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# Homeward bound: Introducing a four-domain model of perceived housing in very old age

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**Abstract**

The aim of this article is to introduce an integrative and more comprehensive approach to understanding and measuring perceived housing in old age. First, four conceptual domains of subjective housing were introduced, based on the assumption that each of the domains brings a unique perspective to the understanding of perceived housing: housing satisfaction, usability in the home, meaning of home and housing-related control beliefs. Second, relationships between the proposed domains were empirically examined using correlative analysis, factor analysis and structural equation modelling (SEM) techniques. Cross-cultural similarities and differences in the observed empirical relations were then analysed across three Western European countries. Data were drawn from a sub-sample of the participants in the European ENABLE-AGE Project amounting to 1223 old adults aged 80–89 years and living alone in their private homes in Swedish, British, and German urban regions. The ENABLE-AGE data set has the advantage of containing measures related to all four domains of perceived housing which are the focus of this paper. The results of exploratory and confirmatory factor analysis as well as of the SEM give empirical support for the usefulness of the theoretically proposed four component model of perceived housing. Furthermore, multi-group analysis supports the assumption of similarity of perceived housing among older people living in the different countries.


## 1. Introduction

The vast majority of older adults live in ordinary community-based dwellings. Among them, increasing proportions of older people live alone, especially in the rapidly growing population of the very old (i.e. 80 years of age or more) (United Nations Development Programme, 2001). Typically, housing is treated as an important objective context of ageing in the environmental-gerontology literature (e.g. Wahl, 2001; Wahl & Gitlin, 2006). One major argument in this respect is that the immediate home environment is the person's major living space in old and particularly very old age, both in terms of the increased time older people spend at home, as well as the many activities that take place inside the home (Baltes, Maas, Wilms, Borchelt, & Little, 1999).

Also, there is a strong relationship between age-related loss in functional capacity, such as vision loss or mobility impairment, and objective living arrangements. It has been argued in the environmental press-competence model, suggested by Lawton and Nahemow (1973), that elderly people with pronounced functional loss are particularly vulnerable to environmental challenges such as barriers within the house or objective distance between the house and important environmental facilities such as shops, public transportation stops or park areas (see also Wahl, Oswald, & Zimprich, 1999). Thus, the home may compensate for the reduced functional capacity of the ageing individual, i.e. after the implementation of barrier-free design and a full range of available housing adaptations (Gitlin, 1998). However, although of fundamental importance, targeting only objective person-environment

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relations in this context presents a limited perspective on housing in old age due to its neglect of the symbolic and experiential dimension of ageing in place (Altman & Low, 1992; Rowles & Chaudhury, 2005; Wahl, Scheidt, & Windley, 2004). In particular, a high degree of residential stability in old age reflects an accumulation of home experience over time. Housing contributes to everyday life at home in terms of functional links related to behavioural adaptation as well as in terms of meaningful links related to identity (Oswald & Wahl, 2005; Rowles, Oswald, & Hunter, 2004). Over time, a sense of "dwelling" or "being in place" tends to develop as an expression not only of habitual routines and cognitive awareness of interior home spaces but also as a result of a psychological fusion of person and place at home (Rowles et al., 2004; Sixsmith & Sixsmith, 1991). In the rest of this article, we use the term *perceived housing* to address the totality of subjective phenomena of experiences and symbolic representations related to living at home.

Over the years, a number of disciplines have contributed to the understanding of perceived housing in old age such as social geography (Rowles & Watkins, 2003), architecture (Després, 1991), anthropology (Miller, 2001; Rubinstein & De Medeiros, 2004), sociology (Mathes, 1978), occupational therapy (Fänge & Iwarsson, 1999, 2003) environmental psychology (Hay, 1998; Hayward, 1975; Manzo, 2003, 2005; Moore, 2000; Sixsmith, 1986; Sommerville, 1997), and environmental gerontology (Oswald & Wahl, 2005). As a consequence of this, a huge variety of concepts and terms have been suggested to address perceived housing. Among these are housing satisfaction, experience of home, meaning of home, place attachment, place identity, subjective housing, perceived environmental control, and usability. One key problem in the literature dealing with housing is that these concepts are often used either interchangeably or in a rather isolated manner, perhaps due to their diverse disciplinary origins. For example, housing satisfaction has predominantly been used in the psychology and sociology of ageing in place (Pinquart & Burmedi, 2004), while place attachment has been used in the anthropology of ageing (Rubinstein & Parmelee, 1992) and issues of usability in occupational therapy (Fänge & Iwarsson, 2003, 2005a, 2005b). Given the heterogeneity of these constructs, there is a clear need for an integrative approach which identifies the role of such concepts in comprehensively documenting the subjective perception of home in old age.

Furthermore, perceived housing is linked to the existing sociocultural background (e.g. Rubinstein & De Medeiros, 2004). However, cultural differences in this regard are often addressed in terms of developmental contexts in early life or as extremes due to climate, religious background, daily habits, and economics, e.g. in so-called "Third World" versus "First World" nations (e.g. Hay, 1998; Miller, 2001). Beyond such contrasts, cross-national housing-related research with older adults has remained quite rare.

The overall objective of this article is to propose an integrative and more comprehensive approach to better understand perceived housing in old age on the conceptual and empirical level. In terms of the conceptual level, we argue for the need to consider a family of four domains as a best available representation of perceived housing: housing satisfaction, usability in the home, meaning of home, and housing-related control beliefs. Regarding the empirical level, we analyse the relationships of the four domains based on the assumption that each of the domains brings a unique perspective to the understanding of perceived housing. In addition, the question of cross-country usefulness of the four component model will be addressed by drawing from comparative data available from three European countries (Germany, Sweden, and the UK). We start with a case example derived from the same data set (i.e. the ENABLE-AGE Project) to illustrate the complex ways in which housing is perceived by older people, then proceed with a conceptual analysis of perceived housing, followed by the presentation of respective empirical findings.

### 1.1. On the complexity of perceived housing: a case example

Mrs. Scott is 89 years old and living alone in a village setting in the North West of England. She owns her own detached bungalow with gardens to front and rear, abutting a golf course. Over the past 2 years, Mrs. Scott has become increasing more frail and immobile and at the time of interview, was suffering from pain in her hips (she has already experienced three hip operations) and legs, accompanied by heart, lung and urinary problems. In addition, she complains of eye and hearing impairments and general fatigue. In constant pain and with debilitating symptoms, Mrs. Scott was in remarkably good mental health, she said, enjoying her life and taking part in social events with family and friends. For her, home was the centre of family life, the place her sister (aged 91), her own children and grandchildren treat as the focus of family life. Her home is not simply a current lived experience, but a storehouse of memories and the incarnation of her whole life lived in this familiar space with her now deceased husband and young children. Their presence was still felt in the fabric, the furnishings, the layout and the memorabilia surrounding her, making this house her home. Mrs Scott thinks of her home as the centre of her social community, where friends and neighbours visit, play bridge and gossip. As she said, "In my home, the world comes to me!".

