To accomplish these developmental tasks, processes of p–e belonging and p–e agency are expected to play a major supporting role. Finally, it is assumed that both identity and autonomy are also globally related to well-being. We use this term in its widest sense to address cognitive and affective evaluations of one's life as well as healthy ageing outcomes in both the somatic and mental spheres.

The model under discussion simultaneously considers autonomy, identity, and well-being as major endpoints of p–e interchange as people age. This is significantly different from traditional approaches in environmental gerontology, which have concentrated on only *one* of well-being (e.g., Lawton and Nahemow, 1973), autonomy (e.g., Carp, 1987), or identity (e.g., Neisser, 1988).
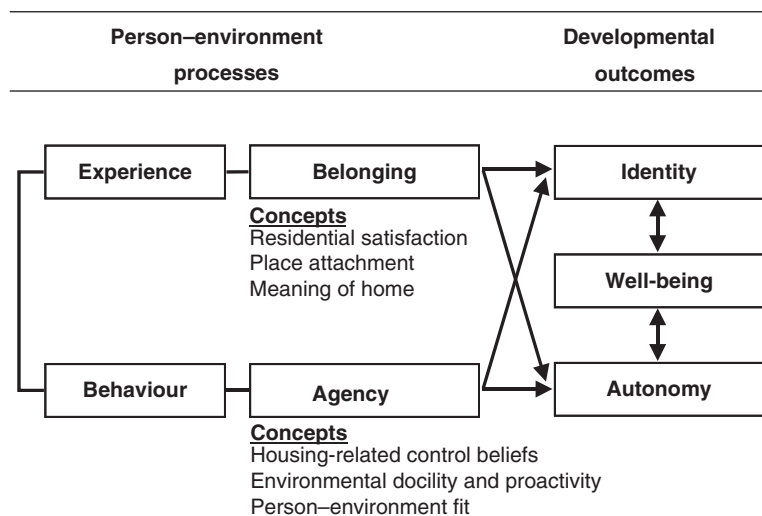
Figure 8.1   Overarching conceptual framework on person–environment relationships in later life

In order to illustrate the integrative potential of the constructs of p–e belonging and p–e agency, we discuss the classic approaches of environmental gerontology under these conceptual umbrellas, followed in the next section by a selection of respective empirical findings.

Processes of person–environment belonging

Processes of belonging have frequently been based on concepts and theories of residential satisfaction, including, to take one example, subjective evaluations of the environment based on age or geographic location, as well as the relationship between residential satisfaction and life satisfaction (Aragonés et al., 2002; Pinquart and Burmedi, 2004; Weideman and Anderson, 1985). Residential satisfaction is also considered as a manifestation of place evaluation processes. The potential of the construct of residential satisfaction in relation to p–e processes lies in its attempt to provide a broad attitudinal and cognitive evaluation of housing. Often, residential satisfaction is assessed by single-item self-evaluations (Oswald et al., 2003b; Pinquart and Burmedi, 2004). The criticism of this approach is reflected in the well-known residential satisfaction paradox, which is a special case of a general problem with measures of satisfaction. The problem is that evaluations are typically biased towards the positive and the correlation between subjective and objective ratings (in the case of residential satisfaction of the house, neighbourhood, or city district) tends to be low-to-medium at best, reflecting apparent satisfaction despite objective loss (Fernandez-Ballesteros, 2001; see further below).

Theories on place attachment and identity (Altman and Low, 1992; Neisser, 1988; Stedman, 2002) emphasize domains of belonging in a more process-oriented and differentiated way. Beyond residential satisfaction, place attachment both influences attitudes and encompasses the gamut of processes that operate when people form affective, cognitive, behavioural, and social bonds to the environment (Brown and Perkins, 1992), thereby transforming 'space' into 'place' (Altman, and Low, 1992; Rowles and Watkins, 2003). Often these aspects of physical, social, and personal bonding are assessed by global attachment evaluations, e.g., on indoor versus outdoor place attachment (Oswald et al., 2005). While most such studies are quantitative, a number of studies use a qualitative approach to explore the relation between place attachment and identity (Peace, 2005).

