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Challenges of cross-national housing research with older persons: lessons from the ENABLE-AGE project

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Abstract Although it is generally acknowledged that housing is a major issue regarding health in old and very old age, most empirical research still tends to treat the role of the housing environment in a rather superficial manner. The cross-national project Enabling Autonomy, Participation, and Well-Being in Old Age: The Home Environment as a Determinant for Healthy Ageing (ENABLE-AGE) seeks to make a substantial contribution to this shortcoming. The main objective of the project is to examine subjective and objective aspects of housing and their impact on health in very old age, while health is understood mainly in terms of autonomy, participation and well-being. The project involves five European Union member countries, i.e. Sweden (coordinating unit), Germany, the United Kingdom, Latvia and Hungary. The total sample includes 1,918 older adults in the age range of 75–89 years and living in single households. We provide a systematic analysis of major challenges coming with cross-national research in the housing and ageing domain based on the experience of the ENABLE-AGE Project. Treated are: challenges related to sampling and data collection procedures, challenges related to inclusion and exclusion criteria based on housing characteristics, challenges related to differences in housing legislation, norms, and guidelines, challenges related different availability of professional expertise for person-environment assessments, challenges related to valid and reliable person-environment assessments, and challenges related to the interpretation of housing-related findings.

Keywords Housing · Health · Person-environment fit · Accessibility · Very old age

Introduction

Although it has long been generally acknowledged that housing is a major issue regarding health in old age (e.g. Lawton 1983), empirical research still tends to treat the role of the housing environment rather superficially (Iwarsson 2004; Wahl 2001). Housing environments are most frequently assessed, at best, based on a few questions regarding tenure, housing standards or a residential satisfaction rating. Such information is used mainly for sample description or as a rationale for sub-sample construction but not as a substantial tool to describe, explain, or predict the ageing process. Further, housing needs a multi-dimensional research approach addressing objective (e.g. housing standard, environmental barriers) as well as subjective aspects (e.g. meaning of home, place attachment). To date few gerontological studies have dealt with such aspects in sufficient depth (Wahl 2001; Wahl et al. 2004).

To better understand ageing from an environmental gerontology perspective (Lawton and Nahemow 1973; Wahl et al. 2004) it is critical to emphasise the role of the socio-physical context. As our research shows, under-emphasising the environment while over-emphasising person-related variables runs the risk of potentially wrong conclusions, for example, in understanding changes in health status along the ageing process. Empirical ageing research taking a balanced view on person and environment however, has remained rare, and this is particularly true with respect to European social and behavioural ageing studies. The project Enabling Autonomy, Participation, and Well-Being in Old Age: The Home Environment as a Determinant for Healthy Ageing (ENABLE-AGE; Iwarsson et al. 2004) funded within the European Commission's Fifth Framework Programme has the ambition to make a substantial contribution to this shortcoming.

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Cross-national, interdisciplinary research always entails challenges, while those involving person-environment research have not yet been reported much in the literature. The general aim of this contribution is to provide a systematic analysis of the major challenges in interdisciplinary, cross-national research on housing and health among older persons. We begin with a general account of such challenges and then use the sample case of the ENABLE-AGE Project for further illustration. Hopefully other researchers involved in studies targeting housing and health in old age will profit from our experiences, strategies, solutions, and to some extent pitfalls in the ENABLE-AGE Project.

Challenges of cross-national housing research with older persons

It has been argued that the understanding of cross-national and cross-cultural similarities and differences in the ageing process requires new conceptual and methodological frameworks (Jackson 2002). This is particularly true as such foundations are still much under debate, particularly in the area of housing and health in ageing research (Gitlin 2003; Wahl and Weisman 2003). A broad variety of concepts such as environmental press, person-environment fit, environmental congruence, accessibility, place attachment and residential satisfaction have been introduced over the years (Wahl and Weisman 2003). Many of these concepts, however, have not achieved the clarity and sharpness necessary to underlie empirical work explicitly dealing with the role of the environment as persons' age (Iwarsson and Ståhl 2003).

In addition, qualified research on housing and health requires an interdisciplinary approach (Iwarsson 2004; Wahl and Weisman 2003), but documentation is scarce on the challenges in such research endeavours involving different disciplines. In terms of methodological challenges the standards and methods of rigorous empirical research dealing with housing in old age are still not well developed (Gitlin 1998; Iwarsson 2004). One example of this is the ongoing refinement of reliable and valid assessments of housing environments and aspects of person-environment fit (Gitlin 1998; Kahana 1982; Wahl et al. 1999). The goal to have internationally acknowledged instruments at one's disposal similar to classic areas such as depression, personality, or cognitive performance is still far ahead.

Furthermore, in gerontological research on housing and health empirical data are scarce, and cross-national comparative data hardly exist. For example, given the long-standing prominence of the research by Lawton and Nahemow (1973) and Lawton and Simon (1968) in the ecology of ageing and in gerontology at large, the empirical treatment of person-environment relationships and their consequences for major health outcomes has remained surprisingly rare (Scheidt and Norris-Baker 2004; Stuck et al. 1999). Finally, while conducting

housing and health research in different countries to obtain comparative data, challenges may arise with respect to different political and cultural background (Lynn 2003). For instance, potentially different understanding of 'independent living' or 'community residing', the labelling of housing options (e.g. sheltered housing) and a diversity in housing legislation, norms, and guidelines deserve consideration.