Home for Mrs. Scott should be a tidy, clean place offering comfort, privacy and security. However, her health problems have resulted in her inability to maintain her home as she had previously done, and to remain independent, Mrs. Scott required a substantial amount of domestic and personal care. This meant that her home was no longer the private refuge it had been in the past, as carers and helpers woke her up, put her to bed, bathed her, cooked, cleaned and tidied the house. Interestingly,

although she had relinquished control of her body and her home in these respects to paid 'strangers', she still felt in psychological control over her environment, after all, it was she who gave instructions about when and how to manage the home. Despite such control, safety and security were problematic for Mrs. Scott as she feared the consequences of burglary and falls. Subsequently, she had reorganized her immediate living space to contain all she needed on a daily basis, centralizing her life around her favourite chair within her living room. From here, she looks out onto her back garden and the adjoining golf course and waves to the golfers passing by, unable to get out to chat to them due to the raised threshold separating garden from home. This she said, created a huge barrier for her, cutting her off from the pastimes she loves, gardening and chatting, and effectively holding her prisoner inside her own home: a home she does not want to leave despite her frailty because to do so would not simply be leaving a house but, "…splitting up a family".

This case study indicates that Mrs. Scott's home cannot be described simply by attitudinal housing satisfaction, but covers usability to maintain her daily habits and routines. Moreover it spans the full scope of cognitive, emotional, behavioural, physical and social meanings as well as being important in terms of perceived control over the environment. In sum, understanding of the psycho-social home requires the integration of satisfaction, meaning of home, usability and housing-related control.

### 1.2. Description of four domains of perceived housing

#### 1.2.1. Housing satisfaction

Housing satisfaction is the classic measurement of perceived housing and used in many studies around the globe since the 1960s (e.g. Aragonés, Francescato, & Gärling, 2002; Pinquart & Burmedi, 2004). The potential of the construct of housing satisfaction lies in its ambition to provide a broad and simple overall attitudinal and mostly cognitive evaluation of housing (Hidalgo & Hernadez, 2001). Housing satisfaction is a well-established construct in assessing the perceived quality of the home (e.g. for a summary see Aragonés et al., 2002; Hidalgo & Hernadez, 2001; Weidemann & Anderson, 1985). However, there is neither a generally accepted definition nor a generally acknowledged methodological standard to measure housing satisfaction, although in survey research single item measures are used quite frequently (Pinquart & Burmedi, 2004). Research has repeatedly revealed that housing satisfaction could also be understood as a complex outcome of demographic and health-related circumstances as well as objective and subjective characteristics of the person's environment (e.g. Christensen, Carp, Cranz, & Whiley, 1992; Heywood, Oldman, & Means, 2002; Jirovec, Jirovec, & Bosse, 1984). A meta-analysis has revealed that the association between residential conditions and residential satisfaction is stronger in younger than in older samples, indicating that old people base their satisfaction evaluation less strongly on objective characteristics (Pinquart & Burmedi, 2004). Indeed, high levels of housing satisfaction among older people have frequently been reported in objectively poor living arrangements, labelled as the housing satisfaction paradox (Kivett, 1988; Staudinger, 2000; Walden, 1998). Older people seem to be particularly adept at adapting to different objective living conditions and sustaining high levels of satisfaction (Diener, Suh, Lucas, & Smith, 1999; Schwarz & Strack, 1991; Staudinger, 2000).

In conclusion, housing satisfaction is a common and important indicator to measure perceived housing (e.g. Heywood et al., 2002). The construct is, however, limited with respect to the understanding of home because it provides only a global and predominantly cognitive evaluation of the relation of the ageing person to her/his home environment (Pinquart & Burmedi, 2004; Staudinger, 2000). To contain the scope of housing satisfaction in the current study, we focus entirely on satisfaction with physical housing conditions.

#### 1.2.2. Usability in the home

Usability in the home is a construct predominantly developed within occupational therapy research since end of the 1990s (e.g. Fänge & Iwarsson, 2003; Iwarsson & Ståhl, 2003). Its major focus is on activity and functionality, addressing perceived possibilities to perform necessary and preferred activities in a given home environment (Fänge & Iwarsson, 2005a, 2005b). Usability has been defined as the extent to which the person's housing needs and preferences can be fulfilled in terms of activity performance at home (Fänge & Iwarsson, 2005a), comprising a personal component, an environmental component, and an activity component. The personal component relates to functional capacity, adaptive strategies, and motivation, while the environmental component relates to the physical environmental barriers in the home and its close surroundings. Finally, the activity component relates to the personal repertoire of activities in the home (Fänge & Iwarsson, 2005a, 2005b; Iwarsson & Ståhl, 2003), and their characteristics (Fänge & Iwarsson, 2005a). Usability is based on core assumptions underlying occupational therapy theory, i.e. person–environment–activity transactions (Fänge & Iwarsson, 2003, 2005a; Law et al., 1996), as well as on Lawton's ecological model (Lawton & Nahemow, 1973). Empirical studies have focused on the relationship between housing accessibility and usability (Fänge & Iwarsson, 2003), as well as longitudinal changes along housing adaptation processes (Fänge & Iwarsson, 2005a, 2005b).

In conclusion, usability adds to the understanding of perceived housing mainly by considering the perceived usefulness of the home environment for everyday activities. In this way, and very similar to the limits of the concept of housing satisfaction, it provides only a partial understanding of perceived housing.

#### 1.2.3. Meaning of home

The concept of meaning of home refers to a body of work which has grown since the end of the 1970s based on the work from Hayward (1975), Relph (1976), Rowles (1978) and others. Studies framed within anthropology (e.g. Rubinstein & De Medeiros, 2004), social geography (Rowles, 1983), and psychology (e.g. Hayward, 1975; Manzo, 2003, 2005; Moore, 2000; Oswald & Wahl, 2005) have contributed to phenomena concerned with symbolic representations of space and place and personal meanings linked to one's home. Based on theories of place identity (e.g. Proshansky, Fabian, & Kaminoff, 1983; Stedman, 2002), the home is not only considered to fulfil objective functions (e.g. shelter, support, access, use), but represents individual meanings related to the inhabitant's experience and personality. The concept of meaning of home is used to cover subjectively meaningful habits, social contacts, evaluations, goals, values, cognitions and emotions of a person in relation to their home (Manzo, 2005; Marcus, 1995; Moore, 2000; Oswald & Wahl, 2005; Sixsmith, 1986). The meaning of home describes the accumulation of a range of place attachment processes, operating when people form affective, cognitive, behavioural and social bonds to a particular setting (Brown & Perkins, 1992), thereby transforming space into place (Altman & Low, 1992; Rowles & Watkins, 2003). In contrast to housing satisfaction, meaning of home is not only related to evaluative components of the home. Rather, behavioural aspects of meaning can reflect familiarity and routines developed over time, and cognitive, emotional and social aspects of meaning are manifest through processes of reflecting on the past, symbolically represented in certain places and cherished objects.

Moreover, the need to cope with impairments in old age can be linked to specific meaning patterns. A study with mobility impaired and blind elders revealed different meanings in regard to physical, behavioural, cognitive, emotional and social aspects (Oswald & Wahl, 2005). Such experiential differences support the notion that individual meaning may serve as a resource to cope with everyday problems but also that the home may become a potentially problematic space, an environment of stress and distress (Sixsmith & Sixsmith, 1991).

In conclusion, the concept of meaning of home covers a broad scope of evaluations related to the home environment, represented subjectively within the individual. However, there are still other components relevant for perceived housing, which are not covered by the concepts of housing satisfaction, usability or meaning of home. In particular, we argue that control beliefs in the domain of housing provide a fourth class of processes to be integrated in our model of perceived housing (e.g. Slangen-de Kort, 1999).

