

Environmental qualities in supported housing facilities for people with severe mental illness: an investigation of separate levels of the environment

Marcheschi, E ^{a*}, Johansson, M. ^a, Brunt, D. ^b, Laike, T. ^a

^a *Department of Architecture and the Built Environment, LTH, Lund University, Sweden*

^b *School of Health and Caring Sciences, Linnaeus University, Växjö, Sweden*

*Corresponding author. Tel (+46) 462227615

E-mail address: elizabeth.marcheschi@arkitektur.lth.se

ABSTRACT

It is widely acknowledged in the field of environmental psychology that the physical environment of healthcare facilities influences users' well-being. There is, however, a lack of knowledge regarding its impact on people with severe mental illness (SMI) (Kloss and Shah, 2009). The present study is part of a larger research project on supported housing facilities (SHF) for people with SMI. Previous results from this project suggested that the overall physical environmental quality of SHF supports users' needs for; visual pleasantness, social support, perceived control and restoration possibilities (Marcheschi, Johansson, Brunt & Laike, 2012, submitted). The aim of this study is to further investigate the supportive characteristics of three specific inter-connected functional units of SHF; private room/apartment, common indoor and outdoor environment (multi-place approach, Wright & Kloos, 2007). These latter have been distinguished on the basis of their physical environmental aspects in two groups; 'high' and 'low' quality. Their supportive characteristics have been assessed by people with SMI (residents, N = 72), staff (mental health nurses N = 117), a user group panel (N = 3) and experts (Environmental Psychologists N = 5) with regard to the perceived qualities of; indirect environmental effects, visual pleasantness and homelikeness. The results from separate units of environmental analyses reported by the staff and the experts showed that SHF with higher levels of physical environmental qualities for the outdoor and common indoor environments were perceived as more pleasant, with a higher degree of social status and unity. Greater degree of homelikeness was perceived by the experts in private room/apartment units with higher levels of physical environmental qualities. Moreover the residents perceived the outdoor environment as having a greater degree of physical environmental qualities such as being more supportive for their needs of; social support, perceived control and restoration. Implications of the findings for the target group of people with SMI and for future planning of SHF are discussed.

Keywords: Supported housing facilities, Mental illness, Multi-place approach, Multi-dimensional approach, Environmental audit tool

Subtitle: Environmental qualities of supported housing facilities

Introduction

Social services in Sweden provide two types of living solutions for people with severe mental illness (SMI); supported housing facilities (SHF) and housing support. The former ones are congregate housing solutions with on site professional workers, whereas the latter ones offer support in the individual's own apartment. The present study investigates the first type, SHF. In 1995 a Mental Health Reform was carried out in Sweden with the aim to provide homelike settings to people with SMI and to increase their community integration (Swedish National Board of Health and Welfare, 2003). However, after this new legislation several differences between the SHF were found and the reestablishment of institutional climates had been identified in more than 30% of them (Swedish National Board of Health and Welfare, 2003; Johansson & Brunt, 2012; Marcheschi, Johansson, Brunt, & Laike, 2012, submitted). Previous research on housing facilities for people with SMI has mainly addressed care programs, medications and the social climate (Fakhoury, Murray, Sheperd, & Priebe, 2002; Brunt & Hansson, 2002; Kloos & Shah, 2009). Although the importance of the physical environment for the residential atmosphere is well documented in the field of environmental psychology (Küller, 1991b.), its role in the design of the physical environment in SHF has not been focused on (Kloos & Shah, 2009).

A recent study performed in Sweden found differences in physical environmental quality between purpose-built (PB) and non-purpose-built (NPB) SHF (Johansson & Brunt, 2012). The main differences were identified at the private and common environments levels. PB houses (newly constructed houses for the target group of people with SMI) offered more possibilities for self-sufficient living, social interaction and a higher quality of single environmental factors and higher degree of homelikeness.

Other studies have reported that community integration was higher in congregate facilities rather than in housing with outreach support (housing support) and that community belonging

was fostered by neighborhood relationships, safety and satisfaction (Kloos & Shah, 2009; Townley & Kloos, 2009, 2009).