The ENABLE-AGE Project: objectives, background and basic research approach

Objectives

The ENABLE-AGE Project is based on the general assumption, independently of political and cultural background, that housing provides a very important but much neglected context for the ageing process. The main objective of the project is to examine subjective and objective aspects of housing and their impact on health in very old age, while health is understood mainly in terms of autonomy, participation and well-being (Iwarsson et al. 2004; <http://www.enableage.arb.lu.se>). This 3-year project involved five European Union (EU) member countries; Sweden (coordinating unit), Germany, the United Kingdom (UK), Latvia and Hungary. The two latter countries joined the EU during the course of the project.

Background data relevant for the ENABLE-AGE Project

Although the importance of housing for old age is assumed in the ENABLE-AGE Project as a universal phenomenon, differences and similarities in the housing situation as well as demographic differences between the countries involved had to be acknowledged. This is particularly important in projects involving countries with substantial socio-economic, political and cultural differences, for example, in the ENABLE-AGE Project which involved three western and two eastern European countries.

For the ENABLE-AGE Project and its cross-national comparative ambition in the housing and health domain it was important to start from a selection of countries revealing pronounced diversity in the mix of potential macro level influences on housing and health in very old age. Table 1 provides an overview. As shown in Table 1, the countries included in the ENABLE-AGE Project differ substantially regarding housing tenure. Housing tenure is important because it is well-known that it significantly strengthens place attachment and decreases the likelihood of relocation to other places such as institutions or purpose-built housing (Wahl 2001). It is worth noting that the proportion of those 65 years or older being owners of their house or flat is lower in Sweden than the other countries involved (Nygren et al. 2004; Statistics Sweden, 'Investigation on

Table 1 Diversity of countries involved in the ENABLE-AGE Project: housing tenure, housing standard, life expectancy and definition of the 'fourth age'

	Sweden	Germany	UK	Latvia	Hungary
Housing tenure (age 65 and older)	Around 40%	Around 50%	Around 70%	No data available	Around 90%
Housing standard	High	High	High to medium	Low to very low	Low
Life expectancy at birth; men	77	75	75	65	68
Life expectancy at birth; women	82	81	80	77	77
'Fourth age' (tentative definition for ENABLE-AGE Project)	Above 80 years	Above 80 years	Above 80 years	Above 75 years	Above 75 years

housing conditions 1998–2000, available at: <http://www.scb.se>), letting aside Latvia where data are not reliable. With respect to the new EU member states in the ENABLE-AGE Project a general issue in Hungary (Acsády et al. 2004) was that pronounced and rapid societal transformation had taken place since the early 1990s which also brought about a new trend in housing policy. This led to a significant increase in older persons owning their own flats, which traditionally was rather high (around 70% in 1980), but increased to around 90% in the second half of the 1990s. A second major indication of housing on the macro-level is the availability of a high housing standard, for example, indoor toilet, bathroom facilities, hot water and central heating. For example, an important issue after the re-unification of Germany in 1990 was the need to proceed as quickly as possible with the harmonisation of housing standard of older persons in the eastern and western parts; high housing standards of older persons living in the eastern part of the country (the former German Democratic Republic) had increased from 33% in 1990 to far over 85% in 2004, while the respective proportions in the western part were 74% in 1988 and far over 90% in 2004 (Oswald et al. 2004). In Hungary it is especially important to juxtapose the high extent of housing tenure against the rather low housing standard; only 30% of flats in which older persons live have all conveniences regarded as high housing standard (Kovács 2000). In Latvia (Tomsone et al. 2004) housing quality for the elderly is a critical issue. This must also be seen in the context of the material welfare of older persons, which worsened considerably in the 1990s. Finally, in the UK housing standards for older persons still is somewhat mixed and may best be described at present as high to medium (Sixsmith et al. 2004).

As indicated in Table 1, the ENABLE-AGE Project also considers the diversity in life expectancy between the countries involved as an important macro-level variable for the housing and health issue. As can be seen, life expectancy varies significantly between the three western European and the two eastern European countries with, as expected, the latter being lower. Taking different life expectancies into account becomes critical in the light of the argument that the housing environment plays a particularly crucial role in very old age, or what has been coined the 'fourth age' (e.g. Baltes and Smith 1999). The argument is that in this period of the life span the incidence and prevalence of somatic and

psychiatric diseases tend to rise, leading to consequences in terms of functional limitations and disability. In particular, the sharp rise in sensory impairment, mobility and gait problems, and dementia during the 'fourth age' is a major threat to independent living in ordinary housing. As a consequence the ENABLE-AGE Project decided to concentrate on the 'fourth age', which is frequently operationalised in the literature as the life period roughly beyond the age of 80 years (Baltes and Smith 1999). Given the differences in life expectancies between the ENABLE-AGE countries, however, it did not seem a convincing strategy to address housing and health in old age based on the same calendar-age stratum across all five countries. Since established strategies for sampling in cross-national projects dealing with this kind of challenges were lacking, the decision was made to set the limit for the 'fourth age' at the age of 80 years in Sweden, Germany and the UK and at the age of 75 years in Latvia and Hungary.

