Architectural style and green spaces predict older adults' evaluations of residential facilities

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Published online: 10 December 2016
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Abstract The purpose of this study was to analyse the effects of residential facilities' design features on older adults' psychosocial responses. Participants ($N = 192$) were over 65-year-old residents who were randomly exposed to different experimental scenarios concerning a hypothetical residential facility for older adults, using a 3×2 between-subjects design (i.e. home-like vs. hotel-like vs. usual-standard architectural style; presence vs. absence of green spaces). After the experimental session, participants were asked to fill in a questionnaire that measured their attitudes towards short- and long-term relocation, anticipated residential satisfaction with the facility, and feelings of broken home attachment. The results showed (1) more positive responses to “home-like” and “hotel-like” architectural styles than the usual-standard type and (2) the positive impact of green spaces on the assessment of the facilities. These design features should

thus play a role in both reducing the stressful impact of leaving home and promoting beneficial patterns, hence fostering “successful ageing”.

Keywords Older adults' residential satisfaction · Attitude towards relocation · Home attachment · Architectural style · Green space

Introduction

Although most older adults show a general preference for ageing in place, the natural health decline during ageing could make the home an unsuitable place, making relocation preferable or necessary for some people (Rubinstein and De Medeiros 2004). Particularly, older people may spend some periods in hospital rooms or may relocate (permanently or for long periods) to residential facilities that provide custodial care to those who are not (sufficiently) able to live independently in their own homes.

As stated by Del Aguila et al. (2006), the life context plays an important role because “performance limitations requiring assistance arise from the interrelationship between impaired (cognitive and physical) functional capacity and challenges presented by the immediate physical context of the residence and the extended physical environment of the residential location” (p. 134). Given that many older people spend most of their time in the residential environment (e.g. see Bonaiuto et al. 2004), the study of its properties is crucial to reach the goal of “successful ageing” (Rowe and Kahn 1997) or “optimal ageing” (Baltes 1996). In this regard, the special symbolic valence of the residential environment is widely recognised for providing a sense of continuity with the past (Korpela 2012), maintaining a positive self-image (Rubinstein and

Responsible editor: H.-W. Wahl.

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Parmelee 1992) and promoting identity, independence and well-being (Eyles and Williams 2008).

The present study analyses the role of specific residential facilities' design features, such as architectural style and green spaces, in older adults' psychosocial responses. The following subsections report the theoretical underpinnings that represent the basis of our research work. Particularly, we address the relevant implications of relocation, also related to the meaning of the home environment; then we report the empirical evidence about the importance of "humanising" the design of residential facilities, including the specific case of the restorative valence of green spaces.

Older adults and relocation

Scientific literature on relocation showed conflicting results. Most empirical studies, mainly conducted in the US context, focused on the analysis of relocation's (especially non-voluntary) negative effects on individuals' well-being, and showed that older people who spent their later lives at home evaluated the quality of their lives higher than those who were faced with relocation despite having a preference to remain in their own homes (Scanlon and Devine 2001). In contrast, other studies carried out in Europe showed that a relocation event—although initially feared—might have a very positive impact on an older person's health, especially in the areas of autonomy, social relations and overall quality of life (Nygren and Iwarsson 2009; Oswald et al. 2002).

Older people are more likely "to remain in place", especially in the presence of a strong attachment to their homes and neighbourhoods, economic problems and the fear of losing the continuity of routine activities. In contrast, the determinants of moving to another living environment are the desire to maintain independence and the avoidance of loneliness (Löfqvist et al. 2013). A longitudinal study involving older adults from Sweden and Germany (Granbom et al. 2014) explored the residential reasoning processes regarding the choice between ageing in place and relocation. Specifically, the findings showed changes over time, related to the older adults' own environmental experiences, the development or decline of the attachment to a place, and the maintenance of residential normalcy.

Relocation from one's own home, either actual or prospective, can be a complex experience, particularly for older people, from both cognitive and affective perspectives, especially if this experience is not driven by a personal choice (Cerina and Fornara 2011).

The relocation experience implies detachment from the previous residential place, not only in spatial but also in

psychological terms. This involves breaking ties with that place that was formerly considered "home". According to the theory of place attachment (Low and Altman 1992), people develop attachment bonds with important places (e.g. their homes), thus developing meaningful relationships with these places and incorporating them as part of their self-identity (Moore 2000).

Ageing in place

The idea of home captures much more than a physical dimension; it is a "diffuse and complex condition that integrates memories and images, desires and fears, the past and the present" (Pallasmaa 1995, p. 133). This may be one reason that leads older people to avoid novelty and to prefer the familiarity of their homes. Older people who live in comfortable and accessible homes, perceived as meaningful and useful places, are more independent in their daily activities and express a higher level of well-being (Oswald and Wahl 2005; Oswald et al. 2007). Thus, home becomes their "haven", a special place where they can keep themselves away from unwanted intrusions by others (Kearns et al. 2000), enjoy the freedom to do what they want, as well as when and how they want it, and maintain control over their environments and daily lives (Leith 2006). Moreover, home gives access to the physical, social and biographical meanings of a place (Fogel 1992; Rowles 1993).

This phenomenon, now commonly referred to as "ageing in place" (Callahan 1992), has been widely documented in the literature and has generated much debate about the best ways to deliver long-term care (LTC) services that are responsive to older persons' desire to live at home. Ageing in place can be understood as "a transaction between an aging individual and his or her environment that is characterized by changes in both person and environment over time, with the physical location of the person being the only constant" (Lawton 1990, p. 288). However, as stated by Leith (2006), the experience of "feeling at home" may also grow in a place that is different from one's own home, and this experience seems to be an important precondition for the process of adaptation to the new residential environment.

