

Appropriating space in an assisted living residence. On architecture and elderly frail people's spatial use

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ABSTRACT:

An assisted living residence with identical layout for two non-special care units (NSCU) and two special care units (SCU), designated as an exemplary model, was used as a test bed for this study on elderly people's spatial appropriation of communal space. Using qualitative research methods (interviews, participatory observations, TESS-NH), eighteen residents' spatial usages were mapped. Thereafter, ten residents with dominantly somatic diseases were interviewed as to their appreciation and use of the communal space. Using the same qualitative interviewing guide, three staff members were interviewed in relation to eight persons with dementia. The collected data was analyzed by use of the Lynchian imageability pentad. Depending on the residents' age-related problem and the specific conditions in situ, the elderly persons' spatial usages of the individual unit could be described graphically in a mental map. A place-making process was the motivating force behind this spatial appropriation, conditioned by age-related problems. At the NSCUs, the elderly spurred this process themselves by developing a pattern consisting of movements towards places open for activities, contact and social interaction. On the other hand, at the SCUs, the dementia diagnosis affected this pattern. At these units, the movements and the places depended upon the elderly person's dependency on the staff for self-affirmation and calm. The overarching conclusion of this study is that an appropriate architectural space for an assisted living residence reinforces the place-making process, either the one of the elderly frail people, or the one staged by the staff. Besides general requirements of accessibility, functionality, and usability, this type of architecture needs to employ spatial elements that constitute a communal space that fosters an appropriative process based on the sensuous stimulation exploitable at a particular place. Thus, architecture acquires a supportive quality that nourishes the perceived homeliness by the elderly people themselves, or as staged by the staff.

KEY WORDS: assisted living architecture, architectural design, age-related problems, appropriation, mental maps.

INTRODUCTION

In the context of an assisted living residence, *"the most light-hearted becomes saddened"* (Balzac, 1835, p. 5), since this is often a place *"where the sound of a vehicle becomes an event"* and *"the walls smell like prison"* (Ibid., p. 5). It embodies a *"materialistic concretization of ideas and beliefs"* (Balzac, 1842, p. 9) about the appropriate space for aging. The social relationship between residents and staff, and the separation between communal and private space are defined by guidelines for the architectural space. These guidelines for the optimal interaction between aging, age-related problems and care philosophies have a certain similarity with a lost art that prior to the photographic revolution consisted of a meticulous description of human artifacts, usages and built space, *"l'architectonographie"* (Mimouni, 1999, p. 88). (Mimouni, 1999, p. 88). To go beyond the existential dilemmas of aging, this paper tries to reconnect to this old tradition, and will explore elderly people's use of communal space in a Swedish assisted living residence, and their relationship with architectural space.¹

1.0 BACKGROUND

Natural processes slacken and make an elderly person cognitively slower to perceive architectural space (Johansson, 2001). Still, this process is highly individual, and dominantly permits an aging in place. A significant feature of the aging process is that the individual use of space shrinks and becomes restricted to the most immediate environment close to home (Rowles, 1993). At the same

time, in Western developed countries, place identity is a vital component of self-identity for elderly people (Peace, Holland, & Kellaher, 2005). Thus, the environmental provision of autonomy and independence as well as the resident's individual choice are core criteria for the design of assisted living residences in most Western countries (Brent, 1999; Pynoos & Regnier, 1991; Regnier, 2002; Schwarz, 1999). In some cases, the aging process leads to cognitive and functional impairments that cause a changed behavior and a distorted visuo-spatial thinking (Hoof, Kort, Duijnste, Rutten, & Hensen, 2010; Kolb & Whishaw, 2002; Robinson, 2002; Schreder et al., 2007). In such a case, an apartment in an assisted living residence² becomes necessary. Swedish assisted living residences accommodate approximately 95,200 elderly persons with a high degree of assistance and care in order to uphold activities in daily living (ADL) (NBHW, 2008). There is a recommendation that for the architecture for an assisted living residence to be ideal it must meet a list of over a hundred various spatial criteria (Regnier, 2002). Of particular importance is the provision of small spaces suitable for spontaneous sojourns for a group of two to three persons, thereby allowing for the creation of new social arenas inside the residence, since the aging process tends to narrow the individual social network (Ibid). In the context of elderly people suffering from dementia, space for wandering is required so as to ease the corporeal sensation of worry that the disease induces (Dehan, 1997, 2007). In contrast to these requirements based on the human aging process, the assisted living residence is subject to a societal interest, that disarms innovative architectural thinking and promotes standardization (Schwarz, 1997). The resultant impact is normative guidelines that aim to optimize the area of the resident's individual space and the one of the residents' communal space. The probable reason for this regulatory force can be found in the old origins of the modern social work for frail people in the former poor relief aid (Andersson, 2005b; Laws, 1997).

The architectural design defines a spatial choreography, an interior movement and a relation towards the exterior space, and establishes a staging of the architectural space (Bergström, 1996). Still, in the case of indoor architectural space, few studies have been performed other than those with a focus on architecture generally acknowledged as exemplary (Canter, 1991). When a gerontological angle is introduced in the context of human interactions with architecture, the question of aging, place, and space becomes a multi-disciplinary field of research. The architectural design has been attributed with a therapeutic dimension (Cutler, 2007; Day, Carreon, & Stump, 2000; Rioux, 2003; Teresi, Holmes, & Ory, 2000) that may result in a supportive environment for elderly people with extensive need of daily assistance (Devlin & Arneill, 2003). Both international and Swedish experience- or research-based findings have emphasized the significance of the so-called homeliness in the assisted living setting (Altman_Klein, 1993; Lindström & Åhnlund, 1982; NBHW, 1983). Architectural research suggests that an elderly person's adjustment to the assisted living residence depends on a successful transition from the previous domicile to the new environment (Toyama, 1988). Spatial interventions in housing for elderly frail people have shown that the elderly person's individual experience of the interior setting is dovetailed with coping strategies and nutritional status (Elmståhl, 1987; Küller, 1991). A homelike environment exploits spatial features that are present in the ordinary domicile. The architectural space and its artifacts are powerful components of the on-going resident-staff agency in an assisted living residence (Nord, 2010).

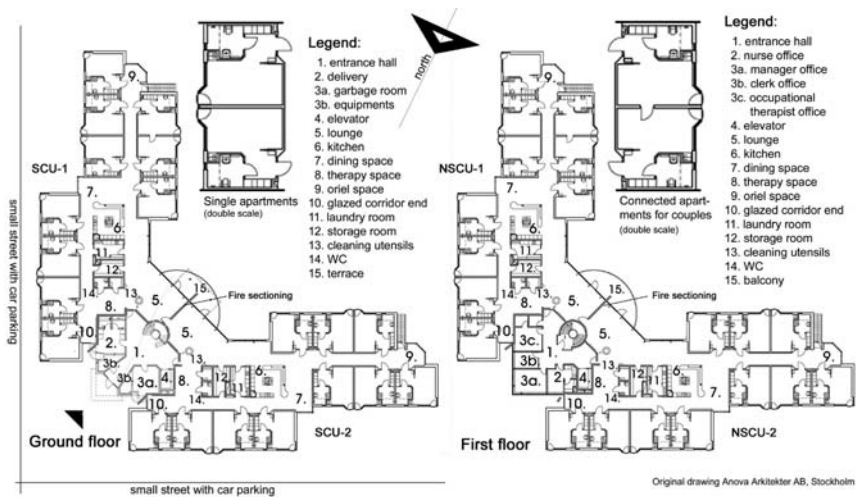
1.1 AIMS AND WORKING HYPOTHESIS

The objective of this study is to explore the architectural space of an assisted living residence with a post-occupancy evaluative approach. The residence has been designated as an exemplary model of assisted living. This study has two explicit aims: Firstly, to explore elderly frail people's spatial uses of communal space in terms of movements and sojourns in an assisted living setting. Secondly, to identify significant architectural features active in this process. This study has been guided by the working hypothesis that the individual's appropriation of the communal space of an assisted living residence is an outcome of the degree of homeliness that is attributable to the interior landscape and that the elderly person experiences. Nonetheless, the elderly person's perception of homelike environmental features is conditioned by his or her individual health status, either affected by dementia or somatic disorders.

1.2 THEORETICAL FRAMEWORK

In this paper, architecture is understood as any man-made construction and a scalable reflection of human existence (Norberg-Schulz, 1971). The interest of this paper pertains to the individual appropriation of communal space in a residence for assisted living (Lefebvre, 1985). It is a matter of a place-making process (Rosel, 2003; Rowles, 1993, 2000), where a personal attachment to a certain spatiality acquires an existential dimension, since space with its artifacts becomes an important *place* for a certain individual. Place identity is an important component of older people's self-identity (Peace et al., 2005; Smith, 2009). Contrary to the traditional view that the built space per se is a place (Tuan, 1977), this place-making is created through the rhythms of being, and place is constituted by dispersed pieces of architecture, or natural landscapes (Lefebvre, 1992). This paper embraces a transactional world view (Altman & Rogoff, 1987), where home is perceived as a holistic entity constituted by inter-related qualities of activities, physical settings, social interaction, and time. In turn, these qualities are assumed to be influenced by the cognitive and physical aging process of the residents (Lawton, 2000; Lawton & Simon, 1968). Given the implications of aging, namely dementia causing visuo-spatial problems or somatic multi-diagnoses affecting the body's locomotive functions, the architectural space of the assisted living residence constitutes a special kind of spatiality that bears on the quality of life (Pynoos & Regnier, 1991).

