

# **Use of exit concealment techniques to reduce the unwanted exit attempts in nursing homes: an exploratory study**

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## **Abstract**

Main goal of this exploratory research was to study the perceived effectiveness, perceived safety and satisfaction of residents, their relatives and staff regarding a specific design feature of a nursing home: concealment of exits (such as a bookcase, train compartment and forest) that has been applied in order to reduce the amount of unwanted exit attempts. The study was carried out using semi-structured interviews and focus group techniques. The results indicate that residents, their relatives and staff are generally satisfied with the applied design principles. According to the participants, the concealment design principles contribute to the peacefulness of the unit, they give rise to a conversation and are part of the emotion-focused care. Regarding the perceived safety and the effectiveness of the concealment technique, in order to guarantee safety, additional measures are required.

Keywords: dementia, interior design, exit attempts, wellbeing

## **Introduction**

As of 2010, there are an estimated 10 million (mostly older) people living with dementia in Europe and 35.6 million people worldwide. The global prevalence of dementia will nearly double to 65.7 million in 2030 and 115.4 million in 2050 (Prince and Jackson, 2009). Dementia is a syndrome which affects cognition, activities of daily living and behaviour. Particularly behavioural symptoms, such as agitation, are an important cause of strain on carers, and a common reason for institutionalisation as the family's coping reserves become exhausted (de Vugt et. al., 2005). In literature, there are several studies regarding the effects of the physical environment on people suffering from dementia (Matteson & Linton, 1996; Day et al., 2000; Fleming, Crookes & Sum, 2008; Fleming & Purandare, 2010). The physical environment, can provide safety and a degree of orientation, can facilitate the functioning of disoriented person suffering from dementia and reduce agitation and depression. The environment can also contribute to under- and over-stimulation by causing discomfort and problem behavior. Although to a lesser extent, specific research is conducted on physical elements in an environment that influence wandering and exit-behavior (Radar et al, 1987; Cohen-Mansfield & Werner, 1998; Yao & Algase, 2006; Algase, et al, 2010). These studies show that too little stimulation or interesting aspects in an environment can contribute to wandering as a result of boredom.

Wandering is a form of agitation which is common in people with dementia. Wandering away from home or institution may lead to falls, hospitalisation and even death (Aud, 2004). Traditional interventions to prevent wandering include medication, physical restraint and locked doors. A locked facility is a form of restraint and can be seen as inconsistent with quality of life of people with dementia for whom self-determination and freedom are important domains. Design interventions that make use of residents cognitive impairment to prevent exits, may be an inexpensive, safe, effective and ethical alternative to personal restraint (Day et. al., 2000; Fleming, et. al., 2007; Fleming and Purandare, 2010).

Many studies have explored the effects of the physical environment on reduction of wandering and exit attempts, such as a mirror in front of the door, grids on the floor, a cloth over the

doorknob or a wall mural masking the door. These studies and findings are summarized by Siders et al. (2004) in their systematic review of literature. Evidence for the effectiveness of these design interventions is still weak and outcome measures are often limited to exiting behaviour. The effect on residents quality of life or carer stress, received little attention (Price, et al, 2009).

Traditionally Dutch nursing homes for people with dementia are locked facilities, in which doors are locked to guaranty safety. The facility where the research has taken place, however, implemented an ‘open door’ policy which means exits are not locked and residents are free to leave the unit. This, however, does not mean residents are encouraged to leave the unit, as the safety of residents is of great importance to the care facility. It is therefore, that all residents are being closely observed (supported by technology) not to compromise their safety and to make sure they do not unnoticeably leave the unit. With this policy they aim to provide a safe and caring environment for their clients, and thereby maximising their freedom. To support the ‘open door’ policy, the facility applied concealment techniques in the interior design of the units to reduce exit attempts and to create an engaging environment to positively distract clients. Concealment techniques consisted of wall murals with prints of a bookcase, train compartment or forest applied to lift exits, door exits and adjacent walls and a bus stop was created in a hallway for distraction purposes. The question remains whether the proposed design solutions provide an adequate solution for the intended purpose and leads to improved outcomes.

