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ORIGINAL INVESTIGATION

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Ageing and person–environment fit in different urban neighbourhoods

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Abstract Based on the "complementary-congruence model" of person–environment fit, this study focuses on housing in old age as an interaction between housing needs and housing conditions in urban settings. The research aims are (1) to establish a set of housing-related person–environment (p–e) fit indices based on the relationship between environmental needs and existing conditions in different physical and social domains, and to describe housing among elders aged 51–80 years and in different urban districts with these indices; the study distinguishes between basic, higher-order and social needs relating to housing; (2) to explain outdoor place attachment as an indicator for quality of life in different urban districts with a set of predictors including these person–environment fit indices. Data were drawn from telephone-based interviews with 365 older adults (51–80 years) who were questioned about individual housing needs and housing conditions. Results revealed higher p–e fit scores in the domains of higher-order and social housing needs and conditions in the districts which were considered to be more pleasant but had poor access to the city and to public transportation. By contrast, age was more important in explaining differences in the domain of basic housing needs and conditions with higher p–e fit scores among older participants. In explaining outdoor place attachment, the fit between basic and social housing needs and conditions was important, but the higher-order fit did not play a role.

Keywords Housing · Urban areas · Person–environment fit · Outdoor place attachment · Social needs

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Introduction

As people age, housing and the immediate home environment become more important due to a decrease in action range and an increased risk of competence loss. Although the likelihood of living in purpose-built accommodation is increasing in contemporary western societies, the vast majority of older adults live in ordinary dwellings. In Germany, for instance, about 93% of persons 65 and older live in community settings (BMFSFJ 2001). Moreover, elders display a high degree of residential stability. Data from a national survey in Germany of approximately 4,000 persons show that people aged 70–85 years had lived on average 31.6 years in the same apartment and 50.3 years in the same town (Motel et al. 2000). As a result, older people tend to spend more time at home and in the immediate outdoor environment than do younger people. Recent data show that persons 65 years of age and older in Germany spend, on average, 80% of each day at home (Küster 1998), and carry out most of their daily activities there (Baltes et al. 1999) or in the immediate outdoor environment (Friedrich 1995; BMFSFJ 1998; Saup 1999; Mollenkopf et al. 2004a, 2004b).

Although the home and the neighbourhood represent important places for older people in their everyday lives, relatively little is known about the relationship between housing needs and conditions in old age, covering the micro- and meso-levels of indoor and outdoor environment. In a broader sense, housing is defined not only by barriers or adaptations but also by social exchange and by indoor and outdoor stimulation (Lawton 1989a, 1989b; Oswald 2003). Furthermore, there is good reason to argue that quality of life and health in old age, in terms of independence, well-being and perceived place attachment in the community, are increasingly related to the immediate home environment as people age (Lawton 1998; Krause 2003; Oswald 2003; Oswald and Wahl 2004). However, there is limited research regarding, for instance, the impact of the relationship between housing

needs and conditions on outdoor place attachment as an indicator for quality of life in the community (Rubinstein and Parmelee 1992).

Against this background, two theoretical assumptions have been made for this study. First, we assume that housing among elders is not only based upon objective housing conditions but is also linked to personal subjective housing needs. In their "complementary-congruence model" of person–environment fit, Carp and Carp (1984) distinguish between "basic environmental needs" and "higher-order needs". Basic needs are oriented towards maintaining personal autonomy with respect to necessary activities of daily living and competencies in everyday life. Higher-order needs reflect more subjective, development-oriented domains including privacy, comfort, familiarity, stimulation or favoured personal activities (Carp and Carp 1984). This differentiation of environmental needs can easily be adapted to the domain of housing, resulting in a distinction between home-related basic needs and higher-order needs. In addition to needs associated with the physical environment, social needs in the housing domain are also important in old age (Krause 2001; Mollenkopf et al. 2004a, 2004b). This latter dimension is referred to in this study as "social housing needs". Furthermore, we assume that it is neither the subjective housing needs nor the objective housing conditions, but rather the perceived fit or misfit of environmental needs and conditions (person–environment fit) which reflects the quality of housing in the individual's personal neighbourhood (Kahana 1982; Rubinstein and Parmelee 1992; Scheidt and Norris-Baker 2003). Based on these assumptions, a set of three person–environment (p–e) fit indices was developed to describe three domains of p–e indoor and outdoor exchange, i.e. basic housing needs versus conditions, higher-order housing needs versus conditions, and social housing needs versus conditions. Note that personal competencies are not included in the p–e fit indicators.