A study led by Küller (1991) in a Swedish geriatric hospital revealed the role of a "home-like" environment in counteracting the older adults' institutionalisation process. Specifically, this kind of design seemed to promote both functional/social competence due to the presence of a familiar environment and a positive modification of the schema of spatial appropriation characterising the relationship between older people and their living places (Anderson 2011).

Architectural humanisation

Considering the particular states of emotional distress, anxiety, helplessness and reduced personal autonomy that may characterise older adults' experiences of relocation to a residential facility, significant attention should be paid to design features in order to foster the process of adaptation to the new residential environment. In this regard, a pertinent construct that has been applied to healthcare environments is "architectural humanisation", which evokes "hotel-like" or "home-like" concepts of these places (Fornara and Andrade 2012). These concepts are related to people's preference for either a healthcare design with a high-technology image (since it elicits trust in the structure's ability to provide the latest medical procedures) or healthcare environments that are viewed as familiar (since they fulfil a reassuring function) (Nesmith 1995).

Examples of architectural humanisation of healthcare structures are the presence of areas for cooking or gardening, the reduction of the number of beds in inpatient rooms, a reception area similar to a hotel lobby where information can be obtained (with plants, paintings and other decorative furnishings), the removal of barriers or visual obstructions, the use of warm materials (such as wood, instead of cold and aseptic metals), the presence of colours and comfortable furnishings (Salonen et al. 2013), the possibility of personalising room spaces with familiar objects and views of green spaces (Verderber and Fine 2000; Fornara and Andrade 2012). A more humanised environment should boost the level of residential satisfaction, that is, the experience of pleasure or gratification derived from living in a specific place (Bonaiuto 2004).

Several studies carried out in healthcare environments provided empirical support for the design features' importance in enhancing users' residential satisfaction and perceived quality of their environmental experiences (Arneill and Devlin 2002; Harris et al. 2002; Fornara et al. 2006).

Over the last decades, major challenges in the healthcare design field are reflected in ambitions for design that is "therapeutic" (e.g. the design of "healing environments", see Stichler 2001; Devlin and Arneill 2003; Schweitzer et al. 2004) and more tailored to the needs of special populations, including older adults in general (Falk et al. 2009) or those affected by specific diseases such as dementia (Zeisel 2009).

Restorative effect of green spaces

Research on environmental preferences showed that people favoured natural environments because these had positive effects on promoting recovery from both stress and attentional fatigue (as postulated in the attention restoration

theory, see Kaplan and Kaplan 1989) and on fostering experiences that are essential for self-regulation and emotional control (Korpela et al. 2001). Natural daylight and views of nature are recommended for the positive health benefits to the occupants of healthcare facilities, as demonstrated by extensive scientific literature (e.g. see Douglas and Douglas 2004; Ulrich et al. 2004; Curtis et al. 2007; Bringslimark et al. 2009). The creation of healing environments with green spaces, such as parks, gardens, indoor plants or pictures of natural landscapes, can promote regenerative experiences. Psychological benefits, such as stress reduction and increased pain tolerance, had been reported in several experimental studies conducted in the US context (Lohr and Pearson-Mims 2000; Park et al. 2004; Park and Mattson 2008, 2009) that focused on the properties of indoor plants.

When persons experience stress or anxiety, looking at nature scenes improves their moods and elicits beneficial physiological changes, such as lower blood pressure and reduced heart rate (Ulrich et al. 1991). Analogously, an interview study conducted in US Long-Term Care facilities showed that the older residents preferred windows with prominent views of nature and expressed dislike for window views of built structures without elements of nature (Kearney and Winterbottom 2005). Similar findings emerged from a study on gardens and outdoor spaces in assisted-living facilities in the US, where the older residents expressed their preference for outdoor spaces with greenery, flowers, birds and water features (Rodiek 2005). The positive value of green spaces was also indicated in studies involving older adults affected by dementia, who used to walk outdoors more often if their residential facility included a therapeutic garden (Day et al. 2000). In this regard, both the variety of sensorial stimulation and a set of physical components (e.g. plants, paving, planters and benches) and spatial properties (e.g. simple configurations and places for social interaction) represented the gardens' attributes that might improve older adults' abilities related to accessibility and wayfinding (Diaz Moore 2007).

Research questions

Overall, most studies about the various features of architectural humanisation's influence on users' psychological responses concern hospitals and other healthcare environments, whereas less attention is paid to the impact of these aspects in residential facilities for older people. Specifically, few studies identify which features of the residential facilities influence older people's attitudes towards relocation and what can be done to improve residential settings in terms of older adults' well-being and quality of life. These two points represent the main research questions addressed by the present paper.

Objective and hypotheses

The purpose of this experimental study was to analyse the role of environmental features of residential facilities¹ for older people in influencing their attitudes and perceptions. Particularly, the research focused on the following aspects:

- (1) the exterior design and appearance of the residential structure, with specific reference to the “hotel-like” (conveying a modern and somewhat futuristic image of a seniors’ facility) and the “home-like” (conveying the familiar and identitarian image of the houses of the past) concepts and.
- (2) the presence of green spaces surrounding the residential structure.