#### 1.2.4. Housing-related control beliefs

This strand of research to be considered within any integrative and comprehensive model of perceived home derives from psychological theories and studies on perceived control in different domains of life (Lachman, 1986; Lachman & Burack, 1993; Levenson, 1973, 1981). Given that striving for control has advantages for all species capable of influencing their environment (Schulz & Heckhausen, 1999), control beliefs have been found to reflect a major driving force in explaining the course and outcome of ageing (Heckhausen & Schulz, 1995; Levenson, 1973; Smith, Marsiske, & Maier, 1996). Psychological control theory has recently also been applied to the housing domain (Oswald, Wahl, Martin, & Mollenkopf, 2003a, 2003b). Housing-related control beliefs explain events at home either as contingent upon one's own behaviour, or upon luck, chance, fate, and powerful others. Here, the major argument is that control beliefs related to the regulation of person–environment interchange at home becomes increasingly important in very old age. Striving for housing-related control has also been shown to be linked to the maintenance of independence in daily living and well-being in very old age (Oswald et al., 2003a, 2003b). Furthermore, housing-related control beliefs can be expected to trigger residential decisions such as 'staying put' versus moving to sheltered housing or institutional settings. In conclusion, we argue that control beliefs in relation to housing add a unique and innovative aspect to the concept of perceived housing.

## 2. Empirical research objective and hypothesis

Our theoretical contention is that all four domains—housing satisfaction, usability, meaning of home, and housing-related control beliefs—should be simultaneously considered for a more comprehensive understanding and holistic empirical analysis of perceived housing. Concerning the four domains of perceived housing, we strove to analyse empirical relations between indicators representing these domains, in order to detect to what extent these four domains overlap or differ in content.

We hypothesized that the domains of housing satisfaction, meaning of home, usability in the home, and perceived housing-related control cover distinct dimensions of housing evaluation. Applying a combination of exploratory and confirmatory data analytic procedures, we expected to find a four-factor solution which supports the distinctiveness of the four conceptual domains.

Furthermore, we explored whether comparable relationships between the constructs do exist in all three European sub-samples selected for this study (Germany, Sweden, and the UK), indicating universality of perceived housing and by this also the cross-country usefulness of our conceptual proposal and its empirical validity.

## 3. Method

### 3.1. Project context

This study is based on data collected for an extensive European research project, the ENABLE-AGE Project

(Iwarsson, Nygren, & Slaug, 2005; Iwarsson, Wahl, & Nygren, 2004). The overarching aim of the project was to explore the home environment as a determinant for healthy ageing in very old age using a longitudinal perspective in five countries (Germany, Sweden, the UK, Hungary, and Latvia). The project comprised three major parts. First, a macro level update on housing policies was conducted. Second, a longitudinal survey comprising two measurement points ($N = 1918$) took place (ENABLE-AGE Survey Study) and third, an in-depth study based on interviews and case study analyses was completed (ENABLE-AGE In-depth Study). The data used in this article derived from the ENABLE-AGE Survey Study with its rather comprehensive focus on perceived housing, supported by a case example derived from the ENABLE-AGE In-depth Study.

### 3.2. Sample

For this study, data were drawn from the Swedish, British, and German sub-samples of the data set, for two reasons. First, the target sample in each country was comparable in terms of the age-range, i.e. 80–89-year-old adults living in single-person private households in urban districts (about 75% women), whereas in both East-European countries the age range was 5 years younger due to different life expectancy rates (Iwarsson et al., 2004). Second, we decided to emphasize in this first stage of analyses those countries which have been members of the European Union for many years, assuming a considerable amount of comparability in societal infrastructure and housing standards for older adults. In all, the sample used for this study comprised $N = 1223$ 80–89-year-old adults, who took part in the first measurement point of the ENABLE-AGE Survey Study (see Table 1).

As shown in Table 1, differences in education and objective finances existed in the three countries, although it should be noted that subjective evaluations of financial resources were comparable in all three research sites. Although there were also differences in subjective health and duration of living, this nevertheless was a relatively fragile sample of very old adults who on average had lived in their current homes over a long time period.

### 3.3. Data collection procedure

All instruments used in the survey were administered in individual face-to-face sessions at home visits. The instruments and project-specific questions were translated and back translated into the different languages of the participating countries, followed by pilot examinations and bi-lingual final language adjustments. Involving researchers and interviewers from all participating countries, a series of 3-day interviewer courses were held, focusing on reliable administration of all instruments involved (Iwarsson et al., 2005). Next, in each country the national project leader arranged team courses, instructing and training all interviewers in their own language and context.

In Sweden and Germany, participants were randomly sampled from official registers in urban regions. Intended participants were consecutively included from sampling lists, via mailed letters followed by phone calls using a project-specific sampling strategy with well-defined inclusion and exclusion criteria (Iwarsson et al., 2005). All participants were enrolled after informed consent had been given, following the ethical guidelines and procedures for formal ethical consent of each country. In the UK, where official urban registers are not made available to researchers in the way necessary for the ENABLE-AGE Project, participants were sampled through (Primary Care Trust) PCT lists followed by invitation letters. Since community-dwelling very old persons who live alone are considered to be very sensitive and vulnerable concerning extensive external contact with researchers, as expected the refusal rates were considerable (58.9% in Sweden, 67.2% in Germany; no information available in the UK due to ethical considerations). However, the most important reasons for refusal were comparable in all three countries, such as "lack of interest or time", "poor health", and "interview too stressful".

Table 1
Sample description

| ($N = 1223$) (M, S.D.) or (%, $n$) | Sweden ($n = 397$) | Germany ($n = 450$) | UK ($n = 376$) | $p$ |
|---|---|---|---|---|
| Age (years) | 84.6 (3.1) | 85.1 (3.2) | 84.8 (2.7) | |
| Gender (% women) | 74.6% | 78.4% | 70.0% | |
| Education (years of schooling) | 8.8 (2.2) | 11.6 (2.6) | 9.9 (1.9) | *** |
| Finances (€ per month and person)[a] | 1015 | 1569 | 1044 | *** |
| Subjective evaluation of finances (% rating income as "high") | 10.6% (42) | 9.1% (41) | 10.9% (41) | n.s. |
| Subjective health (satisfaction 1–5)[b] | 3.6 (0.8) | 2.8 (1.1) | 3.0 (1.0) | *** |
| Duration of living in same home (years) | 21.8 (17.4) | 33.5 (19.4) | 25.0 (18.3) | *** |

*Note*: Statistical test for differences: $F$-test (means), Chi-Square-test (frequencies) with not significant: n.s., $p < .05^{*}$; $p < .01^{**}$; $p < .001^{***}$.

[a]In Germany 122 participants, in Sweden 54, in the UK 68 participants refused to give information.

[b]Subjective evaluation, higher scores indicate lower subjective health (SF 36).