From a more differentiated, developmental perspective, personal competencies and individual interests are believed to contribute to varying p–e fit constellations in different age groups. The rationale behind this assumption is that people of different ages must address the "developmental task" of housing (Havighurst 1972) in different ways. One may assume, for example, that older people who are still working (approx. 51–60 years) rarely deal with questions of housing in old age, in comparison to those who are retired or very old. Especially in the domain of basic housing needs versus conditions, this younger age group may have a relatively limited degree of p–e fit, since severe, environmentally relevant competence losses are low and their ability to cope with environmental barriers is high. The topic of housing should focus on issues of everyday life for those who are close to retirement or have recently retired (approx. 61–70 years). Many important housing decisions fall into this period of time, including the decision to move or to stay put (Oswald and Rowles 2005). Consequently, p–e fit evaluations should be based on a more differentiated examination of the home situation. Specific characteristics of the immediate residential neighbourhood may appear especially advantageous or disadvantageous in this regard. Furthermore, basic housing needs may play an increasingly important role in future neighbourhood housing plans. People at the approximate age of 71–80 years are increasingly confronted by functional limitations and environmental barriers (Lawton and Nahemow 1973), and the home's basic conditions and supportive functions become much more important. Those older people who still live independently require optimised basic housing conditions in order to obtain a good fit with their housing needs.

In sum, we would assume an increase in p–e fit in the domain of basic needs versus conditions across these three age groups. In order to identify whether these means are sensitive to differences between urban neighbourhoods, we assessed elders of the three age groups across three different urban settings. Regarding higher-order housing needs and conditions, as well as social housing needs and conditions, we would not expect to find great differences between age groups, but rather between different districts, as perceived housing quality in these domains is dependent on environmental options.

Second, we assume that a substantial degree of quality of life in the community may be partially explained by p–e fit, which is reflected in individuals' perceived attachment to their urban neighbourhood. The rationale underlying this assumption is that it is not age, health or length of residence per se but rather the ability to establish a fit between housing needs and housing conditions which contributes to outdoor place attachment to a particular district. From a differentiated perspective, environmental conditions in different urban districts may facilitate or hinder p–e fit in some respects (e.g. the ability to meet one's basic needs in a locality). Based upon the well-established constructs of "place attachment" (Altman and Low 1992; Hidalgo and Hernandez 2001) and "place identity" (Proshansky 1978; Schneider 1992; Stedman 2002), we assume that outdoor place attachment in old age spans the full scope of cognitive, emotional, behavioural, physical and social bonding to community and that it may serve as an outcome variable for a good life in the community. Residential satisfaction may reflect attitudes rather than affective circumstances, and is often unrealistically high (Staudinger 2000; Hidalgo and Hernadez 2001; Pinquart and Burmedi 2003).

Research objectives

The study has two main research objectives:

1. To establish a set of housing-related p–e fit indices based on the relationship between environmental needs and existing conditions in different physical

and social domains, and to describe housing among older people of different ages and in different urban districts with these indices. In this regard, basic, higher-order and social housing needs are differentiated. Our first hypothesis is that p–e fit indices which reflect housing needs versus conditions serve as a useful measure to describe housing in urban neighbourhoods for older adults of different ages as well as in different settings.

2. To explain outdoor place attachment as an indicator for quality of life in different urban districts, with a set of predictors including p–e fit indices. Our second hypothesis is that the amount of p–e fit in the three domains of basic, higher-order and social housing needs versus conditions contributes significantly to outdoor place attachment.

Methods

Data were drawn from telephone-based interviews. Based on research objectives, the study includes participants belonging to three age groups (51–60, 61–70, and 71–80 years) living in three different urban districts. Furthermore, we assessed p–e fit for the domains of basic, higher-order and social housing needs and conditions to cover the full range of housing-related aspects.