In the exteriority as well as in the interiority, the individual interpretive process of understanding the inner architectural space in terms of pleasant places to explore is active. Using sixty informants, the American urban planner Kevin Lynch explored three American cities, Boston, Jersey City and Los Angeles, by studying their "quality (...) of evoking a strong image of identity and structure in any given observer" (Lynch, 1960, p. 9). Lynch concluded that the urban landscapes could be transcribed into two-dimensional mental maps that described the city's character, its imageability (Ibid., p. 9). A Danish study, with a similar approach focusing on six residents' spatial usages of the Danish city Aalborg, concluded that these uses were mental maps that described a place-making process based on a list of personal priorities (Marling, 2003). In this paper, it is assumed that the Lynchean pentad of district-edge-landmark-node-path that is used to define the perceived imageability of the cityscape (Lynch, 1960), has an equivalent for the inner space. With reference to a study of an interior space, mental maps were used in order to describe the employees' spatial appropriation of the communal office space (Bodin Danielsson, 2005). The pentad of the exterior world was transferred to the interior one: 1) *landmarks*- the physical elements that created a strategic spatial foci for orientation;



Ros-Anders Assisted Living Residence

Figure 1: Ros-Anders assisted living residence, first floor and second floor. Approximate scale 1:800.

2) *paths*- the floor layout or the furnishing of space that defined how to traverse the environment; and 3) *nodes*- random junctions of intersecting paths. Given that the inner architectural space suffers from structural limitations, the Lynchian term district assuming an urban scale had to be translated by the term 4) *zone*, and fringe elements appeared as 5) *edges* between the zones detected (Ibid.).

2.0 METHODOLOGY

This study employed case study methodology (Yin, 2003) and a mixed method design (Creswell, Plano Clark, Gutmann, & Hanson, 2003). Heterogeneous research strategies were used in order to collect data and triangulate empirical findings (Onwuegbuzie & Johnson, 2008; Patton, 1997, 2002; Yin, 2003).

2.1 SETTING

This study was performed at a Swedish assisted living residence, Ros-Anders gården³, situated in a picturesque garden city in the municipality of Haninge, some 33 kilometers south of Stockholm. It has been designated as an exemplary model (Regnier, 2002). Inaugurated in 1999, the architecture features two special care units (SCU) with twenty apartments for elderly people with dementia on the first floor and, on the second floor, two non-special care units (NSCU) with apartments for the same number of persons with somatic diseases (Figure 1).⁴ Oriel windows in the gables create views of the surrounding environment, and there is a minimum of enclosing walls. Each unit has an individual kitchen.⁵ A locking keypad regulates passages to and from the unit. The observations were performed during the period June to September 2004, this particular summer with a very high temperature, often above 30 degrees Celsius before noon. Since the residence lacked air conditioning, this circumstance might have affected the elderly frail people's spatial usage of communal space that was more exposed to the sun.

2.2 SAMPLE

The sample was based on general information about the total population of 39 residents who lived at the residence at the time of the study. This was supplied by the staff. Twenty residents, six men and fourteen women, who lived on the first floor, the SCUs, were said to suffer from moderate to severe dementia. On the second floor, the NSCUs, nineteen residents, four men and fifteen women, experienced dominantly age-related functional disorders and other somatic problems. The staff reported that two of the residents, two women, suffered from a mild dementia. One of them was still fully able, while the other person was confined to a wheelchair. The average age of the residents of the SCUs was approximately eighty-one years old, whereas it was slightly higher, eighty-four years old at the NSCUs. However, the exact age and medical condition of each resident has not been possible to establish, since this was classified information that necessitated an approval from an ethical review board. The main focus of this study was elderly people's spatial interactions with architectural space, and therefore a descriptive statistical analysis of age and medical condition was deemed irrelevant for this type of study.⁶ Instead, the 39 residents formed the target population (n=39), but there were no inclusion criteria other than the resident's willingness to participate. Information about the resident's age, health and medical condition was attained to the extent the resident was willing to provide it.

2.3 RESEARCH METHODS

ENVIRONMENTAL ASSESSMENT: The Therapeutic Environment Screening Survey of Nursing Homes (TESS-NH) is an observational instrument that assumes the perspective of the elderly person with dementia and assesses the provision of safety, security, and physical health; orientation; provision of privacy, control, autonomy, and stimulation (both positive and negative); enhancement of socialization (social milieu); and personalization/familiarity (Sloane et al., 2002). In this study, the original American version of this instrument was used as a summary scale,⁷ along with the Special Care Unit Environmental Quality Scale (SCUEQS), a validated scale within the instrument. In both

cases, a high scoring indicates an appropriate environment for elderly frail people. A value of 0-10 points was assigned each item in the protocol. The evaluations were photo-documented, and aimed at corroborating the qualitative assessment of each unit. On average, the evaluation time per unit was 50 minutes. INTERVIEWS: A qualitative interviewing guide with three question themes was used in the interviews with ten residents and three staff members: a) the interviewee's background; b) views on the architecture of the residence and use of communal space; c) views on the care given (and in the case of interviews with a staff member questions pertaining to the residents). Twenty-six photographs were included in the guide that aimed to bring about a relaxed conversation that was adjusted to the interviewees' command of the language.¹⁰ The architect and the representative of the municipal administration for eldercare of Haninge municipality (AEHM) were also interviewed using the same interviewing guide. The interviews were transcribed. A recording (resident) or a printout (staff member or other) was sent to the interviewee. OBSERVATIONS: The participatory observations were coordinated with meal hours. The first observations took place between nine o'clock and noon, while the second occurred after lunch until 17.30 in the afternoon. A third segment occurred at 18.00-19.30 in the evening. During the observations, the author interacted with residents and staff.

First floor, 20 residents in all	
<p>SCU-1 10 RESIDENTS and 3 staff members (day time) All residents had dementia in an early phase. One resident one resident was aphasic but still able and fit. On the other hand, his personality had changed, and he had acquired a severe wandering behavior, and he constantly rearranged the interior decorating at the unit. This affected the other residents.</p> <p>Three women and one man regularly seen during the observation period.</p>	<p>SCU-2 10 RESIDENTS and 3 staff members (day time) All residents had dementia in a mid- or late phase. The residents were highly dependent on staff.</p> <p>Three men and one woman regularly seen during the observation period.</p>
Second floor, 19 residents in all	
<p>NSCU-1 10 RESIDENTS and 3 staff members (day time) The residents suffered mainly from somatic diseases (heart problems, brain tumor, equilibrium problems, age-related frailties), but two residents suffered from dementia in an early phase.</p> <p>Three women and two men regularly seen during the observation period.</p>	<p>NSCU-2 9 RESIDENTS and 2 staff members (day time) All residents have somatic diseases (aphasia, heart problems, equilibrium problems, age-related frailties)</p> <p>Three women and one man regularly seen during the observation period.</p>

Table 1: An approximate description of medical conditions found at the four units during the observation period in 2004

2.4 DATA COLLECTION PROCEDURE AND DATA ANALYSIS

Field notes summarized the events that took place, and the residents or staff members involved in these.¹¹ The study began with the TESS-NH assessment (the NSCUs in the morning on June 21st; the SCU-1 on June 22nd; the SCU-2 on June 28th, both were performed during the afternoon). The interviews started in July and ended in December 2004. The analysis of the collected data identified a variety of elderly person's usages of communal space, and conclusive mental maps of these uses were drawn for each unit using the pentad edge-landmark-node-path-zone. A preliminary report with seven fictitious characters and their use of the interior setting was written in 2005 (Andersson, 2005a), but circumstances postponed the full paper.^{12,13} The assisted living residence was revisited at random occasions in 2005, 2006 and 2007. Some of the usages identified seemed to persist although the original sample of residents had moved out or deceased and the new focus group for the entire residence had changed into being solely elderly people with dementia diagnoses.

2.5 ETHICAL CONSIDERATIONS

The ethical principles for research within the humanities and the social sciences have guided the study (Swedish_Research_Council, 2002). In February 2004, the residents, their relatives and the staff were informed about the project, and, prior to the observations, a letter that stated the aim of the project was sent out. A written statement of anonymity and confidentiality was handed over to the interviewee at the beginning of the interview.

3.0 RESULTS

This section is divided into three parts. The first part deals with the environmental assessment of the full residence and the separate units. The second part presents the characteristics of eighteen elderly persons who under fictitious names participated in the study. In two subsections, the elderly people's spatial use of the communal space is presented, one describing the conditions at the NSCUs, and the other one the conditions at the SCUs. In the third part, the elderly persons' spatial appropriations of the communal space of the NSCUs and the SCUs are transcribed into three separate mental maps, one for NSCU-1 and NSCU-2, and two for SCU-1 and SCU-2.