The three parts of the ENABLE-AGE Project

To address the housing and health issue in a comprehensive manner, acknowledging the political and socio-economic diversity of the countries involved, the ENABLE-AGE Project comprised three major parts: the ENABLE-AGE Update Review, the ENABLE-AGE Survey Study, and the ENABLE-AGE In-Depth Study (Iwarsson et al. 2004). To outline the project as a whole, all three parts are briefly described below. However, to delimit the scope of the current paper the challenges described and discussed further on are mainly based on experiences in from the ENABLE-AGE Survey Study.

The *ENABLE-AGE Update Review* was a five-country macro-level update of current housing policies and legislation based on a social policy approach but also involving legislation on housing design. The first phase of the ENABLE-AGE Update Review was a review of building regulations and norms for housing design in the five countries involved, necessary for development of the ENABLE-AGE Survey Study instrumentation. Based on legislation, other official documents and official statistics in the five countries the second and main phase targetted housing policies, legislation, housing options for older persons, as well as general information on the parts of the national welfare systems considered relevant.

The *ENABLE-AGE Survey Study* was based on a comprehensive, project-specific questionnaire, administered by means of interviews and observational assessments. The questionnaire comprised several standardised instruments aimed to assess the objective housing environment and the subjectively perceived home environment supplemented by a scope of outcome variables such as dependence in activities of daily living (ADL), subjective well-being, and depression. Further, information on assistive devices, aspects of health, and social participation was collected by means of project-specific questions. A follow-up design was used comprising two data collection occasions with a 1-year interval. At the first data collection occasion the extensive data collection required two home visits with each participant, while for the second a reduced questionnaire was administered during one home visit.

In the *ENABLE-AGE In-Depth Study* interviews were conducted with a sub-sample of survey participants in each country. Inspired by the ‘grounded theory’ framework (Glaser and Strauss 1967) as described by Charmaz (1996, 2003), a project-specific qualitative design was developed (Iwarsson et al. 2004). Five research questions intended to explore key concepts related to housing and health in old age were developed and used as a guide for in-depth interviews with a sub-sample of the survey study participants.

Sampling design of the ENABLE-AGE Project

The sample target in each country was 400 very old adults ($n=2,000$). Since women are in the majority among the very old, the sample was stratified for gender to guarantee possibilities for some gender-specific analyses (75% women, 25% men). Informed by the different life expectancies across countries (see again Table 1), we developed a sampling strategy to some extent compensating for such differences, stratifying the sample in two age groups (50% ‘older’ and 50% ‘younger’). In Sweden, Germany, and the UK, ‘older’ was defined as 85–89 years of age and ‘younger’ as 80–84 years. In Hungary and Latvia the corresponding age spans were 80–84 and 75–79 years of age. Furthermore, only persons living in single-person private households in urban districts were included because those living alone are probably at particular risk of losing their capacity for independent housing and relocating to institutions (Wahl 2001). Also,

coping with housing challenges probably differs substantially in other living arrangements (e.g. in couples), and these are thus not comparable to the single household situation.

Interviewers in Sweden, Germany and Hungary used official registers to recruit their samples. Because official registers are not available for researchers in the UK, the UK sample was recruited based on general practitioners’ patient lists, as has been done in many other research projects (e.g. Morgan 1998). In Latvia, after unsuccessful in-depth negotiations with government authorities, the only possible pathways remaining for recruitment were to approach social day care centres and older persons’ voluntary organisations. The final cross-national T1 sample totalled $n=1,918$, with national sample sizes varying between $n=376$ –450 (Table 2).

In-depth analysis of challenges in cross-national housing research: lessons learned from the ENABLE-AGE Project

We describe here some of the challenges encountered in the ENABLE-AGE Survey Study. Some are more general in character, i.e. they might be met in any cross-national survey, while others are specific to survey studies targeting housing and health in old age.

Challenges related to sampling and data collection procedures

After arriving at national solutions for generation of sampling lists the next kind of challenge encountered in recruiting a sufficient number of participants was the difference in prerequisites for how to approach older persons in different countries for home visits. In particular, there were different understandings of privacy and different degrees of fear for crime restricting persons’ willingness to participate. Although these issues apply to many cross-national projects, as described, for example, by Harkness (1999) and Lynn (2003), it should be noted that in research on housing and health it is imperative to collect data at home visits. That is, the ENABLE-AGE Project required quite intensive, systematic observation of the housing environment as well as extensive observations and interviews of the person. In addition to the different cultural implications of doing this with older persons in different countries, it is far from easy to

Table 2 Overview of the ENABLE-AGE Project sample sizes, by sex and age at baseline

	Sweden ($n=397$)	Germany ($n=450$)	UK ($n=376$)	Latvia ($n=303$)	Hungary ($n=392$)	Total ($n=1,918$)
75–85 years old						695
Women	–	–	–	268	316	
Men	–	–	–	35	76	
80–89 years old						1,223
Women	296	353	263	–	–	
Men	101	97	113	–	–	

achieve this without endangering reliability and validity (Iwarsson, Nygren and Slaug 2004). That is, such data collection requires trained interviewers with specific competency as well as ecologically valid survey instruments.