Previous findings from the current project showed that the overall physical environmental quality of SHF can be used to discriminate between different settings and to assess physical design features that better support people with SMI's needs. These findings refer to the investigation of the environment of SHF as a whole (holistic approach). Nevertheless, ecological approaches from the field of Environmental Psychology pose that individuals are influenced by the interaction with different nested system in the environment, from more private to more public (Bronfenbrenner, 1977). The environment can therefore be described as comprising different structures that are strongly interconnected with one another, and each level of the environment is contained within the next (Bonnes & Secchiaroli, 1995). Moreover the crucial role played by the individual's own experiences is greater at the private, or more immediate, environmental level (microsystem) than at the public level (macrosystem). It has been suggested, in particular for the target group of people with SMI, that different units of the environment such as; private room, common indoor, and outdoor environment will have a different impact on users' well-being (Wright & Kloss, 2007). The present study thus aims to further investigate the physical environment of SHF for separate units of environmental analysis in order to discover which physical environmental aspects better support the users' needs at the different levels.

Theoretical background

The Human Environment Interaction model (HEI, Küller, 1991a., 1991b., 2004), describes how human's emotional processes are influenced by the transaction with the physical and social environment with a consideration for the activities the users are engaged in. These influences vary over time and are modified by personal resources and prior experiences. This

type of approach has no fixed relationships, thus the prerequisites must be redefined in each new situation. For this reason the theoretical background has been complemented with theories regarding physical environmental aspects, which have proved to impact people's well-being. In the present study the emphasis of the transaction between the environment and the individual regards the extent to which the physical environment supports the needs of people with SMI, which have been operationalized in terms of perceived visual impression, homelikeness and indirect environmental effects. The indirect environmental effects are the psychosocial processes of; social support, perceived control and restoration possibilities that intercede between the physical environment and mental health (Evans, 2003).

A salutogenic perspective was integrated within the theoretical background (Antonovsky, 1996, Bringslimark, Bysheim, & Nyrud, 2009) and thus the environmental assessment focuses on the recognition of physical environmental qualities, rather than environmental stressors. Moreover the study embraces an ecological approach to the investigation of the transactions between humans and the environment that considers individuals and environmental variables interconnected with each other, and therefore equally important to investigate (Wright & Kloos, 2007). For this purpose a multi-place and a multi-dimensional approach that comprises the assessments of different social actors such as; architects and users were adopted (Bronfenbrenner, 1977; Bonnes & Secchiaroli, 1995; Devlin & Arneill, 2003). The environmental levels selected for the present study are; outdoor environment, common indoor and private room/apartment.

Aim

The study embraces an ecological approach for the study of SHF for people with SMI, which entails separate units of environmental analysis being specifically assessed (multi-place approach). Moreover the physical environment has been investigated by different social

actors. The aim was to identify how varying levels of physical environmental qualities in the outdoor, common indoor and private room/apartment of SHF, influence the perception of supportive qualities. The study research questions could be summarized as follow;

1. To what extent does the physical environment of outdoor, common indoor and private room/apartment of SHF influence residents' and experts' perceptions of; social support, perceived control and restoration possibilities (indirect environmental effects)? It is hypothesized that the perception of indirect environmental effects would be greater in the outdoor, common indoor and private environments with higher level of physical environmental qualities.
2. Does the degree of homelikeness and the overall visual pleasantness differ in the outdoor, common indoor and private room/apartment of SHF with varying levels of physical environmental qualities? A greater degree of homelikeness and a higher level of the visual pleasantness are expected in the outdoor, common indoor and private environments with higher level of physical environmental qualities.

Method

Selection of SHF

The study investigates congregate housing facilities, with on site professional workers, for people with SMI (Swedish National Board of Health and Welfare, 2003, 2010). A sample of thirty-eight SHF, located in the southern part of Sweden, Scania region, was stratified to ensure variation among the facilities with regard to the degree of homelikeness and housing localization. Of these SHF (N = 20) were included in the present study to equally represent environments with high and low degree of homelikeness and with different localization (city centre vs. suburbs/small towns).

Discrimination of SHF

An environmental audit tool was used by five experts in environmental psychology for the discrimination between high quality and low quality of SHF's outdoor, common indoor and private room/apartment. In order to establish the degree of physical environmental quality a mean score was drawn between the environmental psychologists' assessments for each level of environmental analysis. Based upon their total score (scale range = '1' 'low quality' to '4' 'high quality') the houses were divided in outdoor, common indoor and private room/apartment high quality (HQ) and low quality (LQ) (Table 1).