3.1 ENVIRONMENTAL ASSESSMENT

The architect said that the ambition for the communal space had been to create a "street character that passed through an urban landscape with a varying width". The architect argued that such an environment was supportive, since it reduced the "inhibiting sensation of entering an unknown room" (Karlsson, 2004). The representative from the AEHM said that that residence had turned out to be "a beautiful exterior and interior architecture" that "empowered the staff". Nevertheless, the representative said that the pleasant architectural space made the staff more inclined "to overlook the residence's shortcomings, since the residents seemed to be happy and thrive." Moreover, they had to make ad hoc adjustments in order to "compensate for the compact rationalized working environment" (Geijer, 2004): For instance, the handling of the residents' medicines and their individual journals had to be done on the kitchen counter for lack of working space. Furthermore, the representative explained that the interior decorating of each unit had been done independently by the staff themselves, as a part of a management strategy to improve the staff's adjustment to the new premises as well as to improve their performance as a care team. Each team had received the same amount of money, but they had chosen to employ it differently, some focusing on furniture and artifacts, and some focusing on textiles and curtains (Ibid.).

Computed for all four units, the mean TESS-NH summary score was 93.8 pts, lower than the mean value of the 53 referential American facilities, 95.5 pts, (Table 2). On the other hand the mean SCUEQS value, 26 points, was higher than the American referential values, 23.0 points. The SCU-2 was attributed the highest scores, 104.0 TESS-NH pts and 29.0 SCUEQS pts. The ranking order of the other units was unclear: According to the TESS-NH, the order was NSCU-2 (93 pts), and in a shared third position, NSCU-1 (89 pts) and SCU-1 (89 pts), while the SCUEQS gave the following ranking: NSCU-1 and NSCU-2 in second place (27 pts) and SCU-1 in third place (21 pts). Despite an extensive uniformity, the individual scores concerning environmental factors - maintenance, cleanliness, sensory stimulation, and noise-varied. Question 19 that dealt with the homelike appearance of communal space was important for the scope of this paper: The NSCU-1, NSCU-2, and SCU-2 were regarded somewhat homelike, while SCU-1 not at all. The overall assessment of the physical environment, question 32, on a ten point grading scale from unpleasant to pleasant, attributed a shared first place to NSUC-2 and SCU-2 (7 pts), the second place to NSCU-1 (4 pts) and the third place to SCU-1 (3 pts). This inconclusive outcome suggested that the individual ranking order of the units had to be correlated with the perceived completeness of the interior setting as a homelike environment. When combining this qualitative assessment with the interviews, the photographic documentation, and the TESS-NH instrument, the ranking order of the most appropriate unit turned out to be NSCU-2 in the first place, NSCU-1 in the second, and the SCU-2 in the third place. The SCU-1 was perceived as the least appropriate environment for elderly frail people.

3.2 PARTICIPANTS AND USE OF COMMUNAL SPACE

By use of observations and subsequent interviews, a sample of eighteen persons was established. On a regular basis, four female residents and four men were found in either of the communal spaces of the SCU-1 or the SCU-2, see table 2. These residents not only suffered from moderate to severe dementia, but they also had somatic diseases that added to their problems, especially at SCU-2. At the NSCU-1 and NSCU-2, six female residents and three male residents regularly used the

communal space for various purposes, (Table 3). These nine residents experienced mainly somatic problems although two also had a dementia diagnosis. A tenth resident, Felix confined to his bed, represented a special type of resident whose spatial use was limited due to architectural features. The interviews with the residents at the NSCU-1 and NSCU-2, and the staff at SCU-1 and SCU-2 revealed a key difference between residents. The residents with somatic diseases had consciously made the move from their previous apartments to the assisted living residence. Prior to moving, they had visited the residence, and they had chosen it due to its homelike appearance—the wooden flooring, the interior coloring, and the openness inside the communal space and towards the exterior. They liked the layout of the apartment. Still, Eugene remarked that a space for handicraft was missing, and Laure and Louise added that the home cooked meals had been a vital parameter for their decisions to move to the residence. The residents with dementia had been assigned an apartment at the residence by the AEHM, but they had not consciously moved to the assisted living. Adam, living at SCU-2, acted as if the unit was a barrack he recalled from his military service. Augustine and Beth, living at the NSCU-1 and both suffering from a mild dementia, described their apartments in relation to their previous experiences of work environments, offices and hospitals. They maintained their previous addresses. Thomas at SCU-1, had lived nearby the residence, and a relative took him regularly for walks in the neighborhood.

Therapeutic Goal, Domain, and Item Number		Ros-Andersgården Care Home, assessment June 2004						Referential values of American nursing homes n=53	SCUEQS
Item Description	Scoring Range	MEAN	SCU-1 21st June 04	SCU-2 21st June 04	NSCU-1 21st June 04	NSCU-2 21st June 04			
Privacy/ control/ autonomy									
1	Unit nursing station presence/ type	0-2	0.0	0.0	0.0	0.0	0.0	1.6	
2a	Nursing station for paperwork	0-1	0.0	0.0	0.0	0.0	0.0	0.7	
2b	Desk for paperwork	0-1	0.0	0.0	0.0	0.0	0.0	0.2	
2c	Combined work area for paperwork	0-1	1.0	1.0	1.0	1.0	1.0	0.0	
2d	Enclosed workroom, not a nursing sta	0-1	0.0	0.0	0.0	0.0	0.0	0.1	
3	Unit use as pathway between other ur	0-1	0.5	0.0	0.0	1.0	1.0	0.3	
4a	Residents eat on/ off unit	0-3	3.0	3.0	3.0	3.0	3.0	2.9	
4b	Formal activities on/ off unit	0-3	3.0	3.0	3.0	3.0	3.0	2.3	
4c	Residents bathe on/ off unit	0-3	3.0	3.0	3.0	3.0	3.0	2.9	
Outdoor Access									
26	Enclosed courtyard/	0-3	1.5	2.0	2.0	1.0	1.0	2.5	
27a	Attractiveness of courtyard	0-3	2.0	2.0	2.0	2.0	2.0	2.1	
27b	Courtyard is functional	0-3	3.0	3.0	3.0	3.0	3.0	1.9	
Privacy									
29a	Privacy curtain provides separation between beds in semiprivate rooms	0-9	9.0	9.0	9.0	9.0	9.0	1.0	
Safety/ security/ health/ exit control									
5a	Doors to rest of facility disguised	0-2	0.5	1.0	1.0	0.0	0.0	0.0	
5b	Doors to outside disguised	0-2	0.3	1.0	0.0	0.0	0.0	0.0	
6c	Doors are locked	0-1	1.0	1.0	1.0	1.0	1.0	0.8	
6d	Locking device triggered by approach	0-1	0.0	0.0	0.0	0.0	0.0	0.1	
6e	Lock disengaged by keypads/ switch	0-1	1.0	1.0	1.0	1.0	1.0	0.7	
6f	Locked at night/ during bad weather	0-1	0.0	0.0	0.0	0.0	0.0	0.0	
6g	Doors are alarmed	0-1	0.0	0.0	0.0	0.0	0.0	0.8	
6h	Alarm triggered by device worn by res	0-1	0.0	0.0	0.0	0.0	0.0	0.1	
6i	Alarm disengaged using keypad, card	0-1	0.0	0.0	0.0	0.0	0.0	0.5	
6j	Alarm sounds with all entries/ exits	0-1	0.0	0.0	0.0	0.0	0.0	0.2	
Maintenance									
7a	Maintenance of social spaces	0-2	1.8	1.0	2.0	2.0	2.0	1.7	SCUEQS
7b	Maintenance of halls	0-2	1.8	1.0	2.0	2.0	2.0	1.6	SCUEQS
7c	Maintenance of resident rooms	0-2	1.8	1.0	2.0	2.0	2.0	1.7	SCUEQS
7d	Maintenance of resident bathrooms	0-2	1.8	1.0	2.0	2.0	2.0	1.7	SCUEQS
Cleanliness									
8a	Cleanliness of social spaces	0-2	1.8	1.0	2.0	2.0	2.0	1.4	SCUEQS
8b	Cleanliness of halls	0-2	1.8	1.0	2.0	2.0	2.0	1.7	SCUEQS
8c	Cleanliness of resident rooms	0-2	1.8	1.0	2.0	2.0	2.0	1.8	
8d	Cleanliness of resident bathrooms	0-2	1.8	1.0	2.0	2.0	2.0	1.8	
9a	Bodily excretion odor in public areas	0-2	2.0	2.0	2.0	2.0	2.0	1.7	SCUEQS
9b	Bodily excretion odor in resident room	0-2	2.0	2.0	2.0	2.0	2.0	1.6	SCUEQS
Safety									
10a	Floor surface in social spaces	0-2	1.0	1.0	1.0	1.0	1.0	0.7	
10b	Floor surface in halls	0-2	1.0	1.0	1.0	1.0	1.0	0.8	SCUEQS
10c	Floor surface in resident rooms	0-2	1.0	1.0	1.0	1.0	1.0	0.6	
10d	Floor surface in resident bathrooms	0-2	1.0	1.0	1.0	1.0	1.0	1.3	
11a	Handrails in hallways	0-2	0.0	0.0	0.0	0.0	0.0	1.9	
11b	Handrails in bathrooms	0-2	0.0	0.0	0.0	0.0	0.0	1.4	

