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Quality of life and place attachment among people with severe mental illness

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Abstract

This study investigated the extent to which perceived physical and social-environment qualities of supported housing facilities (SHF) account for variations in the perceived quality of life of people with severe mental illness (SMI). Based on a user-centered approach, people with SMI (N = 72) appraised the environment of their SHF (N = 20). Moreover, it investigated whether place attachment played a role in the relationship established between the environment of SHF and users' quality of life. Perceived physical and social-environment qualities predicted quality of life. Together the two factors accounted for approximately 32% of quality of life variance. Furthermore, attachment to place mediated this relationship. Implications for future planning of psychologically supportive facilities for this vulnerable group in society are discussed.

1. Introduction

The mental health systems in the western world have faced major changes due to the process of deinstitutionalization of psychiatric services. This process has led to the creation of different forms of supported-housing facilities (SHF) for people with severe mental illness¹ (SMI) (Fakhoury & Priebe, 2002). At a more general level this phenomenon has caused a shift from institutional settings to community-based environments for people with psychiatric disabilities, with the intention to support their empowerment and well-being by fulfilling their needs for privacy, autonomy and by reinforcing their community integration (Fakhoury & Priebe, 2002; Brunt & Rask, 2005).

Internationally, the range of housing facilities differs in terms of support, programs and treatments depending on users' general functioning and needs. However, common patterns can be found across the different models with regard to the core principles of supporting community participation and independent living in homelike ambiances (Rog, 2004; Wright & Kloos, 2007; Tabol, Drebing & Rosenheck, 2010). The purpose of providing a homelike

setting to this frail group of society lies in the valuable meaning that the home environment has for the development of the individual and overall well-being (Borg, Sells, Topor, Mezzina, Marin & Davidsson, 2005; Brown & Perkins, 1992). The home is often experienced as an extension of a person's self-image and identity since it provides a sense of security and connectedness, which in turn enhances opportunity to experience feelings of belonging and attachment (Cristoferetti, Gennai & Rodeschini, 2011). Feelings of attachment towards a place have, in particular, been associated with emotional distress regulation, which in the case of people with SMI, appears to be a crucial factor for psychiatric treatments' outcome (Korpela, 1989). However, the influences of place attachment on the relationship between SHF and people with SMI are largely unknown. Moreover, home settings have been considered emblematic ambiances for the development of place attachment since they foster feelings of control and offer opportunities to restore from the external world (Giuliani, 1991; Cristoferetti et.al., 2011). For these reasons, and due to the large amount of time spent by people with SMI in their residential facilities, the environment of SHF seeks to mirror homelike ambiances rather than institutional.

Nevertheless, a great variation in the physical-environment quality of housing facilities can be found worldwide (Newman, 2001, 2008; Harkness, Newman & Salkever, 2004; Kloos & Shah, 2009). In Sweden, two levels of housing facilities are provided to people with SMI; congregate houses, with onsite professional workers, and outreach supported houses, which entails independent tenancies and regular visits from professionals (Swedish National Board of Health and Welfare, 2003, 2010). Both types of housing varies substantially in environmental quality and there are indications that institutional atmospheres are replicated in some of them (Johansson & Brunt, 2012; Marcheschi, Johansson, Brunt & Laike, 2014; Swedish National Board of Health and Welfare, 2003). Many countries are facing similar

problems in providing suitable residential facilities for people with SMI (Fakhoury, Murray, Shepherd & Priebe, 2002).

Previous research has found an association between the perceived physical-environment quality of SHF and the perceived social-environment quality (*social climate*²) of the setting (Marcheschi, Brunt, Hansson & Johansson, 2013). Furthermore, research on similar environments such as hospitals and facilities for the elderly has demonstrated that physical environmental features such as, single-bed rooms, appropriate lighting, ergonomic design and natural distractions, may also have an influence on people's health (Evans, 2003; Ulrich, 1991, 2002; Kweon, Sullivan & Willey, 1998; Newman, 2001; Tyvima, 2010; Huisman, Morales, Van hoof & Kort, 2012).

It is however unclear if the same physical environmental aspects are perceived as being psychologically supportive from the point of view of people with SMI. Evans (2003) suggests that the impact of the overall environment on residents' well-being is a consequence of the indirect effect of the built environment. Key questions thus remain about the extent to which the setting of SHF supports important functions for its residents i.e. to be in control of their environment, provide space for social interaction and restoration, and thereby contributes to i) supporting their users' well-being (Evans, Kantrowitz, & Eshelman, 2002; Evans, 2003; Knight & Haslam, 2010; Johansson & Brunt, 2012) and ii) their place attachment (Harkness et. al., 2004).

The present study thus seeks to investigate if the perception of physical and social-environment qualities is associated with variations in the well-being of people with SMI, and if place attachment is an underlying factor in this process. The well-being of people with psychiatric disabilities was operationalized in terms of perceived quality of life.

1.1 Place attachment

Emotions have been recognized as fundamental parts of the human–environment interaction but there is, however, a paucity of knowledge regarding the impact that feelings of attachment towards a place (home) have on the well-being of people with SMI (Kaplan & Kaplan, 1984; Morgan, 2010).