### 3.4. Instruments

#### 3.4.1. Housing satisfaction

To measure housing satisfaction (HSAT) a single item measure was used which specifically targeted satisfaction with the condition of the house (''Are you happy with the condition of your home?''). This item was drawn from the more extensive Housing Options for Older People (HOOP) questionnaire (Heywood et al., 2002). The question on housing conditions was answered on a five point scale from 1 = ''definitely not'' to 5 = ''yes, definitely'', adapted from the original questionnaire (Sixsmith & Sixsmith, 2002). In the English assessment battery the notion of satisfaction was represented by the word ''happy'' to remain close to normal everyday language used by older people as identified in the ENABLE-AGE qualitative pilot studies. Indeed, the wording of this question varied slightly in each of the participating countries to reflect common language usage around issues of housing satisfaction. In Sweden this was translated most effectively in terms of ''feeling content'' and in Germany, the term equivalent to ''satisfied'' was used. The English items of all questionnaires (as well as M, S.D., and range) are listed in Table 2 (see Table 2).

#### 3.4.2. Usability in the home

In order to capture usability, the Usability in My Home Questionnaire (UIMH) (Fänge & Iwarsson, 1999, 2003, 2005a, 2005b) was applied. This instrument addresses the degree to which the physical housing environment supports the performance of activities at home, based on individual subjective judgements. Each item is rated on a 5-point scale from 0 = ''not at all'' to 5 = ''fully agree'' (see Table 2). The items of the instrument have been found in earlier research to reveal to a three-factor pattern (Fänge & Iwarsson, 2003) addressing activity aspects, personal and social aspects, and physical environmental aspects of usability. Psychometric analyses in the present data set, however, indicated a limited level of internal consistency (Cronbach's $\alpha < 0.50$) in the ''personal and social aspects'' sub-scale. Thus, only two sub-scales were used in the current study: ''Activity aspects'' (UMH1: 4 items, sum-score; Cronbach's $\alpha = 0.67$) and ''Physical environmental aspects'' (UMH2: 6 items, sum-score; $\alpha = 0.75$).

#### 3.4.3. Meaning of home

To measure meaning of home, we used the Meaning of Home Questionnaire (MOH) which was developed to assess older individual's subjective meanings in four areas of particularly theoretical importance: physical, behavioural, cognitive/emotional and social (Oswald et al., 1999). Participants were instructed to judge to what extent they personally agreed or disagreed with the statements on an 11-point scale from 0 = ''strongly disagree'' to 10 = ''strongly agree'' (see Table 2). The development of the scale covered open-ended examinations of a broad scope of contents for each domain (for details see Oswald & Wahl, 2005), purposefully selected to represent pronounced heterogeneity of perceived housing. Psychometric analyses in the present data set indicated acceptable internal consistency (Cronbach's $\alpha > 0.50$) in three out of four sub-scales, that is physical aspects (MOH1: seven items, $\alpha = 0.60$), behavioural aspects (MOH2: six items, $\alpha = 0.67$), and cognitive/emotional aspects (MOH3: 10 items, $\alpha = 0.62$). The sub-scale on social aspects (five items, $\alpha = 0.44$) was discarded due to its low reliability.

#### 3.4.4. Housing-related control beliefs

Housing-related control beliefs were assessed with the Housing-related Control Beliefs Questionnaire (HCQ). This scale was developed as a 24-item questionnaire, based on the widely used psychological dimensions of Internal Control (8 items, sum-score), External Control: Powerful Others (8 items, sum-score), and External Control: Chance (8 items, sum-score) (Oswald et al., 2003a, 2003b). Participants were instructed to judge to what extent they personally agree or disagree with the statements on a five-point scale from 1 = ''not at all'' to 5 = ''very much'' (see Table 2). ''Internal Control'' means that housing-related events are highly contingent upon a person's own behaviour, where personal responsibility implies that one is responsible for what happens. ''External Control'' means either some other person is responsible or things happen by mere luck, by chance, or by fate. However, psychometric analyses in the present data set indicated poor levels of internal consistency in the internal control sub-scale and only medium internal consistency in both external control sub-scales. To improve the psychometric qualities of this instrument in the current analysis, the internal control sub-scale was removed. The removal of the internal control sub-scale was in accordance with the conceptual argument that housing-related external control is of particular interest in perceived housing in very old age (e.g. Baltes, Freund, & Horgas, 1999). Further, both external sub-scales were combined, resulting in sufficient reliability (HEXC: 16 items, $\alpha = 0.67$).

### 3.5. Data analysis

Descriptive results are based on bi-variate correlative findings. To acknowledge the large sample, correlation coefficients are reported only with $p < 0.001$. Regarding the effect sizes of correlation coefficients, data analyses will follow Cohen's proposal (1988), arguing that $r \geqslant 0.1$ is considered as a ''small effect'', $r$ from 0.3 to 0.5 as a ''medium effect'', and $r \geqslant 0.5$ as a ''large effect''.

To test for the empirical dimensionality of the set of instruments, we chose an exploratory factor analysis approach using principal component analysis. The benefit of exploratory factor analysis is the ''unconditional'' examination of the factorial structure, enabling detection of factors not hypothesized a priori. With respect to the exploratory analysis, we expect from our hypothesis that a four factor solution—revealing the four domains as basic factors—could be accepted from the results.