Stimulation/ Lighting									
12a	Light intensity in hallways	0-3	0.0	0.0	0.0	0.0	0.0	0.7	
12b	Light intensity in activity areas	0-3	1.3	1.0	2.0	1.0	1.0	1.2	SCUEQS
12c	Light intensity in resident rooms	0-3	1.0	1.0	1.0	1.0	1.0	0.6	SCUEQS
13a	Glare in hallways	0-2	0.0	0.0	0.0	0.0	0.0	1.0	
13b	Glare in activity areas	0-2	1.0	1.0	1.0	1.0	1.0	1.0	
13c	Glare in resident rooms	0-2	2.0	2.0	2.0	2.0	2.0	1.1	
14a	Lighting evenness in hallways	0-2	0.0	0.0	0.0	0.0	0.0	0.4	
14b	Lighting evenness in activity areas	0-2	1.0	1.0	1.0	1.0	1.0	0.7	
14c	Lighting evenness in resident rooms	0-2	1.0	1.0	1.0	1.0	1.0	0.2	
Visual/ tactile stimulation									
24a	Bedrooms with view of courtyard	0-3	3.0	3.0	3.0	3.0	3.0	5.2	
24b	Public areas with view of courtyard	0-3	3.0	3.0	3.0	3.0	3.0	2.7	
25a	Tactile stimulation opportunities	0-3	0.8	0.0	1.0	1.0	1.0	1.3	
25b	Visual stimulation opportunities	0-3	0.8	0.0	1.0	1.0	1.0	1.8	
Noise									
30	Status of television in main activity are	0-6	1.8	2.0	2.0	1.0	2.0	1.6	
31a	Residents screaming/ calling out	0-2	1.5	2.0	1.0	2.0	1.0	2.6	
31b	Staff screaming/ calling out	0-2	1.5	2.0	2.0	1.0	1.0	2.5	
31c	TV/ radio noise	0-2	1.3	2.0	2.0	0.0	1.0	1.9	
31d	Loud speaker/ intercom noise	0-2	1.0	2.0	2.0	0.0	0.0	2.7	SCUEQS
31e	Alarm/ call bell noise	0-2	1.0	2.0	2.0	0.0	0.0	2.5	
31f	Other machine noise	0-2	1.0	2.0	2.0	0.0	0.0	2.7	
Socialization/space/ seating									
17a	Path leads to dead ends	0-1	0.0	0.0	0.0	0.0	0.0	0.1	
17b	Path with places to sit	0-1	1.0	1.0	1.0	1.0	1.0	0.5	
18	Configuration of rooms of unit	0-2	1.0	1.0	1.0	1.0	1.0	0.2	
Personalization/ familiarity/homelikeness									
19	Public areas homelike	0-3	0.8	0.0	1.0	1.0	1.0	1.4	SCUEQS
20	Kitchen on the unit	0-2	1.0	1.0	1.0	1.0	1.0	0.9	
21	Pictures/ mementos in resident rooms	0-2	3.0	3.0	3.0	3.0	3.0	1.9	SCUEQS
22	Noninst. furniture in resident room	0-2	3.0	3.0	3.0	3.0	3.0	1.4	
23	Resident appearance	0-2	2.0	2.0	2.0	2.0	2.0	1.3	SCUEQS
Orientation/cuing									
28a1	Doors left open	0-1	0.0	0.0	0.0	0.0	0.0	0.8	
28b1	Resident's name on/ near door	0-1	1.0	1.0	1.0	1.0	1.0	0.2	
28c1	Current picture of resident	0-1	0.0	0.0	0.0	0.0	0.0	0.2	SCUEQS
28d1	Old picture of resident	0-1	0.0	0.0	0.0	0.0	0.0	0.0	SCUEQS
28e1	Objects of personal significance	0-1	0.0	0.0	0.0	0.0	0.0	0.0	
28f1	Room numbers	0-1	0.0	0.0	0.0	0.0	0.0	0.6	
28g1	Colour coding	0-1	0.0	0.0	0.0	0.0	0.0	0.0	
28a2	Bathr. door left open; toilet vis. fr. bed	0-1	0.0	0.0	0.0	0.0	0.0	0.0	
28b2	Bathr. door open; toilet not vis. fr. bed	0-1	0.0	0.0	0.0	0.0	0.0	0.3	
28c2	Bathr. door closed; picture or graphic	0-1	0.3	0.0	1.0	0.0	0.0	0.2	
28a3	Activity area visible from 50 % of resid	0-1	1.0	1.0	1.0	1.0	1.0	0.4	
28b3	Visual indicator of activity area visible	0-1	0.0	0.0	0.0	0.0	0.0	0.3	
28c3	Direction, identification sign visible froi	0-1	0.0	0.0	0.0	0.0	0.0	0.0	
Global rating									
32	Subjective rating of overall environmer	1-10	5.3	3.0	7.0	4.0	7.0	5.8	
total score TESS-NH			93.8	89.0	104.0	89.0	93.0	95.5	
total score SCUEQS			26.0	21.0	29.0	27.0	27.0	23.0	

Note. The SCUEQS is computed by adding the observed value for each variable. SCUEQS items are: 7a, 7b, 7c, 7d, 8a, 8b, 9a, 9b, 10b, 12b, 12c, 19, 20, 21, 23, 25, [a 0/1 variable which is 0 if 28c1 and 28d1 are both 0, and 1 if the value of either is 1], and 31d.

Table 2: The TESS-NH instrument used as a summery scale and SCUEQS scores (mean value's for the residence, and individual ones per unit). Main differences are presented in bold, italic style. Comparative values from 53 American nursing homes are added in the right column (Sloane et al., 2002).

fictive name	age	unit	diagnosis	type of interview	movement ¹		sojourns ²																	
					individual capacity to move	individual motive for movement	amount of staff assistance for movement	sensuous motive for place-making		emotional motive for place-making					personal activity involved in place-making									
								SL	EW	CL	CP	SI	Cs	H	R	RX	SA	T	SP	WT				
Augustine	80s	NSCU-1	NUD	PI	fully able	personal routine	ADL-m	1	1															
Beth	70s	NSCU-1	AD-II	PI	wheelchair	emotional worry	ADL-m			1	1													1 ³
Eugene	90s	NSCU-1	RA	PI	walker	personal routine	ADL-m	1	1															1
Felix	70s	NSCU-1	BT	PI	bed confined	staff related	ADL-e					1	1											1 ⁴
Louise	70s	NSCU-1	ND	PI	wheelchair	staff related	ADL-e			1	1													1
Coralie	70s	NSCU-2	ND-A	SI	wheelchair	staff related	ADL-e	1	1															1
Jerome	70s	NSCU-2	HRP	PI	stick	personal routine	ADL-m	1	1															1
Julie	90s	NSCU-2	SAP	PI	walker	personal routine	ADL-m	1	1															1
Laure	80s	NSCU-2	HRP	PI	walker	personal routine	ADL-m	1	1															1
Philip	90s	NSCU-2	MAP	PI	fully able	personal routine	no ADL	1	1															1
Caroline	70s	SCU-1	AD-I	SI	fully able	personal routine	ADL-m	1	1															1
Esther	70s	SCU-1	AD-I	SI	fully able	personal routine	ADL-m	1	1															1
Sophie Thomas	70s	SCU-1	AD-I	SI	fully able	personal routine	ADL-m	1	1															1
Adam	70s	SCU-1	AD-II	PI	fully able	personal routine	ADL-m	1	1															1
Cesar	80s	SCU-2	AD-I	SI	fully able	personal routine	ADL-m	1	1															1
Flore	60s	SCU-2	AD-I	SI	Wheelchair	staff related	ADL-e	1	1															1
Raoul	80s	SCU-2	AD-III	SI	wheelchair	staff related	ADL-e	1	1															1

Abbreviations, diagnoses: AD-I = Alzheimer's disease, mild; AD-II = Alzheimer's disease, moderate; AD-III = Alzheimer's disease, severe; ADL-e = Activities in Daily Living, extensive need of assistance; ADL-m = Activities in Daily Living, moderate need of assistance; BT = brain tumor; HRP = heart-related problems; MAP = mild age-related problems; ND = neurological disease; NDA = neurological disease with apraxia; NUD = unclassified dementia; RA = rheumatoid arthritis; SAP = severe age-related problems of unidentified nature.

