

Importance of the Home Environment for Healthy Aging: Conceptual and Methodological Background of the European ENABLE-AGE Project

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Currently in Europe as well as in the United States, an increasing proportion of very old people remain living in their homes despite declines in physical and mental health. Together with the fact that the population of very old people is rapidly increasing (Mathers, Sadana, Salamon, Murray, & Lopez, 2001; United Nations Development Programme, 2001), this poses new challenges to societal planning and housing development (Gitlin, 2003).

In addition, the home environment is a major arena for aging research focusing on objective as well as perceived housing and relying on both quanti-

tative and qualitative methods (Scheidt & Windley, 2006). As earlier research has consistently shown, daily activities are predominantly performed in the home and its close surroundings. As people grow older, they spend relatively more time in their homes; on average, very old people tend to spend 80% of their time at home (Baltes, Maas, Wilms, Borchelt, & Little, 1999). Strong cognitive and affective ties to the home environment are formed as people age, and, as a consequence, aging in place and preventing relocation are among the strongest needs of older adults as well as their families (Gitlin, 2003). Thus, an important goal in health promotion is to create home environments that support healthy aging.

Promoting health framed within a person-home environment perspective requires robust knowledge underscoring the way good home environments can help to alleviate or prevent illness and declining health. Although such knowledge has been gathered in recent decades (see, for review, Gitlin, 2003; Iwarsson, 2004; Oswald & Wahl, 2004; Scheidt & Windley, 2006; Wahl & Gitlin, in press; Wahl, Scheidt, & Windley, 2004), the evidence still is fragmented and scattered (Wahl & Weisman, 2003).

Researchers designed the European project "Enabling Autonomy, Participation, and Well-Being in Old Age: The Home Environment as a Determinant for Healthy Aging" (ENABLE-AGE) to address this major research gap. Their main ob-

The Enabling Autonomy, Participation, and Well-Being in Old Age: The Home Environment as a Determinant for Healthy Ageing (ENABLE-AGE) Project was funded by the European Commission from 2002 to 2004 (under Grant QLRT-2001-00334). The Swedish ENABLE-AGE team is grateful for additional funding from the Swedish Research Council on Social Science and Working Life, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, and the Swedish Research Council. We thank all study participants, consortium and national team members, and subcontractors for their contributions.

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jective in the project was to examine the home environment and its importance for major components of healthy aging. In the ENABLE-AGE Project, researchers used the term *healthy aging* to address selected aspects of physical, mental, and social health that are assumed to be particularly relevant to housing. Among the core concepts chosen for the project were independence in daily activities and subjective well-being (Iwarsson, Wahl, & Nygren, 2004). It is widely accepted that an active life is positively associated with better health (Mendes de Leon, Glass, & Berkman, 2003). Engagement in activities is of crucial importance in promoting and maintaining health and well-being throughout life (Law, Steinwender, & Leclair, 1998), and thus independence in daily activities constitutes an important aspect of health in very old age. The point of departure for the definition of subjective well-being is the World Health Organization's definition of health "as a state of complete physical, mental, and social well-being [and] not merely the absence of disease and infirmity" (World Health Organization, 1946, as cited in Christiansen & Baum, 2005). The three elements of well-being (physical, mental, and social) are part of an integrated whole, and therefore they should not be separated (Stanley & Cheek, 2003). In relation to gerontological research in general, the hallmark of the ENABLE-AGE Project is the richness of variables in covering aspects of housing. What is most important, and in contrast to most other projects in this field, in this project equal emphasis was given to the assessment of objective *and* perceived aspects of housing.

Very old individuals, particularly those living in single households, have been described as particularly sensitive to "environmental press" (Lawton, 1999), because of sensory, mobility, and cognitive declines (Baltes & Smith, 1999). Because community-residing, very old participants living alone have a pronounced risk of losing independence and becoming socially isolated, the ENABLE-AGE Project targeted this group. In addition, major studies that targeted this at-risk segment of the aging population (see, e.g., Baltes & Mayer, 1999; Myers, Juster, & Suzman, 1997) narrowly focused on variables related to the person and his or her social environment, but not on the home environment.