Table 2
Instruments on perceived housing in old age

| Remaining items of questionnaires on perceived housing (numbers in order of presentation in the questionnaire) | Mean | s.d. | Range |
|---|---|---|---|
| Housing satisfaction (Sixsmith & Sixsmith, 2002) | | | |
| *Housing satisfaction (1 item)* | | | |
| 1. Are you happy with the condition of your home? | 4.62 | 0.77 | 1–5[a] |
| Usability in my home (Fänge & Iwarsson,1999) | | | |
| *Usability in my home: activity aspects (4 items)* | | | |
| 1. In terms of how you normally manage your personal hygiene, dressing, visiting the toilet, or how you eat, to what extent is the home environment suitably designed in relation to this? | 4.60 | 0.77 | 1–5[b] |
| 2. In terms of how you normally manage your cooking/heating of food or preparation of snacks, to what extent is the home environment suitably designed in relation to this? | 4.58 | 0.90 | 1–5 |
| 3. In terms of how you normally manage your washing up, cleaning, care of flowers, to what extent is the home environment suitably designed in relation this? | 4.46 | 1.10 | 1–5 |
| 4. To what extent is the home environment suitably designed in relation to how you normally manage your washing, ironing, mangling, or repair of clothes? | 3.98 | 1.70 | 1–5 |
| *Usability in my home: physical environmental aspects (6 items)* | | | |
| 10. How usable do you feel that your home environment is in general? | 4.63 | 0.72 | 1–5 |
| 11. How usable do you feel that the environment outside your home is? | 4.31 | 1.02 | 1–5 |
| 12. How usable do you feel that the entrance to your home is? | 4.44 | 0.92 | 1–5 |
| 13. How usable do you feel that the secondary spaces in your home are? | 4.25 | 1.10 | 1–5 |
| 15. How usable do you feel that the balcony, patio, or garden is? | 4.13 | 1.49 | 1–5 |
| 16. How usable do you feel that the interior of your home is? | 4.70 | 0.62 | 1–5 |
| Meaning of home (Oswald, Mollenkopf, & Wahl, 1999) | | | |
| *Meaning of home: physical aspects ("Being at home means for me…") (7 items)* | | | |
| 1. Living in a place which is well-designed and geared to my needs | 9.15 | 1.69 | 0–10[c] |
| 6. Having to live in poor housing conditions [item value was reversed for calculations] | 9.57 | 1.57 | 0–10 |
| 7. Having a nice view | 7.94 | 2.80 | 0–10 |
| 12. Living in a place that is comfortable and tastefully furnished | 9.24 | 1.58 | 0–10 |
| 15. Feeling that the home has become a burden [item value was reversed for calculations] | 8.98 | 2.18 | 0–10 |
| 20. Having a base from which I can pursue activities | 8.55 | 2.62 | 0–10 |
| 25. Being confined to the rooms (and things) inside the home [item value was reversed for calculations] | 7.58 | 3.72 | 0–10 |
| *Meaning of home: behavioural aspects ("Being at home means for me…") (6 items)* | | | |
| 2. Managing things without the help of others | 8.15 | 2.70 | 0–10 |
| 8. Doing everyday tasks (e.g. housework) | 7.97 | 2.81 | 0–10 |
| 13. Being able to change or rearrange things as I please | 8.50 | 2.78 | 0–10 |
| 16. Not having to accommodate anyone's wishes but my own | 8.63 | 2.68 | 0–10 |
| 21. No longer being able to keep up with the demands of my home (e.g. maintenance) [item value was reversed] | 7.35 | 3.44 | 0–10 |
| 26. Being able to do whatever I please | 9.44 | 1.59 | 0–10 |
| *Meaning of home: cognitive/emotional aspects ("Being at home means for me…") (10 items)* | | | |
| 3. Being familiar with my immediate surroundings | 9.33 | 1.48 | 0–10 |
| 4. Feeling safe | 9.40 | 1.37 | 0–10 |
| 9. Being bored [item value was reversed for calculations] | 8.42 | 2.74 | 0–10 |
| 10. Knowing my home like the back of my hand | 9.35 | 1.69 | 0–10 |
| 14. Being able to relax | 9.56 | 1.23 | 0–10 |
| 17. Thinking about the past (e.g., important persons and events) | 7.56 | 3.08 | 0–10 |
| 18. Enjoying my privacy and being undisturbed | 9.14 | 1.87 | 0–10 |
| 22. Thinking about what living here will be like in the future | 4.74 | 3.99 | 0–10 |
| 23. Feeling comfortable and cosy | 9.57 | 1.20 | 0–10 |
| 27. Feeling lonely [item value was reversed for calculations] | 6.95 | 3.55 | 0–10 |
| Housing-related control beliefs (Oswald et al., 2003) | | | |
| *Housing-related control beliefs: external control (16 items)* | | | |
| 2. I rely to a great extent upon the advice of others when it comes to helpful improvements to my home | 2.77 | 1.32 | 1–5[d] |
| 3. Having a nice place is all luck. You cannot influence it; you just have to accept it | 2.44 | 1.29 | 1–5 |
| 5. Whether or not I will be able to stay in my home will probably depend on other people | 2.79 | 1.35 | 1–5 |
| 6. It's purely a matter of luck whether or not neighbours will step in if I need help | 2.65 | 1.31 | 1–5 |
| 8. In order to do anything interesting outside of my home I have to rely on others | 2.69 | 1.47 | 1–5 |
| 9. Whether or not I can stay in my home depends on luck and circumstance | 3.71 | 1.28 | 1–5 |
| 11. I must rely on others when it comes to making use of support services and facilities in my local area | 2.43 | 1.37 | 1–5 |
| 12. You just have to live with the way your home is; you cannot do anything about it | 2.94 | 1.48 | 1–5 |

Table 2 (*continued*)

| Remaining items of questionnaires on perceived housing (numbers in order of presentation in the questionnaire) | Mean | s.d. | Range |
|---|---|---|---|
| 14. When other people offer to help around the house or help me outside the home, I can't say no | 2.97 | 1.46 | 1–5 |
| 15. Where and how I live has happened more by chance than anything else | 2.84 | 1.52 | 1–5 |
| 17. Other people have told me how to arrange the furnishings in my home | 1.73 | 0.98 | 1–5 |
| 18. It's a case of luck or chance whether I will be able to continue my present way of life in my home in the future | 3.59 | 1.27 | 1–5 |
| 20. I listen to the advice of others when they tell me not to change anything in my own home | 2.45 | 1.28 | 1–5 |
| 21. The way my home has been set up just happened by chance, over time | 3.17 | 1.45 | 1–5 |
| 23. Other people are to blame if my home is not a place where I can enjoy life | 1.78 | 1.01 | 1–5 |
| 24. Whether or not there are support services or community facilities in my neighbourhood is just a matter of luck | 3.09 | 1.37 | 1–5 |

[a]From 1 = "definitely not" to 5 = "yes, definitely".
[b]From 0 = "not at all" to 5 = "fully agree".
[c]From 0 = "strongly disagree" to 10 = "strongly agree".
[d]From 1 = "not at all" to 5 = "very much".

Next, to test the hypothetically proposed and empirically revealed four factor model's fit to the data, a confirmatory factor analysis approach, indicating a structural equation model (SEM), was considered to be the optimal strategy. Confirmatory factor analysis offers the benefits of estimating how well the model fits the data and further analysing structural relations between the latent factors specified. With respect to confirmatory analysis, we expected good model fit confirming the four factor model, with the latent factors representing the four domains. As we expected correlations between single indicators across domains, we computed modification indices and included these single-indicator cross-domain correlations which showed a strong impact on model fit. Evaluation of model fit was based on the normed fit index (NFI), comparative fit index (CFI), and root mean squared error of approximation (RMSEA), and we followed widely used "rules of thumb" for good model fit, i.e. NFI and CFI $>0.9$ and RMSEA $<0.05$ (for discussion of SEM fit evaluation see Hu & Bentler, 1999; Marsh, Balla, & Hau, 1996). We did not use the $\chi^2$-test of overall model fit due to the well-known problem of over-rejection of true models due to large sample sizes.

To address potential cultural differences between the different research sites in terms of structural relations, a multi-group analysis was conducted (multi-sample SEM), involving simultaneous estimation of sample-specific parameter values for the three sub-samples (e.g. Bollen, 1989). Thus, this method allows for between-country differences in the structural parameters (e.g. correlations between latent factors), but also serves to test the goodness of fit of the proposed factor structure across the different research sites.

## 4. Results

### 4.1. Descriptive findings on the bivariate level

In order to empirically reveal the relationships between the selected domains of perceived housing, zero-order correlations were found, as shown in Table 3 (see Table 3). Basically, concerning the relation of different aspects of perceived housing, high usability scores are linked with high amounts of different aspects of meaning of home and housing satisfaction. Moreover, usability and meaning scores were negatively linked to external control beliefs. That is, participants who consider their homes as useful for daily activities have stronger meaningful links to their homes, are more satisfied with their housing conditions and think less often that others are responsible for what happens in their homes.

The set of bivariate interrelations between subscales for domains of perceived housing revealed statistically significant but low to medium correlations, indicating that the measurement scales and domains were largely independent of each other due to content specificity. Moreover, the findings show that these domains were not completely independent, i.e. they represent different facets of perceived housing.