Place attachment is a multifaceted phenomenon that occurs over time and integrates different aspects of human-environment interaction (Rollero & De Piccoli, 2010). It has been defined as an emotional bond established between a person and a place in which a particular place acquires a special meaning for the individual and is associated with feelings of security, control and opportunities for privacy and restoration (Hidalgo & Hernández, 2001; Harris, Brown & Werner, 1996).

Different levels of place attachment can be experienced by the individual. These levels may vary from a sense of belonging to a place, to feelings of identification with it, and at the highest level to a feeling of commitment and willingness to sacrifice for the sake of the place (Shamai, 1991; Kaltenborn, 1998; Twigger-Ross, Bonaiuto & Breakwell, 2003; Hernández, Hidalgo, Salazar-Laplace & Hess 2007). Some studies have reported a connection between place attachment and health outcomes (Brown & Perkins, 1992; Harris, Werner, Brown & Ingebritsen, 1995). Attachment and satisfaction with the place of residence have been also acknowledged as predictors of mental health outcomes in vulnerable groups such as, elderly people and people with psychiatric disabilities (Evans et. al., 2002; Wright & Kloos, 2007). Moreover, It has been suggested that environmental dependency and attachment increase when the individual physical, mental and social functioning decreases (Lawton, 1970, 1983; Baroni, 1998). Research has traditionally linked place attachment to home environments, since home environments are commonly considered as symbols for self-continuity and positive self-image (Giuliani, 1991; Rollero & De Piccoli, 2010; Cristoforetti et. al., 2011).

The focus on place attachment has so far been on the process of attachment and the role of individual characteristics in this process. Whereas the setting's attributes and its role as determinant for place attachment development appears to be a neglected area of research (Hidalgo & Hernández, 2001; Scannell & Gifford 2010^a; Lewicka, 2010, 2011^a). It has been claimed that there is a need for theoretical development regarding which physical dimensions contribute to the growth of meaning and attachment towards different environments, and future research directions that emphasize the physical aspects of place attachment have been recommended (Stedman, 2003; Lewicka, 2011^a).

We embrace this issue by investigating the influence of environmental qualities on place attachment, with regard to the living situation of people with SMI. Moreover, we investigate if place attachment is an underlying factor that intercedes between the environment of SHF and users' well-being. Knowledge derived from the field of environmental psychology and human geography have been integrated within the study's theoretical background. For instance, the concept of sense of place, commonly used among geographers, was considered as an overarching indicator of the relationship between SHF and its users, due to its consideration of physical factors as determinants for place attachment growth (Kaltenborn, 1998; Eisenhauer, Krannich & Blahna, 2000; Stedman, 2003; Jorgensen & Stedman, 2006). This construct suggests that the role played by physical environmental features cannot be neglected because meanings and attachments towards places are based on environmental attributes and not exclusively on individuals' characteristics, social ties and prior experiences (Stedman, 2003; Shamai, 1991; Shamai & Ilatov, 2005). The information gathered by the concept of sense of place implies an assessment of the setting that results from a conscious effort to evaluate its actual quality rather than from familiarity through long residence (Easthope, 2004). From the environmental psychology literature suggestions have been made regarding the link between residential rootedness and place attachment and identity. The

concept of ‘rootedness’ has been differently defined across the literature, shifting from concepts of unselfconscious association with a place (Proshansky, Fabian & Kaminoff, 1983) to an overarching indicator of the quality of the attachment established between a person and a place (Tuan, 1980; Hummon, 1992). This latter definition goes beyond the simple familiarity with the setting since it claims that the quality of the experience established in the setting matters more than duration (Tuan, 1977). Moreover, it includes a self-conscious decision to live in a place and to take active interest in it, ‘ideological rootedness’ (Hummon, 1992; Lewicka, 2011^b). For the present study, information regarding the sense of rootedness as intended in Hummon’s typology of ‘ideological rootedness’ was included for the assessment of people with SMI’s attachment towards SHF (Proshansky et. al., 1983; Twigger-Ross & Uzzell, 1996; Fried, 2000; Rollero & De Piccoli, 2010; Scannell & Gifford 2010^a; Lewicka, 2011^b).

1.2 Quality of life

Quality of life is an acknowledged concept in the fields of medicine, psychology and other health related disciplines. It is commonly used as an overarching indicator of peoples’ well-being since it encompasses evaluations of the individual’s holistic experience of life (Bonaiuto, Fornara & Bonnes, 2006; Marans, 2003). The World Health Organization (WHO) has defined quality of life as a multidimensional construct that results from subjective evaluations of fundamental aspects of life such as, physical and psychological well-being, social functioning and environmental quality (WHOQOL, 1993; Power, Harper, Bullinger & WHOQOL, 1999; Steg & Gifford, 2005; Johansson & Laike, 2007).