Sample

Participants were sampled randomly from official population registers in the German city of Heidelberg. Older adults living in three different urban settings were selected. Intended participants ($n = 1{,}620$) were included consecutively from sampling lists via mailed letters, followed by phone calls. Sampling adhered to a project-specific strategy with well-defined exclusion criteria, such as those living in purpose-built housing or institutions, or those with severe cognitive impairment, which led to the exclusion of 793 persons (49%; Hieber et al. 2005). In addition, participants had lived in their districts for at least 5 years to guarantee a certain amount of knowledge about district facilities and circumstances. All participants were enrolled after providing informed consent, according to established ethical guidelines and procedures. Although older people living in community settings may perceive telephone discussion of housing issues with researchers to be problematic, dropout rates were very low (462 persons; 18.5%). The final sample of 365 participants was stratified for three districts and age groups (51–60, 61–70 and 71–80 years). Thus, age and gender distribution are comparable in each district. Gender was also considered important and similar proportions of women and men were recruited (Table 1). Since no representative interpretations can be derived from this randomised sample, unweighted results are reported.

Heidelberg is a dynamic university city with a population of 139,300, a high proportion of whom are academics. Sixteen per cent of the city's population are aged 65 years and over, and about 4% are aged 80 and over (5,700 persons; Stadt Heidelberg 2002). Heidelberg has a diversified settlement structure, encompassing densely settled inner-city neighbourhoods, more sparsely populated peripheral areas, and older and newer suburban areas. The three selected districts represent different urban settings in terms of infrastructure, socio-economic status and housing amenities (Table 1). Further, the districts differ in terms of access to the city centre and to public transportation as well as of being considered to be pleasant. District "A" (126.2 ha) is not considered a pleasant neighbourhood by its inhabitants, but is located close to the city centre with very good access to public transportation. It has no centre of its own, and the housing stock includes a considerable number of dilapidated multi-storey buildings (2/3 were built before 1947). The district has many single-person households in high-density areas and numerous office buildings. Compared to the city as a whole, it has a lower proportion of inhabitants aged 65 years and over, mainly due to the high proportions of students and immigrants. Incomes and housing costs are relatively low, and population turnover is high. By

Table 1 Sample description

($n = 365$)	District A ($n = 122$)	District B ($n = 123$)	District C ($n = 120$)	Diff.
51–60 years old ($n = 123$)	42	41	40	
61–70 years old ($n = 121$)	39	42	40	
71–80 years old ($n = 121$)	41	40	40	
Age (years), *M*(SD)	65.3 (8.1)	65.2 (8.1)	65.4 (8.2)	n.s.
Gender (% female)	52.5	50.4	50.0	n.s.
Subjective health (1–5),*M* (SD)[a]	2.7 (1.0)	2.7 (1.0)	2.3 (0.8)	***
Income (% > €1,500/month)[b]	33.6	51.2	65.8	***
Housing tenure (% owner)	20.5	34.1	84.2	***
Basic facilities (0–9),*M* (SD)[c]	6.0 (1.5)	6.3 (1.4)	7.3 (1.0)	***

[a]Self-evaluation rating scale from 1 "very good" to 5 "very poor"
[b]Missing values (24) are excluded
[c]Total score on basic facilities and appliances at home (e.g. availability of warm running water, a bath or shower, a flush toilet, etc.)

(test on differences is based on Chi-square-tests and ANOVA; *n.s.*not significant, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

contrast, district "C" (1,472.0 ha) is a geographically large neighbourhood located at some distance from the centre of Heidelberg. It is perceived to be a very pleasant and wealthy neighbourhood in a scenic landscape, with a high level of home ownership. The district has expanded continuously since the 1960s and has many modern (well-equipped) buildings in low-density areas close to woodland. It has poor access to the city centre and to public transportation, and is located on a hillside overlooking a river with many steep streets and stairways. High proportions of young high-income families living in multi-person households tend to reduce the share of inhabitants aged 65 years and older to below the Heidelberg average. District "B" lies somewhere between districts "A" and "C" in terms of, for instance, neighbourhood quality, size (264.1 ha), housing and population composition. This district is considered to be relatively pleasant but with limited access to public transport, considering its distance from the city centre. However, the neighbourhood has relatively good access to food stores and other necessary facilities. The proportion of inhabitants aged 65 and over is high compared to Heidelberg as a whole, and many residents are from traditional, working-class backgrounds. Thus, the district has low rates of owner occupation, is characterised by family-oriented household structures and, in recent decades, is marked by an ageing population.