The operational hypotheses were as follows:

H1 The facilities with a “home-like” appearance were expected to receive more positive responses from older people (i.e. attitudes towards both short- and long-term relocation to these places, higher anticipated residential satisfaction and a decreased feeling of broken home attachment) than the other types (i.e. “hotel-like” and “usual-standard” facilities).

H2 The facilities shown as surrounded by green spaces were expected to receive more positive responses than those where no green spaces were visible.

Furthermore, the significance of the interaction between the architectural style and green spaces was tested although no directional hypothesis was possible on the basis of previous literature.

Method

Participants

The target population consisted of older adults living in the Autonomous Region of Sardinia, Italy. To be eligible for the study, participants should live in their own homes, be over 65 years, have no serious communication problems and be willing to participate.

Respondents ($N = 192$; 103 males and 89 females) were recruited on a voluntary basis² in various places (such as urban parks, shopping malls and squares) located in different

towns of Sardinia, Italy. Their ages ranged from 65 to 94 years old (mean age = 73 years, standard deviation = 6.5 years).

Regarding marital status, 59% of the participants were married, 30% were widowed, 6% had never been married and 5% were separated or divorced.

As for the educational level, 19% of the participants had no educational qualification, 33% had a primary education, 27% earned a junior high school diploma, 18% had a high school certificate and only 3% had obtained an academic degree.

All the participants were living independently in their homes (50% with the spouse, 26% alone), and the majority (82.8%) did not need any kind of care, whereas 14% were receiving informal care (from relatives and friends) and 3% were receiving formal care (from domestic care workers and social services).

Experimental design and procedure

The study used a 3×2 between-subjects design. The design factors were the facilities’ architectural style (three levels: home-like vs. hotel-like vs. usual standard³) and surrounding green areas (two levels: presence vs. absence). For each experimental condition, participants were requested to carefully observe two printed pictures, one depicting the facade of a residential facility and the other depicting the supposed external area of such a facility. Previous research supported the use of photographs as proper simulations of the actual environment (Ulrich et al. 1991; Devlin 2008).

Each participant was randomly assigned to one of the six experimental conditions resulting from the combination of the different levels of the design factors, as follows: (1) home-like architectural style and presence of green spaces, (2) hotel-like architectural style and presence of green spaces, (3) usual-standard architectural style and presence of green spaces, (4) home-like architectural style and absence of green spaces, (5) hotel-like architectural style and absence of green spaces and (6) usual-standard architectural style and absence of green spaces. Thus, each condition (i.e. cell) included 32 participants (i.e. the total sample of 192 participants divided by 6). The participants’ random assignment to the different experimental conditions ensured that any difference between conditions was due to chance.

Following the Ethics Code of the American Psychological Association, all participants were enrolled after

¹ Usually, residential facilities in the Italian context are institutional settings where older adults occupy a single (or more rarely, double) room with a bathroom and have access to common services, including food and healthcare.

² To avoid a potential confounder, we selected only older adults with no experience of relocation (and not facing an immediate relocation threat) to residential facilities.

³ Usual-standard facilities are anonymous residential buildings of average to poor quality that do not present any specific design feature or decorative element. The picture used in this study was chosen among similar ones that depicted residential facilities for older adults in various Italian locations. It followed the same parameters of the hotel-like and the home-like pictures (i.e., perspective and building size), differing only in the architectural style.

they gave their informed consent. Information about the purpose, expected duration, procedure and anonymity of the research was provided. The participants were also clarified that they had the right to decline and to withdraw even when the study had begun, including the withdrawal of their data up to the publication of the results.

Five pictures were used for the experiment. The first three pictures depicted the facade of a seniors' residential facility in three architectural styles [i.e. typical Sardinian⁴ or “home-like”, modern or “hotel-like” and usual standard (see footnote 3)]. The other two pictures portrayed the external area of the facility (i.e. with green vs. without green spaces). The pictures selected for the experiment (see the “Appendix” Section for the black/white version, although the photographs were coloured in the original presentation) were modified through the Adobe Photoshop Elements Program to control for possible confounding variables (e.g. presence of persons or cars). The final aim was to obtain images that were equal in all characteristics except (1) the architectural style in the first three pictures and (2) the presence vs. absence of green spaces in the other two pictures.

After being exposed to the stimulus materials, representing the experimental condition they were assigned to, the participants were asked to fill in the questionnaire. Each session was conducted by one of three trained PhD or master-level psychology students in a controlled situation (i.e. a quiet room in the participant's house where only the participant and the experimenter were present). The average length of each session was about 40 min.

Measures

The questionnaire included the following measures:

- (1) *Attitude towards short-term relocation*, five items (from Cerina and Fornara 2011). Respondents expressed their opinions about their possible relocation to the experimental condition facility for a brief period. A five-step semantic differential method was used, including bipolar items (i.e. “pleasant–unpleasant”, “forthcoming–far in the future”, “useful–useless”, “happy–sad” and “easy–difficult”). Cronbach's α was equal to 0.89.
- (2) *Attitude towards long-term relocation*, five items (from Cerina and Fornara 2011). Respondents

expressed their opinions about their possible long-term relocation to the experimental condition facility through the same semantic differential method reported above. Cronbach's α was equal to 0.89.