Abbreviations, other: PI = personal interview; SI = interview with staff in relation to resident; Note: 1) This information was obtained during the interview situation with the resident or the staff member, and correlated with the observations. In some cases, the staff added their knowledge of a particular resident's needs of assistance. 2) This information was obtained during the interview situation with the resident or the staff member, when he or she was asked to evaluate the inner architectural space of the residence. During this discussion, the informant was asked which places he or she would use during the day. This information was correlated with the data from the observations. 3) In Beth's case this refers to having a smoke. 4) In Felix' case, this refers to traditional feasts. 5) In Thomas' case, this refers to a state of anguish and worries. 6) In Flore's case, this refers to a state of anguish and worries.

Table 3: Informant characteristics and an overview of these elderly persons' movements and usages of the communal space of one unit or two units. This information was obtained by interviewing the participating residents and staff members. The information substantiated previous observations.

3.2.1 The communal space of the NSCUs

In 1999, when the residents moved in at the NSCUs, they still experienced good health. Eugene, Laure and Louise recalled happy birthday celebrations, crayfish-parties and Christmas Eves spent here. The door in the glass wall between the units was left open to promote this sense of social community. It still remained open, and both residents and staff members went from the NSCU-1 to enjoy the atmosphere at the NSCU-2. After breakfast or afternoon coffee, the staff helped Louise and the aphasic Coralie in their special wheelchairs, to enjoy the sunshine, a television series or other events in either of the lounge areas. In the afternoon, Jerome used to sit in the sofa in the lounge of the NSCU-2. Laure retained her habit to go there in the evening for company. Philip arranged the furniture on the balcony, and created a pleasant draft in the lounge since the residence lacked air conditioning. Despite his walker, Eugene moved about inside and outside the building as much as Philip did. In the morning or afternoon, Eugene read the newspaper and enjoyed the sunshine at the oriel window at the NSCU-2. If he was looking for a book or dictionary, he went to the glazed-in end of the other corridor, also at the NSCU-2. In the evening, Philip, Eugene and Jerome shared the habit of using the training equipment in the therapy space at the NSCU-1, but never simultaneously. Philip and Jerome often spent the evening outside the residence. Before lunch or in the afternoon, Julie preferred to sit opposite the kitchen or at the oriel window. She wanted to be close to the staff and to supervise those who entered the unit. Being a heavy smoker, Beth's dementia made her constantly search for a staff member in the kitchen area at any of the units so that they could accompany her for a smoke outside.¹⁴ The residents perceived the oriel at the NSCU-1 as belonging to the staff. The staff members used the sofa for short naps behind the folding screen. Occasionally, Augustine used the sofa for a slumber, but she also used the sofa in the therapy area at NSCU-2. Here, she acted as if the residence were a hotel lobby, attentively looking at who entered or left the unit. Accompanied by a staff member, she also took walks between the units, looking out the windows and at the rare artwork on the walls. Felix, on the other hand, was isolated in his apartment since the doorway of his apartment did not allow him the passage. On special occasions like Christmas, the staff placed him in a special wheelchair, and brought him to the lounge.

3.3 THE COMMUNAL SPACE OF THE SCUS

At the SCUs, the venetian blinds were lowered. No one on the street could catch a glimpse of life inside the building, nor could the residents contemplate exterior events. At the SCU-1, Caroline, Esther and Sophie sat at a table, where they pursued three separate monologues. After a while, Esther, carrying her purse, would leave the table to search for her purse in her apartment. She then reappeared, introduced herself and sat down. Shortly afterwards, she repeated this. Caroline used to take a nap in the sofa in the therapy area. The members of staff were busy helping the other residents, one man and five women, who remained in their apartments. Victim of a wandering and picking behavior, Thomas had appropriated the communal space and the garden for his personal usages: two places for resting, in the oriel where he piled up his findings, or in a chair outside on the terrace. Able but aphasic, he constantly rearranged the interior setting, and created invisible barriers for the others to observe. The movements in the more lit up SCU-2 were noticeable in the lounge area from the obscure SCU-1, in which the penetrating daylight from the garden created zones of light or dark. At the SCU-2, the electric lighting was turned on all the time, whereas the light at the SCU-1 was used only in the evenings. The door between the units was locked, and white drapes blinded the glass wall. The noises and the scents from the kitchen or the laundry room added to the homelike atmosphere of the SCU-2: The residents were easily agitated and depended upon the staff. One staff member said that her work required an actor's talent, since she played different characters in order to reaffirm them. One of the six residents present in the communal space, Cesar, aphasic and shrunken in his wheelchair, specially appreciated a certain staff member. They used to spend the afternoon at the oriel that became an open meeting point for any resident. Adam would approach them for a stuttering conversation during his daily inspection tour. Near the sofa in the lounge area, but in his wheelchair, Raoul preferred to sit. He supervised the staff in the kitchen, at the oriel or those who entered the unit. His dementia induced him to shout invectives out loud when someone approached, and the only way to calm him was that a staff member gently touched his arm. At nightfall, Flore in her coat became the victim of his tongue as she tried to leave the unit to "go home".

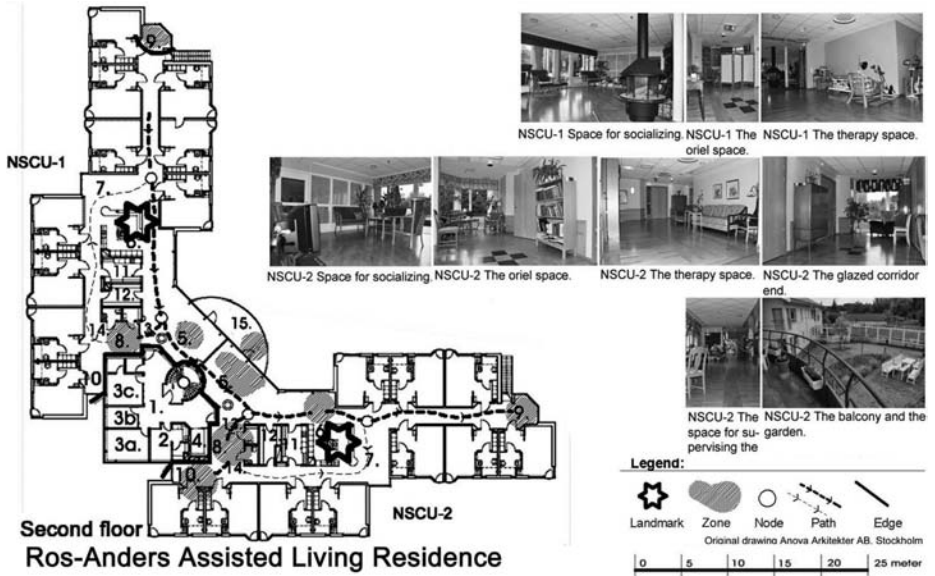


Figure 2: The spatial appropriation of elderly people suffering from somatic diseases at the NSCU-1 and

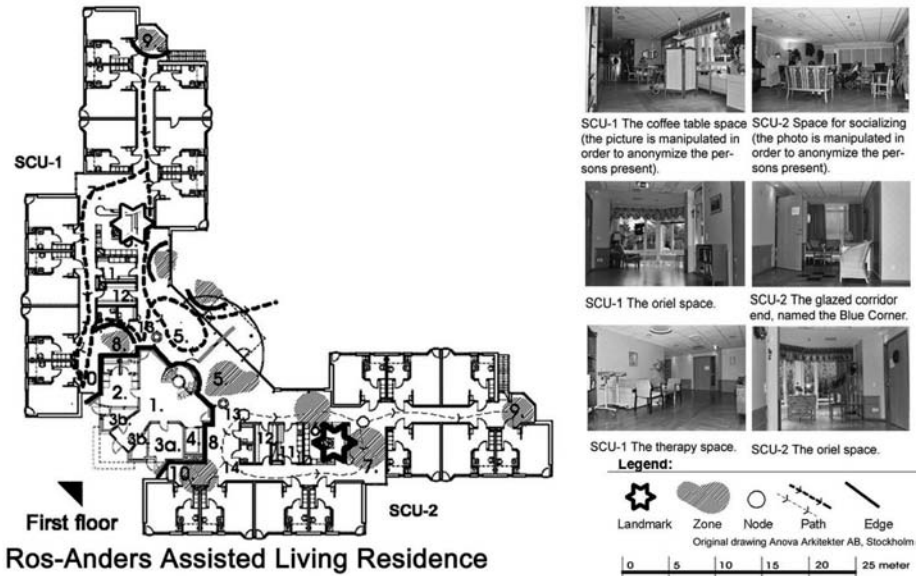


Figure 3: The spatial appropriation of elderly people with dementia at the special care units, SCU-1 and SCU-

Often, the residents became worried at this time of day, and the staff used the glazed-in end of the corridor, named “the blue corner”, to calm them and make them go to bed.

3.4 THE RESULTANT MENTAL MAPS OF THE UNITS

Three mental maps were possible to draw from the observed spatial uses, one map of the NSCUs, and two separate maps of the SCUs.