Instruments

Semi-standardised interviews with trained interviewers were conducted over a 4-month period. The mean duration of each interview was 45 min (with a maximum of 10 contact-attempts). Besides basic socio-structural variables, emphasis was put on the assessment of p–e fit indices in the domains of basic, higher-order and social housing needs versus conditions. Based on 27 characteristics of the indoor and outdoor environment (adapted from an earlier study of outdoor mobility: Mollenkopf et al. 2004b), three p–e fit indices were established by relating housing needs and conditions as follows. First, the environmental characteristics were differentiated in three domains:

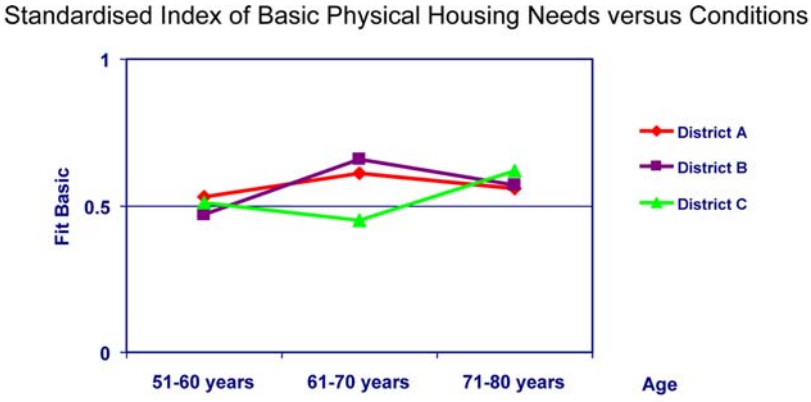
1. amenity-oriented basic physical conditions and needs, covering seven items, i.e. apartment not too large, cheap, barrier-free, medical care nearby, access to street without stairs, good access to public transport, good access to shops and services;
2. comfort-oriented higher-order physical conditions and needs, covering 17 items, i.e. apartment large enough, homely, comfortable, light and sunny, not in a multi-storey building, scenic view, separate bathroom and toilet, balcony available, garage available, garden available, good parking access, clean pavements and streets, safe neighbourhood, quiet residential area, area with greenery, recreation area in the neighbourhood, cultural stimulation in the neighbourhood;
3. social conditions and needs, covering three items, i.e. having pleasant neighbours in the apartment block or house, having good relations to neighbours in the street, living close to friends and relatives.

Second, a decision on p–e fit (yes/no) was made for every item, based on the rationale as to whether this environmental aspect existed and/or was important for the participant. If both conditions were met, in that the item existed and was deemed important, it was decided that housing condition and housing need fit (yes). For instance, if the respondent considered having a balcony to be important and at the same time reported having a balcony, then this specific higher-order housing aspect would be classed as a "fit". Any other combination (important/nonexistent, not important/existent) resulted in a non-fit decision (no). To emphasise positive aspects of fit, the combination not important/nonexistent was also excluded. For instance, misfit was assigned if the respondents indicated that good access to public transport was important to them, but at the same time reported that their apartment had poor access to public transportation.

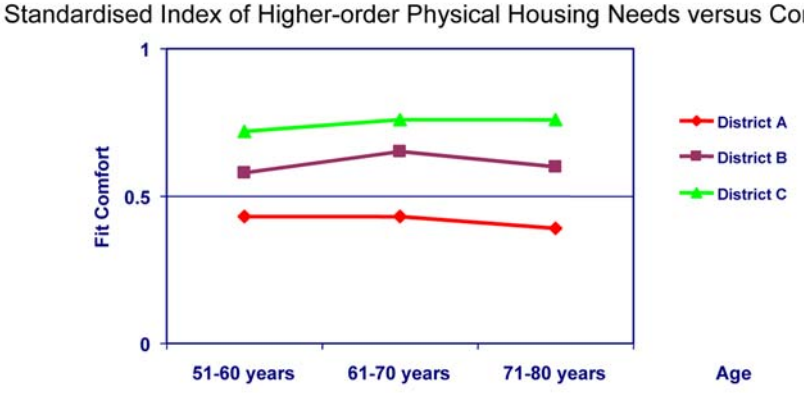
Finally, to account for different numbers of items in each domain, three standardised relative scores (0–1) were calculated where higher scores indicate better fit, as reported in the results section (see Fig. 1). Although housing needs and conditions are considered to be independent, it should be noted that existing housing conditions trigger perceived housing needs. However, given the same bias for all subgroups in all districts, this should affect neither the descriptive results, nor the predictive power of reported p–e fit scores for outdoor place attachment, since all scores would then be consistently lower.