There are several models that could be used to better understand the relationship between user and the environment which could potentially be used in order to make better design decisions (Codinhoto 2009; Bluysen, 2011). However, these models are much broader than the scope of the research and are not directly applicable for the studied domain and user group. Zeisel et al. (1994) proposed an Environment-Behavior model for Alzheimer special care units that is relevant for this research. The model shows the relationship between a facility’s purposes, performance criteria, design decisions and therapeutic outcomes. In this model, the threshold design qualities are necessary for a setting to be able to function. But according to the authors, these qualities do not define what makes a particular setting unique for the special type of user group which is residing or working in these settings. Therefore, it is necessary to define performance indicators which are critical for a successful operation of a particular setting.

When applying the environment behaviour model by Zeisel et al. (1994) to this study we expected therapeutic outcomes as stated in table 1.

*Table 1: Application of an Environment-Behavior model to this study*

<b>Purpose</b>	Provide a safe environment for people with dementia and contribute to overall satisfaction of all users	<b>Expected therapeutic outcomes:</b>  It is expected that this type of design decision can contribute to: <ul style="list-style-type: none"> <li>- reduced exit attempts;</li> <li>- reduced agitation;</li> <li>- increased safety of the residents;</li> <li>- increased satisfaction</li> </ul>
<b>Design and performance goal</b>	To meet the needs of the users by maximizing freedom, not compromising safety of the residents, and improving therapeutic outcomes	
<b>Critical Performance Criteria (concept: exit control)</b>	Moderate immediacy of control (maximizing freedom however not compromising safety)  High unobtrusiveness	

<b>Design decision</b>	Applying ‘open door’ policy and using exit concealment technique	of its users;
<b>User interaction with the setting</b>	Residents living in, staff working in, and family visiting the facility	

Considering exit-controls Zeisel et. al. (1994) propose that exit-controls can be classified either high or low on immediacy of control and unobtrusiveness. They state that when exits are high in immediacy of control (secured exits with little or no delay in control) and high in unobtrusiveness (residents being unaware of the exits), residents are less agitated, there are less exit attempts (which implies less problems for staff and risks for residents) and there is lower use of restraints. According to table 1, we classified the Dutch facility having a ‘moderate’ immediacy of control, because exits are not secured in order to maximise freedom, however some additional measures (see setting) were applied to guaranty safety, and a high unobtrusiveness as exits are masked. This study explores the therapeutic outcomes when immediacy of control is lessened without compromising safety. In other words, the study explores the practical and ethical dilemmas between providing a safe environment and maximising freedom for people with dementia by investigating:

- the general opinion of staff and family members regarding the open door policy;
- the perceived effectiveness in reducing exit attempts through application of the concealment techniques;
- perceived safety and satisfaction of residents, their relatives and staff regarding the concealment techniques;

In the following sections the setting where research was conducted is briefly explained first, followed by the research method, results, discussion and conclusions.

### **Setting**

This study was conducted in small-scale group living units for people with dementia of two care facilities for older people in the Netherlands. Both facilities are located in the same city and are part of the same elderly care organisation.

One facility was built in 1985 and consists of a total of approximately 80 residents. The west wing of the facility has been recently refurbished to accommodate 3 small-scale group living units on floors 1 to 3 for a total of 21 people with dementia. The design of each unit consists of 7 single rooms with private bathrooms and a living room with open kitchen and access to a balcony. A lift provides entrance to the unit. The corridor has two emergency exits, one leading to a stairwell, the other positioned at the end of the corridor leading directly into the care facility by opening large double doors. The lift and the emergency exit to the stairwell were masked with a wall mural with a bookcase print. The doors at the end of the corridor are masked with a wall mural of a train compartment, some floors completed the ‘experience’ with an original train bench. When emergency exits are opened, staff receive an alarm to their DECT phone. In this facility the residents are allowed to use the lift and to go to other units on floors 1 to 3, going to the ground floor (main exit) is not allowed and has been made more difficult as two buttons have to be pushed simultaneously. Floor plan of this location is shown in figure 1, and figures 2 and 3 show the camouflaged exits at this location.