Challenges related to inclusion and exclusion criteria based on housing characteristics

A specific challenge for cross-national research on housing and health is defining inclusion or exclusion criteria for the sampling process. In person-based survey research such criteria usually are defined in terms of person characteristics (e.g. age, cohort, diseases). In person-environment research, however, serious attention must be paid to housing characteristics. Moreover, different understandings due to divergent cultural and political backgrounds must be expected (Jackson 2002; see also Lynn 2003). One example much discussed in the ENABLE-AGE Project and also relevant for other cross-national projects is the definition and operationalisation of crucial terms such as 'independent living' and 'community-residing'. This led to the, at first glance, simple challenge of differentiating between sheltered and ordinary housing, in the ENABLE-AGE Project aiming at inclusion only of participants in ordinary housing in all five countries.

For example, in Sweden sheltered housing is defined based on legislation, and access to sheltered housing facilities (*särskilt boende*) can only be granted based on a professional assessment of needs by an authorised person. In Germany the term sheltered housing (*Betreutes Wohnen*) is ill-defined and applies to a wide range of special living arrangements for older persons, ranging from naturally occurring housing (*Betreutes Wohnen im Bestand*) to institution-like newly built housing complexes. The physical design and standard of sheltered housing facilities differ considerably between Sweden and Germany as well as within each country. To deal with the apparent cross-national differences in this respect after thorough discussions the ENABLE-AGE consortium decided to define inclusion and exclusion criteria for ordinary housing not based on national official classifications but on actual environmental design, housing standard and availability of institutionalised support services. An example of the result of this decision is the Swedish ENABLE-AGE Survey Study sample ($n=397$) which included 38 persons and the German sample ($n=450$) which included 6 persons living in sheltered housing as defined by national definitions.

Another example of cross-national differences concerned difficulties in reaching the targetted sample sizes in terms of participants living alone. In Sweden Germany and the UK this sampling criterion caused no severe problems, while in Latvia and Hungary it was difficult to recruit sufficient numbers of singly living men in the highest age group (see again Table 2). This diffi-

culty is explained by the fact that in eastern parts of Europe it still is common for very old persons, particularly men, to live with their children or grand-children while in western parts this type of living has been largely abandoned.

Challenges related to differences in housing legislation, norms, and guidelines

Legislation, norms and guidelines for housing design differ widely among European countries. Most western European countries have long had legislation regulating housing design in terms of accessibility and safety, while countries in the East have only recently established such legislative frameworks or are now in the process of developing norms and guidelines. One major difference between countries is that some of them, such as Sweden, have only one set of building regulations for all citizens, for example, persons with functional limitations and other user groups with specific needs. Other countries, such as Hungary, are developing separate legislative frameworks for the population in general vs. user groups with specific needs. Also, on the more detailed level there are cross-national differences in norms and guidelines, and in general the empirical basis for definition of norms is weak (Steinfeld and Danford 1999). As an implication of such differences the identification of environmental barriers in housing refers to tentatively diverse norms, which also provides challenges to the cross-national ecological validity of assessment instruments. To achieve good instrument equivalence (Harkness 1999; Singh 1995) it was necessary to perform a cross-national comparison of housing norms and guidelines related to the kind of assessment methodology that we intended to use in the ENABLE-AGE Survey Study; this was carried out in the first phase of the ENABLE-AGE Update Review. As illustrated in Table 3, comparing current legislation in the five countries showed a substantial diversity of measures and other criteria for environmental barriers. From a methodological point of view this kind of cross-national variation was a great challenge (Harkness 1999) that had to be dealt with as the ENABLE-AGE Survey Study instrumentation and data collector training developed.

Challenges related to different availability of professional expertise for person-environment assessments

Even at the very start of the ENABLE-AGE Project crucial differences were identified in professional development necessary for reliable data administration of person-environment assessment in different countries. Since parts of the survey methodology used was developed for use in occupational therapy (Iwarsson and Slaug 2001), based on previous experiences it was considered crucial to include this kind of professional competence in all national teams involved (Iwarsson

Table 3 Exemplification of cross-national differences in environmental design norms and regulations: first phase of the ENABLE-AGE Update Review, unpublished raw data (2002)

Environmental feature	Sweden	Germany	UK	Latvia	Hungary ^a
Path width	> 1.5 m; > 1.3 m only for shorter path	< 0.9 m < 1.2 m, < 1.5 m < 1.8 m	< 1.3 m	> 1.5 m; > 1.2 m for paths inside housing estates	Traffic both ways > 1.3 m; wheelchair traffic > 1.5 m
Marked parking spaces for persons with disabilities	< 25 m walking distance to the entrance door	< 100 m walking distance to the entrance door	< 10 m walking distance to the entrance door	Not specified	< 100 m walking distance to the entrance door
Threshold heights at entrances	20–25 mm, but preferably 0 mm	> 15 mm	< 25 mm	> 20 mm, but preferably 0 mm	According to product standards; no norm for height, but guidelines recommend < 20 mm
Height of stair risers	The same height in the entire staircase required; 15 cm is comfortable if the depth is 30 cm	150–170 mm	Not specified	Not specified	In general, height < 17 cm; in accessible environments < 15 cm

^aNote that in Hungary one norm concerns housing in general and another for users with specific needs

2004). More specifically, to collect reliable and valid data on functional capacity in the person as well as on physical environmental barriers in housing the data collector should be trained and experienced in observation and interview techniques similar to those currently used by occupational therapists (Iwarsson and Slaug 2001). That is, data collectors should be able to carry out systematic and reliable assessments of human functional capacity as well as physical environmental characteristics in natural contexts. Since occupational therapy has not as yet been established as a profession in Hungary, this was not possible there. In Sweden, Germany, the UK and Latvia it was possible to recruit sufficient numbers of occupational therapists for data collection, but for reasons of project organisation and university employment regulation in the UK the survey study data collection team was ultimately multi-disciplinary.