Perceived outdoor place attachment was assessed with an 11-point Likert-type self-evaluation rating scale from 0 ("not at all attached") to 10 ("fully attached"). This item was introduced with an extensive description of the concept of outdoor place attachment as well as a set of comprehensive examples, which allowed participants enough time to reflect upon the affective, cognitive, behavioural and social bonds and linkages between self and the neighbourhood, and in general allowed the topic to be addressed adequately over the phone.

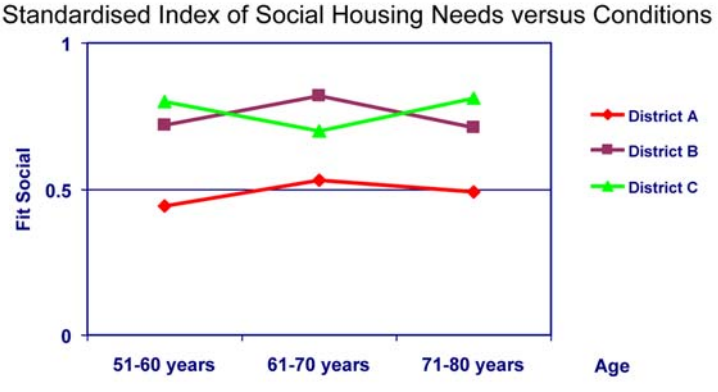
Among the other indicators used to predict outdoor place attachment were socio-structural background variables, i.e. age, gender, subjective health, income, as well as indicators of the present housing situation, i.e. housing tenure (owner vs. tenant), household composition (number of persons in household), length of residence in the district (years) and indoor place attachment (11-point self-evaluation rating scale from 0 = "not at all attached" to 10 = "fully attached"). The subjective health status was assessed with a one-item global self-evaluation rating (1–5), with higher scores indicating better health. Regarding housing amenities, a



Note.
Test of differences in ANOVA with n.s. = not significant, $p < .05$; $p < .01$; $p < .001$; Main effects: District $F = 1.8$ n.s.; Age group: $F = 6.5$ $p < .01$; Interaction: $F = 6.8$ $p < .001$



Note.
Test of differences in ANOVA with n.s. = not significant, $p < .05$; $p < .01$; $p < .001$; Main effects: District $F = 194.1$ $p < .001$; Age group: $F = 3.0$ $p < .05$; Interaction: $F = 1.5$ n.s.



Note.
Test of differences in ANOVA with n.s. = not significant, $p < .05$; $p < .01$; $p < .001$; Main effects: District $F = 30.1$ $p < .001$; Age group: $F = 0.3$ n.s.; Interaction: $F = 1.7$ n.s.

Fig. 1 Indices for person–environment fit scores in three urban districts. *Top* Standardised index of basic physical housing needs versus conditions. *Middle* Standardised index of higher-order physical housing needs versus conditions. *Bottom* Standardised index of social housing needs versus conditions

sum-score of nine basic facilities and appliances was assessed, where participants were asked about the nature of their home's plumbing (warm running water, a bath or shower, a flush toilet), etc. In order to statistically tease out outdoor place attachment from other neighbourhood-related evaluations, three future-oriented housing-related ratings were assessed (i.e. the number of wishes, fears and concrete recommendations regarding urban planning and future development within the neighbourhood), reflecting future plans and hopes as well as individuals' involvement in community life.

Differences between subgroups were computed with either chi-square tests or analysis of variance (ANOVA). To test statistical differences in subgroup analyses on p–e fit scores, ANOVAs were computed. To test predictors of outdoor place attachment, regression analyses were computed, all with $p < 0.05$, $p < 0.01$, $p < 0.001$.

Results

As far as basic descriptive findings are concerned, participants had slightly better health in district C compared to both other districts. Differences in housing tenure and income reflect population differences between the districts. For example, participants in district C had higher rates of owner-occupation and were wealthier than those in district B, and especially those in district A. Regarding housing amenities, homes in district C were better equipped than homes in either district B or A (see Table 1).

Description of person–environment fit

The first objective is to introduce p–e fit indices relating to housing needs vs. conditions as a means of describing housing in urban neighbourhoods for older adults at different ages and in different settings. This section reports results on the p–e fit indices differentiated by age group and district (Fig. 1).