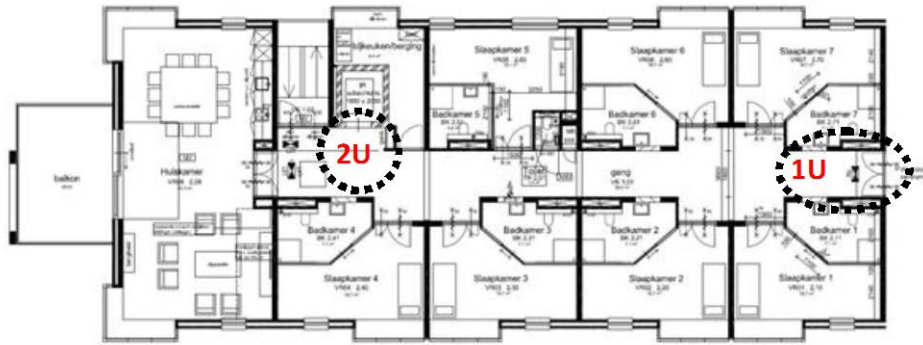


Figure 1. Floor plan of a group living unit with indication of camouflaged exits (1U and 2U)



Figure 2. Exit concealed as train compartment (1U)



Figure 3. Lift concealed as bookcase (2U)

The other facility is a newly built multi-function centre that has been in use since 2010 and has approximately 120 residents. In addition to the residential function the building houses several services such as a café, a therapy pool and child day care. The four group living units are situated on the fourth floor. Each unit is designed with 6 single rooms, two bathrooms, a living room with open kitchen and access to a balcony. The entrance lift opens into a hallway with front doors to each unit. Wall murals are used to make the front doors look like old fashioned homelike front doors in different

colours (red, blue, yellow and green). The hallway has two emergency exits, one leading to a stairwell, the other leading directly into the care facility by opening large double doors that provide access into the centre. The lift and emergency exit doors in the hallway and adjacent walls are masked with wall murals of a forest. Residents can freely exit the front door of their unit into the hallway, however, exiting the hallway is discouraged as the doors and lift are concealed and two lift buttons have to be pressed simultaneously, to use the lift. Connecting doors inside the unit were masked with murals of a bookcase. In this facility, a grid on the floor in front of two connecting doors is also applied. In this facility no alarms were installed. Floor plan of this location is shown in figure 4, and figures 5, 6 and 7 show the camouflaged exits at this location.



*Figure 4. Floor plan of 4 group living units*



*Figure 5. Exit concealed as bookcase (1H)*



*Figure 6. Exit concealed as forest (2H)*



*Figure 7. Lift and adjacent walls concealed as forest (3H)*

## **Method**

This study explored the experiences of residents, family and staff with specific design features applied in a care facility for people with dementia in the Netherlands. Since the resident group could not take part in interviews, staff and family members provided necessary information. In total four focus groups and four interviews were conducted. All focus groups and interviews were recorded with consent of participants. In each care home two focus groups were held, one with family members and one with staff. The study was conducted in November and December 2011. The aim was to include people with dementia in the focus groups, however, staff thought it would be too stressful considering the season, shortly before Christmas. A total of 16 people participated in the focus groups, 8 family members (6 female, 2 male) and 8 staff members (all female). Family members were adult children (n=7) and a spouse (n=1). The average length of stay in the psychogeriatric unit of the residents of whom a family member participated was 7 months. One resident had wandered away from home before being admitted to the care home. Staff members were nursing assistants (n=3), certified nursing assistants (n=4) and a registered nurse (n=1). Staff members had an average experience of working in dementia care of 9 years. Five staff members had also experience working in a locked door facility. Focus group discussions lasted approximately 90 minutes and were led by two researchers. Each session followed a focus group topic guide. Topics were: general opinion on the

open door policy of the care home, effectiveness of the camouflaged exits, safety of the living environment and satisfaction with the environmental features.

Interviews were held as well with the unit managers of both locations (both female), the psychologist (female) and the nursing home physician (male). Interviews lasted approximately 60 minutes, they were semi-structured, hence, interviewees could bring in other issues which they felt relevant for the subject but to their opinion were not covered by the questions. Topics were the same as for the focus groups.