Further, based on previous experiences of the challenges inherent in valid and reliable data collection using a multi-dimensional assessment instrument targeting person-environment relationships (Iwarsson and Slaug 2001), additional attention had to be paid to data collector training (Iwarsson and Isacson 1996). Training courses for data collectors followed by an iterative process of pre-tests and quality monitoring were considered imperative. A specific challenge in this respect was to find data collectors with sufficient English language skills, which was particularly difficult in Hungary. To cope with these challenges different strategies had to be developed for the different countries. Additional efforts and resources were required in Hungary to enable data collection on housing, and the Swedish partner conducted a preparatory trip to Budapest to meet the national project leader there and a person considered well equipped to learn the occupational therapy based person-environment assessment. This was necessary to prepare for Hungarian participation in data collector training.

Challenges related to valid and reliable person-environment assessments

In addition to the challenges related to data collector competency, another challenge for the ENABLE-AGE Project concerned the conceptual and methodological basis for objective assessment of person-environment fit relevant for research on housing and health in old age. Based on previous research (Iwarsson 2004) the ENABLE-AGE consortium decided to focus on assessment of functional capacity, physical environmental barriers and accessibility problems. Accessibility is a relative concept and an aspect of person-environment fit. That is, accessibility problems should be expressed as a person-environment relationship. Accessibility refers to the encounter between functional capacity in the person including dependence on mobility devices (personal component) and the design and demands of the physical environment (environmental component) (Iwarsson and

Ståhl 2003). In this context the definition of the personal component deserves comment. In several acknowledged models and taxonomies, for example, the Disablement Process (Verbrugge and Jette 1994) and the International Classification of Functioning, Disability and Health (World Health Organisation 2001), assistive devices are categorised as part of the environment. However, results from recent empirical studies on older persons' use of mobility devices elucidate that the role of mobility devices in person-environment relationships is far from clear-cut (Brandt et al. 2003). Since persons move about in the physical environment using their mobility device, person and device constitute a unified component interacting with the physical environment. Thus in research on accessibility it is more valid to include mobility devices in the personal component as they are prescribed to compensate for functional limitations. Based on current definitions of accessibility (Iwarsson and Ståhl 2003) the environmental component refers to compliance with official norms and standards, and accessibility is therefore mainly objective in nature (Preiser and Ostroff 2001). The personal and the environmental components of accessibility must both be empirically considered in a project such as the ENABLE-AGE.

The Housing Enabler methodology for operationalising functional capacity, environmental barriers and accessibility (Iwarsson and Slaug 2001) was well established at the Swedish research site for several years before planning of the ENABLE-AGE Project. Inter-rater reliability (Iwarsson and Isacson 1996), content (Iwarsson and Slaug 2001) and construct validity (Fänge and Iwarsson 2003) had been established based on occupational therapy competence. The ENABLE-AGE consortium decided to include the Housing Enabler in the survey study instrumentation. Furthermore, to reach validity the existing Swedish version of the instrument based on national legislation and norms required revision for use in several countries. From the cross-national differences as concerned legislation and norms identified in the first phase of the ENABLE-AGE Update Review a systematic procedure relating those differences to the items of the Housing Enabler was developed. In an iterative process involving an expert on architectural design and building legislation, the revision process ended up with an observation format considered valid for use in the ENABLE-AGE Survey Study (Iwarsson, Nygren and Slaug 2004). As demonstrated by the examples given in Table 3, in particular when considering the fact that the environmental component of the Housing Enabler instrument comprises 188 items, this process required much time and effort.

The Housing Enabler assessment is administered in three steps (Iwarsson and Slaug 2001). Dichotomous assessment ('item present/not present') is carried out in the first step (functional limitations/dependence on mobility devices, i.e. the personal component of accessibility, $n=15$) and the second step (physical environmental barriers, i.e. the environmental component of

accessibility, $n=188$). The third step analyses accessibility problems by relating the personal and environmental components to each other based on predefined severity scores 1–4 (1=minor, 4=major severity). The result of this analysis is quantification of the accessibility problems in each case in terms of a total score. A computerised tool for more efficient data collection and analyses is also available (Slaug and Iwarsson 2001).

On the consortium level four interviewer courses were held in Germany, the UK and Sweden involving the national team leaders and data collectors from each research site. However, since not all data collectors were able to follow a course given in English, with support from Sweden the two participants from Hungary repeated the course in their native language for the rest of the Hungarian data collector team. After the consortium level courses in each country the national project leader arranged further team training with all interviewers in their own language and context. The next step was the iterative pre-tests administration of the survey study questionnaire to older persons not included in the ENABLE-AGE Survey Study sample, followed by subsequent revisions of the questionnaire. Finally, after several months of pre-testing the ENABLE-AGE consortium reached consensus and decided on the final format. Prior to and separate from the data collection for the ENABLE-AGE Survey Study an inter-rater reliability study based on 64 pairwise assessments was carried out, involving the personal and environmental components of the Housing Enabler (Iwarsson, Nygren and Slaug 2004). The results demonstrated moderate to good agreement across research sites; for the personal component agreement was 91% and $\kappa=0.43$, for the environmental component 65% of the items reached agreement greater than 80% and $\kappa>0.61$, and 93% reached more than 80% and $\kappa>0.41$.