Researchers gathered data in urban regions in five European countries representing economically well-developed "old" European Union member states, that is Germany, the United Kingdom, and Sweden, as well as "new" member states that joined the European Union in 2005 and are still in a period of major social and political transformation, that is, Hungary and Latvia (Széman & Harsanyi, 2000). The goal of the project was to deliver evidence-based guidelines for home assessment and home modifications among older people (also see <http://www.enableage.arb.lu.se>).

Research Background

The Home Environment, Independence, and Autonomy

Several empirical studies have focused on the home environment as a potential threat to independence in daily activities and autonomy. For example, Gill and colleagues (Gill, Robinson, Williams, & Tinetti, 1999) examined the home environment of 1,088 adults aged 72 years or older and found no major differences between the homes of physically impaired and unimpaired individuals in the prevalence of physical environmental barriers. Further, early research from Reschovsky and Newman (1990), and later the "Fixing to Stay" study (AARP, 2000), found that many older people undertake at least some home modifications or repairs themselves. Similarly, visually impaired older people employed a wide variety of person- and environment-related compensations to reduce person-environment mismatches (Wahl, Oswald, & Zimprich, 1999). However, such compensation strategies probably do not prevent negative influences of the objective home environment on independence and autonomy. On the basis of a large German study, substandard housing conditions were found to be significantly associated with deficits in activity performance (Olbrich & Diegritz, 1995; Schmitt, Kruse, & Olbrich, 1994). Moreover, German (Wahl et al., 1999) as well as Swedish studies (Iwarsson, 2005; Iwarsson, Isacson, & Lanke, 1998) demonstrated that higher dependence in daily activities was significantly related to lower accessibility, a construct considering the fit between functional limitations *and* objectively observed barriers in the home environment (Iwarsson & Ståhl, 2003). Additional support for this kind of relationship has been found in outcome studies on home modifications, though the evidence remains somewhat mixed (Gitlin, 1998; Lyons et al., 2003). In sum, the connection between the home environment and independence or autonomy in daily activities has received some research support, but few if any studies on housing and health in very old age included data on objective and perceived aspects of housing to an extent that is sufficient for in-depth elucidation of relationships between the home and independence or autonomy.

The Home Environment and Well-Being

The typical empirical approach to the home environment and well-being relationship has focused on housing satisfaction as the sole aspect of perceived housing. Research in the 1990s replicated and extended the classic finding of earlier studies that older people tend to score high on this construct, regardless of objective home and neighborhood conditions (Christensen, Carp, Cranz, &

Whiley, 1992; Iwarsson & Isacson, 1996). A recent meta-analysis on housing satisfaction (Pinquart & Burmedi, 2004) shows that housing satisfaction steadily increases from middle to old age. Furthermore, there is a substantial link between housing quality and well-being (Evans, Kantrowitz, & Eshelman, 2002). According to qualitative research on the meaning of home (e.g., Rubinstein, Kilbride, & Nagy, 1992), the active management of the environment in itself represents a major source of well-being for older people, especially those who are frail or living alone. Sixsmith and Sixsmith's (1991) study and more recently Rowles, Oswald, and Hunter's (2004) findings clearly underline the important role of the home as the major physical-spatial location in old age, where one (re)integrates critical life transitions, such as physical impairment or widowhood, into one's life structure by relying on the resources and enduring nature of the physical home environment. Furthermore, several studies support the notion that staying in one's home is highly desirable for older people at risk, including those who lose functional independence (Krothe, 1997), have recently experienced widowhood (Swenson, 1998), or live in suboptimal environments (Crystal & Beck, 1992). Alternatively, home may not always exert positive influence on well-being; for some older people home can be worrisome, sad, or confining (Rubinstein et al., 1992). In sum, although the assumption of a link between the home environment and well-being seems highly plausible, the available evidence is quite limited and probably biased toward positive relations. Similar to studies on independence in daily activities, few if any studies have included data on objective and perceived aspects of housing to an extent sufficient for in-depth elucidation of relationships between the home and well-being.