Focus group and interview recordings were fully transcribed into Ms Word files, which were then reorganized so that the answers to the same questions were combined for staff and relatives. Accordingly, answers were compared by two researchers to reveal patterns, similarities, and themes running through them.

## **Results**

### *Open door policy*

The open door policy was positively perceived by all participants (relatives and staff). The absence of locks made the facility feel homelike. Family often associated a locked facility with a prison or with relatives being 'put away'. Having their relatives in an 'open' facility was a comforting thought both for themselves as for their relatives. Staff also liked the idea for themselves and for their clients, of not being 'locked up'.

Participants perceived the open door facility as more accessible than a closed door facility ('it looks more friendly', 'it is easier to drop by without the locks'), and therefore, it was perceived as more welcoming to visitors. Staff reported more flexibility in walking in and out of the unit, as they do not have to be aware of unlocking and locking the doors ('you don't have to care about codes or wear keys all the time'). What is also important to staff is that visitors are able to enter or exit the units themselves, staff do not have to open and close the door for them. Staff explained: 'it could be annoying when you are cooking or helping a resident in the bathroom and visitors come by, and you have to lock and unlock the door all the time.'

Other advantages of the open door policy as opposed to a locked facility that were mentioned were: 1) less problematic behaviour (e.g. agitation, aggression) and depression and 2) a more peaceful atmosphere. From previous experiences with locked facilities staff explained that locked doors may elicit agitation or aggression, when residents actually want to go out and experience that they are not able to, due to the closed door. Residents then just wait for a chance to get out (when visitors or staff enter or exit) and feel sad or frustrated when they don't succeed. In a closed facility, clients can be often found standing by the doors panicking and/or angry, which can result in a turbulent atmosphere. The atmosphere in this open facility is more peaceful. Participants reported that this effect might be due to the masking of exits, not the fact that these are locked or unlocked. They wondered whether behaviour would change when the masked exits were locked in the facility.

An advantage that the staff also reported is the possibility for individual clients to leave the facility depending on their cognitive functioning. Several residents actually use this opportunity to visit other units, have a cup of coffee or smoke a cigarette on the balcony and come back. According to the staff, the fact that residents have this opportunity reduces stress. Although family members liked the idea of their relatives being able to move around freely (especially in case of fire for instance), some family members reported disadvantages for staff as they have to be more alert and have to constantly supervise the residents. Especially in the night, when there is only limited staff, this might be stressful. According to the staff, working in this facility is not more stressful, maybe just a bit more difficult. Staff explained: 'we have to be more alert, and creative in finding solutions to keep

clients inside the units as we are not supported by a locked door. It makes the job more interesting.’ Furthermore, family members reported being anxious sometimes about their relative being able to leave the facility, especially during the night. Family in the new facility thought the doors would be locked at night (which was not the case). They preferred locked doors at night, ‘that’s what you do at home too’, but they admitted that at home you would lock doors to keep people out, and here you would lock them to keep people in. This subject is further discussed in the section perceived safety.

Other disadvantages of an open door policy were not mentioned, although some family members did not regard the facility being open, as it was clearly not the intention that residents would leave the unit. Nevertheless, staff and family unanimously opted for an open facility relative to a locked facility, if they had the choice. The open door policy had not been the reason to choose for the facility. Staff and family mentioned small-scale and location as more influential respectively. However, some staff members mentioned that now they experienced an open facility it would be difficult and undesirable to work in a traditional closed unit.

### *Perceived effectiveness of concealment techniques*

When asked about the effectiveness of the concealment techniques to reduce unwanted exits, staff reported that effectiveness depends on the cognitive functioning of residents. The worse the resident’s cognitive functioning, the more effective the concealment techniques seem to be. According to staff, good residents often still have the urge to go home and look for an exit, especially when they have recently moved to the care facility. They sometimes understand the function of the lift, or they just sneak out with a visitor. Once cognitive functioning decreases the concealment techniques seems rather effective. These residents are not aware of the doors anymore and just pass them. But exceptions exist: ‘sometimes residents just stopped walking away, once they had been stopped a couple of times, however, others who were first afraid of using the lift, now frequently use it.’