Figure 1 summarises differences and similarities in relative p–e fit scores by age group and district for the specified p–e fit domains. With respect to the fit of basic housing needs and conditions, ANOVAs reveal a main effect for differences between age groups ($F = 6.5$; $p < 0.01$) but no main effect for differences between districts. The oldest group (71–80 years) has higher scores in p–e fit ($M = 0.58$; SD = 0.17) compared to the youngest group (51–60 years; $M = 0.50$; SD = 0.21), but district differences do not arise. In the middle group (61–70 years), however, clear differences between participants in different districts lead to a highly significant interaction effect between age and district ($F = 6.8$; $p < 0.001$). Participants in districts A and B have relatively high scores compared to those in district C. In sum, age, as well as the interaction of age and district, is important in explaining differences in the domains of basic housing needs and conditions.

Compared to districts B and A, results on the higher-order p–e fit index reveal highest scores for participants in all age groups in district C. The lowest scores are found in district A. ANOVAs indicate a highly significant district effect ($F = 194.1$; $p < 0.001$), whereas differences between age groups are only marginal ($F = 3.0$; $p < 0.05$), with the highest scores amongst those aged 61–70 years—that is, the more pleasant a district is perceived to be, the higher the reported p–e fit score.

Results in the domain of social housing needs vs. conditions are partially comparable to findings in the higher-order fit scores. The lowest scores are found for participants of all ages in district A. By contrast, inhabitants of districts B and C have comparably high scores in the social p–e fit index, resulting in a highly significant main effect of district differences ($F = 30.1$; $p < 0.001$)—again, the two more pleasant districts have higher scores in social p–e fit, compared to district A. The results emphasise that the home environment is evaluated differently in the selected districts, independent of participants' age, especially in the domains of higher-order and social needs vs. conditions.

Explanation of outdoor place attachment

The second objective is to explain if, and to what extent, p–e fit in the three domains of basic, higher-order and social housing needs vs. conditions contribute significantly to outdoor place attachment as an indicator of quality of life in the community. On the mean level, outdoor place attachment (0–10) is higher in the older age groups, with largest differences in district A (51–60 years: 5.1; 61–70 years: 6.4; 71–80 years: 7.4; $p < 0.001$). Regarding differences between the three districts, the youngest age group (51–60 years) shows the largest differences (district A: 5.1; district B: 7.1; district C: 7.5; $p < 0.001$).

The findings from the regression analyses on outdoor place attachment are shown in Table 2. The set of predictors, as outlined above, also covers the three p–e fit indices. The impact of p–e fit on outdoor place attachment is investigated separately for the three districts (Table 2).

The three regression analyses (one for each district) show comparable amounts of explained variance in district A (45%) and district C (48%), and slightly lower explained variance in district B (30%). With respect to basic socio-demographic predictors, age, gender and subjective health do not contribute to outdoor place attachment in all three sites, although participants of different ages and in different districts display varying levels of outdoor place attachment. In relation to financial resources, low-income participants living in the low-income district (A) feel more attached to their neighbourhood than do wealthier individuals. However, there is no comparable positive impact of financial resources in the more affluent district (C).

Turning to indicators of present housing, both tenure and household composition are not relevant in predicting outdoor place attachment in all districts. However, length of residence and indoor place attachment play a major role in districts A and C. Those who have lived longer in their neighbourhood and those who are more attached to their indoor environment have higher scores in outdoor place attachment. Future-oriented recommendations and fears (not wishes) play a role only in districts A and C. Those who propose many

Table 2 Prediction of outdoor place attachment

Regression analyses	Outdoor place attachment (0–10)[a]					
	District A		District B		District C	
	Stand. ß-weight	Semipartial R^{2b}	Stand. ß-weight	Semipartial R^{2b}	Stand. ß-weight	Semipartial R^{2b}
Age (years)	0.00	0.000	0.08	0.004	−0.00	0.000
Gender (m = 1; f = 2)	−0.10	0.001	−0.06	0.003	−0.13	0.015
Subjective health (1–5)[c]	−0.14	0.015	−0.03	0.000	−0.13	0.015
Income (1–4)[d]	−0.25	0.044	−0.08	0.005	0.01	0.000
Housing tenure (owner = 1; tenant = 2)	0.10	0.007	0.05	0.002	−0.08	0.005
Household composition (no. of people in hh.)	0.09	0.006	−0.05	0.001	0.09	0.007
Length of residence in district (years)	0.35***	0.093	0.14	0.015	0.35***	0.077
Indoor place attachment (0–10)[a]	0.30***	0.062	0.10	0.007	0.25**	0.048
Future of the district: recommend. for change	−0.17*	0.023	0.02	0.000	−0.25**	0.038
Future of the district: wishes and hopes	0.04	0.001	−0.10	0.007	0.10	0.006
Future of the district: fears	−0.21**	0.031	−0.13	0.014	0.15	0.017
P–e fit in basic physical needs/cond. (0–1)[e]	0.15*	0.020	0.20*	0.032	0.11	0.008
P–e fit in higher-order needs/cond. (0–1)[e]	0.04	0.001	−0.07	0.004	−0.02	0.000
P–e fit in social needs/conditions (0–1)[e]	0.08	0.006	0.32***	0.084	0.23**	0.042
Model R^2	0.45		0.30		0.48	