Challenges related to the interpretation of housing-related findings: an example

Another challenge concerning accessibility assessed by means of the Housing Enabler is cross-national interpretation of the findings. As shown in Table 4, the prevalence of environmental barriers was considerably lower in two of the countries than in the others, resulting in correspondingly lower accessibility scores, i.e. fewer accessibility problems. It should be noted that the prevalence of functional limitations/dependence on mobility devices differed only little among the five countries, although both samples with the lowest prevalence of environmental barriers also were lower in the number of functional limitations. In analysis of accessibility problems based on Housing Enabler data the accessibility scores are generated by juxtaposing the prevalence of functional limitations/dependence on mobility with the prevalence of environmental barriers in each case (Iwarsson and Slaug 2001), and thus the differences in accessibility scores (Table 4) were gener-

ated mainly by differences in the prevalence of environmental barriers. This was most striking in indoor environments, particularly in the UK. In addition to comparative analyses of median values of sub-sections and total scores, the prevalence of single environmental barriers across countries can be scrutinised. For example, 'letterbox can only be reached via difference in level' was marked as present in only 14% of the UK cases, while the prevalence for this item varied between 37% and 84% in the other countries. Thorough exploration of such differences is beyond the scope of this contribution, but it remains to be investigated whether the differences result from systematic differences in environmental barriers across countries, data collector bias, insufficient ecological validity of the instrument, or other influences. Regardless of the results of such inquiries, such differences present substantial challenges to cross-national research on person-environment relationships and should not be under-estimated.

Concluding remarks

Based on a recent interdisciplinary research project on housing and health in very old age involving five European countries, representing western and eastern parts of the EU, this contribution illustrates some of the challenges of conducting cross-national research with special emphasis on person-environment relationships. While the ENABLE-AGE research consortium attempts to address such challenges, we consider it valuable to report some of our experiences to the scientific community. Empirical publications reporting results from cross-national studies in this field of research usually account for methodological pitfalls and study limitations in a rather restrictive manner. The current examination contributes to the dissemination of experiences valuable for quality development of forthcoming cross-national research projects.

One major challenge warranting discussion concerns issues of validity and reliability. Despite sufficient inter-rater reliability results (Iwarsson, Nygren and Slaug 2004) and continuous quality monitoring during the data collection process, as elucidated in Table 4, comparative data on environmental barriers and accessibility problems collected in the ENABLE-AGE Survey Study were difficult to interpret. During the data collection process factors arose which we had not foreseen, for example, staff discontinuity in some of the national data collector teams, possibly influencing data quality. Future analyses will examine the influence of additional reasons for data inconsistencies such as data collector competency and practice. Regardless ecological validity of the Housing Enabler the ENABLE-AGE Update Review will aid interpretation of the findings. The interpretation of data from cross-national research hinges on a combination of methodological problems and cultural, political and economical differences (Kohn 1987).

In addition to what has been presented, the ENABLE-AGE Project is still struggling with additional challenges typical of cross-national projects in more general terms which are not discussed in this contribution. An example resulting from the intensive interdisciplinary collaboration in the ENABLE-AGE consortium is the need for ongoing in-depth treatment of conceptual definitions. Every discipline to some extent has its own vocabulary, and unless differences in or lack of conceptual definitions are made explicit, major problem will arise during the project process. Another example is the successive, integrative design of ENABLE-AGE Project, that is, integration of the survey instrumentation, the in-depth interview studies, and the policy review. From the very start the consortium attempted to integrate methodologies within the design stage, the data collection stage, the analytical stage, and the cross national interpretation stage. Our experience so far stresses the need for close quality assurance in all

Table 4 Cross-national comparison of Housing Enabler (Iwarsson and Slaug 2001) data (median values)

	Sweden (<i>n</i> = 389)	Germany (<i>n</i> = 425)	UK (<i>n</i> = 376)	Latvia (<i>n</i> = 296)	Hungary (<i>n</i> = 387)	Total (<i>n</i> = 1,873) ^a
No. of functional limitations/ mobility devices ^b	3	3	1	3	2	3
No. of environmental barriers, total ^c	64	66	36.5	55	39	55
Outdoors	12	13	6	13	8	11
Entrances	12	12	5	10	9	10
Indoors	38	37	24	30	20	31
Communication	2	2	1	2	2	2
Accessibility score, total ^d	124	122	20	102.5	52	78
Outdoors	29	31	2.5	30	13	20
Entrances	21	29	1	23.5	12	16
Indoors	67	56	15	50	21	40
Communication	0	0	0	0	0	0

^aBased on cases with complete Housing Enabler data

^bPersonal component of the Housing Enabler, 15 items

^cEnvironmental component of the Housing Enabler, 188 items

^dAnalysis of accessibility problems based on severity scores 1–4, added to a total score

parts along the entire project period (Harkness 1999; Treloar and Graham 2003), continuous discussions, a 'straight line' in decision making and strict monitoring of the project. Further examples of challenges encountered are differences in publication traditions and different traditions concerning the use of quantitative and qualitative methodologies, but it is beyond the scope of this contribution to deal with all these challenges in depth.