Furthermore, concepts of the meaning of home are directly related to place attachment, as they deal with the most frequent manifestation of attachment processes. Since older adults have often lived a long period of time in the same residence, cognitive and emotional aspects of the meaning of home are often strongly linked to biography. Such social, cognitive, and emotional links may become manifest through processes of reflecting on the past, symbolically represented in certain places and cherished objects within the home. Thus, belonging covers non-goal-oriented cognitive and emotional aspects of bonding. Moreover, it covers behavioural and physical bonding, because familiarity and routines have been developed over time. Most research on the meaning of home has relied on qualitative methodology (Rowles, 1983; Rubinstein, 1989; Sixsmith and Sixsmith, 1991), although some researchers have successfully developed quantitative measures of some aspects of meaning of home (Oswald et al., 2006; Rowles, 2006).

In terms of outcomes, a long-standing theoretical assumption is that a sense of belonging contributes to place-related identity (Born, 2002; Neisser, 1988). Rowles, using a social–geographical approach, argues that processes of place attachment and the allocation of meaning of place reflect physical, autobiographical, and social 'insideness' as a result of the long duration of living in the same place: 'Place becomes a landscape of memories, providing a sense of identity' (Rowles, 1983: 114; see also Rowles and Watkins, 2003). One observation here is that in discussions regarding the ageing self, the management of the relationship between interior and external worlds in later life is often reduced to the social environment, neglecting the role of physical aspects of the home (Biggs, 2005; Peace, 2005). Substantial links between processes of self and identity and well-being, as stated in our model (see again Figure 8.1), have been assumed in major psychological theories of life-span development, such as Erikson's psychosocial crisis approach (Erikson, 1950), Levinson's conception of adult development (Levinson, 1986), as well as in theories on successful ageing (Ryff, 1989). However, neither these scholars nor other life-span developmental scholars have paid attention to environmental determinants of ageing.

Processes of person–environment agency

Processes of p–e agency mainly cover cognitions and evaluations, which precede adaptive behaviour aimed to regulate p–e dynamics as people age. A prominent framework in this vein is psychological control theory (Lachman, 1986; Lachman and Burack, 1993), which has recently been applied

to the housing domain (Oswald et al., 2007a). Housing-related control beliefs explain events at home either as contingent upon one's own behaviour, or upon luck, chance, fate, or powerful others. The argument is that control beliefs related to the regulation of p–e exchange at home become increasingly important in old age. As has been revealed in a number of longitudinal studies, external control beliefs are especially sensitive to age-related changes, particularly due to health and functional ability losses, but also due to negative stereotyping. They thus become crucial in explaining autonomy and well-being (Baltes et al., 1999a; Clark-Plaskie and Lachman, 1999).

On the behavioural level, processes of agency mainly rely on the concepts of environmental docility and proactivity, derived from the ecological theory of ageing (ETA) (Lawton, 1982, 1989; Lawton and Nahemow, 1973; Scheidt and Norris-Baker, 2004). The basic assumption is that the capacity to adapt to existing environmental press (the demands and limitations of the environment) decrease as people age, due to an increasing number of functional limitations. The original model describes behaviour and affect primarily as functions of the levels of personal competence and environmental press (Lawton, 1982; Lawton and Nahemow, 1973). The p–e agency in that sense is reduced to docile reactions on existing circumstances. However, in an extension of the model, the environmental proactivity hypothesis assumes that older adults may strive proactively to change housing conditions according to their own wishes and needs in order to maintain independence. This enables them to cope with environmental press and to profit from the full scope of available environmental opportunities (Lawton, 1989), including moving to another location that can better fulfil their housing needs (Oswald and Rowles, 2007; Warnes and Williams, 2006). An important methodological implication of using the docility and proactivity model is that both objective person-related information (e.g., on functional limitations) as well as independently gathered physical–social environment-related information (e.g., a comprehensive assessment of all barriers in a home) is necessary. A surprising observation in this regard is that though the ETA has reached wide prominence in research and application, assessment methods still seem to be far from any gold standard and many unevaluated person and environmental checklists have entered the field (Wahl and Iwarsson, 2007).

Other theoretical concepts address the level of p–e fit and misfit on several domains of p–e exchange as a prerequisite or manifestation of p–e agency, e.g., in the congruence model of p–e fit suggested by Kahana (1982) and in the complementary/congruence model proposed by Carp and Carp (1984). A critical message inherent in p–e fit concepts is that the level of behavioural competence in a certain domain corresponds with the given level of environmental press (e.g., barriers at home), leading to adaptation (fit) versus maladaptation (misfit). Establishing p–e fit assessment can open a perspective on p–e agency for those who are especially at risk in later life, in terms of the congruence of individual competence or needs and environmental demands or conditions. Again, however, assessment instruments have seldom surpassed the status of research devices, with some rare exceptions, particularly the concept of accessibility and respective measurement approach suggested by Iwarsson (2004).