When asked about the reason for wandering away from the unit, staff believed that some people who are used to exercise, have only limited opportunity in the facility to exercise and, therefore, are more prone to wander away. The concealment techniques help to keep residents inside, because they are not able to find the exits. However, wandering away is not always a conscious behavior. Some staff members explained: ‘some residents just wander and touch everything around them. When exits are masked, but when doorknobs/lift buttons are visible, and hence, touchable, residents may just exit the unit by touching the doorknob/lift button without intentions to leave.’ Staff members advised to take away such stimuli when masking an exit. ‘One of our clients just tries every door in the unit, the doors from other residents’ rooms and also the exit doors at the end of the corridor and in this way exits the unit. The connecting door without doorknob is never used by this resident.’

Staff reported that the effectiveness of masked exits decreased when a door is occasionally used, for instance, to take a shortcut through the building. To discourage this behavior, family is told not to use connecting doors (bookcases), but always to enter through the front door, which is a natural situation in any home. Staff only seem to take connecting doors, when not being watched by residents. In the refurbished unit staff reported to be very consequent in this behavior and even the postmen sometimes is not able to find the exit, which shows the effectiveness of the concealment techniques. The same applies for the lifts. The lifts need to be used to reach the units and residents themselves also use the lift when they are taken out of the unit to spend some time elsewhere (go shopping or have a drink with a visitor in the café). Residents, hence, often see people use the lift, push the button, and see the doors open. Residents seem to copy that behaviour. Staff did not believe residents learn this behavior. Fortunately, some people forget what to do next, and step out of the lift again. In this respect, dementia is ‘an advantage’.

Concerning the effectiveness of the different prints, participants felt the bookcase was most effective. According to staff some doors with a bookcase were never opened by residents, but the exits with the forest and train compartment were all sometimes used by residents. The train compartment seemed the least effective in reducing exit behaviour, because of the visible doorknob and its location at the end of the corridor. Some family members thought that the compartment window with a view to the outside actually stimulates residents to go outside. The effects of the grids were unknown, although one resident seemed to be afraid to cross them. Based on the examples it seems that the effectiveness of the concealment techniques depend next to its print on the location of the print (at the end of a corridor), visibility of doorknob/buttons and the frequency of use.

When asked about the appropriateness of the prints, the bookcase was regarded as natural design element inside a building, therefore, all participants liked this print, as it is realistic. Some residents even talked about the bookcase such as “nice books”. Family members from the new facility, however, did not like the bookcase used on the lift (exit to the outside) as it is not realistic to exit the unit through a bookcase, a forest would have been more appropriate to them. The opinions about the forest as a décor differed. Staff members from the facility without a forest, disliked the idea of a forest inside the building. ‘Just take people outside, instead of creating an outside place inside’. The staff members of the facility where a décor of a forest was applied in the hallway and bookcases inside the unit, however, thought this was appropriate. In this way staff can take residents outside their home into ‘the forest’ to distract them, or family can create a private momentum (although staff thought residents don’t really think they are in the forest, they just like the scenery). For the same purpose, also a bus stop was created in the hallway of the new facility, but it was hardly used as it felt unrealistic. Family preferred a film screen on this spot to distract residents. Staff and family thought the train compartment provides a nice setting to distract residents when they are agitated, or for visitors to engage residents into an activity. Some compartments even had a screen that showed a film as if the train was moving. To stress the additional benefit of the train compartment, despite the limited performance to reduce exits, a family member said about the train compartment ‘it would be better to apply the train to a wall, not to an exit’.

In summary, concealment techniques seem effective under certain circumstances to reduce exit attempts, and furthermore, may improve quality of life in a facility by providing a setting that is engaging for residents and helps staff and family to improve quality of provided care.