- (3) *Anticipated residential satisfaction with the facility*, three items (adapted from Fornara et al. 2006). These statements concerned the expected satisfaction with the residential facility of the experimental condition they were assigned to, in case of relocation there (i.e. “I would be satisfied to live in this residential facility”, “If necessary, I would choose this residential facility for relocation”, “I would recommend this residential facility to my friends or relatives”). The response scale was a five-step Likert-type scale (from “totally disagree” to “totally agree”). Cronbach's α was equal to 0.87.
- (4) *Feeling of broken home attachment*. Five statements adapted from two sources (Adriaanse 2007; Fornara et al. 2010) referred to the strength of the feeling of broken home attachment in case of relocation to the experimental condition facility (i.e. “I would feel at home in this facility”, “I would be very displeased to leave my home for relocation to this facility”, “My home is an ideal place to live”, “I would feel strong homesickness if I stayed permanently in this facility”, “I would feel the urge to get away from this facility”). The response scale was a five-step Likert-type scale (from “totally disagree” to “totally agree”). Cronbach's α was equal to 0.86.

A set of sociodemographic indices was also measured.

Data analyses

The data were analysed by means of the Statistical Package for Social Sciences (SPSS), version 22.0. Negatively worded items were reverse-coded for the correct calculation of the Cronbach's α values and for subsequent creation of aggregate scores for each measured construct (i.e. the mean of the single-loading item scores for each participant). In other words, at the individual level, a high score in the measured construct indicated high levels of positive attitudes (or satisfaction or broken home attachment).

To test the two research hypotheses, a set of 3×2 factorial ANOVAs between subjects was performed. In such analyses, the dependent variables (DVs) were the attitude towards either short-term or long-term relocation, anticipated residential satisfaction and feeling of broken home attachment. The independent variables (IVs)⁵ were the architectural style of the facility and the presence/

⁴ The reference is to the common residential architectural style in the South Sardinia of the past centuries, that is, the Campidanese house style. It is characterised by specific structural elements, such as (1) a large arched entrance facing the street; (2) an external space typically surrounded by animal barns, warehouses and wine cellars; (3) a well; (4) a courtyard surrounded by living places; (5) a wide internal space; (6) a loggia connecting with the rooms; and (7) an upper floor, used as a warehouse for food or grains (see Atzeni and Sanna 2008).

⁵ Initial analyses included age and perceived well-being as covariates, but they were then removed from the analyses since they showed no significant effects on the DVs.

absence of green spaces in the surrounding area. Age was inserted in the model as a covariate, taking into account the possible differences between “younger-old” and “older-old” adults. Both the three main effects (the two IVs and the covariate) and the interaction effect between the architectural style and the green factor were analysed in the ANOVAs (with the alpha value for statistical significance set to 0.05) for all the DVs.

Results

Table 1 summarises the ANOVA results.

Attitude towards short-term relocation

Regarding the attitude towards short-term relocation, the main effects of the architectural style ($F_{2,185} = 5.124$, $p = 0.007$, $\eta^2 = 0.052$) and green spaces ($F_{1,185} = 9.427$, $p = 0.002$, $\eta^2 = 0.048$) were both significant, controlling for age (which was not significant).

Post hoc comparisons showed that the usual-standard style received a significantly lower score ($M = -0.50$, $SD = 1.18$) than the hotel-like ($M = -0.01$, $SD = 1.08$) and the home-like ($M = 0.12$, $SD = 1.33$) styles, which did not differ between them.

Concerning green spaces, the attitude towards short-term relocation was significantly more positive in the “presence of green spaces” condition ($M = 0.13$, $SD = 1.18$) compared to the “absence of green spaces” condition ($M = -0.40$, $SD = 1.21$).

Attitude towards long-term relocation

Concerning the attitude towards long-term relocation, the main effects of the architectural style ($F_{2,185} = 6.425$, $p = 0.002$, $\eta^2 = 0.065$) and green spaces ($F_{1,185} = 4.483$, $p = 0.036$, $\eta^2 = 0.024$) were both significant, controlling for age (which was not significant).

Post hoc comparisons showed that the usual-standard style received a significantly lower rating ($M = -0.86$, $SD = 1.06$) than the hotel-like ($M = -0.41$, $SD = 1.14$) and the home-like ($M = -0.15$, $SD = 1.26$) styles, which did not differ between them.

Attitudes towards long-term relocation were less negative in the residential facilities with green spaces ($M = -0.29$, $SD = 1.20$) than in those without green spaces ($M = -0.65$, $SD = 1.16$) in the external areas.

Anticipated residential satisfaction with the facilities

Regarding the anticipated residential satisfaction with the facilities, the main effects of the architectural style

($F_{2,185} = 6.913$, $p = 0.001$, $\eta^2 = 0.070$) and green spaces ($F_{1,185} = 7.839$, $p = 0.006$, $\eta^2 = 0.041$) were both significant, controlling for age (which was not significant).

Post hoc comparisons showed that the usual-standard style was perceived as less satisfying ($M = 2.50$, $SD = 1.19$) than the hotel-like ($M = 3.04$, $SD = 1.20$) and the home-like ($M = 3.22$, $SD = 1.09$) styles, which did not differ between them.

The anticipated residential satisfaction was significantly higher in the green spaces condition ($M = 3.14$, $SD = 1.04$) than in the one without green spaces ($M = 2.69$, $SD = 1.30$).

A significant two-way interaction effect between the architectural style and green spaces also emerged ($F_{2,185} = 3.828$, $p = 0.023$, $\eta^2 = 0.040$). As shown in Fig. 1, the presence of green spaces in the external areas increased the level of anticipated residential satisfaction, especially in the usual-standard facility, but such a pattern was very weak for the home-like and the hotel-like facilities.