Improving the quality of life of people with psychiatric disabilities has been one of the major aims of the deinstitutionalization process and related community integration (Shadish, Orwin, Silber & Bootzin, 1985). Across clinical studies the quality of life of people with SMI has mainly been conceptualized through the satisfaction model proposed by Lehman (1988),

which comprises two major domains: objective quality of life and subjective satisfaction with life (Holloway & Carson, 2002; Hansson, 2006). The first domain refers to external life situations such as housing conditions, family income, residential stability and employment, whereas the second domain provides information about the individual's own appraisal of his/her life (Holloway & Carson, 2002).

At present, quality of life (QoL) is a commonly established outcome in the treatment of patients with SMI and in particular of patients with schizophrenia disorders (Oliver, Huxley, Priebe & Kaiser, 1997; Priebe, Reininghaus, McCabe, Burns, Eklund, Hansson, Junghan, Kallert, van Nieuwenhuizen, Ruggeri, Slade & Wang, 2010). However, it has primarily been used as an outcome measure in studies of the effect of different treatments and mental health services, whereas a rather small number of studies have focused on its relationship to physical and social environmental features (Shadish et al. 1985; Hansson, 2006; Brunt & Rask, 2007).

The present work seeks to reduce this knowledge gap by investigating the influence of perceived physical and social-environment qualities of SHFs on the well-being of people with SMI. For this purpose, and based upon its proven psychometric properties, the construct of quality of life proposed by Lehman and further developed in the Manchester Short Assessment of Quality of Life instrument (MANSA, Priebe, Huxley, Knight & Evans, 1999) was chosen as the main study outcome (Björkman & Svensson, 2005; Priebe et al. 2010).

1.3 Theoretical background

The study employs the Human-Environment Interaction model (HEI model, Küller, 1991^a; 2004) as a theoretical background, for the investigation of SHF for people with SMI. The model asserts how humans' emotional processes are influenced by the interaction with the physical and social environment, and by the activities in which the individuals are involved. These influences vary over time, and are modified by personal characteristics and previous experiences. This approach considers the basis of the emotions as inner states, which are

experienced by the individual as positive or negative and can directly influence humans' perception, cognition and behaviour. This appraisal process is used by the individual to estimate affective qualities of the environment and of life events (see also Mehrabian & Russell, 1974). From a *Salutogenic* perspective, such as the one embraced by this project, all factors that support positive emotional outcomes of the basic emotional process are expected to positively affect humans' emotional regulation and consequentially their well-being (Antonovsky, 1996, Bringslimark, Bysheim, & Nyrud, 2009).

In order to experience a positive emotional state in the environment of SHF the setting should offer possibilities for emotional regulation by for instance providing support to people with SMI in order to meet their needs. In previous parts of the project, these needs have been operationalized in terms of indirect environment effects of the physical environment and positive social climate (Marcheschi et al., 2014; Marcheschi et al., 2013). The indirect environmental effects refer to the extent to which the user perceives the physical environment, to support possibilities for social interaction, privacy and restoration (Evans, 2003). Due to their impact on users' health the indirect environmental effects, as proposed by Evans (2003), were employed as indicators of users' perceived physical-environment quality. The concept of social climate, which in the present study encompasses the perceived quality of interpersonal relationships established in the environment of SHF, has been acknowledged as one of the most relevant single factors for psychiatric treatments and for this reason included as positive indicator of social environmental perception among people with SMI (Goffman, 1961; Cournos, 1987; Moos, Shelton & Petty, 1973).

Moreover, in the present study the constructs of place attachment and quality of life were integrated within the study's theoretical background in order to investigate the emotional and well-being response of people with SMI in relation to the environment of SHF. The multifaceted measure of place attachment provides information concerning the quality of the

human - environment relationship and it was chosen because it is acknowledged as a meaningful and emotional state, which is expected to intercede between the environment and individual's well-being (Korpela, 1989; Giuliani, 1991; Rollero & De Piccoli, 2010;). The construct of quality of life was included as an overarching indicator of the well-being of people with SMI due to its proven reliability across clinical studies on psychiatric patients (Priebe et al., 2010; Björkman & Svensson, 2005).

In line with the HEI model, positive and repetitive emotional episodes, experienced in the environment of SHF, are expected to generate place attachment and a positive quality of life perception (Morgan, 2010). In other words, environments that provide possibilities to regulate users' needs for social interaction, privacy, restoration (perceived physical-environment quality) and have a positive social climate (perceived social-environment quality) are expected to better support the development of place attachment and in turn positively affect quality of life.

Although the overall project employs multidimensional approaches, which entail environmental assessments of different social actors, the present study seeks to investigate exclusively the subjective perspective of people with psychiatric disabilities. This type of approach can be defined as user-centered because it focuses on users' subjective perception. Subjective appraisals of environmental users are likely to be more predictive of the individual experience than objective measures of the same (Bonnes & Secchiaroli, 1995; Fransson, Västfjäll & Skoog, 2007; Wright & Kloos, 2007).

The present work aims to assess the extent to which perceived physical and social-environment quality affects the perceived quality of life of people with SMI. Moreover, it seeks to investigate if place attachment plays a role in the relationship established between the environment of SHF and users' quality of life. The following research questions are addressed:

1. To what extent does the perception of physical and social-environment qualities in the environment of SHF account for the quality of life perception of people with SMI?

