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Lost in a Nursing Home

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Summary

Many people with senile dementia living in a home for the elderly or a nursing home have problems with finding their way. To a large extent these problems are caused by cognitive and perceptual impairments. Another important factor is the influence of the built environment. The design of many buildings and outdoor spaces provides insufficient environmental support for route learning, wayfinding and topographical memory. A review of the literature on spatial orientation shows that many guidelines can be provided to reduce disorientation. However, little empirical research has been done into the effects of these guidelines.

1. Spatial orientation and cognitive disorders

From psychometric research and fieldwork it has been shown that during the process of ageing there will be a decline in the ability to deal with spatial information (Kirsic & Allen, 1985). In particular there is a decline in the ability to familiarise quickly with new surroundings (Georgemiller & Hassan, 1986). Often elderly have a wrong representation in their minds and misjudge the distance between places or find it difficult to rotate a map (Ellis & Young, 1988). This is mainly due to disorders in the ability to concentrate and to a poor short-term memory. Long-term knowledge and frequently used cognitive skills are usually well retained. The decreasing ability to deal with spatial information applies above all to the frail elderly i.e. residents of old people's homes and nursing homes. In an experiment of Weber, Brown & Weldon (1978), 20 alert and mobile residents were shown a considerable number of slides and asked whether they recognised the places and where they were in the building. The same slides were shown to students who had made only a short guided tour of the building. It was found that these students were able to take in and memorise more information about each place during an average of five minutes than some residents who had lived there for two years! Lawton (1981) estimates that at least 60% of residents in nursing homes have problems with orientation. They can no longer form an adequate cognitive map of the environment (Liu et al, 1991; Passini, 1994). They have no proper feeling of location,

direction or the distance to other locations, as a result of which they easily lose their way. However, Passini (1994) found that decisions based on explicit environmental information and routine sets of behaviours are still possible. Among people with senile dementia objects are no longer recognised in their actual function. Dementia patients may wait for the bus in the corridor of the nursing home and yet still be able to find their way in the building. Their orientation seems to be based on an adequate mental representation of the spatial environment, but elements in this representation stem from a distant past.

2. Competence and the environment

According to the environmental docility hypothesis (Lawton, 1970), a lower level of competence is associated with increased sensitivity to restrictions and stimuli from the environment. An optimal balance between a person's level of competence and the level of environmental demand gives maximum comfort and adaptation. If the environment demands slightly more than can be handled, the challenge may result in personal development. If the environment demands a great deal more, stress and deviant behaviour may arise. As the decline in cognitive abilities takes on more serious forms, the need for a simple environment with a large degree of predictability increases accordingly (Skolaski-Pellitteri, 1984). Many homes for the elderly and nursing homes do not sufficiently satisfy old peoples' requirements. Problems of orientation reinforce the feeling of losing personal control over the environment. Disorientation can lead to stress and to a higher level of inactivity (Weisman, 1987; Osterberg, 1987). Several studies show a relation between declining spatial competence and a more restricted radius (Walsh, Kraus & Regnier, 1981). This makes it even more difficult to develop a mental map. Finally, disorientation can lead to dangerous situations, for example in the case of fire. It is therefore important to look for solutions of a spatial and architectural nature that can make it easier to find one's way.

3. Learning from Lynch

In 1960 the American urban planner Kevin Lynch published *The Image of the City*. His book includes both theoretical concepts and empirical research into spatial orientation at urban level. Although it does not focus on the elderly, his concepts and design principles are very useful. Central concepts are imageability - the ease with which a perceived object can be recalled from the memory - and legibility. Just as a logical arrangement of letters and words makes a book legible, likewise a careful arrangement of buildings and other objects makes the city legible. Lynch concluded that in particular three qualities of an object or area facilitate imageability: *identity* i.e. distinctiveness through a conspicuous form, colour or use of

materials; a clear and simple *structure* (for example the grid structure of New York); *meaning*, either functional or emotional.

Referring to the principles of Gestalt psychology, Lynch formulated a number of design principles that can contribute to a greater imageability of the environment:

Singularity: unique qualities that give an element its own identity, e.g. a different façade.

Dominance: the predominance of an element through its size or importance.

Kinesthetic qualities: characteristics of form related to experiences of motion, such as a steep incline or a sharp bend.

Visibility of connections between points, lines and surfaces.

Simplicity of form e.g. geometric forms such as the square, circle and triangle and geometric patterns such as a grid or spider's web structure.

Visual scope: qualities which enhance the extent and depth of the field of vision.

Continuity: features which continually recur, so that single elements are perceived and imagined as a coherent whole, e.g. a long street with the same profile and alignment of trees.

Clearness of direction: spatial characteristics that clearly guide movement in a certain direction, e.g. greater building density nearer the city center.

Time sequences: the succession of elements in space or time, e.g. a series of landmarks between the railroad station and the city center, giving the route dimension and scale.

Clear names can contribute to the identity and location of elements.

Recognizable significance (functional, social, emotional, symbolic, cultural/historical).

4. Guidelines for buildings

Compared with the extensive literature on spatial orientation in urban areas, at the level of buildings there is only a modest tradition of research. The resulting recommendations show great agreement with the principles described by Lynch. We will focus on buildings lived in by elderly people suffering from dementia. Nursing homes should have a simple layout.