Table 1 Description of the different levels of environmental analysis in SHF

Levels of environmental analysis	LQ	HQ	Range
Outdoor	2.08 – 2.90	2.92 – 3.25	1 – 4
Common indoor	2.18 – 2.75	2.78 – 3.27	1 – 4
Private room/apartment	1.93 – 2.93	2.98 – 3.50	1 – 4

The instrument adopted is a modified version of a prior checklist, which is composed of 152 variables on a 4-point scale ('1' indicates 'low level of presence' and '4' 'high level of presence') and investigates environmental qualities (physical attributes), which have been selected on the basis of their proven impact on other groups, such as healthcare users (Johansson & Brunt, 2012). The physical qualities have been grouped in 17 environmental quality indices based on content and internal statistical reliability. The outdoor environment comprises the following indices; 1) accessibility 2) traffic 3) perceived security, 4) building qualities 5) architecture structure 6) outdoor design 7) maintenance 8) greenery 9) and outdoor climate. The common indoor environment comprises indices that cover; 1) spatial structure 2) facilities for indoor activities 3) maintenance 4) quality of environmental factors such as light, color, noise, temperature and odor 5) and interior design and decoration. Finally, the assessment of the private environment includes indices that cover 1) autonomy 2) spatial structure 3) and

maintenance. Cronbach's alpha was above .70 for the majority of the indices. The concordance between the environmental psychologists was tested with the Kendall's coefficient of concordance (Kendall W between .49 and .81).

Recruitment of participants

In addition to the experts' assessment, residents (people with SMI) and staff of each SHF were asked to participate. They were orally informed by the researcher regarding the study aims and procedures with a power point presentation. Moreover a user group panel was invited to assess the physical environment of SHF from the Center for Evidence-Based Psychosocial Interventions for people with SMI (CEPI, Lund, Sweden). Different methods were used by the social actors involved in the survey on SHF, these are summarized in Table 2.

Table 2 Multi-dimensional approach

Social Actors	N	Method
1. Residents	72	POE (Johansson & Brunt, 2012)
2. Staff	117	SED (Küller, 1991a.)
3. User group panel	3*20	Walk-through evaluation (De laval, 1998)
4. Experts	5*20	Environmental audit tool & SED (Johansson & Brunt, 2012; Küller, 1991a.)

Residents

Seventy-two residents from a total of 160 participated in the survey (45% response rate). These participants were people affected by different types of severe mental illness (40% women, 60% men, mean age = 52.5 years, range 25 - 83 years). 47% of them had lived in the same facility for more than 5 years, and 4% less than a year. Their survey consisted of a questionnaire, a consent form and a sealed envelope. The individual diagnosis of each resident was not registered (see ethical considerations), however this target group was mainly composed by people with psychosis and mood disorders.

The residents graded their experience of the outdoor, common indoor and private room/apartment of SHF with a post occupancy evaluation questionnaire (POE), based upon the indirect environmental effects of; social support, perceived control and restoration possibilities (Evans, 2003; Johansson & Brunt, 2012). The instrument consists of 10 items on a 5-point scale ('1' indicates 'totally disagree' to '5' indicates 'totally agree') and it results in a POE-index, which is constructed by averaging the 10 items (Cronbach's alpha = .74).

Staff

One hundred and seventeen staff members from a total of 150 participated in the study (78% response rate). This group comprised mental health nurses and nurse assistants (70% women, 30% men), who on average had worked in the same facility for approximately 4 years (range 0.1-15 years). Their survey consisted of a questionnaire, a consent form and a sealed envelope. The staff assessed the visual experience of two interconnected-functional units of SHF; common indoor and outdoor environment. Their assessments were made by using the mean of the Semantic Environmental Description (SED, Küller, 1991a.), which consists of 36 semantic scales, forming eight dimensions (Table 3). The 36 semantic adjectives are presented on a 7-point scale ('1' indicates 'little' and '7' indicate 'a lot'). Cronbach's alpha was = .71 and above for most of the SED dimensions.