It is hypothesized that perceived physical and social-environment quality will influence variations in terms of people with SMI's quality of life, since physical and social environments directly and indirectly influence people's well-being (Evans, 2003; Baroni, 1998).

2. Does attachment to place mediate the effects of perceived physical and social environment-quality of SHF on the well-being (perceived quality of life) of people with SMI? Place attachment is expected to be a mediator of the environment of SHF (Evans et. al., 2002). Moreover, it is expected to be a stronger mediator for the influence of the physical-environment quality rather than the social-environment quality since it is commonly defined as an underlying mechanism that emotionally connects a person to a physical setting or a geographic location (Rubinstein & Parmelee, 1992; Hidalgo & Hernández, 2001; Stedman, 2003).

2. Method

2.1 Participants and settings

A total of 72 people with SMI from a sample of 160 participated in the study (45% response rate). Their mean age was 52.5 years (range 25 - 83 years) and 40% were women and 60% men. At the time of the data collection about 47% of them had lived in the same facility for more than 5 years, and 4% for less than a year. This group of people with psychiatric disabilities is characterized by individuals with long term severe mental illness, mainly with a diagnosis of psychosis or bipolar disorders. The housing facilities investigated consist of private apartments located in one building with on site professional workers. Assistance and support to the residents are provided on a daily basis 24 hours per day, 7 days a week. Twenty housing facilities were included in the study. The facilities are located in the southern

part of Sweden, Scania region, and in a previous part of this project a stratified sampling technique was adopted to ensure variation between them with regard to the degree of homelikeness and localization. The present study focuses on the investigation of the immediate environment of the SHFs, which includes the outdoor environment (garden), the common indoor and the private room/apartment. The physical setting of each facility was assessed in a previous part of the project by experts with an environmental audit tool. This latter accounts for 17 environmental quality indices such as, building accessibility, architecture and spatial structure, outdoor design, presence of greenery, maintenance, quality of environmental factors (light, color, noise, temperature and odor), interior design and decoration (Marcheschi et. al., 2014).

2.2 Instruments

People with SMI assessed the quality of the physical environment of SHF with a post-occupancy evaluation questionnaire, which in line with Evans (2003) investigates to what extent the users perceive the design of the physical environment to provide for social interactions, privacy (perceived control) and restoration possibilities (Johansson & Brunt, 2012). The instrument contains 10 items with a 5-point response scale, the first 9 items have a scale in which '1' indicates 'totally disagree' to '5' that indicates 'totally agree', item 10 has a scale in which '1' indicates 'bad' and 5 indicates 'good'. The items together result in a POE-index, created by averaging them (Cronbach's $\alpha = .74$). The items composing this measure are provided in Appendix A.

For the social-environment quality assessment (social climate perception) the participants completed the short version of the Community Oriented Programs Environmental Scale (COPES, Moos, 1987). This instrument was revised by the researchers based upon the items' psychometric properties³ and content relevance for the environment of today's SHFs. For this investigation of the social climate only the dimension of perceived social relationship quality

proposed in COPEs was used. This dimension contains 12 items on a 4-point scale (1 indicates ‘not at all’ 4 indicates ‘very much’) and comprises the subscales of involvement, support, and spontaneity. Notably, the third item of the subscale ‘involvement’ and the first three items of the subscale ‘spontaneity’ were reverse coded prior to the analysis. The measure showed satisfactory internal consistency with Cronbach’s $\alpha = .67$. The formulation of the items composing the dimension of social relationship quality is provided in Appendix B.

Regarding the construct of place attachment (PA), a scale was developed specifically for the present purpose based upon the levels of sense of place, proposed by Shamai (1991; 2005). The scale adopts a micro level of analysis with regard to the human-environment interaction; thus focusing on the immediate physical environment of SHF (outdoor, common indoor & private room), where the participants are asked to think of their physical settings while answering the questionnaire. Moreover, it accounts for different levels of attachment towards a place from no-attachment ‘placelessness’ (Hummon, 1992), to attachment/identification, involvement/willingness to sacrifice and rootedness (Hummon, 1992). This instrument contains 8 items on a 5-point scale, for the first 7 items ‘1’ indicates ‘totally disagree’ and ‘5’ indicates ‘totally agree’ whereas, for item number 8 ‘1’ indicates ‘not at all’ and ‘5’ indicates ‘very much’. The first two items with reverse-coded gradation were reversed ahead of the scale score construction. The items together result in an overall place attachment score, which is constructed by averaging them (Cronbach’s $\alpha = .82$). An overview of the items composing the place attachment instrument can be seen in Table 1.