As far as the relationship of p–e agency and autonomy is concerned, a common argument in environmental gerontology is that the physical–social environment may either constrain autonomy or compensate for reduced functional capacity (Carp, 1987; Wahl and Gitlin, 2007). As convincing as the argument may seem at first glance, it deserves differentiation in its understanding of ongoing p–e dynamics. For example, it could well be that nothing remains in terms of explanatory potential for the physical–social environment if a comprehensive assessment of functional limitations and other factors is introduced. Thus, this part of our model (see again Figure 8.1) is subject to further empirical evaluation, while the linkages between autonomy and well-being as proposed in our model have been demonstrated as quite robust (George, 2006).

Interaction of person–environment belonging, agency, and developmental change

Within environmental gerontology theorizing, the domains of p–e belonging and agency are typically addressed separately. However, it makes considerable sense to assume that both p–e interchange processes are closely intertwined and work hand in hand as people age. For example, older people living at home and suffering from severe competence loss can adapt to environmental challenges behaviourally, cognitively, and emotionally (Oswald and Wahl, 2005). They may objectively reduce their action range *and* subjectively re-evaluate their interior spaces as more valuable in contrast to the outdoor environment, which is no longer accessible to them. Thus, p–e adaptation in later life does not refer to either behaviour *or* experience; rather, it refers to both (Rowles et al., 2004). The methodological consequence of this insight is that a balanced set of behavioural (objective) as well as experiential

(subjective) data related to the physical–social environment is needed in empirical research.

A SELECTION OF EMPIRICAL INSIGHTS FROM ENVIRONMENTAL GERONTOLOGY

This section examines a range of empirical work from environmental gerontology relevant to the conceptual framework suggested earlier. The dominant approach in the literature, as noted earlier, has tended to come from North American researchers. However, this review also includes coverage from European contributions.

Findings related to processes of person–environment belonging

As can be expected from our conceptual reasoning (see again Figure 8.1), processes of p–e belonging have been treated in the empirical environmental gerontology literature from a diversity of perspectives. Here, there has been a strong tradition of work focused on residential satisfaction. This is an important construct because it adds to the explanation of well-being and mental health (Oswald et al., 2003b; Windley and Scheidt, 1982), although its use in statistical analysis is limited by its usually low variance. As noted earlier, the majority of older persons are satisfied with their housing situation when asked in this general way, and responses are weakly correlated with objective conditions. For instance, Fernandez-Ballesteros (2001) observed in a study with Spanish elders that perceived (subjective) home environment quality correlated only moderately ($r = -0.36$) with objective need of repair. Pinquart and Burmedi (2004) have provided a meta-analytic integration of the available evidence on residential as well as neighbourhood satisfaction. Among their findings is that residential satisfaction increased with age, a finding reflected in longitudinal as well as cross-sectional studies. This is in accordance with the general assumption that motivations related to environmental belonging increase as people age.

Further support for the age-related increase of belonging comes from studies on place attachment and identity such that conducted by Zingmark et al. (1995) in North America, which considered a wide age range. Similarly, the work of Burholt and colleagues (e.g., Burholt and Naylor, 2005), Peace (2005), and Sixsmith and Sixsmith (1991) in England provided evidence confirming that attachment to place is an important feature of old

age, particularly in old and very old individuals, underpinning core elements of the ageing person such as self, identity, and quality of life.

Investigations into the meaning of home have been explored in North American qualitative work, with Rowles (1983) and Rubinstein (1989) being among the landmark studies. Rubinstein and De Medeiros (2004) reported linkages between the physical–social environment and the ageing self, which accords with the argument of this chapter that processes of belonging are strongly connected to self and identity. The relation between meaning of home and competence loss in later life has been examined in a German study, with data drawn from qualitative in-depth semi-structured interviews with 126 elders (Oswald and Wahl, 2005). One-third of the participants were in good health, one-third suffered from severe mobility impairment, and one-third were blind. The meanings attached to home derived from this study were: (1) 'Physical', focusing on the experience of housing conditions such as experience of the residential area and furnishing; (2) 'Behavioural', related to the everyday behaviour of the person at home and to ways of rearranging items in the home; (3) 'Cognitive', representing biographical bonding to the home, such as the experience of familiarity and insideness; (4) 'Emotional', expressing the experience of privacy, safety, pleasure, and stimulation; and (5) 'Social', expressing relationships with fellow-lodgers, neighbours, or visitors. Healthy participants were more appreciative of the physical location, access, and amenity aspects of the home. Impaired participants emphasized the cognitive and biographical significance of the home. This is, at least indirectly, also in line with our conceptual expectation of a link between ageing and belonging. With respect to behavioural and social aspects, blind participants concentrated more on their social and cognitive sphere and less on behavioural and physical aspects of the home, while the meaning patterns for the mobility-impaired participants included behavioural aspects to a greater extent. About the same share of statements were made with regard to emotional themes in all three groups.