User group panel

This group of participants is composed by people with SMI and with personal experience of living in SHF (N = 3, 2 males and 1 female). The mean age of the group was 47.8 (range 35-63). This group performed a walk-through evaluation in the common indoor and outdoor environment of each of the 20 SHF (de Laval, 1998). With this approach the participants report in an open-ended questionnaire their positive and/or negative assessments of the

following areas; entrance, corridor, living room, kitchen and garden. An average of their assessments was computed for each of the aforementioned five areas. Each assessment was followed by a focus group discussion.

Experts

The group of five experts was composed of four environmental psychologists and one architect (3 female and 2 male). They reported their overall visual impression, the homelikeness and the indirect environmental effects perceived in the 20 SHF. Assessments were made by SED (Küller, 1991a., Table 3) and with a checklist (Johansson & Brunt, 2012) composed of newly developed items concerning the perceived degree of homelikeness and the indirect environmental effects. The same instrument used for the staff was also adopted for the experts' evaluation. High reliability for the eight SED dimensions and the checklist was found (Cronbach's alpha .71 and above). The experts assessments (N = 5*20) were carried out on site, during normal week days. The group had on average a practical field experience in Environmental Psychology of 21 years (range 5-42 years).

Table 3 Description of the physical environment according to the eight dimensions of the SED (Küller, 1991a.)

Factor	Definition
Pleasantness	The pleasantness, beauty and security which the individual experiences in the environment
Complexity	The environment's liveliness and complexity
Unity	How well the various components in the environment fit, and function together
Enclosedness	The closedness and degree of demarcation
Potency	The intrinsic, potential force in the environment
Social status	The evaluation of the environment in economic and social terms
Affection	An age aspect of the environment as well as a feeling of recognition for the old and genuine
Originality	The unusual and surprising in the environment

Ethical considerations

The study was approved by the manager of social services responsible for each SHF. Due to ethical reasons no information regarding residents' diagnosis was included in the study. A consent informed approach was applied for both staff and residents. A person from the staff was selected to help during the data collection. The staff member was responsible for the questionnaire dispatch and return. If required the staff could support the residents while completing the survey. This approach was chosen to reduce the level of possible discomfort for the residents. Special permission was asked of the residents for allowing the physical environmental assessments of their private rooms/apartments. The study was approved by the Regional Ethical Review Board, Linköping, Sweden (EPN Dnr: 73, 2009).

Data treatment and analysis

The data was analyzed in the SPSS, Statistical Package for the Social Sciences for Windows, version 18. The *p*-value criterion for significance was set to $p = 0.05$. A variation in the number of observations between different analyses can be seen due to internal drop out (< 10%). Differences in physical environmental quality perception between HQ and LQ outdoor, common indoor and private room/apartment of SHF were assessed with MANOVA and ANOVA. Chi-square statistic was used to test the user group panel's evaluations. Analysis of covariance was performed to control for the effect of gender, age, length of work and living in SHF.

Results

Description and results of the outdoor environment of SHF

The location of the SHF investigated varies between city centers (70%) and suburbs/small towns (30%). Although the majority of the places were located in the city center, the outdoor environments were characterized by a relative green environment (grass, trees, plants and vegetation in general) and the majority of them supported residents' outdoor activities with barbeque equipment and outdoor furniture. Mean values and standard deviations are given in Table 4.

Nevertheless some differences between HQ and LQ outdoors of SHF were found. HQ outdoors had a better separation between the private garden and the nearby traffic and higher degree of personal safety was perceived. The overall harmony of the outdoor building's façade was also greater for HQ outdoor environments (building qualities), as well as the maintenance of the architectural structures.

Residents and experts perceived the outdoor environment of HQ houses as significantly more supportive for users' needs (social interaction, perceived control and restoration) than the outdoor of LQ houses, respectively; $F(1, 63) = 9.30, p < .01, \eta^2 = .13$ and $F(1, 18) = 9.83, p < .01, \eta^2 = .35$.

Moreover the visual experience of the outdoor with HQ and LQ was differently perceived by the staff of SHF. The HQ outdoor was perceived as more pleasant, $F(1, 110) = 10.84, p < .01, \eta^2 = .09$, having a greater degree of unity, $F(1, 110) = 11.18, p < .01, \eta^2 = .09$ and social status, $F(1, 110) = 6.04, p < .05, \eta_p^2 = .05$. These results have been controlled for the effect of length of work, $F(4, 106) = 1.68, p > .05$.