### *Perceived safety of concealment techniques*

In general, participants perceived the facility as a safe environment to provide care for its residents. Most staff members mentioned that exit incidents also exist in locked facilities, they perceive an open door facility being equally safe compared to a locked facility. However, some staff members in the new facility felt uncomfortable with the exit door leading to the stairwell. Although a forest mural was applied to the door, residents managed to exit via this door. For safety reasons a safety gate prevented residents from falling down the stairs, but one resident even managed to climb over it. A staff member said: ‘sometimes when I am in the bathroom helping another resident, it could take a while before I notice an exit attempt and because of the staircase a client could hurt himself. Therefore, I put a laundry cart in front of that door, in order to prevent residents to use the door, but this was not allowed by management due to fire safety precautions. I would prefer a locked door in this specific case’. As a result, some staff members thought locks on the doors or additional measures are somewhat safer. Staff members felt they had to be more alert, because residents can leave the unit, especially when there were more residents with the intent to leave and when a staff member was alone. Some staff members thought this made their work more interesting because they had to find

creative solutions. By some staff members, a locked facility was thought to be safer, but still everyone preferred an open facility and took the risk of elopements for granted.

Concerning the concealment techniques, all participants reported that these techniques contribute to the perceived safety. It is also important to mention that not all residents have an urge to leave the units. However, it could be that due to the concealment techniques the exits are not so prominent and in that sense discourages the exit attempts.

The fact that all units are not located on the ground floor also contributed to the perceived safety. When exiting the unit, residents enter the facility, but there is no direct connection to the outside. That is a comforting thought for staff as well as family, especially, because in the new facility the train station is near, residents could easily take the train when they manage to leave. For this reason residents were discouraged to use the lift. Next to applying a wall mural on the lift and adjacent wall, to use the lift, two buttons have to be pushed simultaneously which is difficult for residents. This additional measure was only recently applied because residents could go down too easily. Although these measures could be seen as restriction, staff believed it was a necessary adjustment to increase perceived safety.

Staff and family also mentioned the supporting technology as comforting. If an exit door is opened, staff receives a signal to their DECT phone and can act accordingly. Some residents are observed by camera's. According to family members this technology is necessary to guaranty safety. This is especially mentioned by family members with relatives who wander, for other family members safety (risk of leaving the unit) is not an issue. One family member said: 'my mother always uses the lift to leave, the fact that there is no alarm function because it is the main entrance, scares me sometimes'. Remarkably, when asking about safety some family members also mentioned safety of residents to get out of the building in case of fire. Residents are not able to alarm someone if something happens in their room, which was not a safe thought for them.

Family thought the presence of other people also contributed to the perceived safety. Most residents were lonely when living at home and enjoy the company of other people, it makes them feel safe.

Due to all these factors the facilities were perceived to be safe by all participants. Concealment techniques contribute to this feeling, however additional measures are necessary to guaranty safety. Interestingly, all family members with relatives who wander would opt for this open facility with concealment techniques, even though there is the perceived higher risk of their relative leaving the unit as compared to a closed unit. They are comfortable leaving their relatives behind, as staff received many compliments about the care they provide. When asked about safety improvements, staff members preferred additional measures for the door leading to the stairwell in the new facility, moving sensors (especially during the night) were mentioned by family members.

In summary, concealment techniques contribute to the perceived safety as exits are more difficult to find but other factors contribute to the perceived safety as well such as the location of the unit and used technology. Thus, in order to guaranty safety additional measures seems necessary.

### *Satisfaction with concealment techniques*

Participants were very positive about and satisfied with the murals in both facilities. The murals contribute to a homelike atmosphere. A family member said: 'it is great that you don't feel like being in a hospital'. As a result family members believed that their relatives really feel at home, and don't have the urge to leave and go home. A family member explained: 'in the very beginning my mother wanted to leave the facility to go home, but now she is used to the facility and really feels at home and never mentions going home anymore'. In this way the wall murals indirectly influence exit seeking behaviour. Participants also mentioned that due to the fact that the exits are masked, residents do not

stand in front of the exits and get agitated, as is common in locked facilities. This makes the facility more peaceful and calm. Participants stressed, however, that next to the concealment techniques, other elements also contribute to the homelike and peaceful environment. For instance, the small scale setting, the private rooms and personal furniture, the normal daily activities like shopping, drinking coffee in the living room, preparing dinner in the kitchen in the unit, etc., all contribute to the homelike atmosphere.