[a]Eleven-point self-evaluation rating scale, higher scores indicating higher attachment
[b]Proportion of the dependent variable's total variance explained by regression on the predictor uniquely; not to sum up to the model's total R^2
[c]Self-rating scale from 1 "very good" to 5 "very poor"
[d]Global category, higher scores indicating more resources; 24 missing values are excluded
[e]Standardised score with higher scores indicating better fit
(regression analyses with * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$)

recommendations to change the neighbourhood, i.e. mostly points of criticism and dissatisfaction, are less attached whereas (in district A only) those with fewer fears are more attached to their neighbourhood.

The focus of interest is, however, on the impact of p–e fit indices. Here, the amount of comfort-oriented higher-order p–e fit does not contribute to outdoor place attachment in all three districts, not even in the very pleasant district C. However, both basic and social fit scores contribute to outdoor place attachment. In the less pleasant district A, only the basic p–e fit index is relevant, i.e. those with better fit are more attached to their district. In district C, those with a better social p–e fit score (not the higher-order p–e fit score) are more attached to their district. In district B, it is both higher basic fit and higher social fit scores which contribute positively to outdoor place attachment.

Considering the amount of explained variance by each single indicator, it is clearly the length of residence in the district which explains most variance, followed by indoor place attachment and income (district A). However, both the social and the basic fit indicators contribute considerably to outdoor place attachment while the impact of other factors was simultaneously controlled.

Discussion

This study sought to establish, first, whether p–e fit indices relating to basic, higher-order and social housing needs versus housing conditions represent a useful means of describing urban housing in different districts of the city of Heidelberg, Germany. Second, it sought to clarify if, and to what extent, p–e fit in these three domains contributes significantly to outdoor place attachment as an indicator of quality of life in the community, while simultaneously controlling for other variables.

Description of person–environment fit

Patterns of the newly developed three p–e fit indices for participants of different age groups and in different districts revealed differences and similarities linked to age and district. In accordance with our first hypothesis, we found different fit patterns for basic, higher-order and social housing needs versus conditions (Carp and Carp 1984). As expected, age, as well as the interaction of age and district, is most important in explaining basic housing needs and conditions. In the domains of higher-

order and social housing needs and conditions, clear differences between districts, but not age, are observed. Thus, p–e fit in basic physical housing aspects is highest in the oldest (71–80 years) and lowest in the youngest age group (51–60 years). This possibly reflects different ways of dealing with the developmental task of housing at different ages in this particular domain (Havighurst 1972). Thus, the degree of fit in basic aspects of indoor and outdoor housing becomes more important with age in every district. However, the salient district differences in the middle age group (61–70 years) may support the assumption of a changed profile of housing-related interest close to and shortly after retirement. In this respect, the district considered to be pleasant but with poor access to the city and to public transportation (C) is evaluated more negatively than the other districts (A, B). Housing options are potentially the topic of renewed discussion at this time in life, with decisions to be made about whether it is better to adapt one's existing housing or move to new housing (Oswald and Rowles 2005). Additional explanatory longitudinal analyses with a subgroup of this sample showed that these differences are not an artefact, since they remained stable for a period of 3 years after the first measurement point (Oswald and Hieber 2003).