Feeling of broken home attachment

Finally, regarding the feeling of broken home attachment, the main effects of the architectural style ($F_{2,185} = 4.042$, $p = 0.019$, $\eta^2 = 0.042$) and green spaces ($F_{1,185} = 5.015$, $p = 0.026$, $\eta^2 = 0.026$) were both significant, controlling for age (which was not significant).

Post hoc comparisons showed that the usual-standard style triggered a higher level of the feeling of broken home attachment ($M = 4.12$, $SD = 0.82$) than the home-like style ($M = 3.67$, $SD = 0.97$). The hotel-like style ($M = 3.83$, $SD = 0.92$) did not differ significantly from both the usual-standard and the home-like styles.

The feeling of broken home attachment was also expected to be weaker in residential facilities with green spaces in the external areas ($M = 3.73$, $SD = 0.93$) compared to those without green spaces ($M = 4.02$, $SD = 0.89$).

Discussion and conclusions

The research hypotheses were partially confirmed by the outcomes.

Concerning H1, older people showed (as expected) different reactions to the diverse architectural styles of the residential facilities, as if they “judge[d] a book by its cover” (Devlin 2008). In fact, consistent with Verderber and Fine’s (2000) findings about the more “humanised” and “familiar” healthcare settings’ effects on hospital residents, older adults in the present study expressed more positive ratings for the “home-like” and the “hotel-like” residential facilities than for the “usual-standard” one. As expected, the highest rates were for the “home-like”

Table 1 Overview of the results: *F*-values, *p* values and effect size for each dependent variable

Dependent variable	Effect	<i>F</i>	<i>p</i>	η^2
Attitude toward a short relocation	Architectural style	$F_{2,185} = 5.124$	0.007	0.052
	Green areas	$F_{1,185} = 9.427$	0.002	0.048
Attitude toward a long relocation	Architectural style	$F_{2,185} = 6.425$	0.002	0.065
	Green areas	$F_{1,185} = 4.483$	0.036	0.024
Anticipated Residential Satisfaction	Architectural style	$F_{2,185} = 6.913$	0.001	0.070
	Green areas	$F_{1,185} = 7.839$	0.006	0.041
	Architectural style $\times$ Green areas	$F_{2,185} = 3.828$	0.023	0.040
Feeling of broken Home Attachment	Architectural style	$F_{2,185} = 4.042$	0.019	0.042
	Green areas	$F_{1,185} = 5.015$	0.026	0.026

Fig. 1 Interaction effect between Green areas in external spaces and Architectural style on Anticipated residential satisfaction

facility since this kind of residence should recall the memory of the typical (Sardinian) ancient houses, where most of the participants had lived since their childhood. In this sense, it would likely provide a linkage and a sense of continuity with their own place identity (see Proshansky et al. 1983). Thus, the positive attitude towards traditional housing that is an example of “vernacular architecture” (Hourigan 2015) should be elicited by the salience of the cultural heritage of the (home) place. Furthermore, the use of local construction materials (e.g. typical local bricks) may help in preserving the particular place’s rural aesthetic characteristics (Donovan and Gkartzios 2014), which mirror the values, customs and needs of its inhabitants (Heath 2009). In other words, a given residential prototype should trigger the feeling of “being at home” and with reference to a personal life story and identity, may facilitate reminiscence processes, which will help older people foster a sense of continuity in their lives (Cappeliez et al. 2008). This outcome recalls Arneill and Devlin’s (2002) findings, where older adults showed a distinctive feature (compared to the other age groups) of feeling more comfortable in

physicians’ waiting rooms that looked like old Victorian parlours or sitting rooms.

Nevertheless, the “home-like” facility did not receive significantly more positive responses than the “hotel-like” facility (characterised by a modern and somewhat “futuristic” appearance). Thus, both kinds of architecture styles seem to communicate a positive impression about the expected quality of the residential facilities. This result is in line with other studies that showed how the perceived design quality of a built environment was congruent with the perceived quality of other dimensions, such as expected care (see Arneill and Devlin 2002) and received care (see Fornara et al. 2006; Andrade et al. 2012).

As for the anticipated residential satisfaction, older people viewed the facilities that showed home-like and hotel-like architectural styles as more satisfying than the one that featured the usual-standard style. This result confirms the importance of introducing design features that could have symbolic and affective significance in order to increase the anticipated residential satisfaction of older people (O’Bryant and Wolf 1983).

The architectural style also influenced another pattern that was supposed to be closely related to the anticipated residential satisfaction (see Austin and Baba 1990; Ringel and Finkelstein 1991), that is, place attachment towards the residential environment. Specifically, “home-like” residential facilities evoked a reduced feeling of broken attachment towards the people’s previous “own” homes than the other two kinds of facilities. Given that the experience of “feeling at home” may also grow in places different from a person’s private home (Leith 2006), and such experience seems to be an important precondition for the process of adaptation to the new residential environment, particular attention should be dedicated to those design features that should recall a familiar and domestic environment rather than an “institutionalised” place (Fornara and Andrade 2012).

About H2, the positive effect of the presence of green spaces (in the external areas) on the older people’s

responses clearly emerged. Particularly, the “green” factor positively influenced all the considered outcome variables, both as a distinctive feature (i.e. for attitudes towards short-term relocation and feelings of broken home attachment) and in combination with the architectural style (in the case of the anticipated residential satisfaction). Specifically, the presence of green spaces in external areas elicited a more positive attitude towards short-term relocation, on one side, and decreased the feelings of broken home attachment, on the other side. Furthermore, the presence of open spaces with natural elements seemed to play a role in fostering the anticipated residential satisfaction with “standard” facilities, which would typically appear anonymous and unattractive.