The specific sampling strategy aiming at controlling for life expectancy differences between the countries involved in the ENABLE-AGE Project deserves serious consideration. To our knowledge, there are no standardised or accepted solutions to this problem, and the sampling strategy that we adopted can of course be discussed. In particular as it is known that mortality rates in younger ages are considerable in Latvia and Hungary, especially among men, it did not seem valid to rely solely on life expectancy differences for the differentiated age stratification. This would have resulted in up to 10-year differences in calendar age, and therefore we chose a solution only to some extent compensating for the life expectancy differences across countries. The recent expansion of the EU underscores the necessity for developing valid strategies for sampling in cross-national research, while at this stage we do not claim that the solution adopted for the ENABLE-AGE Project is the optimal one. It is surprising, however, to see that the problem of comparing the same age strata across countries quite diverse in life expectancy has not found much consideration so far in the literature.

A specific insight deriving from the challenges related to sampling in a housing-related study as we experienced in the ENABLE-AGE Project process concerns the question of how to achieve adequate heterogeneity representing the population addressed. Because 'population' does not necessarily mean in housing research only persons but also housing environments or even person-environment constellations, it may be questioned whether sampling driven only by person characteristics is the optimal approach. Even if we adopted such a sampling strategy for the ENABLE-AGE Project, as we now reflect upon our sample it is in any case not the only approach. Alternatively for future projects in this field, it may be better to develop sampling strategies taking person characteristics as well as housing characteristics into account. As illustrated by the challenge related to inclusion and exclusion criteria on housing characteristics accounted for, however, this is far more difficult to do on the practical field level than sampling based only on personal characteristics.

In conclusion, we believe that major challenges related to European cross-national research can be handled successfully, although—as shown here—investments are considerable and compromises at the level of design and data quality are necessary (Harkness 1999; Lynn 2003). Both research consortiums and funding bodies planning for this kind of research need to be aware of the investments necessary to reach sufficient quality in cross-na-

tional projects (Kohn 1987; Harkness 1999, Lynn 2003). Challenges such as those treated in this contribution ought to be informative for European gerontology research at large. Hopefully, European studies in the future will be encouraged by work such as the ENABLE-AGE Project to give more consideration to housing aspects and challenges in cross-national research on person-environment relationships. In particular, we would argue that achieving a better balance between person- and environment-related data is crucial for ageing research. For instance, as long as emphasis is put on person-related variables in ageing projects focusing on health issues there simply is no possibility of exploring the housing and health issue in further detail. This may result in a somewhat one-sided picture. Further, careful methodological considerations and preparatory work are strongly recommended, while often under-estimated in project applications in terms of time and budget planning. It would certainly be of help if review guidelines in the European funding context would still better acknowledge that this is essential for promising research outcomes in the longer run.

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References

- Acsády J, Kucsera C, Széman Z (2004) ENABLE-AGE survey study T1: national report Hungary. Project QLRT-2001-0, delivered to the European Commission. Institute of Sociology, Hungarian Academy of Sciences, Budapest
- Baltes PB, Smith J (1999) Multilevel and systemic analyses of old age: theoretical and empirical evidence for a fourth age. In: Bengtson VL, Schaie KW (eds) *Handbook of theories of aging*. Springer, Berlin Heidelberg New York, pp 153–173
- Brandt Å, Iwarsson S, Ståhl A (2004) Older people's use of powered wheelchairs for activity and participation. *J Rehabil Med* 36:70–77
- Charmaz K (1996) Grounded theory. In: Smith JA (ed) *Rethinking methods in psychology*. Sage, London, pp 27–49
- Charmaz K (2003) Grounded theory. In: Smith JA (ed) *Qualitative psychology. A practical guide to research methods*. Sage, London, pp 81–110
- Fänge A, Iwarsson S (2003) Accessibility and usability in housing—construct validity and implications for research and practice. *Disabil Rehabil* 25:1316–1325
- Gitlin LN (1998) Testing home modification interventions: issues of theory, measurement, design, and implementation. In: Schulz, Maddox, Lawton (eds) *Annual review of gerontology and geriatrics. Interventions research with older adults*. Springer, Berlin Heidelberg New York, pp 190–246
- Gitlin LN (2003) Conducting research on home environments: Lessons learned and new directions. *Gerontologist* 43:628–637
- Glaser B, Strauss A (1967) *The discovery of grounded theory*. Aldine, Chicago