Highest correlations were found within the "Usability in My Home" questionnaire between the scales for environmental and activity aspects ($r = 0.52$) as well as within the "Meaning of Home" questionnaire sub-scales, especially between the scales for physical and behavioural aspects of meaning, ($r = 0.50$) respectively. The findings further revealed that concepts which are expected to be closely related due to overlapping contents, especially activity aspects of usability and behavioural aspects of meaning of home ($r = 0.38$), are linked to each other, whereas, for instance, the global indicator of "Housing Satisfaction" and the remaining measures of perceived housing are interrelated only weakly (ranging between $-0.11$ and 0.28). Finally, there were consistently negative (albeit relatively weak) correlations between "Housing-related External Control Beliefs" and other measures of perceived housing ($r < -0.25$), indicating that believing events at home are contingent upon external influences is higher when perceived usability, meaning and satisfaction is lower.

### 4.2. Test of the central hypothesis: empirical distinctiveness of the four domain model of perceived housing

To determine the underlying factor structure of perceived housing measured in this study, an exploratory factor analysis was conducted with a slightly reduced sample of $N = 1189$ due to missing values. The factor structure and factor loadings are shown in Table 4. Results revealed one strong first factor (eigenvalue 2.66, explaining 38% of variance) and another three factors explaining 12–16% of the variance each (eigenvalues 1.13; 0.92; 0.81 resp.) whereas the remaining factors showed lower proportions of variance explanation $<8\%$. This can be interpreted in terms of a four factor solution, explaining 79.0% of the variance, indicating that considerable amounts of perceived housing can be explained by the four domains of meaning, usability, external control beliefs and satisfaction. The Varimax rotated pattern of factor loadings shows all subscales addressing meaning of home with highest loadings (all $>0.72$) on factor 1, both subscales addressing usability in the home with highest loadings (0.78, 0.87) on factor 2, while not substantially loading on the other factors. Factor 3 is dominated by the external control belief sum-score (0.98) and the housing satisfaction single item score is exclusively loaded on factor 4 (0.96). Thus exploratory factor analysis revealed evidence for a four factor solution such that the four domains of perceived housing are distinct as expected hypothetically. Notably, regarding the eigenvalues, the four factor solution appeared to be the most suitable compared to all other possible factor structures which might have been used for further interpretation.

Results of the test of the four factor model's fit to the data are reported, based on a confirmatory factor analysis approach. The findings are shown in Fig. 1, by indicating a structural equation model (SEM) computation (see Fig. 1). As there was only one observed indicator for housing satisfaction (HSAT, single item) and external housing related control beliefs (HEXC, sum-score), measurement error variance had to be constrained to zero in order to identify the model (i.e. observed scores are taken as error free measures of the underlying true-score). The four domains of perceived housing (in circles) were allowed to correlate, as implied in the theoretical considerations made above.

First, the SEM results revealed a "close to good" model fit (RMSEA = 0.055; NFI = 0.914; CFI = 0.931) (not in the figure). Modification indices showed a correlation between MOH2 (meaning of home: behavioural aspects) and UMH1 (usability in the home: activity aspects) as those leading to best fit improvement (for explanation of modification indices, see Bollen, 1989). This cross-domain correlation was in line with the theoretical considerations and correlative findings on activity/behaviour-oriented aspects of perceived housing. Allowing for just this additional single-indicator correlation led to good model fit with RMSEA = 0.041 (90% confidence interval 0.031–0.052), NFI = 0.948, CFI = 0.964 (see Fig. 1)

Table 3
Interrelations between aspects of perceived housing in old age

| Domains of perceived housing | HSAT | UMH1 | UMH2 | MOH1 | MOH2 | MOH3 |
|---|---|---|---|---|---|---|
| Housing satisfaction (HSAT) | 1.00 | | | | | |
| Usability in my home: activity aspects (UMH1) | 0.17 | 1.00 | | | | |
| Usability in my home: physical environmental aspects (UMH2) | 0.28 | 0.52 | 1.00 | | | |
| Meaning of home: physical aspects (MOH1) | 0.26 | 0.26 | 0.34 | 1.00 | | |
| Meaning of home: behavioural aspects (MOH2) | 0.13 | 0.38 | 0.34 | 0.50 | 1.00 | |
| Meaning of home: cognitive/emotional Aspects (MOH3) | 0.11 | 0.16 | 0.18 | 0.44 | 0.43 | 1.00 |
| Housing-related external control beliefs (HEXC) | −0.11 | −0.25 | −0.23 | −0.19 | −0.19 | n.s. |

*Note*: Correlation coefficients $p>0.001$; n.s. = not significant.

Table 4
Exploratory factor structure of the set of instruments on perceived housing

| ($N = 1189$) | Factors and factor loading | | | | Communality |
|---|---|---|---|---|---|
| Domains of perceived housing | 1 | 2 | 3 | 4 | |
| Meaning of home: physical aspects (7 items) | **0.76** | 0.17 | −0.13 | 0.26 | 0.69 |
| Meaning of home: behavioural aspects (6 items) | **0.72** | 0.39 | −0.10 | −0.06 | 0.68 |
| Meaning of home: cognitive/emotional aspects (10 items) | **0.85** | 0.00 | 0.05 | 0.01 | 0.72 |
| Usability in my home: activity aspects (4 items) | 0.14 | **0.87** | −0.12 | 0.03 | 0.79 |
| Usability in my home: physical environmental aspects (6 items) | 0.16 | **0.78** | −0.08 | 0.26 | 0.71 |
| Housing-related control beliefs: external control (16 items) | −0.07 | −0.14 | **0.98** | −0.04 | 0.99 |
| Housing satisfaction (1 item) | 0.09 | 0.13 | −0.04 | **0.96** | 0.94 |

*Note*: Factor analysis using principal component analysis revealed a four-factor solution, explaining 79.0% of the variance.

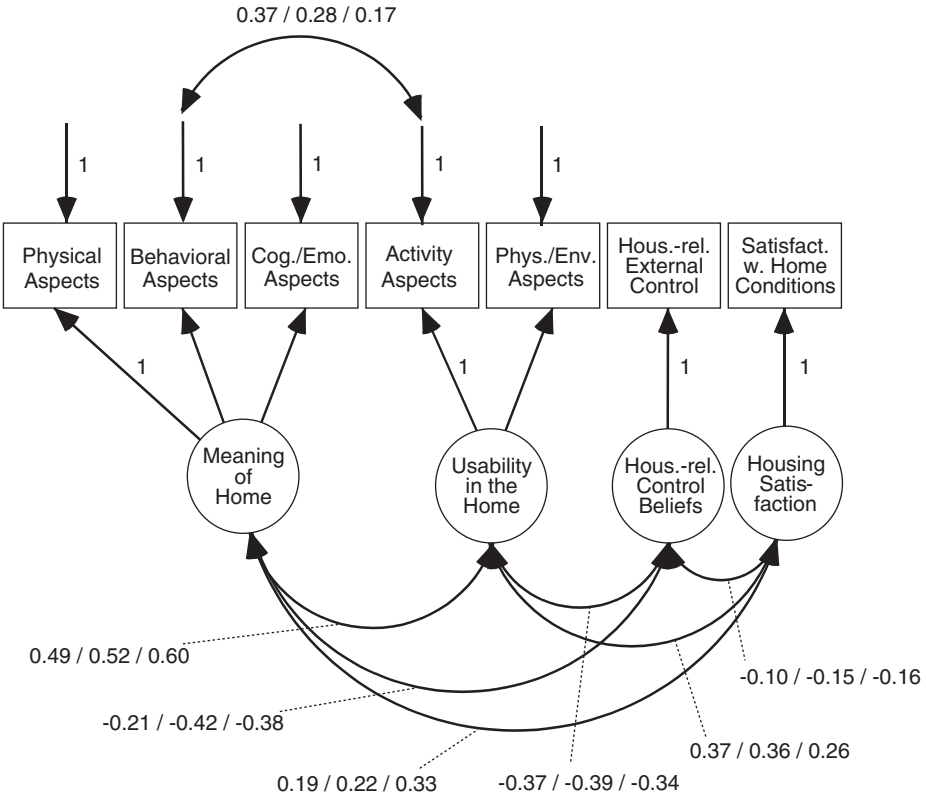


Fig. 1. Confirmatory factor structure of the set of instruments on perceived housing. *Note*. Numbers attached to double-headed arrows: correlations for German/Swedish/UK sample. RMSEA = 0.041; NFI = 0.948; CFI = 0.964; $\chi^2 = 78.6$ ($p < .001$).