Research Needs and the ENABLE-AGE Project

In order to fill the knowledge gaps identified, research with a wider perspective is needed that takes into account objective as well as perceived aspects of housing alongside relevant aspects of health in very old age. In particular, the assessment of housing requires a methodological approach with the same levels of validity and reliability in assessments of the home environment as assessments of person-related variables (Iwarsson, Wahl, & Nygren, 2004). The absence of such an approach has led to an imbalance in the existing research with respect to person- and environment-related assessments (Iwarsson, 2004, 2005).

Given the shortcomings in the existing literature, we, the researchers of the ENABLE-AGE Project, had several major targets distinguishing it from other projects in this field. First, we were interested in relationships between objective and perceived hous-

ing in very old age. Second, relationships between objective and perceived housing and healthy aging outcomes, namely, independence in daily activities and well-being, served as the target for our analysis. Third, we examined cross-national similarities in these relationships. In addition, the ENABLE-AGE Project sought to advance methodological quality in the assessment of home environments and very old people. Even if there are other projects that strived to attain similar goals, we argue that this project was different in that we managed to combine these goals in the same project. Having stated this, one should keep in mind that other environmental domains potentially influencing health in very old age do, of course, exist, such as aspects related to care environments, family support, or professional support from nursing and rehabilitation staff, or social and physical contexts in the neighborhood. Because it was beyond the scope of the ENABLE-AGE Project to include such aspects, one should keep this limitation in mind while interpreting our results.

Theoretical Models Guiding the ENABLE-AGE Project

The person-environment fit-oriented analysis of healthy aging that we conducted was driven by the World Health Organization's (2001) International Classification of Functioning, Disability, and Health (ICF). According to the ICF, multifaceted relationships among the components of body functions, activity, and participation, and personal and environmental factors are expected. However, the ICF does not differentiate among environmental factors in terms of objective and perceived aspects.

Regarding the role of objective housing, we used the ecological theory of aging (ETA) and the environmental docility hypothesis (Lawton, 1999; Lawton & Nahemow, 1973; Lawton & Simon, 1968), which underlie many environmental gerontology studies (Scheidt & Norris-Baker, 2004; Wahl & Gitlin, in press), as the major conceptual background of the project. According to the ETA, individuals with low functional capacity are much more vulnerable to environmental demand than those with high capacity, and environmental details are critical to what they can manage in their everyday lives. The ETA, other classic person-environment conceptions (e.g., Carp, 1987), and the disablement process (Verbrugge & Jette, 1994) underscore the notion that it is the fit between personal competencies and needs and environmental conditions that is key to understanding person-environment relations as people age, rather than personal and environmental factors as separate constructs (Iwarsson, 2004, 2005).

In contrast to the role of objective housing, the role of perceived housing has been underdeveloped in current conceptual frameworks (Rubinstein &

De Medeiros, 2004). Regarding perceived housing, the ENABLE-AGE Project did not rely solely on housing satisfaction, seeing this as too limited in its conceptual approach, because housing satisfaction only involves a cognitive evaluation of the home environment. Instead, the project also considered the meaning of home (Oswald & Wahl, 2005; Rowles et al., 2004; Rubinstein et al., 1992), its usability (Fänge & Iwarsson, 1999, 2003), and the newly introduced concept of housing-related control beliefs (Oswald, Wahl, Martin, & Mollenkopf, 2003). In a recent methodological study based on the ENABLE-AGE Project, Oswald and colleagues (in press) demonstrated that these concepts hold as a four-domain model of perceived housing.