The well-being of people with SMI was assessed by the Manchester Short Assessment of Quality of Life (MANSA, Priebe et. al., 1999). The psychometric validity of the Swedish version of the MANSA has been tested and confirmed (Björkman & Svensson, 2005). This measure accounts for an overarching index of life satisfaction with regard to the domains of

work, economic situation, friendships, leisure time activities, housing conditions, personal safety, relationship with other residents/neighbors, family and physical and psychological health. The instrument contains 16 items; four of these refer to objective matters of life and are presented on a dichotomous scale (yes or no answer). The remaining 12 items focus on a subjective perception of satisfaction with life, which are to be answered on a 7-point scale ('1' indicates 'could not be worse' to '7' indicates 'could not be better') and result in an overall quality of life score, constructed by averaging the items (Cronbach's $\alpha = .84$). Only the 12 items focusing on the subjective evaluation of quality of life have been used as indicator for the well-being of people with SMI in the present study.

2.3 Procedure

A power point presentation was used by the first author to orally inform the participants about aims and procedures of the study. Afterwards, people with SMI were asked to participate and to evaluate the physical and social-environment qualities of the facility in which they live, as well as to report their perception of place attachment and quality of life. For this purpose, self-report questionnaires were adopted. The participants had approximately 2 weeks to complete the questionnaires and to return them to the staff member responsible for the data collection in previously provided sealed envelopes.

3. Ethical Considerations

The study was approved by the Regional Ethical Review Board, Linköping, Sweden (EPN Dnr: 73, 2009). Approval for data collection was also provided by the manager of the social services responsible for each of the twenty SHFs in the study. A consent-informed approach was applied for both staff and people with SMI, and a staff member was also chosen as responsible for the data collection. This means that he/she could, if required, support the residents while completing the survey, by for instance reading aloud the questions, but not commenting or influencing their answers. This approach was previously tested in a pilot study

and was believed to be less disturbing and invasive for people with SMI, than if an unknown researcher were to assist them. Due to ethical reasons, no information regarding residents' diagnosis was reported.

4. Statistics

Missing values on single scales were replaced by the series mean for the perceived physical-environment quality (POE), the place attachment (PA), the perceived social-environment quality (social climate) (COPEs) and the quality of life (MANSA) measures (missing values < 15%). However, due to large internal drop out, and unsuitable items' content for the living situation of people with SMI, two items from the scale of COPEs (item 2) and MANSA (item 13) were deleted from the analysis. The content of item 2 ("The staff are very interested in how it goes for the residents after they have left the SHF") from COPEs and 13 (How satisfied are you with your sexual life?) from MANSA. The first of these two items focuses on a hypothetical and improbable situation that is less easy to respond to, while the second refers to a relatively private aspect of a person's life, which might explain why some of the participants found it difficult to respond to them.

Hierarchical regression analyses were used to test the extent to which perceived physical and social-environment qualities of SHFs account for the well-being of people with SMI and for testing the potential mediator effects of place attachment. The method used to enter the independent variables in the hierarchical model was that of 'blockwise entry' in which the experimenter decided the order of enter of each predictor (Field, 2009). The effects of gender, age and length of living in SHF were controlled for, by entering these variables in the first step of the regression model. The logic of mediation, proposed by Baron and Kenny (1986), was adopted to estimate the potential mediation of place attachment on the study outcome. The Sobel test procedure was then used to statistically probe the effect and the degree of the mediator on the predictor-outcome relationship (<http://quantpsy.org/sobel/sobel.htm>). The

data was analyzed using SPSS, Statistical Package for the Social Sciences for Windows, version 21. The p -value criterion for significance was set to $p = 0.05$.

5. Results

5.1 Quality of life results and test of mediation

Positive relationships between the measures of perceived physical and social-environment qualities, place attachment and quality of life were found (Table 2).

In the first regression model we tested the relationship between perceived physical-environment quality (POE) and perceived quality of life (MANSA) and if place attachment (PA) was a mediator of this relationship. Table 3 shows that in step 1 POE is associated with MANSA ($F(4, 60) = 3.4, p < .01$) and when entering PA (step 2) the explained variance in MANSA increases. These factors account approximately for 40% of quality of life variance among people with SMI ($F(5, 59) = 20.7, p < .001$). Notably, the magnitude of perceived physical-environment quality (POE) is substantially reduced to the point of non-significance once the mediator (PA) is included in the regression model (Table 3, step 2). Such a reduction is in line with what Baron and Kenny define as complete mediation (1986). The Sobel test was used to statistically assess the degree and significance of the mediation. The result further indicates that place attachment is a significant mediator of the effects of physical-environment quality on the perceived quality of life ($z = 3.5, p < .001$).

The second regression model tested the relationship between perceived social-environment quality (COPES) and perceived quality of life (MANSA) and the potential mediation role of place attachment (PA) on this relationship (Table 4). COPES was associated with MANSA ($F(4, 60) = 6.42, p < .001$) (step 1), as well as PA was associated with MANSA ($F(5, 59) = 16, p < .001$) (step 2). Together, COPES and PA account for 45% of quality of life variance among people with SMI.

The magnitude of COPES is reduced once PA is introduced into the regression model (step 2). The reduction in the β -values of COPES indicates the presence of a partial mediation. The Sobel test confirms that place attachment is a significant mediator of the effects of social-environment quality on the perceived quality of life outcome ($z = 3.8, p < .001$).

No effects of gender, age or length of living are found in the two regression analyses and the VIF values of both models are below 10 and the tolerance statistics are greater than 0.2.