indicating that the model now fit well with our data. That is, perceived housing was best displayed by the selected four constructs, reflecting four different domains, each uniquely contributing to the understanding of perceived housing in old age. Thus, the results from the SEM confirmed the theoretically proposed underlying factor structure of the four perceived housing domains meaning, usability, external control and satisfaction.

### *4.3. Exploration of comparable empirical relationships between the four domains of perceived housing in sub-samples from three European countries (Germany, Sweden, the UK)*

Cultural differences or similarities in terms of structural relations between the four domains were revealed in the multi-group analysis for the three sub-samples, i.e. Germany, Sweden, and the UK, showing relatively little variability. Although personal and environmental background variables (see again Table 1) and objective housing conditions could vary within and between the sub-samples in Germany, Sweden and the UK, the findings revealed comparable patterns of perceived housing in different European settings, indicating an expected universality of perceived housing patterns and cross-country usefulness of this assessment within the limited set of research sites.

Additionally we found empirical evidence for comparability of the different magnitudes in the correlations between the domains and respective measures due to their level of specificity. Estimated correlations between the four domains (and between the sub-domains MOH2 and UMH1) are also depicted in Fig. 1. In accordance with preceding findings (see again Table 2), correlations between housing-related external control beliefs and housing satisfaction showing smallest associations in all samples ($r = -0.10$; $-0.15$; $-0.16$), whereas usability in the home and meaning of home showed strongest association in all samples ($r = 0.49$; 0.52; 0.60). Correlations between usability and meaning on one hand and housing satisfaction and external control beliefs on the other reach a medium level.

The experience of usability and personal meaning of home are thus closely linked, indicating that participants who were behaviourally, cognitive, and emotionally attached to their homes tend to consider the home as useful for necessary everyday activities. Particularly weak links between housing satisfaction and external control indicate that participants who were unsatisfied with their homes do not necessarily feel that others are in charge of what happens in their homes. Moreover, medium relationships between perceived usability and meaning on one hand and housing satisfaction and control beliefs on the other hand indicate that the four constructs reflect not only

different contents of perceived housing which exist in all three European settings but also contribute to perceived housing in very old age more or less in the same way in all settings.

## 5. Discussion

In this article empirical support was given for the usefulness of a theoretically proposed four component model of perceived housing across countries in old age. First four conceptual domains of perceived housing were introduced, covering a broad range of well-established and innovative concepts of home evaluations. Second it was shown that these four domains represent distinct indicators of perceived housing on the empirical level.

In detail, bivariate correlative findings indicated some amount of content specificity for all the measures included into our analyses, but showed also substantial amounts of interdependencies, pointing towards the existence of higher order dimensions of perceived housing. Regarding our hypothesis that a four domain model is adequate for the understanding of perceived housing, exploratory and confirmatory factor analyses supported the existence of four theoretically proposed domains of perceived housing. Exploratory factor analysis revealed that the domains housing satisfaction, usability in the home, meaning of home, and external housing-related control beliefs are empirically distinct aspects of perceived housing, accordingly to the hypothesis. In other words, we found no striking evidence for a different, "stronger" dimensionality underlying the seven measures, fitting the data better than the four-factor solution. Confirmatory factor analysis revealed good fit of this four-factor model, hence confirming the hypothetical assumption of this pattern of perceived housing domains in very old age. In sum, these findings highlight that an integrated understanding of perceived housing needs to address all these domains in a comprehensive instrument, covering the selected set of measures.

It is important to note that confirming this four-factor model is not self-evident at all. For usability as well as for meaning of home, evidence for a common factor underlying the different sub-domains means conceptual improvement and better understanding not implied a priori in the measurement of these domains. For instance, a person ranking highly in the behavioural sub-domain of meaning of home does not necessarily need to have high scores in the other meaning of home sub-domains as well. However, as all sub-scales have highest loadings on the same factor, this often happened.

Regarding the theoretical foundation of the four factors of perceived housing, the housing satisfaction factor has found particularly strong recognition in housing theory and empirical research (e.g. Aragonés et al., 2002; Pinquart & Burmedi, 2004). However, it should kept in mind that the satisfaction rating in our study was a general evaluation of a specific facet of housing (i.e. physical housing conditions) and not a broad-scale assessment of housing satisfaction (Heywood et al., 2002; Sixsmith & Sixsmith, 2002). What we were able to empirically support was that this particular satisfaction rating appeared relatively independent from the other domains of perceived housing (see again Fig. 1). Although the single-item characteristic of the satisfaction measure may have promoted low correlations, one may conclude from the weak links between housing satisfaction and external control beliefs as well as from the moderate links between housing satisfaction and usability or meaning of home, that the assessment of housing satisfaction alone, as it is done quite frequently, is far from being sufficient to assess perceived housing in very old age.

The finding on usability as a latent construct of perceived housing in very old age is in line with the theoretical and empirical research related to person–environment–activity transactions (Fänge & Iwarsson, 2003, 2005a; Iwarsson & Ståhl, 2003; Law et al., 1996), arguing that usability can be regarded as a combined activity-related and physical environment-related aspect of perceived housing. The latent factor correlations estimated from the confirmatory factor analysis underpin the relative independence of this dimension from other aspects of perceived housing, showing its importance for any comprehensive characterization of the home experience in old age.

Similarly, the clear empirical support found in the present study for one unique factor covering the sub-domains measured by the meaning of home subscales, adds to a better empirical understanding of a latent construct or domain of common "meaningfulness" of the home. As has been found, participants who consider their home as meaningful for daily behaviour also tend to feel, for instance, cognitive and emotional bonding to their home. Such empirical evidence enhances the existing literature on meaning of home, which has revealed so far as theoretically rather rich, but empirically rather poor (Marcus, 1995; Moore, 2000; Oswald & Wahl, 2005; Rowles & Watkins, 2003; Sixsmith, 1986).

Against the background of control theory and findings on perceived control in different domains of life in old age (e.g. Heckhausen & Schulz, 1995; Lachman, 1986; Levenson, 1973, 1981), the results revealed the need to address housing-related control beliefs as an independent dimension of perceived housing in very old age. In particular, this has been shown with respect to external housing-related control beliefs. Thus, following theoretical assumptions on the role of control beliefs in the domain of housing (Oswald et al., 2003a, 2003b), this study has generated first empirical evidence to underline the notion that this new domain-specific control dimension with particular importance for environmental psychology is critical for the better understanding of perceived housing in late life.