Analogous results were reported by the experts who perceived the outdoor of SHF with HQ as more pleasant, $F(1, 18) = 12.99, p < .01, \eta_p^2 = .42$, with a higher degree of unity, $F(1, 18) = 16.83, p < .01, \eta_p^2 = .48$ and social status, $F(1, 18) = 27.25, p < .001, \eta_p^2 = .60$.

More supportive characteristics were found in the outdoor environment with HQ by the user group panel participants ($\chi^2(1) = 15.06, p < .001$). Greenery (presence of garden, trees and flowers), outdoor furniture, facilities (for barbeques) and possibilities for privacy were considered the most supportive aspects of the outdoor environment. Lack of greenery was instead reported as a negative aspect. A summary of the results is reported in Table 4 and an example of HQ outdoor environment of SHF can be seen in Figure 1.

Table 4 Outdoor environment of SHF: differences between HQ and LQ

Environmental quality indicators for the outdoor environment	LQ SHF M ± SD	HQ SHF M ± SD	F (df)	Sig
Accessibility	3.34 ± .30	2.86 ± .68	4.15 (1,18)	ns
Traffic	2.32 ± .39	3.05 ± .44	15.77 (1,18)	p < .05**
Perceived security	2.90 ± .56	3.38 ± .24	5.90 (1,18)	p < .05*
Building qualities	2.62 ± .36	3.19 ± .14	20.51 (1,18)	p < .05***
Architectural structure	2.45 ± .28	2.95 ± .25	16.60 (1,18)	p < .05**
Outdoor design	3.30 ± .43	3.50 ± .28	1.46 (1,18)	ns
Maintenance	1.85 ± .43	2.36 ± .15	12.36 (1,18)	p < .05**
Greenery	2.34 ± .73	2.94 ± .31	5.6 (1,18)	p < .05*
Outdoor climate	2.47 ± .48	3.30 ± .21	24.21 (1,18)	p < .05***
Indirect env. effects (residents)	3.21 ± .67	3.72 ± .67	9.30 (1,60)	p < .05**
Indirect env. effects (experts)	1.93 ± .62	2.62 ± .31	9.82 (1,18)	p < .05**
Homelikeness (experts)	2.33 ± .89	2.93 ± .52	3.28 (1,18)	ns
Pleasantness SED (staff)	4.02 ± 1.6	4.94 ± 1.2	10.84 (1,110)	p < .05***
Pleasantness SED (experts)	3.19 ± 1.2	4.67 ± .37	12.93 (1,18)	p < .05**
Unity SED (staff)	3.31 ± 1.4	4.12 ± 1.1	11.18 (1,110)	p < .05**
Unity SED (experts)	4.39 ± .65	5.27 ± .15	16.83 (1,18)	p < .05**
Social status (staff)	2.79 ± 1.4	3.43 ± 1.2	6.04 (1,110)	p < .05**
Social status (experts)	2.71 ± .71	4.15 ± .48	27.25 (1,18)	p < .05***
Garden positive aspects (Chi ²)	54%	82%	15.06 (1)	p < .05**
Garden negative aspects (Chi ²)	46%	18%	15.06 (1)	p < .05**

* p < .05, ** p < .01, *** p < .001



Figure 1 A typical example of HQ outdoor environment in SHF

Description and results of the common indoor of SHF

The common indoor was relatively similar across the different facilities investigated. At this environmental level the interactions between staff and residents were more frequent. The detailed analysis carried out for separate units of the environment showed that HQ common indoors had a better demarcation between private and public areas, offered better facilities (TV, stereo and internet access) to their users, and on the whole had a better preservation of single environmental attributes (maintenance). HQ common indoors were perceived as more supportive for the users' needs of; social interaction, perceived control and restoration, $F(1, 18) = 15.16, p < .01, \eta^2 = .46$, as reported by the experts.