In accordance with our expectations in relation to higher-order and social needs, pleasant districts have higher scores, especially in the domain of comfort-oriented higher-order p–e fit, but also in the social domain. These results lead to the interpretation that the degree of fit in higher-order and social aspects is mainly a matter of place and not of age, reflecting larger objective differences between the selected districts A and C, especially in comfort-oriented housing conditions. In other words, basic fit could easily be provided in different settings, in contrast to comfort-oriented and social fit. However, this argument is more obvious for higher-order housing aspects than for social aspects. Nevertheless, in sum, our findings lead to the assumption that age plays a major role in the basic housing domain, whereas place becomes relevant in the higher-order and social aspects of housing. Additional explanatory longitudinal analyses (Oswald and Hieber 2003) show that there are different fit trajectories in different districts. Indeed, over a 3-year period, we find an increase in the domain of social fit in district A, and a decrease in the districts B and C. This suggests that the immediate outdoor environment at least partially constitutes developmental processes in old age (Bronfenbrenner 1999).

In sum, p–e fit indices allow a more differentiated interpretation of housing in the district compared to separate personal (e.g. age) vs. environmental information (e.g. housing tenure). In this regard, the study findings contribute to the discussion of p–e fit (e.g. Carp and Carp 1984; Scheidt and Norris-Baker 2003) as well as to the broader field of environmental gerontology (Lawton 1977; Scheidt and Windley 1985; Wahl 2001).

Explanation of outdoor place attachment

First, the explanatory findings reveal different predictor patterns in diverse urban settings. Whereas certain sociodemographic (age, gender, health) and basic housing-related variables (tenure, household composition) do not contribute to outdoor place attachment, the findings relating to the positive impact of indoor place attachment, particularly length of residence in districts A and C, are clearly in accordance with the relevant literature (e.g. Rubinstein and Parmelee 1992; Krause 2003). Place attachment is not particularly a matter of financial resources. In the less wealthy district A, participants with low income display a stronger bond to their neighbourhood than do wealthier individuals, some of whom might wish to relocate. Interestingly, wealthier residents of the affluent district C do not feel better attached to their neighbourhood than do less affluent older residents. Second, future-oriented recommendations and fears, often encompassing detailed points of criticism and accumulated bad experiences over recent years, lead to a decrease in attachment to the neighbourhood. Independent of financial resources, in both districts with relatively low proportions of older adults (A, C), the number of recommendations could be interpreted as a critique arising from perceived unmet senior-specific needs in local policy-making, leading to low neighbourhood attachment among elders. Thus, outdoor place attachment is not something to be taken for granted in old age, but a result of sensitive bonding processes which need continuous support from local policy-making in order to maintain quality of life, which in turn supports health and well-being in old age (Krause 2003).

As expected in our second hypothesis, the p–e fit indices contribute considerably and with differentiation to outdoor place attachment in different urban settings. As was demonstrated, contributions to outdoor place attachment, while simultaneously controlling for sociostructural background (age, gender, income, health) and basic housing-related variables (tenure, household composition, length of residence), include the fit of basic housing needs and conditions in the poor and more deprived district A, the fit of basic and social housing needs and conditions in the "medium" district B, and also the fit of social (but not higher-order) housing needs and conditions in the most affluent and favourable district C. The differential predictor patterns clearly underpin the need to distinguish between basic, higher-order and social housing aspects (Carp and Carp 1984; Mollenkopf et al. 2004a, 2004b). However, the lower total amount of explained variance in district B, compared to districts A and C, leads to the assumption that other unknown factors may trigger outdoor place attachment in this setting. In sum, these findings contribute to the ongoing discussion concerning the need for further investigation of the concept of neighbourhood attachment as an important and worthwhile indicator of quality of life in communities (Rubinstein and Parmelee 1992; Krause 2003).

Conclusion

The findings not only reveal differences and similarities in p–e fit indices and predictor sets relating to outdoor place attachment but also clearly indicate the need to address the micro-, meso- and macro-levels of the environment in old age (Bronfenbrenner 1999; Wahl 2001). Shortcomings in this district-specific and age-related perspective on person–environment exchange should be acknowledged. For example, the interdependence of housing needs and conditions, and the question of generalisability to other districts, is potentially problematic. Furthermore, the study's perspective on p–e fit might be considered uncommon since it does not address personal competencies, focusing instead on perceived needs. However, the results on p–e fit indices and on the prediction of outdoor place attachment highlight the impact of person–environment interaction, whereas separate person- or environment-related aspects are less significant. If we accept the existence of a strong link between outdoor place attachment and quality of life, health and well-being in old age, as has been suggested elsewhere (Rubinstein and Parmelee 1992; Taylor 2001; Krause 2003), our findings not only contribute to assessing the role of the neighbourhood in old age but also stress the importance of indoor and outdoor housing for ageing in general.

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