These results are in line with plenty of studies proving the preference for natural environments compared to built ones (Cooper Marcus and Barnes 1995; Hartig and Staats 2003), as well as the positive effect of the view of natural environments on psychophysical well-being (Ulrich 1984; Kaplan and Kaplan 1989; Korpela et al. 2001; Devlin and Arneill 2003; Ulrich et al. 2004). These outcomes provide further empirical support for other studies’ findings that people prefer environments with restorative features because these promote recovery from both stress and attentional fatigue (attention restoration theory; Kaplan and Kaplan 1989) and foster regenerative experiences that are important for self-regulation and emotional control (Korpela et al. 2001).

Thus, it is confirmed that the view of a natural environment embodies positive outcomes (see Ulrich 1984), and specifically among older adults, it is preferred over a view of a built space (Kearney and Winterbottom 2005). These should be convincing findings for promoting the presence of green areas at residential facilities for older adults, which can provide opportunities for sensorial and social stimulations (Diaz Moore 2007), as well as be used for therapeutic aims (Day et al. 2000).

Concerning the possible role of age differences, this dimension neither affected the outcome responses nor influenced our research hypotheses.

A possible limitation of this study concerns the kind of task the participants were asked to perform, that is, to assess the hypothetical experience of relocation to the observed structure. Given the imaginative effort required, this task might have been too distant from the actual life experiences of some participants. In other words, we could not be sure that the same outcomes would emerge in case of comparisons among “real” facilities (for older adults) that would include the analysed design features. This aspect includes also the supposed difference between evaluating pictures versus evaluating “real” places, as raised by Scott and Canter (1997). Nevertheless, it is to mention that the use of pictures for “imaginative” tasks

has been widely used in research literature on place assessment (e.g. see Arneill and Devlin 2002; Devlin 2008).

A further point is related to the idiosyncratic nature of the chosen pictures. Despite the accurate procedures that we used for the selection, modification (via Photoshop) and control for possible confounders of the target prototypes, we could not exclude that some characteristics of the pictures—unrelated to the manipulated variables (e.g. combination of colours and shapes)—affected the perceived pleasantness (or unpleasantness) of the depicted facilities.

Hence, this study’s main limitations concern the artificiality of the situations (and materials), which is by definition associated with an experimental study. Further research is thus needed to confirm these experimental findings in field studies, possibly recruiting occupants of actual facilities. Nevertheless, it should be noted that our results confirm (as mentioned) the findings of more ecological studies, that is, both the green factor’s and the specific design features’ positive effects on attitudes.

In conclusion, this study represents an effort to verify the design features’ (such as the architectural style and green spaces) impact on fostering more positive relocation experiences in residential facilities for the older population. The outcomes provide some empirical evidence that can be handled by those (designers, managers and decision makers) in charge of the design or requalification of such facilities. In fact, this study’s findings suggest that older persons react differently to the appearance of residential facilities. In the light of a “user-centred” perspective (Norman 1988), on one hand, and an “evidence-based” design (Hamilton 2003), on the other hand, the focus should be specifically on those design features of seniors’ residential facilities that have proven to meet the potential users’ preferences. This may help reduce the possible stressful impact that leaving home may provoke, as well as promote positive patterns, such as satisfaction with the residential structure, formation of attachment bonds with the new place and perceived control over the environment, which are all salient elements of “successful ageing” (Rowe and Kahn 1997). In other words, designing residential facilities characterised by a given architectural style and surrounded by pleasant green spaces may increase the levels of comfort and satisfaction of older residents, thus improving their overall well-being and quality of life.

Acknowledgements We are pleased to thank Giorgio Matzuzzi and Barbara Mocchi for their valuable help in the data collection phase. This study is part of the PhD research project of the first author, who was financially supported by the Master & Back Program of the Autonomous Region of Sardinia (Grant DR-8689).

Appendix

See Figs. 2, 3, 4, 5, 6.

Fig. 2 Home-like architectural style

Fig. 3 Hotel-like architectural style

Fig. 4 Usual-standard architectural style

Fig. 5 Presence of green areas in external spaces

Fig. 6 Absence of green areas in external spaces

References

- Adriaanse CCM (2007) Measuring residential satisfaction: a residential environmental satisfaction scale (RESS). *J Hous Built Environ* 22:287–304
- Anderson JE (2011) Appropriating space in an assisted living residence: on architecture and elderly frail people's spatial use. In: Proceedings of the 2011 ARCC (Architectural Research Centers Consortium) conference "reflecting upon current themes in architectural research". Lawrence Technological University, Detroit, MI, 20–23 April 2011, pp 1–19
- Andrade C, Lima L, Fornara F, Bonaiuto M (2012) Users' views of hospital environmental quality: validation of the Perceived Hospital Environment Quality Indicators (PHEQIs). *J Environ Psychol* 32:97–111
- Arneill AB, Devlin AS (2002) Perceived quality of care: the influence of the waiting room environment. *J Environ Psychol* 22:345–360
- Atzeni C, Sanna A (2008) *Architettura in terra cruda dei Campidani, del Cixerri e del Sarrabus* (trad.: Architecture in raw earth of Campidani, Cixerri and Sarrabus). Retrieved September 30, 2014 on <http://www.sardegna.digitalibrary.it/index.php?xsl=626&id=203275>
- Austin DM, Baba Y (1990) Social determinants of neighborhood attachment. *Sociol Spectr* 10:59–78
- Baltes MM (1996) *The many faces of dependency in old age*. Cambridge University Press, New York
- Bonaiuto M (2004) Residential satisfaction and perceived residential environment quality. In: Spielberger C (ed) *Encyclopedia of applied psychology*. Academic Press, San Diego, pp 267–272