In order to test the combined effects of perceived physical and social-environment qualities on the perceived quality of life among people with SMI, and to prove the mediating role of place attachment on this relationship, a three steps regression model was tested (Table 5). Similar to the previous tested models, the results of step 1 and step 2 suggest that perceived physical-environment quality (POE) and perceived social-environment quality (COPES) significantly account for 32% of quality of life variance among people with SMI. The effect of POE in step 1 is however reduced to the point of non-significance in step 2 when COPES is introduced in the regression model.

When place attachment is added to the model in step 3 another 13% of variance is accounted for. Just as in the second regression model the β -value for COPES is reduced when place attachment is added. The three variables together explain approximately 45% of quality of life variance among people with SMI. No effect of gender, age or length of living was found in the first two steps of the regression analysis. The VIF values for the current model are below 10 and the tolerance statistics are greater than 0.2

6. Discussion

The present study assesses the relationship between perceived physical and social-environment qualities of SHF and the well-being of people with SMI. Moreover, it investigates the potential mediating effects of place attachment on this relationship.

Based on findings from similar settings, it was hypothesized that housing facilities that sustain possibilities for social interaction, privacy and restoration in the physical environment and a positive social climate in the social environment would better support the well-being of people with SMI (Evans, 2003; Lemke & Moos, 1987; Moos & Houts, 1968). This hypothesis was confirmed by the influence that the perception of higher levels of physical and social-environment quality has on the perception of quality of life experienced by people with SMI. Moreover, place attachment was found to be a mediating factor of the relationship between the environment and users' well-being. This is in line with what is posited by the HEI model concerning the association between supportive environments and users' positive emotional responses and confirms the second hypothesis.

The results from the physical environmental assessment of SHFs for people with SMI corroborate findings from similar disciplines, such as architecture and gerontology, on hospital environments and elderly facilities. These areas have systematically reported a connection between the quality of the environment and mental health outcomes and this is the case, for instance, of physical environmental features that promote possibilities for social interaction, perceived control (privacy) and restoration.

The perception of a positive social climate was also found to be associated with positive quality of life responses, confirming previous findings (Cournos, 1987). However, the present study had the further aim to investigate how the combination of perceived physical and social environmental quality impacts people with SMI. The environment of SHFs, in accordance with the HEI model (1991), is composed of different domains (physical – social), which are perceived as constituting parts of the same environment from a user perspective (Baroni, 1998; Moderato & Rovetto, 2006; Wright & Kloos, 2007). The hypothesis that the combined effect of these domains would influence the well-being of people with SMI was confirmed by

the study's results. Perceived physical and social-environment qualities account for approximately 32% of variance of the perceived quality of life among people with SMI.

An interesting result regards the significance of the perceived physical-environment quality, which disappears once the perceived social-environment quality is introduced to the regression model. The effect of physical environmental features on social relations has previously been identified in hospital settings (Holahan, 1972; Holahan & Seagert, 1973; Zimring, Reizenstein, Carpman & Michelson, 1987). Already in 1958, Sommer and Ross demonstrated with an experiment in a mental hospital that it is possible to create ambiances that support users' social interaction (sociopetal spaces) by simple positioning furniture such as, chairs and tables, closer together rather than along a wall.

It could be argued, that the potential mediation effect of the perceived social climate quality on the relationship between the perceived physical environment quality of SHF and the well-being among people with SMI would be explained by the overlapping scope of POE and COPES regarding the quality of interpersonal relationships. Nevertheless, the mediating role played by the social environment remains a plausible outcome since the aforementioned measures investigate different aspects of these relationships. The measure of physical environmental quality refers to how well, the physical environment itself, is perceived by the users to support regulation of social interactions through environmental features such as, furniture and private areas, whereas the measure of social environmental quality refers to the perceived quality of the social relationships (social climate) established in the setting (Appendix A & B).

The possible scenario of the social climate being a mediating factor of the relationship between the physical environment and users' well-being was also hypothesized in the work of Lemke and Moos (1987). However, this research direction has not received much attention, as there has been a greater focus on a more general conceptualization of the social climate as an

overarching atmosphere of the place. For this reason, in clinical studies, the dimensions of programs for psychiatric treatments and administrative structures are commonly investigated, together with the dimension of social relationship, as integral parts of the social climate construct (Moos, 1972; Moos, Gauvain, Lemke, Max & Mehren, 1979).

In this study, the dimension of social relationship was assessed per se, and the results suggest that it mediates the influence of the physical environment on the quality of life of people with SMI. From a theoretical perspective we could argue that the mediation of social climate might be explained by its connection with place and social identification processes since, the measure of social climate used in the study accounts for users' perception of quality of social relationships. This view transferred the focus of the discussion of the social climate as an overarching atmosphere of the setting to one of a multifaceted phenomenon, in which, the dimension of perceived quality of social relationship, has a great relevance for the individual development of what Weber (2013) defines as social place identity. This latter is a socially determined identity that occurs in places that facilitate attachment, through their physical features, and in which the individual perception of quality of social relationships accounts for the degree of identification with the group of social actors involved (Proshansky et. al., 1983, Weber, 2013). The potential association between social climate and processes that sustain self-identification could explain findings from psychiatric research, which have largely demonstrated a link between social climate and well-being of people with SMI. Indeed, environments that are beneficial for an individual's identity have proven to be relevant for emotional distress regulation, self-actualization, self-continuity and satisfaction with life (Korpela, 1989; Knight & Haslam, 2010). Future investigations might want to assess social climate from this novel perspective, also considering potential underlying processes and their association with the physical environment.