3.4.1 THE MENTAL MAP OF THE NSCUS

Based on the ten residents’ spatial appropriations, a mental map was traced over the two units (Figure 2). This map contained eight places that the residents used in different manners. It was mainly the residents’ own movements that created a network of paths that connected the places. The places were closely connected to sensuous or social stimulation, being in the sun, enjoying the view, or engaging in some sort of social activity. In line with the higher TESS-NH score, the NSCU-2 had the majority of the eight available zones that attracted the residents. At this unit, furniture arrangements created places for contemplation and socializing. The oriel window space at the NSCU-2 was used by the residents, whereas the corresponding one of the NSCU-1 was used by staff members. The glazed-in end at the NSCU-2 was equipped with an armchair and a low book-shelf containing encyclopedia and literature. At the NSCU-1, this end was used for the storing of assistive equipment. Although one unit was the inversed copy of the other, the NSCU-1 depended on the NSCU-2. The kitchens acted as landmarks, and the residents knew that they could find a staff member in this area at any time. The mental map corroborated the higher score of the NSCU-2 compared to the lower one of the NSCU-1.

3.4.2 THE MENTAL MAP OF THE SCUS

The eight residents’ spatial appropriations of the SCUs constituted two separate mental maps (Figure 3). At the SCU-1, one resident’s extensive spatial usages affected the communal space negatively for the others. This mental map demonstrated this resident’s movements all over the unit. There were only three zones, of which one was strongly appropriated by this person and connected to this person’s state of mind. The other two were used by the three other residents, but in all three cases there was a strong boundary surrounding them. On the other hand, at the SCU-2, there were five defined zones, but a weak pattern of movements. This seems to be attributable to the residents’ higher degree of dependency on the staff that created the zones at the unit. These were used to counteract the residents’ state of anguish, and they were closely interrelated with social interaction with the staff in order to affirm the residents’ self-esteem. In addition, these place exploited the sensuous qualities that the architectural space supplied by an open view onto the garden or a solitary corner for privacy. The higher TESS-NH score of the SCU-2 was attributable to this conscious use of architecture for caring purposes, whereas the lower TESS-NH score of the SCU-1 can be explained by the on-going conflicting spatial appropriation. The kitchen area of the SCU-2 had a quality of a landmark, and the residents gathered in this area to be close to the staff. This quality was less accentuated at the SCU-1, since the members of the staff were less visible in the communal space.

4. FINDINGS

Based on the observations at the four units, the elderly persons’ spatial uses were possible to translate into mental maps. The movements and sojourns created a pattern of paths and zones that interacted with the sensuous qualities of the architectural space. Given the residents’ limited capacity to move, the paths nearly disappeared at the units, where the seniors had reached a high level of dependency on the staff to be able to move around. As a consequence, few nodes were noted, especially in situations in which a choice of multiple zones to go to presented itself. The kitchen area added a landmark quality to the particular zone that evolved in its proximity. Still, the presence of staff, familiar noises, or scents seemed to be more important than architectural features. Edges between different zones depended on the distance needed to traverse in order to reach them or the invisible boundaries that the appropriating person had set up at a particular zone. The amount of available

zones at a certain unit correlated with the perceived homeliness: the higher the number of zones, the greater the feeling of a homelike environment. In addition, this correlation was traceable in a higher, but not conclusive, SCUEQS and TESS-NH scoring. These findings supply the premises on which to base five preliminary conclusions:

I) A mental map of elderly frail people's movements and sojourns in the communal space of a care unit gives an indication of the degree in which these elders perceive homeliness in the communal space;

II) A mental map demonstrates the capacity of the architectural space to add a sensuous dimension to the communal space for exploitation in everyday activities. Zones for sojourns appeared in conjunction with architectural elements that allowed for an external view, a spatial overlook and by way of these attractions generated a subsequent social interaction at this very place;

III) A mental map of the communal space indicates the degree of the elderly residents' dependency on the staff, since voluntary movements decrease in relation to aggravated age-related problems. Thus, the number of staged zones increased as an effect of the aging process and an outcome of the care work;

IV) A mental map describes an on-going place-making process initiated by the elderly frail people themselves and conditioned by their health status;

V) A mental map of the movements and the sojourns found at a unit for dependent seniors combined with the TESS-NH protocol supplies a generic environmental assessment of architectural space, interior setting and eldercare provided.

5. DISCUSSION

This paper has explored elderly frail people's inter-actions with architectural space in the context of an assisted living residence. A guiding working hypothesis has postulated that these spatial encounters resemble the ones found in an urban landscape and can be described by use of mental maps. The fundamental argument for this analogy relies on the assumption that "my body is the texture that communicates with all objects, and, concerning the understanding of the surrounding environment, my primary instrument for understanding it" (Merleau-Ponty, 1945)¹⁵. This phenomenological stance has influenced the research strategies and the aims of this study: *to explore elderly frail people's spatial appropriation of communal space through movements and sojourns, and to identify significant architectural features active in this process.*

The dependent seniors' spatial appropriation seemed to be part of an individual adjustment process to aging and the assisted living environment. This resulted in various coping strategies in which architectural space and the interior setting interacted (Küller, 1991). Apart from the mere effect of various age-related problems, a notable difference persisted between the four units, since the demented persons had not established a conscious connection with the new environment. In contrast, persons with somatic problems found zones in the communal space that suited their need for sensory stimuli, relaxation, and social contact. The necessary balance between the previous living and the new one was achieved by these intellectually lucid seniors, but not by the persons with a dementia diagnosis. Still, this equilibrium has been put forward as a key criterion for a successful adjustment to the assisted living situation (Toyama, 1988). The participants with mainly somatic diseases explained their individual motives behind a certain spatial usage, and these were aspects of a place-making process (Rosel, 2003; Rowles, 1993, 2000): The personal attachment to space and its artifacts acquired an existential dimension, and became an important *place* for this individual. In this aspect, this study corroborates previous research on place identity as a fundamental criterion for the architectural design of an assisted living residence (Brent, 1999; Peace et al., 2005; Pynoos & Regnier, 1991; Regnier, 2002; Schwarz, 1999).

This study corroborates previous research in architecture on the relation between the aging person and the ideal spatial configuration of the assisted living residence (Dehan, 1997, 2007; Regnier, 2002), and touches on the issue of architectural quality of the assisted living architecture. The architectural design of the assisted living residence in the study realized a fortunate interior spatiality, since it offered openings to the exterior space with a varying penetration of daylight and views. In addition, the interior space seamlessly incorporated different functions such as corridor, dining

room, lounge and other necessary functions in a progressively larger or smaller space (Regnier, 2002). The staff became key players in the elderly frail people's subsequent place-making process, since the interior setting had been arranged by the staff as an initiation assignment in the new work place. It is, nonetheless, noteworthy that this work seemed to have been done without any professional guidance, given the various environments created at the units. The most successful setting was found at the NSCU-2, since a book-shelf, a sofa, a side table, textiles, added meaning to the place to be, and empowered it with some sort of genius loci (Norberg-Schulz, 1980, p.170). This stronger feeling of homeliness was the probable reason for the residents of the NSCU-1 migrating to the neighboring unit. In this sense, this study adds power to the assumption that architectural space really has a therapeutic dimension (Cutler, 2007; Day et al., 2000; Devlin & Arneill, 2003; Rioux, 2003; Teresi et al., 2000), and that space is a vital parameter in the resident-staff agency (Nord, 2010).

This study has used a mixed method research design in order to explore individual usages of communal space in the context of aging and care. This approach stems from a wide consensus that states that a variety of methods increases the validity of a study (Creswell et al., 2003). The TESS-NH instrument supplied a validated protocol for a strategic environmental assessment, which was combined with observations in situ of the human interactions with the interior settings of each unit. However, the results necessitate some caution since the participatory observations might have affected the spatial usages that were identified at the four units. In addition, spatial differences between American and Swedish residences for assisted living can influence the use of the TESS-NH protocol. In a similar way, the interviewing guide might have induced the residents to present usages that were related to the interior climate that occurred during the observation period. Consequently, it has to be assumed that the spatial usages presented in this study had a momentary character and were changing over time. However, the definition of mental maps based on the Lynchian pentad makes this study explorative (Bodin Danielsson, 2005; Lynch, 1960), since few other studies with a similar methodological approach have been identified during the preparation of this study. All the same, since 45 per cent of the residents participated in the study, and multiple sources of knowledge were used to triangulate data (Yin, 2003), the conclusions are credible and transferable to similar situations involving architectural space and aging (Maxwell, 1996).

CONCLUSION

By a post-occupancy and mental mapping approach, this study has focused on end-users values in architecture for an assisted living residence and other interior incitements to promote dependent seniors' spatial appropriation. The results suggest that the elderly persons' usages of space, conditioned by the aging process, can be promoted by the architectural design and interior measures that enhance this design. The overarching conclusion of this study is that the perceived homeliness of an assisted living setting is the result of a place-making process that can be described by mental maps. Besides general requirements of accessibility, functionality, and usability, the higher the number of places in the communal space, the greater the degree of perceived homeliness.