- Bonaiuto M, Bonnes M, Continisio M (2004) Neighborhood evaluation within a multi-place perspective on urban activities. *Environ Behav* 36:41–69
- Bringslimark T, Hartig T, Patil GG (2009) The psychological benefits of indoor plants: a critical review of the experimental literature. *J Environ Psychol* 29:422–433
- Callahan JJ (1992) Aging in place. *Generations* 16:5–6
- Cappeliez P, Guindon M, Robitaille A (2008) Functions of reminiscence and emotional regulation among older adults. *J Aging Stud* 22:266–272
- Cerina V, Fornara F (2011) The psychological determinants of attitudes toward relocation in the elderly: a survey study in urban and rural environments. *Psychology* 2:335–348
- Cooper Marcus C, Barnes M (1995) Gardens in healthcare facilities: Uses, therapeutic benefits, and design recommendations. The Center for Health Design, Martinez
- Curtis S, Gesler W, Fabian K, Francis S, Priebe S (2007) Therapeutic landscapes in hospital design: a qualitative assessment by staff and service users of the design of a new mental health inpatient unit. *Environ Plan C* 25(4):591–610
- Day K, Carreon D, Stump C (2000) The therapeutic design of environments for people with dementia: a review of the empirical research. *Gerontologist* 40:397–416
- Del Aguila M, Cox L, Lee L (2006) Functional interdependence. *Australas J Ageing* 25:134–139
- Devlin AS (2008) Judging a book by its cover. Medical building facades and judgments of care. *Environ Behav* 40:307–329
- Devlin A, Arneill AB (2003) Health care environments and patient outcomes. A review of the literature. *Environ Behav* 35:665–694
- Diaz Moore K (2007) Restorative dementia gardens: exploring how design may ameliorate attention fatigue. *J Hous Elder* 21:73–88
- Donovan K, Gkartzios M (2014) Architecture and rural planning: ‘Claiming the vernacular’. *Land Use Policy* 41:334–343
- Douglas CH, Douglas MR (2004) Patient-Friendly Hospital Environments: exploring the Patients’ Perspective. *Health Expect* 7(1):61–73
- Eyles J, Williams A (2008) Sense of place, health and quality of life. Ashgate, Aldershot
- Falk H, Wijk H, Persson LO (2009) The effects of refurbishment on residents’ quality of life and wellbeing in two Swedish residential care facilities. *Health Place* 15:717–724
- Fogel BS (1992) Psychological aspects of staying at home. *Generations* 16:15–19
- Fornara F, Andrade C (2012) Healthcare environments. In: Clayton S (ed) *The Oxford handbook of environmental and conservation psychology*. Oxford University Press, New York, pp 295–315
- Fornara F, Bonaiuto M, Bonnes M (2006) Perceived hospital quality indicators: a study of orthopaedic units. *J Environ Psychol* 26:321–334
- Fornara F, Bonaiuto M, Bonnes M (2010) Cross-validation of abbreviated Perceived Residential Environment Quality (PREQ) and Neighbourhood Attachment (NA) Indicators. *Environ Behav* 42:171–196
- Granbom M, Himmelsbach I, Haak M, Löfqvist C, Oswald F, Iwarsson S (2014) Residential normalcy and environmental experiences of very old people: changes in residential reasoning over time. *J Aging Stud* 29:9–19
- Hamilton K (2003) The four levels of evidence-based design practice. *Healthc Des* 3:18–24
- Harris PB, McBride G, Ross C, Curtis L (2002) A place to heal: environmental sources of satisfaction among hospital patients. *J Appl Soc Psychol* 32:1276–1299
- Hartig T, Staats H (2003) Guest Editors’ introduction: restorative environments. *J Environ Psychol* 23:103–107
- Heath K (2009) Vernacular architecture and regional design. cultural process and environmental response. Architectural Press, Oxford
- Hourigan N (2015) Confronting Classifications - when and what is vernacular architecture? *Civil Eng Archit* 3:22–30
- Kaplan R, Kaplan S (1989) *The experience of nature: a psychological perspective*. University Press, New York
- Kearney AR, Winterbottom D (2005) Nearby nature and long-term care facility residents: benefits and design recommendations. *J Hous Elder* 19:7–28
- Kearns A, Hiscock R, Ellway A, Macintyre S (2000) Beyond four walls: the psychosocial benefits of home: evidence from West Central Scotland. *Hous Stud* 15:387–410
- Korpela KM (2012) Place attachment. In: Clayton S (ed) *The Oxford handbook of environmental and conservation psychology*. Oxford University Press, New York, pp 148–163
- Korpela KM, Hartig T, Kaiser FG, Fuhrer U (2001) Restorative experience and self-regulation in favorite places. *Environ Behav* 33:572–589
- Küller R (1991) Familiar design helps dementia patients cope. In: Preiser WFE, Vischer JC, White ET (eds) *Design intervention: toward a more humane architecture*. Van Nostrand Reinhold, New York, pp 255–267
- Lawton MP (1990) Knowledge resources and gaps in housing for the aged. In: Tilson D (ed) *Aging in place: supporting the frail elderly in residential environments*. Scott, Foresman, and Company, Glenview, pp 287–309
- Leith KH (2006) “Home is where the heart is...or is it?” A phenomenological exploration of the meaning of home for older women in congregate housing. *J Aging Stud* 20:317–333
- Löfqvist L, Granbom M, Himmelsbach I, Iwarsson S, Oswald F, Haak M (2013) Voices on relocation and aging in place in very old age: a complex and ambivalent matter. *Gerontologist* 53:919–927
- Lohr VI, Pearson-Mims CH (2000) Physical discomfort may be reduced in the presence of interior plants. *HortTechnology* 10:53–58
- Low SM, Altman I (1992) Place Attachment: A Conceptual Inquiry. In: Altman I, Low SM (eds) *Place attachment*. Plenum Press, New York, pp 1–13
- Moore J (2000) Placing home in context. *J Environ Psychol* 20:207–217
- Nesmith EL (1995) *Health care architecture: designs for the future*. American Institute of Architects Press, Washington, DC
- Norman DA (1988) *The design of everyday things*. Basic Books, New York
- Nygren C, Iwarsson S (2009) Negotiating and effectuating relocation to sheltered housing in old age: a Swedish study over 11 years. *Eur J Ageing* 6:177–189
- O’Bryant SL, Wolf SM (1983) Explanations of housing satisfaction of older homeowners and renters. *Res Aging* 5:217–233
- Oswald F, Wahl HW (2005) Dimensions of the meaning of home in later life. In: Rowles GD, Chaudhury H (eds) *Home and identity in late life: international perspectives*. Springer, New York, pp 21–46
- Oswald F, Schilling O, Wahl HW, Gäng K (2002) Trouble in paradise? Reasons to relocate and objective environmental changes among well-off order adults. *J Environ Psychol* 22:273–288
- Oswald F, Wahl HW, Schilling O, Nygren C, Fänge A, Sixsmith A, Sixsmith J, Széman Z, Tomsone S, Iwarsson S (2007) Relationships between housing and healthy aging in very old age. *Gerontologist* 47:96–107
- Pallasmaa J (1995) Identity, intimacy, and domicile: notes on the phenomenology of home. In: Benjamin DN, Stea D, Saile D (eds) *The home: words, interpretations, meanings, and environments*. Avebury, Aldershot, pp 131–147
- Park SH, Mattson RH (2008) Effects of flowering and foliage plants in hospital rooms on patients recovering from abdominal surgery. *HortTechnology* 18:563–568