Round forms in the corridor system make orientation more difficult. On the other hand they can give areas an identity of their own. Activity areas should be clustered according to their function (Cohen & Weisman, 1991). No confusion should arise concerning the purpose and use of the various parts of the building. The sphere of use should be recognisable through a unique form and interior (Pastalan, 1985). The repetition of identical sections and areas should be avoided. Transitions between different spheres of use should be visually clear. The use of materials, colours and lighting to accentuate form and sphere are important aids for this purpose. Orientation can also be helped by differences in texture and smell (Pynoos & Regnier, 1991). It is important to reinforce the visual recognisability of major elements and

places and to reduce visual complexity. An example of the latter is painting the doors of service areas not relevant to the elderly in inconspicuous colours with little contrast with the background. Colours can also be used to draw attention to environmental elements. Primary colours draw attention. Blue and green contrasts are perceived less well by the elderly (Chafetz, 1991). Colour alone however (e.g. different coloured restroom doors), is not effective in indicating the functions of rooms. Elderly persons suffering from dementia have particular difficulty in remembering the combination of colour and function. Pictograms are far more effective aids (Klisz & Dye, 1981). These need not detract from the quality of a 'normal' environment. When well-chosen form and colour contrasts constitute a natural route, signposting can be kept to a minimum. If signs and indications of functions are required, use should be made of symbols that are concrete, familiar and easy to understand (Smith, Park, Cherry & Berkovsky, 1990). Combinations of clear symbols and simple texts enhance recognisability. Arrows have to be on close spatial proximity to the name of the destination, otherwise the connection is not made (Passini, 1994). Each message should be spatially separated from the other messages on the same display, otherwise nonsense links are made between the messages. Abbreviations should not be used. Another recommendation is a simple version of the floor plan of the building immediately by the entrance (Pynoos & Regnier, 1991). In order to make them recognisable, the interior of areas where patients spend their time should be oriented to what is still intact in their memories. An example is to hang a small glass case in the room, containing items full of personal memories (Carey, 1991). See-through openings and lines of view created by open areas, atriums and patios can facilitate anticipation or 'previewing' (Morton, 1981; Regnier, 1987; Pynoos & Regnier, 1991).

5. Research into application of the guidelines

After an extensive literature search Lawton (1981) lamented: "Despite the many aids to orientation suggested in the literature or incorporated into institutional design, no clear empirical evidence exists to suggest whether these aids are effective". Nowadays there has been a slight amount of empirical research demonstrating that application of the guidelines has a positive effect. In an American nursing home with little architectural differentiation researchers found many orientation problems (Weiner, 1975). The use of a colour system and graphic symbols to replace the original signposting system reduced the number of residents who needed help to find their own rooms. Osterberg (1987) noticed far fewer orientation problems in sections with a clear corridor structure and lines of view through an atrium compared with those sections that had a complex corridor structure. A circular route was found to have a positive effect. If people walk in a circle they will ultimately come back to

where they started. The resident will always see the same things at the same side. Colour codes were found to be less effective in indicating the floor level (in this case a different colour for the floor covering and the information board on each different floor level). Large figures near the elevators, showing the number of the floor level, are more effective.

A well-known study is the evaluation of the Weiss Institute of the Philadelphia Geriatric Center, a home for 40 elderly people with brain damage (Liebowitz, Lawton & Waldman, 1979). As a result of the clear layout - a large communal open area surrounded by residents' rooms - less pathological behaviour was found here than elsewhere and residents showed more lively interest in the environment. Also interesting is an American survey among 44 elderly people with slight to severe forms of dementia, focussing on the effect of adequate signposting (Namazi & Johnson, 1991). This study revealed that use of the term 'toilet' is more effective than the term 'restroom'. In combination with arrows on the ground and removal from elements distracting attention from the toilet, the experimental signposting resulted in less incontinence among residents.

An important issue is the possibility of environmental learning. American research showed that a guided tour of a building is an important aid in the development of a cognitive map, and even more so a clear explanation of its layout as a whole and of the individual parts (Weisman, 1987). By showing the residents of a 125-bed nursing home a series of slides of the home, they gained a clearer picture of the structure of the building. Deliberately introduced 'cues' such as signposting and room numbers make up just under twenty per cent of the elements which people pay attention to when finding their way. More important are elevators, doors, furniture, a clock, plants and colours. Nevertheless, the less mobile residents in particular asked for additional signposting, with a preference for combinations of simple and recognisable symbols and texts.

Opposite but closely related to spatial orientation are environmental measures to prevent the wrong use of (emergency) exits. Many dementia patients exhibit wandering behaviour and are frequently inclined to go outside. For the safety of the patients, staff tries to prevent this. Often electronic devices, e.g. a chip in the shoe, are used to make the door close automatically if the patient comes near the exit. As a closed door can lead to frustration, an American study examined whether the use of optical illusions is also effective (Namazi, Rosner & Calkins, 1989). Because contrasts on the floor are perceived three-dimensionally by elderly patients with dementia, horizontal lines were drawn on the floor, parallel to the door. Another measure was putting lines on both the floor and the door at an angle of 45° in relation to the doorframe

and the threshold. Neither of these two solutions was found to work adequately. Covering the door handle with a piece of cotton proved a more effective solution, or, slightly less effective, camouflaging the door handle by painting it the same colour as the door. Both measures considerably reduced the number of attempts that were made to go outside.

6. Conclusions

In summary, it can be concluded that imageability and legibility of the built environment is very important. It enhances spatial orientation and wayfinding. It evokes the feeling of having personal control over the environment. It enhances interest in the environment, increases residents' radius of action, reduces the likelihood of stress and improves safety. Although often not specifically developed for the elderly with cognitive disorders, the guidelines from the literature would appear to be useful in environments for senile dementia patients. Although little research has been done on the effects on behaviour and perception, the results are for the most part positive.

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