Findings related to person–environment agency

Research on perceptions regarding the older person's ability to control crucial aspects of their environment, such as housing, has been feature of work carried out by Oswald et al. (2003a). Perceptions that this aspect of the environment is beyond the individual's control contribute substantially to explanations of variance in outcomes

related to autonomy (i.e., a measure of activities of daily living). This has been observed for different data sets from a selection of European countries; these indicate the expected negative relationship, with a belief that control over housing is beyond the individual's responsibility, linked to lower autonomy and higher depression in the range of countries covered in the study (Oswald, 2007b).

Going further, assumptions of the ETA concerning processes related to environmental docility and proactivity and p–e fit have also found considerable though not consistent empirical support. Iwarsson (2005) found that accessibility, a construct considering the fit between functional limitations *and* objectively observed barriers in the home environment, is more important for functional ability than the number of barriers as such, which was unrelated to functional ability. Wahl et al. (1999) found additional support for this assumption in a group of visually impaired elders, but also added some complexity to p–e dynamics in the home environment. The p–e fit was particularly important for those activities which assist independent living in the community, but less important for achieving the basic task of daily living. The explanation given for this was that the objective environment becomes particularly important in more complex activities, while basic activities are so critical for day-to-day autonomy that older adults strive to exert these even when experiencing adverse environmental conditions. Wahl et al. (in press) provide a literature analysis of all studies published between 1997 and 2006 in peer-reviewed journals, which addressed relations between the physical home environment and endpoints such as activities of daily living, amount of help and support needed, and falls. A total of 21 studies found supportive or at least partially supportive evidence for substantial linkages between environmental barriers and hazards in the home and disability-related outcomes, while only four did not. Again, the subset of studies also considering the fit or lack of fit between a person's functional limitations and physical barriers revealed the relative strongest linkages with disability-related outcomes.

Despite the critical mass of research, the absence of longitudinal studies remains a problem, as does the quality of many of the available studies. The latter particularly applies to the reliability and validity of home environment measurement devices. It is also disappointing that not a single study is available investigating the impact of the physical home environment on dementia-related disorders. Another limitation of the literature is the underuse of proactivity and the overuse of docility as a conceptual driver of empirical research, thus providing a somewhat one-sided

image of older people as being the pawns of 'bad' environments. Wahl et al. (1999) were able to underline, drawing from the sample case of elders with irreversible low vision, that even in the situation of severe loss of competence a rich set of 'palliative' compensations and adjustments on the p–e level can be found. For example, reducing one's outside and even inside available space seems a developmental loss at first glance, but is highly efficient in enhancing the feeling of being in control in a now 'smaller world'. Such 'gaining by losing' strategies may possibly provide a fundamental p–e mechanism to 'survive' in the situation of chronic functional loss that becomes more common in very old age.

In a wider understanding of p–e fit or misfit as suggested in our theoretical section, research on the role of neighbourhoods comes into play. Research into this aspect was conducted by Scharf et al. (2005) in urban communities in England. The major concept driving this research was the multi-dimensional phenomenon of social exclusion, composed of neighbourhood exclusion, exclusion from material resources, social relations, civic activities, and basic services. Among 600 persons aged 60+ living in deprived neighbourhoods, Scharf et al. found that a threefold differentiation existed: 33 per cent were not excluded on any of the five dimensions, whereas 31 per cent experienced exclusion in one dimension and 36 per cent exclusion in a cumulative manner. In Germany, Oswald et al. (2005) found that type of neighbourhood correlated with p–e fit in the expected direction: i.e., higher fit was observed in more pleasant city districts, particularly in the domain of higher-order needs such as privacy, comfort, familiarity, and favoured activities.