Moreover the SED-profile suggests that the staff perceived the HQ common indoor as more pleasant $F(1, 107) = 13.72, p < .001, \eta_p^2 = .11$, having a higher degree of unity, $F(1, 107) = 13.44, p < .001, \eta_p^2 = .11$ and social status, $F(1, 107) = 16.31, p < .001, \eta_p^2 = .13$, while greater

affection was perceived in the LQ common indoor, $F(1, 107) = 7.32, p < .01, \eta_p^2 = .06$. The results were controlled for the effect of length of work, $F(5, 103) = 1.203, p > .05$.

Experts' visual experience of the common indoor was similar to that reported by the staff. HQ common areas were perceived as more pleasant, $F(1, 18) = 6.88, p < .05, \eta_p^2 = .28$, having a higher degree of unity, $F(1, 18) = 9.83, p < .01, \eta_p^2 = .35$ and social status, $F(1, 18) = 10.78, p < .01, \eta_p^2 = .37$, whereas greater affection was reported for LQ common indoors, $F(1, 18) = 4.97, p < .05, \eta_p^2 = .22$.

The entrance and the corridor, composing the common indoor of SHF, were differently perceived by the user group panel participants. The results from the Chi square test showed greater supportive characteristics in the HQ entrances ($\chi^2(1) = 5.16, p < .05$) and in the HQ corridors ($\chi^2(1) = 3.39, p = .05$) than in those areas of LQ residential units. Automatic doorways, elevators and luminous environments were considered the most supportive aspects at the entrance level, while dark and narrow spaces were considered negative aspects. Moreover greenery (flowers and plants), and homelike colors in the corridor environment were considered positive attributes, whereas narrow and long corridors were recalling institutional settings and thus perceived as constituting negative features.

The results are summarized in Table 5 and an example of HQ common indoor of SHF is reported in Figure 2.

Table 5 Common indoor of SHF: differences between HQ and LQ

Environmental quality indicators for the common indoor	LQ SHF M ± SD	HQ SHF M ± SD	F (df)	Sig.
Spatial structure	2.77 ± .26	3.03 ± .16	7.04 (1,18)	p < .05*
Facilities	1.93 ± .18	2.38 ± .39	10.14 (1,18)	p < .05**
Maintenance	2.66 ± .41	3.37 ± .21	23.07 (1,18)	p < .05***
Quality of env. factors	2.55 ± .28	2.82 ± .14	7.57 (1,18)	p < .05*
Interior design & decoration	2.33 ± .23	2.71 ± .20	15.38 (1,18)	p < .05**
Indirect env. effects (experts)	2.11 ± .17	2.50 ± .26	15.16 (1,18)	p < .05 **
Indirect env. effects (residents)	3.39 ± .61	3.57 ± .77	-1.03 (69)	ns
Homelikeness (experts)	2.04 ± .51	2.52 ± .69	2.99 (1,18)	ns
Pleasantness SED (experts)	3.67 ± .41	4.39 ± .76	6.88 (1,18)	p < .05*
Pleasantness SED (staff)	3.95 ± 1.3	4.78 ± 1.0	13.72 (1,107)	p < .05***
Unity SED (experts)	4.07 ± .59	4.85 ± .51	9.82 (1,18)	p < .05**
Unity SED (staff)	3.33 ± 1.2	4.15 ± 1.1	13.44 (1,107)	p < .05***
Social status SED (experts)	3.16 ± .59	4.03 ± .58	10.78 (1,18)	p < .05**
Social status SED (staff)	2.71 ± 1.0	3.51 ± 1.0	16.31 (1,107)	p < .05***
Affection SED (experts)	4.08 ± .71	3.39 ± .67	4.97 (1,18)	p < .05*
Affection SED (staff)	4.25 ± 1.0	3.68 ± 1.0	7.31 (1,107)	p < .05**
Entrance positive (Chi ²)	53%	73%	5.16 (1)	p < .05*
Entrance negative (Chi ²)	47%	27%	5.16 (1)	p < .05*
Corridor positive (Chi ²)	56%	74%	3.39 (1)	p = .05
Corridor negative (Chi ²)	44%	26%	3.39 (1)	p = .05

* p < .05, ** p < .01, *** p < .001



Figure 2 A typical example of HQ common indoor environment of SHF

Description and results of the private room/apartment of SHF

At the private environmental level greater variation of physical environmental qualities between the SHF investigated was found. The majority of the residents lived in apartments rather than in single rooms, however significant differences were found with regard to the possibilities for independent living (autonomy) and formaintenance of the architectural structures, which were greater in the HQ room/apartment than in LQ. Moreover the experts perceived the private room/apartment in HQ units as more supportive for the users' needs of; social interaction, perceived control and restoration, $F(1, 18) = 15.72, p < .01, \eta^2 = .47$ and as characterized by higher degree of homelikeness $F(1, 18) = 17.78, p < .01, \eta^2 = .50$.