In addition, much neglected in the person-environment and aging literature are linkages between micro and macro contexts. Therefore, besides attention to person-environment relations (micro context), the ENABLE-AGE Project also considers macro contextual differences and similarities. By selecting a set of European countries, we attempted to make cross-national comparisons. That is, because legislation, housing regulations, and socioeconomic standards are quite diverse across European countries, relationships among personal factors, housing, and healthy aging outcomes may be influenced by macro factors. On the one hand, it can be assumed that socioeconomic differences among countries should be directly linked with housing quality and concomitant outcomes. On the other hand, it could also be true that the interplay between objective and perceived housing and healthy aging outcomes is so fundamental in nature that similar relations may be observed across a diversity of national backgrounds.

We are not arguing that the person-environment approach taken in the ENABLE-AGE Project is fully comprehensive. For example, environmental forces such as caregivers or family members are not explicitly considered. The major aim of the ENABLE-AGE Project was to explicitly focus on aspects normally not addressed in studies on healthy aging in such intensity (i.e., major components related to the objective and perceived home environment).

Major Components of the ENABLE-AGE Project

Research Design

An advantage, a necessary prerequisite, and also a challenge for the ENABLE-AGE Consortium was the fact that the research team was composed of scholars from a wide range of disciplines (e.g., gerontology, human geography, medicine, psychology, occupational therapy, and sociology). These disciplines complemented each other and were configured in different combinations for the specific project components.

The project included three study arms: (a) The ENABLE-AGE Survey Study; (b) the ENABLE-AGE In-Depth Study; and (c) the ENABLE-AGE Update Review. We integrated the three project elements throughout the 3-year period (2002–2004), as each provided systematic input into conceptual definitions, research design, methodological development, analyses, cross-national comparisons, theory development, and dissemination of results (Iwarsson et al., 2004).

The *ENABLE-AGE Survey Study* was based on a comprehensive questionnaire incorporating a wide range of well-proven self-report scales and observational formats, along with project-specific questions on housing and health. We collected data at two time periods spaced 1 year apart with a reduced assessment battery applied at follow-up. The ENABLE-AGE In-Depth Study involved in-depth semistructured interviews conducted with a subsample of the survey participants in each of the five countries. The interviews focused on very old peoples' understandings of the meaning and experience of home in relation to health, well-being, and aging. The ENABLE-AGE Update Review aimed to explore key policy issues in the five countries. The first component of this review concerned detailed documentation of building norms and guidelines in each country. Second, we identified national key policy topics, which in turn we compiled into a policy topic list at a cross-national level, concluding with a macro-level critical analysis of current policies and housing trends. This article as well as the two related articles that follow it (Nygren et al., this issue; Oswald et al., this issue) mainly focus on the ENABLE-AGE Survey Study.

Study Sample

Our initial sampling strategy was to draw participants at random from official national registers, in a similar way in all five countries. This was possible only in Sweden, Germany, and Hungary. In the United Kingdom and Latvia, official national registers are not made available for researchers in the way necessary for this project. Thus, in the United Kingdom our sampling strategy relied on use of general practitioners' patient lists, whereas in Latvia we recruited participants at social day care centers and through older people's voluntary organizations (Iwarsson et al., 2004). Following the ethical guidelines and procedures for formal ethical consent of each country, we enrolled all participants after they gave informed consent. We handled all data with strict anonymity. We informed participants that they were allowed to withdraw from the interviews if they wished, including potential withdrawal of their data up to the time of the publication of results.

Because of differences in the population mean

age and life expectancy between Western–Central and Eastern European countries, we regarded the use of the same age strata across countries as an inadequate approach, particularly for very old people. For instance, given the life expectancies at birth in 2002 (study start) in Sweden of 77 years of age for men and 82 years of age for women as compared with Latvia of 65 years of age for men and 77 years of age for women, using the same age groups would have led in Latvia to a much more positively selected group of survivors as compared with Sweden (Iwarsson et al., 2004). In addition, given the fact that far fewer people in Eastern European countries reach very old age, it would have been difficult to recruit sufficient numbers of participants in Latvia and Hungary. In order to adjust for this, in Sweden, Germany, and the United Kingdom, we had the “younger” age groups composed of participants aged 81–84 years and the “older” age groups composed of participants aged 85–89 years. We selected the corresponding age groups in Hungary and Latvia as those aged 75–79 years and 80–84 years, respectively. In addition, we included only individuals living alone in urban households (Iwarsson et al., 2004). We stratified the sample for sex with the original aim of 25% men in each national sample. However, we only partially achieved this goal, particularly in the Eastern European countries because of our difficulties in recruiting very old men.