Simultaneous consideration of person–environment belonging and agency processes

As we have argued, processes of p–e belonging and p–e agency go hand in hand as people age. To address this conceptual need on the empirical level, selected findings from the European ENABLE-AGE Project are presented (Iwarsson et al., 2007[3]). The overarching aim of this study was to explore the home environment as a determinant for healthy ageing in very old age in Germany, Sweden, the UK, Hungary, and Latvia. Among the core components of healthy ageing considered in the ENABLE-AGE study were independence in daily activities and subjective well-being. Regarding processes of belonging, the ENABLE-AGE Project considered meaning of home, the

perceived usability of one's home, and residential satisfaction. In terms of agency, p–e fit processes were considered via matching existing functional limitations with existing environmental barriers resulting in a total accessibility score (Iwarsson, 2004). In addition, housing-related control beliefs (Oswald et al., 2003a) were assessed. The final ENABLE-AGE Survey Study sample at baseline comprised 1918 community-dwelling participants aged 75–89 years, living alone in urban regions in the five included countries. More details of the national samples and of the methods used are provided in Nygren et al. (2007) and Oswald et al. (2007b).

The findings (reported in detail in Oswald et al., 2007b) underscore that participants living in more accessible homes, who perceive their home as meaningful and useful, and who think that external influences are not responsible for their housing situation, were more independent in daily activities and had a better sense of well-being. In particular, it was not the number of environmental barriers in the home environment, but the magnitude of accessibility problems that was substantially related to different aspects of healthy ageing. Moreover, these results applied rather consistently to all five national samples. Taken together, the findings of the ENABLE-AGE Project can widen the perspective when striving for barrier-free building standards to encompass a holistic approach that takes both processes of p–e agency and p–e belonging into account.

NEW CHALLENGES FOR ENVIRONMENTAL GERONTOLOGY

As previously mentioned, most theories and concepts in environmental gerontology stem from the 1970s and 1980s and are predominantly North American in origin. Meanwhile, the argument has been made that the so-called 'new' ageing can be understood better when change over time in p–e relations find particular attention (Wahl et al., 2007). Prototypical examples include:

- transitions in the social environment (e.g., family, other social relations, new contexts of care)
- the home environment (e.g., new housing solutions, the continuing care retirement community movement, new relocation behaviours, temporary and/or secondary residences)
- the outdoor environment (e.g., new mobility behaviour, including new mobility means, as well as new lifestyle and leisure activity patterns), in the technology domain (e.g., internet, smart home technology, high-tech assistive devices),

- and in the societal and policy arena (e.g., globalization and urbanization issues, new understanding of the potential of ageing in politics and in the labour force).

Two examples can be used to illustrate these trends in more detail – urbanization and increasing use of technology and their relation to ageing in the future. Gerontology research has been predominantly based in urban contexts, although this point and its implications are seldom made explicit (Phillipson, 2004). Urban environments raise a number of tensions and pressures for older residents. One such is the need for hypermobility, on the one hand (particularly for the young, well-educated, elite population), and a 'nomadic' lifestyle as well as for place attachment, 'cocooning', and *Heimat*, on the other hand (particularly for older people). Furthermore, there is reason to assume that urban settings, under the influence of globalization, economic pressure, and mega diversity of their populations, launch social exclusion and inequalities in day-to-day quality of life and in the use of resources, which traditionally have been among the fundamental motivations to live in the city (e.g., cultural and recreational facilities, health and care facilities, participation in the modernization of societies at large). The ETA or p–e fit approaches may be helpful to better understand why older adults have a high likelihood of becoming the targets of such social exclusion processes. There is, however, a clear need to bring such micro- to meso-level environmental gerontology theorizing together with macro perspectives, such as those offered in urban sociology and the political science of ageing, under conditions of modernity. Linking, for example, theoretical ideas of place attachment and identity with the social exclusion concept (Scharf et al., 2007) may be a promising conceptual avenue to understand why social exclusion produces depression and other adverse health conditions in a considerable portion of elders, while others (possibly those with high place identity) remain rather untouched by it. Similarly, current p–e fit approaches predominantly applied to the housing domain (e.g., Iwarsson, 2004; Wahl et al., 1999) deserve extension to liveable communities or even countries, and they may add to the better understanding of the role of ambiguities of ageing in the city. In other words, environmental gerontological theorizing and the theoretical approaches of a 're-vitalized' (Phillipson, 2004: 963) urban sociology and political science concerned with ageing should merge their conceptual strengths, also leading to new empirical research arenas, which could aim toward better understanding of modern ageing in challenging new environments.