The SED-profile showed that HQ private environments were perceived as more pleasantness, $F(1, 18) = 11.83, p < .01, \eta^2 = .40$, having a higher degree of unity, $F(1, 18) = 13.98, p < .01, \eta^2 = .44$, complexity, $F(1, 18) = 4.76, p < .05, \eta^2 = .21$ and social status, $F(1, 18) = 6.73, p < .05, \eta^2 = .27$, as reported by the experts. A summary of the results can be seen in Table 6. No pictures of the private room/apartment can be shown due to ethical reasons.

Table 6 Private room/apartment of SHF: differences between HQ and LQ

Environmental quality indicators for the private room/apartment	LQ SHF M ± SD	HQ SHF M ± SD	F (df)	Sig.
Autonomy	2.58 ± .60	3.20 ± .44	6.83 (1,18)	p < .05*
Spatial structure	2.63 ± .50	3.52 ± .18	27.17 (1,18)	p < .05***
Maintenance	2.59 ± .37	2.86 ± .19	4.29 (1,18)	p = .05
Indirect env. effects (experts)	2.71 ± .42	3.30 ± .18	15.72 (1,18)	p < .05 **
Indirect env. effects (residents)	3.38 ± .79	3.60 ± .60	-1.29 (69)	ns
Homelikeness (experts)	2.84 ± .61	3.73 ± .24	17.77 (1,18)	p < .05**
Pleasantness SED (experts)	3.45 ± .57	4.36 ± .60	11.83 (1,18)	p < .05**
Complexity SED (experts)	3.23 ± .58	3.83 ± .63	4.76 (1,18)	p < .05*
Unity SED (experts)	4.17 ± .42	4.78 ± .27	13.98 (1,18)	p < .05**
Social status SED (experts)	2.73 ± .66	3.57 ± .78	6.73 (1,18)	p < .05*

* p < .05, ** p < .01, *** p < .001

Discussion

The present study successfully investigates the physical environmental quality of separate units of the environment of SHF (multi-place approach, Wright and Kloos, 2007) with an environmental audit tool and by adopting a multi-dimensional approach that integrates users' and experts' perspectives.

Separate levels of environmental analysis – outdoor environment of SHF

The outdoor environments of SHF did not differ very much in terms of greenery and outdoor furniture availability. Nevertheless many differences were found between HQ and LQ outdoor settings. For instance greater possibilities for social support, perceived control and restoration (indirect environmental effects) were perceived in the outdoor environments of HQ units by people with SMI (residents) and experts. These results confirm our hypothesis and prior findings from this project, which suggest that overall physical environmental quality and outdoor quality are fundamental factors for users' well-being. Moreover the results from experts' and staff's SED-profiles suggest that outdoor environments of HQ units were perceived as more pleasant, with a higher degree of unity and social status than those in LQ units. The user group panel participants found positive aspects in the HQ units' outdoor environment rather than in the corresponding LQ unit of SHF. Proximity with nature and suitable outdoor furniture were considered the main relevant attributes for a positive outdoor environment.

These results can be useful for architects and planners being as they emphasize the relevance of specific physical environmental features in supporting people with SMI's needs. For instance proximity to nature and greenery, a clear demarcation between the private garden and the nearby traffic, and harmonical and well kept architectural structures seem to be the most relevant aspects of a supportive outdoor environment.