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REFERENCES

- Altman, I., & Rogoff, B. (1987). World Views in Psychology: Trait, Interactional, Organismic and Transactional Perspectives. In D. Stokols & I. Altman (Eds.), *Handbook of Environmental Psychology* (Vol. 1, pp. pp 1-40). New York: Wiley & Sons Inc.
- Altman_Klein, H. (1993). Home satisfaction: Related Health and Psychosocial Variables. *The Journal of Applied Gerontology*, 12(4), pp. 439-451.
- Andersson, J. E. (2004). När åldern tar ut sin rätt. *Tidskriften Arkitektur*, 2004(4), pp. 14-23.
- Andersson, J. E. (2005a). Arkitektur och åldrande - sju berättelser om användning och upplevelse av rum i boendemiljöer för äldre med omsorgsbehov. (Architecture and ageing - seven histories about spatial use and experience of space in a care facility for elderly frail people). In G. Blücher & G. Graninger (Eds.), *Den omvända ålderspyramiden*. Linköping: Stiftelsen Vadstena Forum för samhällsbyggnad/ Linköpings Universitet.
- Andersson, J. E. (2005b). Rum för äldre. Om arkitektur för äldre med demens eller somatisk sjukdom. (Space for ageing. On architecture for elderly people suffering from dementia or somatic diseases). Stockholm: KTH, Royal Institute of Technology.
- Andrews, G. J. (2005). Residential Homes. From distribution in space to the elements of place. In G. J. Andrews & D. R. Phillips (Eds.), *Ageing and Place. Perspectives, policy, practice.* (pp. pp. 61-78). London and New York: Routledge, Taylor & Francis Group.
- Balzac, H. d. (1835). *Le Père Goriot*. Paris: Booking International.
- Balzac, H. d. (1842). *La Comédie Humaine* (1976 ed. Vol. I). Paris: Éditions Gallimard.
- Baptiste, A., Belisle, C., & Pechenart, J. (1991). *Photolangage. Une méthode pour communiquer en groupe par la photo*. Paris: Édition Organisation.
- Bergström, I. (1996). Rummet och människans rörelser. (Approximate translation to English: Space and human movements). Göteborg: School of Architecture. Chalmers University of Technology.
- Blennow, K., Leon, M. J. d., & Zetterberg, H. (2006). Alzheimer's disease. *The Lancet*, 366(July 29th), 387-403.
- Bodin Danielsson, C. (2005). Office Design: Applying Lynch's theory on office environments. *The Nordic Journal of Architectural Research*, x(y), pp.
- Brent, R. (1999). A place to grow old and die. In B. Schwarz & R. Brent (Eds.), *Ageing, Autonomy and Architecture. Advances in Assisted Living*. Baltimore and London: The John Hopkins University Press.
- Canter, D. (1991). Understanding, assessing and acting in place: is an integrative framework possible? In T. Gärling & T. Evans (Eds.), *Environmental cognition and action. An integrative multidisciplinary approach* (pp. pp. 191-209.). Oxford: Oxford University Press.
- Creswell, J., Plano Clark, V., Gutmann, L., & Hanson, W. (2003). Advances in mixed method design. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of Mixed Method Design in Social and Behavioral Research*. Thousand Oaks: Sage Publications Inc.
- Cutler, L. J. (2007). Physical environments of assisted living: research needs and challenges. *The Gerontologist*, 47(III), pp. 68-82.
- Day, K., Carreon, D., & Stump, C. (2000). The therapeutic design of environments for people with dementia. A review of the empirical research. *The Gerontologist*, 40(4), pp. 397-416.
- Dehan, P. (1997). *L'Habitat des personnes âgées, du logement aux établissements spécialisés*. Paris: Le Moniteur.
- Dehan, P. (2007). *L'Habitat des personnes âgées, du logement adapté aux EHPAD, USLD, et unités Alzheimer*. Paris: Le Moniteur.
- Devlin, A. S., & Arneill, A. B. (2003). Health care environments and patient outcomes. A review of literature. *Environment and Behavior*, 35(5), pp. 665-694.
- Elmståhl, S. (1987). *Hospital Nutrition in Geriatric Long-stay Medicine, Dietary Intake, Body Composition and Effects of Experimental Studies*. University of Lund, Lund.
- Geijer, R.-M. (2004). Intervju om tillblivelsen och arkitekturen för Ros-Anders Gården, Tungelsta. (Interview about the design process and the architectonic vision of Ros-Anders Gården, Tungelsta). (retrieved 7th Oct

2004). Stockholm.

Hoof, J. v., Kort, H. S. M., Duijnste, M. S. H., Rutten, P. G. S., & Hensen, J. L. M. (2010). The indoor environment and the integrated design of homes for older people with dementia. *Building and Environment*, 45(2010), pp. 1244-1261.

Johansson, B. (2001). Minne och tankeförmåga. (Approximative translation into English: Memory and mental capacity). In A. Grimby & G. Grimby (Eds.), *Åldrandets villkor* (Approximative translation into English: The ageing process) (pp. 66-87.). Lund: Studentlitteratur.

Karlsson, B. (2004). Intervju om tillblivelsen och arkitekturen för Ros-Anders Gården, Tungelsta. (Interview about the design process and the architectonic vision of Ros-Anders Gården, Tungelsta). (retrieved 18th Nov 2004). Stockholm.

Kolb, B., & Whishaw, I. (2002). *Cerveau et Comportement*. (J. Cassel & H. Jeltsch, Trans. 1 edition, translation into French from English ed.). Bruxelles: De Boeck et Larcier, SA.

Küller, R. (1991). Familiar Design Helps Dementia Patients to Cope. In W. V. Preisler, JC; White, ET (Ed.), *Towards a More Human Architecture*. New York: Van Nostrand Reinhold.

Laws, G. (1997). Spatiality and age relations. In A. Jamieson, S. Harper & C. Victor (Eds.), *Critical Approaches to Ageing and Later Life*. (pp. pp. 90-101). Buckingham: Open University Press.

Lawton, M. P. (2000). The physical environment of the person with Alzheimer's disease. *Aging and Mental Health*, 5(Suppl. 1), pp. 56-64.

Lawton, M. P., & Simon, B. (1968). The ecology of social relationships in housing for the elderly. *Gerontologist*, 8, pp. 108-115.

Lefebvre, H. (1985). *La production de l'espace* (4th Edition ed.). Paris: Anthropos.

Lefebvre, H. (1992). *Éléments de rythmanalyse. Introduction à la connaissance des rythmes*. Paris: Éditions Syllepse.

Lindström, B., & Åhnlund, O. (1982). Utvärderingsstudier av särskilda boendeformer för pensionärer. Del I, metodutveckling. (Approximative translation to English: Evaluation studies of special housing forms for Swedish pensioners. Part one, method development). Lund: Arkitektursektionen. Byggnadsfunktionslära. Lunds Universitet.

Lynch, K. (1960). *The image of the city*. Cambridge Massachusetts USA: MIT.

Marling, G. (2003). *Urban songlines, hverdagslivets drømmespor* (Appr. translation of the Danish title: Urban songlines, the traces of dreams in everyday life). Aalborg: Aalborg Universitetsforlag.

Maxwell, J. (1996). Understanding and validity in qualitative research. *Harvard Educational Review*, 62, pp. 279-299.

Merleau-Ponty, M. (1945). *Phénoménologie de la perception*. (2nd ed.). Paris: Éditions Gallimard.

Mimouni, I. (1999). Balzac, illusionniste. Les arts dans l'oeuvre de l'écrivain (in English: Balzac, the illusionist. Arts in the work of the author). Paris: Société nouvelle Adam Biro.

NBHBP. (2008). *Swedish Building Regulations*.

NBHW. (1983). *Annorlunda Långvård* (Different long-term hospitalisation). Stockholm: Socialstyrelsen.

NBHW. (2008). *Äldre - vård och omsorg år 2007* (Care and services to elderly persons 2007) (No. 2008-44-7). Stockholm: Socialstyrelsen (The National Board of Health and Welfare).

Norberg-Schulz, C. (1971). *Existence, Space & Architecture*. London: Studio Vista.

Norberg-Schulz, C. (1980). *Genius Loci. Towards a Phenomenology of Architecture*. New York: Rizzoli.

Nord, C. (2010). Individual care and personal space in assisted living in Sweden. *Health & Place*, doi:10.1016/j.healthplace.2010.02.008.

Onwuegbuzie, A., & Johnson, R. (2008). The validity issue in mixed research. In P. C. VL & J. Creswell (Eds.), *The Mixed Methods Reader*. Los Angeles: Sage Publications Ltd.