When asked whether residents felt misled by the concealment techniques, the answers were negative. Although residents are a bit misled, family as well as staff believed it is in the interest of the residents and could be considered as taking good care of the residents. They believed that as long as residents are being treated with respect and are taken seriously, the use of concealment techniques is an appropriate design intervention. Participants mentioned that it is important that the murals are realistic. The bookcase, therefore, was acceptable for everyone, as it can be found in every household. Some staff members thought the forest was less appropriate, as it is not realistic to have a forest inside. Family members thought that their relatives do not really think it is a real forest, but they just like the scenery and feel comfortable looking at it. Also, staff members never heard residents mention they thought they were being deceived.

Another mentioned benefit of the concealment techniques, that satisfied the participants, was the change of scenery it provides. The participants stressed that the forest and the train compartment, especially, provide the opportunity to take the residents to another scenery, which can reduce stress, or other problem behaviour. Staff reported that residents do not enter the forest or train compartment on their own, it mainly helps staff and visitors to engage in other activities if necessary or wanted. Some family members, however, complained that the forest hallway was too small and the smell inside this hallway was not always pleasant. If they want to change scenery, they would rather go to the grand café downstairs.

In summary, the participants are in general satisfied with the concealment techniques as it improves the homelike atmosphere in combination with other design features, contributes to the serenity at the units and provides a positive distraction for the residents.

## **Discussion and conclusions**

The results of this exploratory study indicate that family and staff members were very satisfied with the open door policy and applied concealment techniques. Family and staff are particularly content about the contribution of the wall murals, next to other factors, to the homelike and peaceful atmosphere in the unit. Furthermore, participants value the fact that the wall murals can provide an alternative setting (f.e. forest, or train compartment) that helps staff and family to positively distract residents. All participants would opt for an open facility with the application of concealment techniques, if they had the choice between an open and locked facility. The concealment techniques seem to be effective in reducing exit attempts, especially for those with a moderate to severe cognitive impairment. Although exit seeking behaviour is influenced directly (residents cannot find the exits due to the wall mural) as well as indirectly (people feel more at home, and therefore, they feel no need to leave the unit) by the concealment techniques, and thereby contribute to the perceived safety, additional measures are necessary to maximise freedom and guarantee safety. These results show that in order to guarantee safety immediacy of control should be high in accordance with the exit concept of Zeisel et al (1994). However this does not mean that exits should be secured. The fact that the facility had an open door policy with masked exits and additional measures to guarantee safety resulted in increased satisfaction by residents, staff and family members. Both residents and staff do not feel trapped and family can easily enter the facility which in turn may reduce the threshold to come to visit. Although, from this study it is not clear whether this would lead to more visits. By using this

model, the designers can choose easier a focus and put their effort on finding a solution that fits the goal of the care facility. This remains a challenge for designers, industry and other relevant stakeholders, which could look together for a better solutions in order to maximize the safety and at the same time preserve the maximum freedom for residents.

These findings can have important implication for the image of institutionalisation. The institutionalisation of a family member can be a very stressful event which can lead to feelings of guilt (Gaugler, Pot and Zarit, 2007 cited in te Boekhorst et al, 2008). Traditional nursing homes can be perceived as unfriendly and institutional, which may contribute to those feelings. This research indicates that with simple design interventions the image of the care provided in an institution can be improved. It also stresses the importance of including measures of quality of life in research designs that investigate the effect of design interventions on the reduction of exit attempts, as these intervention can have other positive effects as well. Furthermore, due to the exploratory nature of this study, and because the wall murals had already been applied, objective effect measurements on reduced exits could not be conducted. It is interesting to further investigate the effectiveness of for instance, the prints of wall murals, without confounders like visibility of doorknobs or location of the doors or the optimal combination between concealment techniques and technology to optimise freedom and guaranty safety at the same time.

Lastly, it should be mentioned that participants in the focus group discussions were not selected by the researchers but by the care home. Family members were selected because of their involvement in providing care and may have been more positive about the living environment than family members in general.

## **Acknowledgements**

We thank the family members and care home staff of Woonzorgcentra Flevoland for participating in this research.

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