Common indoor of SHF

The common indoor environment of SHF represents the place where staff and residents most frequently meet. Although the majority of the facilities were reproducing, through the architectural structure and design, a new form of institutional living significant differences were still found between common indoor environments of HQ and LQ units. For example the common indoors in HQ units were better supporting users' needs for; social interaction, perceived control and restoration, as reported by the experts. Moreover the results of the experts' and the staff's SED-profiles showed that HQ common indoor environments were perceived as being more pleasant, with a higher degree of unity and social status. A higher degree of affection was, however, perceived by staff and experts for the common indoor environments of LQ units. The dimension of affection is linked to an age aspect of the environment and to feelings of it being old and genuine. Being as LQ common indoor environments scored lower on the quality of single environmental factors, it is reasonable to believe that their environments were characterized by older structures and older details, which could explain the higher results on the dimension of affection.

More supportive characteristics were also found by the user group panel participants in the common indoors of HQ units. Well-designed entrances with elevators, automatic doorways and illuminated environments were positively assessed, as well as corridors decorated with greenery and homelike designs. Narrow and dark environments that resembled institutional settings were on the other hand considered negative aspects of the common areas.

Being as previous results from this project could not discriminate between the common indoor environments of SHF, these findings are of great importance for the target group of people with SMI (Marcheschi, et. al., 2012, submitted). The practical implication for future planning of supportive common indoor environments are; clear separation between private and common areas, illuminated environments, homelike interiors, and suitable facilities.

Private room/apartment of SHF

At this level of environmental analysis a greater variation in terms of physical environmental quality between the facilities was found. Analogous to the other levels of the environment, HQ private room/apartments were better in terms of supporting users' needs for; social interaction, perceived control and restoration, as reported by the experts. Moreover a greater degree of homelikeness was also perceived for the HQ private spaces. The experts' SED-profile showed that HQ environments were perceived as more pleasant, with a higher degree of complexity, unity and social status. Psychologically supportive private spaces for people with psychiatric disabilities should provide autonomy, privacy and homelike features, through their architectural structure and design for their residents.

The study results corroborate the stated hypotheses, which are that the physical environments with levels of higher qualities (HQ) were generally perceived as being more supportive for the users' needs, at each level of environmental analysis.

On the whole residents, staff, user group panel and experts, perceived the physical environment of SHF in a similar way with regards to the identification of supportive qualities. No effects of gender, age and length of living or work, were found in relation to these findings.

The study embraced a holistic approach to the investigation of the physical environment of SHF (HEI model, Küller, 1991a., 1991b.) and thus it investigated not only the impact of single environmental prerequisites but also how these aspects work together in the overall design (SED, Küller, 1991a.). The results from this holistic perspective suggest that physical qualities at each level of environmental analysis (outdoor, common indoor and private) were interacting with the overall housing design in a manner that supports visual pleasantness.

The implications of the study's results are important for the target group of people with SMI because they suggest that different units of environmental analysis will have a different impact on users' well-being. Specific design features would thus be more relevant than others depending on which unit of the environment we are considering. We suggest that future studies should enhance the involvement of architects, at this final level of the research process, in order to reduce the gap between research findings and actual application of them in the housing design of SHF. The integration of an architect's perspective could be seen as an additional tool to convert research results into design solutions that meet the needs of people with psychiatric disabilities.

This study confirms prior findings from similar settings regarding the influence of physical environmental quality in meeting users' needs (Lawton, 1983; Andersson, 2011; Devlin & Arneill, 2003; Evans, 2003). Nevertheless, further investigations will be carried out to test the impact of specific physical attributes, as well as the overall housing design, on other relevant indicators of users' well-being, such as; social climate outcomes and quality of life. Moreover future research directions could develop a new tool, based upon the ones proposed in this study, to test the extent to which differences in physical environmental qualities of SHF influence health outcomes of people with SMI.

Conclusion

The findings from this study support the importance of physical environmental qualities for the well-being of people with SMI. Moreover the study proposes a separate level of environmental analysis for the investigation of the physical environment of SHF. This method successfully discriminated between the settings and informed about which physical environmental features better support the users' needs at the outdoor, common indoor and private room/apartment level.

Previous results from this project could not discriminate between the common indoor environments of SHF because of the extreme similarity between the places (Marcheschi et al., 2012, submitted). The implications of this study are therefore relevant for future research on SHF and healthcare settings, being as they proved that a more detailed investigation of interconnected-functional units (multi-place approach) can capture salient aspects of the environment, which would otherwise have remained unknown.

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