The final sample for the ENABLE–AGE Survey Study at the baseline wave was composed of 1,918 participants (details of the national samples are provided in Oswald et al., this issue). For the set of articles published in this issue, we used only baseline data from the ENABLE–AGE Survey Study. In the two empirical papers, we use the term *national samples* to address the samples in the different countries. This is a technical naming not meant to state that samples were representative of the respective countries.

Methodological Development and Interviewer Training

Prior to the data collection within the ENABLE–AGE Survey Study, we gave major attention to methodological development and interviewer training. We integrated the first phase of this process with the ENABLE–AGE Update Review, because a review of building standards, regulations, and norms for housing design was necessary to revise the section of the instrument that covered accessibility assessment for cross-national use. Further, we had instruments and questions translated into the six languages involved (Swedish, German, English, Hungarian, Latvian, and Russian), followed by iterative piloting in all countries. We followed this with several 3-day interviewer training courses focusing on the reliable administration of all instruments. In Sweden,

Germany, and Latvia, the interviewer teams consisted of occupational therapists, whereas the UK and Hungarian interviewer teams were multidisciplinary (Iwarsson et al., 2004). In each country, the national project leader arranged further team training with all interviewers in their own language. Thereafter, we performed iterative pretests, administering the survey questionnaire to older adults who were not included in the ENABLE–AGE Survey Study sample, followed by subsequent revisions of the questionnaire. After several months of pretesting, the ENABLE–AGE Consortium reached consensus and decided on the final format (Iwarsson et al., 2004). Finally, we carried out a separate interrater reliability study of the accessibility instrument, based on 64 pairwise assessments (Iwarsson, Nygren, & Slaug, 2005). The results demonstrated moderate to good agreement across research sites, and study design issues and experiences related to interviewer competence were highlighted.

Conclusion

Formally, the ENABLE–AGE Project was completed at the end of December 2004. The integrated approach of the project in terms of conceptual understandings, methodological design, and forms of analysis is particularly relevant to strengthening the evidence base in the area of housing and ageing. Bringing such information together has presented, and will continue to present, exciting opportunities for new insights to emerge of theoretical and practical importance for very old people’s housing, building upon the ENABLE–AGE multidimensional methodology for research on housing and healthy aging. Major parts of this methodology are now available in six European languages (see <http://www.enableage.arb.lu.se>), and the experiences gained are valuable for the implementation of research on housing and health at large. Strong emphasis is currently being placed on the dissemination of knowledge within scientific as well as practical domains. The two empirical studies presented in this issue are important parts of this ongoing dissemination. Several additional research reports adding to the results given in this issue are currently available (Haak, Dahlin Ivanoff, Fänge, Sixsmith, & Iwarsson, in press; Haak, Fänge, Iwarsson, & Dahlin Ivanoff, in press; Iwarsson, Wahl, Oswald, Tomsone, & Nygren, in press; Löfqvist, Nygren, Széman, & Iwarsson, 2005), whereas still others are in progress. The two articles following this introduction consider findings from all five countries involved in the project. In the first article (Nygren et al., this issue), the relationship between objective and perceived housing serves as the primary target for analysis. The second article addresses the relationships between objective housing, perceived housing, and healthy aging outcomes (Oswald et al., this issue).

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Received November 7, 2005
 Accepted September 11, 2006
 Decision Editor: Linda S. Noelker, PhD

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