- Patton, M. Q. (1997). *Utilization-Focused Evaluation*. The New Century Text. (3rd ed.). Thousands Oaks, London, New Dehli: Sage Publications, Inc.
- Patton, M. Q. (2002). *Qualitative Methods and Research Evaluation* (3rd Edition ed.). Thousands Oaks: CA Sage.
- Peace, S. M., Holland, C., & Kellaher, L. (2005). Making space for identity. In G. J. Andrews & D. R. Philips (Eds.), *Ageing and Place. Perspectives, policy, practice*. (pp. 188-204). Abingdon, UK and New York, US: Routledge.
- Pynoos, J., & Regnier, V. (1991). Improving Residential Environments for Frail Elderly: Bridging the Gap between Theory and Application. In J. E. Birren, J. E. Lubben, J. C. Rowe & D. E. Deutchman (Eds.), *The Concept and Measurement of Quality of Life in the Frail Elderly*. San Diego, New York, Boston, London, Sydney, Tokyo, Toronto: Academic Press, Inc.
- Regnier, V. (2002). *Design for Assisted Living. Guidelines for Housing the Physically and Mentally Frail*. New York: Wiley & Sons Inc.
- Rioux, L. (2003). Le bien-être des résidents en foyer-logement. *Bulletin de psychologie*, 56(5), 677-684.
- Robinson, C. A. (2002). The role of anatomical pathology in understanding human movement disorders. *Parkinsonism and Related Disorders*, 8(2002), pp. 439-448.
- Rosel, N. (2003). Aging in Place: Knowing where you are. *International Journal of Aging and Human Development*, 57(1), pp. 77-90.
- Rowles, G. (1993). Evolving images of place in aging and 'aging in place'. *Generations*, 17, pp. 65-70.
- Rowles, G. (2000). Habituation and being in place. *The Occupational Therapy Journal of Research*, 20, pp. 52-67.
- Schreder, E., Eggermont, L., Swaab, D., Heuvelen, M. v., Kamsma, Y., Greef, M. d., et al. (2007). Gait in ageing and associated dementias, its relationship with cognition. *Neuroscience and Behavioral Reviews*, 31(2007), pp. 485-497.
- Schwarz, B. (1997). Nursing Home Design: A misguided Architectural Model. *Journal of Architectural and Planning Research*, 14(4), pp. 343-359.
- Schwarz, B. (1999). Assisted Living. An Evolving Place Type. In B. Schwarz & R. Brent (Eds.), *Ageing, Autonomy, and Architecture. Advances in Assisted Living*. (1 ed.). Baltimore, Maryland: The John Hopkins University Press.
- Sloane, P. D., Mitchell, C. M., Weisman, G., Zimmerman, S., Long Foley, K. M., Lynn, M., et al. (2002). The therapeutic environment screening survey for nursing homes (TESS-NH), an observational instrument for assessing the physical environment of institutional settings for persons with dementia. *The Journals of Gerontology*, 57(No. 2. Series B: Psychological Sciences and Social Sciences), S69-S78.
- Smith, A. E. (2009). *Ageing in Urban Neighbourhoods. Place attachment and social exclusion*. Bristol: University of Bristol.
- Swedish_Research_Council. (2002). *Forskningsetiska principer inom humanistisk-samhällsvetenskaplig forskning* (Ethical principles for research within the humanities and the social sciences)
- Teresi, J. A., Holmes, D., & Ory, M. G. (2000). The therapeutic design of environments for people with dementia: Further reflections and recent findings from the National Institute on Aging Collaborative Studies on Dementia Special Care Units. *The Gerontologist*, 40(4), pp. 417-421.
- Toyama, T. (1988). *Identity and Milieu, a study of relocation focusing on reciprocal changes in elderly people and their environment*. Stockholm: School of Architecture, Royal Institute of Technology, Stockholm, Sweden.
- Tuan, Y. F. (1977). *Space and place: the perspective of experience*. Minneapolis: University of Minnesota Press.
- Yin, R. K. (2003). *Case Study Research, Design and Methods*. Thousands Oaks: Sage Publications, Inc.

ENDNOTES

1. These quotations are taken from the French novelist and play-writer Honoré de Balzac (1799-1850), and the novel *Le Père Goriot*, (Balzac, 1835): "Like other passers-by, the most light-hearted becomes saddened at this site, where the sound of a vehicle becomes an event, the building is gloomy, and the walls smell like prison"

(page 5, translation by author). The third fragment is taken from Balzac's foreword to his magnum opus *La Comédie Humaine*, (Balzac, 1842) where he explains his ambition to present a panorama of contemporary French social life: "Thus, the work to be executed must have a threefold shape: the men, the women and the things, i.e. the individuals and the materialistic concretisations of ideas and beliefs, which they understand" (page 9, translation by author). The word *architectonographie* is a French word that has not yet entered the English or the Swedish encyclopaedias. According to a French-English dictionary of 1897 it is an extensive description of architecture (Wilson, Joseph, 1897: Harvard College). Originally, "architectonography is the science to describe buildings, and the art to establish with precision and exactitude the state of any type of constructions or buildings, like the house, the garden, the monument, the manufactory, the factory, etc," (Maxwell, 1996; Mimouni, 1999, p. 83, translation by author). The phenomenon is often found in the realistic tide of the European literature of the early 19th century. The use of the quotations stemmed from an idea to lighten an inventory of twelve exemplary assisted living residences in the Swedish magazine of Architecture that the author wrote in 2004 (Andersson, 2004).

2. This paper uses the term assisted living to describe the Swedish type of sheltered housing although this term is complicated due to the different regulatory status found in the European countries and the US (Andrews, 2005). In this paper, the term assisted living is seen as a type of residential home. Swedish facilities for assisted living imply an individual apartment of approximately 20-40 square-metres offered by the municipality after an assessment of the individual need of assistance and eldercare. The dependent senior receives a lease of an apartment. In addition to the monthly rent, the tenant pays a fee proportional to the assessed need of eldercare. Spatially, the apartment is optimized, and this type of housing together with housing for university students holds a special section in the Swedish Building Act. Additional space for kitchen, dining and socializing is found in communally shared premises in order to meet the national guideline of an appropriate private habitat (NBHBP, 2008). Besides this communal space, additional space is required to provide an appropriate working environment. The assistance and eldercare work is provided either by the municipal eldercare or by private entrepreneurs in this field of services. Regularly, the Swedish municipalities propose commissions of assistance and eldercare, which are a time limited contract open for renegotiation in case of ill provided eldercare or malpractice.

3. In 2005, the assisted living was converted into housing that solely welcomes elderly frail people suffering from dementia. Existing residents with primarily somatic problems were offered to move to other facilities in the municipality, and the majority chose to do so. Still, two informants with somatic problems chose to remain at the residence.

4. A third floor contains staff space, namely change rooms, a rest room, and space for meetings and preparing lunch or coffee.

5. Originally, the meals were prepared and cooked in the unit kitchen. Depending on the elderly residents' increasing need of assistance, this was changed in the beginning of the new millennium. Instead, meals are prepared at one centrally located catering service in the municipality of Haninge. Using canteens, the food is transported to the assisted living residence, and reheated in the kitchen before serving.

6. At Swedish assisted living residences, the medical diagnoses are classified information. The characteristics of each elderly person are based upon the information that the individual provided herself or himself, or what the staff members reported. The medical conditions used in this paper are a layman's assessment based on information provided and correlated with characteristics of the Alzheimer's disease (Blennow, Leon, & Zetterberg, 2006; Kolb & Whishaw, 2002). The fictitious names are taken from balzacian novels, (Balzac, 1842).

7. Questions number 6a-b, 15, and 16a-i were excluded, since they did not supply computable facts.

8. The exception is question 29 that was assigned the highest score, nine points, since all residents had an individual apartment, and shared rooms do not exist in Swedish assisted living residences, other than for couples in a larger apartment.

9. The documentation served as a means to analyze discrepancies between the American recommendations for nursing homes and the Swedish architectural guidelines of assisted livings. The photographic documentation of each unit was performed without flash, and without the presence of any resident or staff member within the picture frame. A plain glass lens was used on a photographic zoom lens of 1:35-45 28-80 mm, and a 400 ISO color film (Fuji color).

10. This section in was inspired by the French Photolanguage method (Baptiste, Belisle, & Pechenart, 1991).

11. On some occasions, the author took coffee with the residents and the staff, although it had been agreed that meal times should be respected and excluded from the observations, since the majority of the residents were in need of assistance and the staff heavily occupied in helping them.

12. The author of this paper was invited as a presenter at the three-day seminar of Vadstena Forum, 1st-3rd June in 2005. This seminar constituted a meeting between municipal and regional decision-makers and researchers representing on-going research on the interaction between aging, architecture and eldercare. The theme for the seminar was the "The reverted population pyramid". The preliminary report with seven fictitious characters and their use of the interior setting was prepared for this occasion and published in the proceeding report of the conference (Andersson, 2005a).

13. In this context, another parameter comes of importance: At the Swedish technical universities funding is correlated with the two-step procedure of a doctoral thesis. Consequently, new funding is required in order to proceed from the licentiate thesis and continue with the doctoral thesis. In this particular case, the research project had to remain dormant during the period 2005 to 2007.
14. In Sweden smoking is only allowed outside of the building.
15. "Mon corps est la texture commune de tous les objets et il est, au moins à l'égard du monde perçu, l'instrument général de ma « compréhension »." (Merleau-Ponty, 1945, p. 272, translation by the author).