Such an approach might overcome the difficulties that clinical studies have been facing while trying to define the concept of social climate, which to date, remains an intangible and yet so fundamental aspect for psychiatric treatments outcomes (Brunt & Hansson, 2002).

The results on place attachment confirm previous research findings reporting a connection between attachment to place and health outcomes (Brown & Perkins, 1992; Harris et. al., 1995; Evans et. al., 2002). Place attachment, together with perceived physical and social-environment quality account for 45% of quality of life variance among people with SMI. In the present study, place attachment appears to work as a complete mediating factor for the effect of the perceived physical-environment quality and as a partial mediating factor for the effect of the perceived social-environment quality, which is in line with the stated hypothesis. The differences found between physical and social environment regarding the magnitude of place attachment's mediation could be explained by the type of measure adopted for the investigation. Since the scale used for the assessment of place attachment was framed towards physical environmental features, rather than social aspects, a greater mediation on the effect of the physical environment could have been expected (Shamai, 1991). The scale refers to emotional connections established between people with SMI and their physical settings (dwelling), whereas emotional bonds between different social actors such as neighbor ties or interpersonal relationships are not included (Table 1). This approach was chosen to emphasize the role played by physical environment quality in determining the growth of place attachment. The findings show that housing facilities designed to support the perception of the users regarding possibilities for social interaction, privacy and restoration are most likely to sustain the development of place attachment, which in turn indirectly affects the quality of life perception among people with SMI. This indicates the existence of underlying mechanisms that mediate the effect of the perceived physical environment quality of SHFs on users' well-being. Our findings thus emphasize the need for greater attention towards the creation of

home environments that are psychologically supportive for the vulnerable group of people with SMI (Wiles, Allen, Palmer, Hayman, Keeling & Kerse, 2009). Further investigations should aim to focus on which specific physical environmental features are associated with the perception of high environmental quality among people with SMI as well as linked to the development of a positive social climate and place attachment, since these two factors appear to be related to quality of life perception among people with SMI.

One potential limitation of the study regards the user-centered approach adopted for the data collection, which may be biased by individual characteristics. On the other hand, this study is part of a larger research project in which the different perspectives of experts and SHFs' users (social actors) have been tested. Results have shown that these different social actors share similar views with regard to the identification of psychologically supportive environmental aspects. Moreover, users' subjective perception of environmental quality has been acknowledged as being more informative of people's well-being than experts' technical evaluations (Bonnes & Secchiaroli, 1995; Fransson et. al., 2007).

A further limitation may be the measures used for the investigation of the social climate and the quality of life among people with SMI (Moos, 1987; Björkman & Svensson, 2005). Despite the revisions performed by the researchers the measures appeared not to be entirely suitable as there were a number of missing values on two specific items, and consequently removed from the analysis. The target group of people with SMI had some difficulties in providing answers about hypothetical questions and those of a personal nature. Future investigation might want to consider adopting other measures, which in turn might increase the response rate of people with SMI (Brunt & Rask, 2012). Moreover, further investigations with a larger sample are suggested in order to investigate whether the social climate mediation in the relationship between physical environment and quality of life, can be confirmed by means of structural equation modelling.

Another potential limitation regards the place attachment scale, which was purposely framed towards the physical environment of SHF rather than the social. However, the extent to which the participants effectively discerned the social qualities of the environment in their evaluation of place attachment is not given. Nevertheless, since the instructions of the questionnaire were clearly orienting the participants towards the evaluation of physical environmental features, it is reasonable to believe that they had their physical setting in mind while answering the place attachment scale. Future investigations are desirable to test the extent to which this type of scale accounts for people's attachment towards physical aspects of the environment.

A final limitation is the cross-sectional design adopted for the data collection, which does not allow any type of inferences regarding the causality between the variables involved.

The physical and social environments affect each other to such an extent that their interaction cannot longer be neglected by planners of housing facilities for people with psychiatric disabilities. There is thus a need for further research to reconsider the importance of the overall (physical and social) environment in determining health outcomes of psychiatric patients. Since the completion of social interventions, programs and daily activities (social climate) would most likely be affected by the perceived quality of the physical setting, future research should investigate the extent to which physical features support the development, and the well-functioning, of different social interventions. Presumably, environments in which physical and social aspects are synchronized to support one another would have a greater impact on the well-being of people with SMI than if these two domains were to be separately approached.