- Harkness J (1999) In pursuit of quality: issues for cross-national survey research. *Int J Soc Res Methodol* 2:2:125–140
- Iwarsson S (2004) Assessing the fit between older people and their home environments—an occupational therapy research perspective. In: Wahl H-W, Scheidt R, Windley P (ed) *Environments, gerontology and old age*. *Annu Rev Gerontol Geriatr* 23:85–109
- Iwarsson S, Slaug B (2001) The Housing Enabler. An instrument for assessing and analysing accessibility problems in housing. Vetén & Skapen HB & Slaug Data Management, Nävlinge and Staffanstorps
- Iwarsson S, Isacsson Å (1996) Development of a novel instrument for occupational therapy assessment of the physical environment in the home—a methodologic study on “the Enabler”. *Occup Ther J Res* 16:227–244
- Iwarsson S, Ståhl A (2003) Accessibility, usability and universal design—positioning and definition of concepts describing person-environment relationships. *Disabil Rehabil* 25:57–66
- Iwarsson S, Sixsmith J, Oswald F, Wahl H-W, Nygren C, Sixsmith A, Széman Z, Tomsone S (2004) The ENABLE-AGE Project: multi-dimensional methodology for European housing research. In: Wilkinson N, Hurol Y (eds) *Housing research methodologies*. Urban International, Mersin
- Iwarsson S, Nygren C, Slaug B (2004) Cross-national and multi-professional inter-rater reliability of the Housing Enabler. *Scandinavian Journal of Occupational Therapy* (in press)
- Jackson J (2002) Conceptual, methodological linkages in cross-cultural groups, cross-national aging research. *J Soc Issues* 58:4:825–835
- Kahana E (1982) A congruence model of person-environment interaction. In: Lawton, Windley, Byerts (eds) *Aging and the environment*. Theoretical approaches. Springer, Berlin Heidelberg New York, pp 97–121
- Kohn ML (1987) Cross-national research as analytic strategy. *Am Sociol Rev* 52:713–731
- Kovács M (2000) Housing conditions of the elderly. In: Szűcs Z (ed) *The situation of the elderly in Hungary in the 90s (in Hungarian)*. HU, Budapest, pp 47–56
- Lawton MP (1983) Environment and other determinants of well-being in older people. *Gerontologist* 23:349–357
- Lawton MP, Nahemow L (1973) Ecology and the aging process. In: Eisdorfer C, Lawton MP (eds) *The psychologist of adult development and aging*. American Psychological Association, Washington
- Lawton MP, Simon B (1968) The ecology of social relationships in housing for the elderly. *Gerontologist* 8:108–115
- Lynn P (2003) Developing quality standards for cross-national survey research five approaches. *Int J Soc Res Methodol* 4:323–336
- Morgan K (1998) The Nottingham Longitudinal Study of Activity and Ageing: a methodological overview. *Age Ageing* 27:5–11
- Nygren C, Johannisson A, Iwarsson S (2004) ENABLE-AGE Survey Study T1: national report Sweden Project QLRT-2001-00334, delivered to the European Commission. Lund University, Lund
- Oswald F, Wahl H-W, Mollenkopf H et al (2004) ENABLE-AGE. Survey study T1. Preliminary descriptive findings from Germany. Report no 18. German Centre for Research on Ageing, Heidelberg
- Preiser WFE, Ostroff E (eds) (2001) *Universal design handbook*. McGraw-Hill, New York
- Scheidt RJ, Norris-Baker C (2004) The general ecological model revisited: evolution, current status, continuing challenges. In: Wahl H-W, Scheidt RJ, Windley PG (eds) *Aging in context: socio-physical environments*. Annual review of gerontology and geriatrics, vol 23. Springer Berlin Heidelberg New York, pp 34–58
- Singh J (1995) Measurement issues in cross-national research. *J Int Business Studies* 26:3:597–619
- Sixsmith A, Sixsmith J, Green S et al (2004) ENABLE-AGE Survey Study T1: national report United Kingdom. Project QLRT-2001-00334, delivered to the European Commission. University of Liverpool, Liverpool
- Slaug B, Iwarsson S (2001) Housing Enabler 1.0—a tool for housing accessibility analysis. Software for PC. Vetén & Skapen HB & Slaug Data Management, Nävlinge and Staffanstorps
- Steinfeld E, Danford GS (1999) Theory as a basis for research on enabling environments. In: Steinfeld E, Danford GS (eds) *Enabling environments. Measuring the impact of environment on disability and rehabilitation*. Kluwer/Plenum, New York
- Stuck AE, Walthert JM, Nikolaus T, Büla CJ, Hohmann C, Beck JC (1999) Risk factors for functional status decline in community-living elderly people: a systematic literature review. *Soc Sci Med* 48:445–469
- Tomsone S, Litvjakova N, Teibe U (2004) ENABLE-AGE Survey Study T1: national report Latvia. Project QLRT-2001-00334, delivered to the European Commission. University of Riga, Riga
- Treloar C, Graham ID (2003) Multidisciplinary cross national studies: a commentary on issues on collaboration, methodology, analysis, publication. *Qual Health Res* 13:7:924–932
- Verbrugge LM, Jette AM (1994) The disablement process. *Soc Sci Med* 38:1–14
- Wahl HW (2001) Environmental influences on aging and behavior. In: Birren JE, Schaie KW, (eds) *Handbook of the psychology of aging*. Academic, San Diego, pp 215–237
- Wahl H-W, Weisman GD (2003) Environmental gerontology at the beginning of the new millennium: reflections on its historical, empirical, and theoretical development. *Gerontologist* 43:616–627
- Wahl HW, Oswald F, Zimprich D (1999) Everyday competence in visually impaired older adults: a case for person-environment perspectives. *Gerontologist* 39:140–149
- Wahl H-W, Scheidt R, Windley P (eds) (2004) Annual review of gerontology and geriatrics, vol 23. Springer, Berlin Heidelberg New York
- World Health Organisation (2001) International classification of functioning, disability and health (ICF). WHO, Geneva