- Park SH, Mattson RH (2009) Therapeutic influences of plants in hospital rooms on surgical recovery. *HortScience* 44:1–4
- Park SH, Mattson RH, Kim E (2004) Pain tolerance effects of ornamental plants in a simulated hospital patient room. *Acta Hort* 639:241–247
- Proshansky HM, Fabian AK, Kaminoff R (1983) Place-identity: physical world socialization of the self. *J Environ Psychol* 3:57–83
- Ringel NB, Finkelstein JC (1991) Differentiating neighborhood satisfaction and neighborhood attachment among urban residents. *Basic Appl Soc Psychol* 12:177–193
- Rodiek S (2005) Resident perceptions of physical environment features that influence outdoor usage at assisted living facilities. *J Hous Elder* 19:95–107
- Rowe JW, Kahn RL (1997) Successful aging. *Gerontologist* 37:433–440
- Rowles GD (1993) Evolving images of place in aging and ‘aging in place’. *Generations* 17:65–70
- Rubinstein RL, De Medeiros K (2004) Ecology and the aging self. In: Wahl HW, Scheidt RJ, Windley PG (eds) *Annual review of gerontology and geriatrics. Aging in context: socio-physical environments*. Springer, New York, pp 59–84
- Rubinstein RL, Parmelee PA (1992) Attachment to place and the representation of the life course by the elderly. In: Altman I, Low SM (eds) *Human behavior and environment: advances in theory and research: vol 12. Place attachment*. Plenum Press, New York, pp 139–163
- Salonen H, Lahtinen M, Lappalainen S, Nevala N, Knibbs LD, Morawska L, Reijula K (2013) Physical characteristics of the indoor environment that affect health and wellbeing in health-care facilities: a review. *Intell Build Int* 5(1):3–25
- Scanlon E, Devine K (2001) Residential mobility and youth wellbeing: research, policy, and practice issues. *J Sociol Soc Welf* 28:119–138
- Schweitzer M, Gilpin L, Frampton S (2004) Healing spaces: elements of environmental design that make an impact on health. *J Altern Complement Med* 10:71–73
- Scott MJ, Canter DV (1997) Picture or place? A multiple sorting study of landscape. *J Environ Psychol* 17:263–281
- Stichler JF (2001) Creating healing environments in critical care units. *Crit Care Nurs Q* 24:1–20
- Ulrich RS (1984) View through a window may influence recovery from surgery. *Science* 244:420–421
- Ulrich RS, Simons RF, Losito BD, Fiorito E, Miles MA, Zelson M (1991) Stress recovery during exposure to natural and urban environments. *J Environ Psychol* 11:201–230
- Ulrich R, Zimring C, Quan X, Joseph A, Choudhary R (2004) The role of the physical environment in the hospital of the 21st century: A once-in-a-lifetime opportunity. Report to the Center for Health Design for the “Designing the 21st Century Hospital” Project
- Verderber S, Fine DJ (2000) *Healthcare architecture in an era of radical transformation*. Yale University Press, New Haven
- Zeisel J (2009) *I’m still here: a breakthrough approach to understanding someone living with Alzheimer’s*. Penguin, New York