In general, the estimated correlations between the four factors are low to medium for all research sites, showing substantial independence of the constructs of perceived housing. Next, we further explored whether comparable relationships between the constructs exist in three

European sub-samples available in the ENABLE-AGE Project, reflecting similar socio-cultural settings. As was shown, the identified factor structure of four domains of perceived housing were confirmed for different country-specific urban sub-samples, indicating a great amount of comparability in both the structural patterns of the domains as well as the relationships between the domains of perceived housing in Germany, Sweden, and the UK. Thus, the results from the multi-group analyses underpin the usefulness of the four component assessment in different European urban settings. Comparable results in this regard can be interpreted in terms of a validation of the findings in different sub-samples. Moreover, the findings provide empirical support for the assumption of comparable patterns of aspects of perceived housing in very old age, regardless of different objective circumstances in terms of the macro-level environment.

Besides the usefulness of our results for future research purposes, we also see practical potential in the findings. For example, one may consider inter-individual variation in perceived housing as a resource or a hindrance for the regulation of housing and quality of life at large for ageing people. Strong bonding to the home and the related positive evaluation of the home's usefulness may on the one hand positively contribute to older people's ability to cope with increasing problems in carrying out daily routines and activities. On the other hand, strong bonding may also hamper the older person's acknowledgement of objective problems at home or mitigate against environmental decisions like moving to an objectively better equipped apartment. However, further studies are needed to elucidate perceived housing aspects in relation to everyday problem-solving in later life.

Of course, these findings are subject to limitations. Five issues should be stressed in this regard: First, three subscales from the domains of usability, meaning of home and housing-related control beliefs—that is, personal and social aspects of usability, social meanings of home and internal control beliefs—were discarded from the empirical analyses due to poor psychometric quality. This has weakened somewhat our empirical argument towards a rather comprehensive assessment of perceived housing, as three measures related to our main constructs are not used. However, note that in the domains of usability and meaning of home, it was possible to include two out of three sub-scales (usability) and three out of four sub-scales (meaning) thus covering substantially the concepts' semantic substance. Regarding the inclusion of external control only, it should be noted that findings from longitudinal studies suggest that external control beliefs are particular sensitive to age-related changes, and thus, crucial in explaining independence in daily living and well-being in old age (e.g. Baltes et al., 1999; Clark-Plaskie & Lachman, 1999). Therefore, we believe that the sole consideration of external control, while being a limitation of our study, addresses a major facet of the full control dynamics picture as people age. There is nevertheless a clear need for the optimization of the subscales dropped in the present study in order to show that our argumentation of four distinct dimensions of perceived housing still holds, when all subscales considered of theoretical importance are also part of the measurement model.

Second, the set of concepts and measures in our study may not be sufficient to cover all facets of perceived housing. In particular, the single-item measure of satisfaction with housing conditions may be seen as a too rough measure to represent the full housing satisfaction domain (e.g. Aragonés et al., 2002; Pinquart & Burmedi, 2004). However, due to limitations in the duration of interview capacity of very old persons, some choices had to be made. Hence we emphasized those domains not yet well established in relation to perceived housing, such as control beliefs, usability, and meaning of home and assessed housing satisfaction in relation only to physical housing conditions.

Third, as already argued, the single-item measure on housing satisfaction may be seen as a methodological shortcoming, as single-item measures could be regarded as more sensitive to measurement error than multi-item measures, which might lower their correlations with other indicators (Anastasi, 1988; Epstein, 1983). However, there is also considerable evidence indicating sufficient psychometric quality of single-item satisfaction measures (Scherpenzeel, 1995; Veenhoven, 1996).

A fourth limitation may be seen in the generalization of the findings in terms of a "universal" pattern of perceived housing in very old age. Although we analysed data from three different European settings and the results are rather comparable in these settings, the findings are based on a selected set of countries with relatively similar cultural backgrounds. Data from other sites, reflecting more cultural variety, would be needed to fully address the question of universality of the structure of perceived housing (Hay, 1998; Miller, 2001).

Finally, our sample consisted of very old adults living alone in their community dwellings. Thus, the present study is limited in its potential to reflect the full range of the ageing population, such as those being "young-old", i.e. about 60–80 years of age, cohabiting older people, or older adults living in institutional settings.

Taken together, insights from our study support the assumption that the complexity of home (see again our case example) has been underestimated in earlier research. While measuring the subjective perception of home using the measures adapted in the paper produces a promising and rather comprehensive application, the in-depth understanding of how the home is perceived by very old persons might be a valuable goal for further research. For example, qualitative methods might expand our conceptual models. Bringing together quantitative and qualitative approaches of perceived housing would herald a new era of research on perceived home whereby process oriented perspectives on person–home transactions can be meaningfully pursued (Oswald & Rowles, 2006).

Another set of findings from the ENABLE-AGE project published elsewhere have provided evidence that both objective characteristics of the home environment *and* the subjective experience of home are crucially related with health and well-being of very old people (Iwarsson, Nygren, &, Slaug, 2005; Iwarsson, Sixsmith, et al., 2005; Oswald et al., in press). Thus, further research may address the complexity of perceived housing in relation to objective housing conditions such as accessibility and prevalence of environmental barriers, as well as to age-related outcome variables, such as independence and well-being. In particular, the mediating impact of perceived housing in order to maintain or even enhance "healthy ageing" in very old age seems a promising research objective. Perceived housing may serve as a resource or mediator to cope with functional loss in very old age (e.g. due to the environmental press-competence model proposed by Lawton & Nahemow, 1973) or in addition to processes of home adaptation and environmental centralisation (Gitlin, 1998; Rubinstein & Parmelee, 1992).

In terms of application, the findings can contribute to enrich and strengthen the user's perspective on perceived housing in housing counselling and home adaptation practice (e.g. Fänge & Iwarsson, 2005a, 2005b; Lanspery & Hyde, 1997). In particular, the current focus on barrier free building standards needs to be widened to encompass a more holistic approach that takes seriously both the objective and subjective, "invisible" aspects of the home. Housing, health and social care professionals need to be aware of the importance of the home in the lives of their clients and to include housing solutions within a multidisciplinary approach to assessment and care planning. In this regard the current findings can show that perceived home in old age covers a whole range of housing experiences beyond mere support and functionality, as it is reflected, for instance, in the cognitive/emotional aspects of meaning of home. Using an integrative, comprehensive, and parsimonious assessment of perceived housing in old age can sensitize housing professionals to a holistic approach in order to find individualized and customized housing solutions (Connell & Sanford, 1997). However, further steps towards the development of an easy assessment and evaluation procedure of these measures are needed.

In conclusion, evidence presented in the present paper suggests that perceived housing in very old age is well covered by a set of theoretically informed concepts and related measures, addressing housing satisfaction, usability in the home, meaning of home and housing-related external control. That is, a rather comprehensive understanding of perceived housing needs to cover the scope of personal links to the home (meaning), perceived functional activity possibilities at home (usability), a global evaluation perspective (satisfaction) and the perceived agency related challenges of housing in later life (control). The provided set of measures was found to be useful to reflect the proposed domains of perceived housing for very old elders living alone in their urban community dwellings, although psychometric optimisation of perceived housing measures still is a challenge and deserves more instrument refinement.

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