Both the increasing availability of technology and the decreasing possibilities for avoiding new technologies (e.g., ticket machines, automatic teller machines, menu-driven services on all levels, mobile phones, information only available on the web) have become another challenging new environment for ageing individuals (see Chapter 47). It is obvious that technology cannot be excluded when it comes to the analysis of p–e dynamics. Technological solutions such as smart home appliances (e.g., Melenhorst et al., 2007) reshape the 'environmental press' of the traditional household and compensate for possible p–e mismatches. This also applies for many increasingly smart assistive devices, which now offer a full new potential of maintaining autonomy and participation. Examples here include the latest generation of powered wheelchairs, GPS-based orientation systems for those with low vision or blindness, or computerized devices to assist those with cognitive impairment (Mann and Helal, 2007). In conclusion, it no longer makes sense to reduce the semantics of environmental gerontology theorizing to the 'built' or 'physical' environment, because these concepts (and realities) are no longer separable from technological equipment.

CONCLUSION

Intervention research has become a major feature of environmental gerontology, particularly with the aim of reducing disability and loss of autonomy as people age. The argument is that improving the physical–social environment via means of home modification or the ecological optimizations of neighbourhoods or even communities at large should have a positive impact on quality of life in old age. Research findings, as described above, suggest that this omnibus argument is valid, but, as noted, most research has been cross-sectional. The real test will come only with controlled intervention research (Gitlin, 1998).

A recent literature review on the available evidence regarding the impact of home modification[4] revealed 29 original investigations, a considerable portion of which were randomized controlled trials, and 10 review papers in the period between 1997 and 2006 (Wahl et al., in press). Typical outcomes included variations of activities of daily living assessment and falls and injuries in the home. A major finding of the review is that, taken as a whole, there is strong evidence for the hypothesis that home modification is able to reduce ADL–IADL-related outcomes, with the majority of studies reporting at least partially supportive evidence. In the array of falls and injuries,

the evidence of positive benefit is less clear. However, a number of studies clearly indicate that the elimination of home environment hazards is able to reduce the rate of falls in older adults (Wahl et al., 2009) and this evidence is in line with earlier compilations of the literature (Gillespie et al., 2003). There is also supportive evidence of the view that home modification is able to substantially help caregivers of demented elders (Gitlin et al., 2001), reflecting the need for a much broader scope of study than just emphasizing the link between p–e agency and autonomy.

Evidence for the crucial role of home modification also comes from a large body of documented best practice efforts and qualitative and case-oriented research (e.g., Connell and Sanford, 1997; Pynoos et al., 2003). From the vantage point of the dynamic interplay between belonging and agency, another issue is that a sense of belonging can play a major role in motivating home modification, but may also hinder the unfolding of its full potential. For instance, being too strongly attached to the current shape of one's house or apartment may question the readiness to go for profound changes in the physical outlet. Such strong or even rigid place attachment may also hinder a needed relocation, particularly in cases of limited capacity of the built environment to undergo substantial redesign (Oswald and Rowles, 2007). We still need to learn much more about the simultaneous 'work' of agency and belonging to understand which kind of interventions are best fitting to which kind of older adults, a challenge that asks for combinations of quantitative and qualitative research efforts. Moreover, we need to consider that older people are not oblivious to the forces at work on their situation. They often know very well about these simultaneously working processes of, for instance, decreasing agency and increasing belonging as they age in place without any retrofitting. Thus, in many cases they would gain from external help to negotiate and talk about pros and cons of belonging and agency instead of just getting a list of home modifications. This is particularly important, considering the insight that the potential of home modification is currently much underused and thus a likely efficient means to reduce (or even prevent) the burden of disability is much neglected in the practical sphere (e.g., Wahl and Gitlin, 2007).

The prominent issue of home modification should not, however, override other important application potentials of work in environmental gerontology. Critical are interventions on the level of the public space, with aims such as reducing 'anxiety areas', enhancing safety and participation at large through means of barrier-free design, and counteracting the tendency, particularly in big cities, for increasing separation of the generations

in the public domain (e.g., Ståhl and Iwarsson, 2004). In conclusion, we urge for a still stronger development of what may be called a *p–e culture for ageing societies* in the future. Such a p–e culture of course should target all ages and the full diversity of our societies, including, besides the most heterogeneous population of older adults themselves, migrants and disabled people. Different measures, ranging from home modification and the profound reshaping of neighbourhoods to creative and innovative housing solutions and still hard to imagine technological potential, will shape our ageing societies in the years to come.

NOTES

1 We are using the terms 'context' and 'environment' interchangeably in this work.

2 We use the terms 'life course', preferred by sociologists, and 'life span', preferred by psychologists interchangeably throughout the chapter.

3 See also http//:www.enableage.arb.lu.se.

4 This has been the second goal of the review already cited earlier in the chapter.

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