On a more practical level, this study emphasizes the need for future planning of SHFs, or modification of existing ones, in the direction of environments that are perceived by their users to support possibilities for social interaction, privacy and restoration, since these aspects

appear to be associated with the well-being of people with SMI. Policy makers and planners may want to use these findings as design guidelines or environmental prerequisites for the creation of psychologically supportive facilities. Such type of design recommendations focuses on the occupational purpose that the physical environment should sustain, through its design features, rather than on which specific physical attributes should be placed in the setting. This leads to an overarching conclusion that various design solutions can be used to accomplish the same objective, which is that of obtaining functional environments that offer possibilities to regulate users' social interaction, privacy and restoration, and be for this reason perceived as more psychologically supportive from the frail population of people with SMI.

¹ The terms “severe mental illness” and “psychiatric disabilities” have been similarly defined in the psychiatric literature and for this reason used as interchangeable terms in the present work.

²The term ‘social climate’ has been used in this paper to indicate the quality of the perceived social environment established in the setting of SHF.

³ Psychometric properties refer to the Corrected Item-Total Correlation (CITC) approach, which was used in order to select which items from the COPES scale should be employed in the present study.

References

Antonovsky, A. (1996). The salutogenic model as a theory to guide health promotion. *Health Promotion International*, 11 (1), 11-18.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychology research. Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51 (6), 1173-1182.

Baroni, M. R. (1998). *Environmental Psychology* [in Italian]. Bologna, Il Mulino.

- Björkman, T., & Svensson, B. (2005). Quality of life in people with severe mental illness. Reliability and validity of the Manchester Short Assessment of Quality of Life (MANSA). *Nordic Journal of Psychiatry*, 59 (4), 302-306.
- Bonaiuto, M., Fornara, F., & Bonnes, M. (2006). Perceived residential environment quality in middle- and low-extension Italian cities. *Revue européenne de psychologie appliquée*, 56 (1), 23-34.
- Bonnes, M., & Secchiaroli, G. (1995) *Environmental psychology. A psycho-social introduction*. London: Sage.
- Borg, M., Sells, D., Topor, A., Mezzina, R., Marin, I., & Davidsson, L. (2005). What makes a house a home. The role of material resources in recovery from severe mental illness. *American Journal of Psychiatric rehabilitation*, 8, 243-256.
- Bringslimark, T., Bysheim, K., & Nyrud, A. Q. (2009). *Design and Health*. Evidence based biophilic design. Conference paper. Oslo, Norway.
- Brown, B., & Perkins, D. (1992). Disruption in place attachment. In I. Altman & S. Low (Eds.), *Place attachment* (pp 119-132). New York: Plenum.
- Brunt, D., & Hansson, L. (2002). Characteristics of the social environment of small group homes for individuals with severe mental illness. *Nordic Journal of Psychiatry*, 56 (1), 39-46.
- Brunt, D., & Rask, M. (2005). Patient and staff perceptions of the ward atmosphere in a Swedish maximum-security forensic psychiatric hospital. *Journal of Forensic Psychiatry and Psychology*, 16 (2), 263-276.
- Brunt, D., & Rask, M. (2007). Ward atmosphere. The scarlet pimpernel of psychiatric settings? *Issues in Mental Health Nursing*, 28, 639-655.
- Brunt, D., & Rask, M. (2012). A suggested revision of the Community Oriented Program Environmental Scale (COPES) for measuring the psychosocial environment of supported

housing facilities for people with psychiatric disabilities. *Issues in Mental Health Nursing*, 33, 24–31.

Cournos, F. (1987). The Impact of Environmental Factors on Outcome in Residential Programs. *Psychiatric Services*, 38 (8), 848-852.

Cristoferetti, A., Gennai, F., & Rodeschini, G. (2011). Home sweet home. The emotional construct of places. *Journal of Aging Studies*, 25 (3), 225-232.

Easthope, H. (2004). A place called home. *Housing, Theory and Society*, 21 (3), 128-138.

Eisenhauer, B. W., Krannich, R. S., & Blahna, D. J. (2000). Attachments to special places on public lands. An analysis of activities, reason for attachments, and community connections. *Society & Natural Resources*, 13 (5), 421-441.

Evans, G. W., Kantrowitz, E., & Eshelman, P. (2002). Housing quality and psychological well-being among the elderly population. *Journal of Gerontology*, 57^b. (4), 381-383.

Evans, G. W. (2003). The built environment and mental health. *Journal of Urban Health*, 80 (4), 536-555.

EPN (Etikprövningsnämnden) Dnr: 73 (2009). Lag (2003:460) om etikprövning av forskning som avser människor. [Swedish Act concerning the Ethical Review of Research Involving Humans]. Linköping: Regional ethical review board.

Fakhoury, W., & Priebe, S. (2002). The process of deinstitutionalization an international review. *Current Opinion in Psychiatry*, 15, 187-192.

Fakhoury, W., Murray, A., Shepherd, G., & Priebe, S. (2002) Research in supported housing. *Social Psychiatry and Psychiatric Epidemiology*, 37, 301 - 315.

Field, A. (3rd Eds.) (2009). *Discovering Statistics using SPSS*. London: Sage.

Fransson, N., Västfjäll, D., & Skoog, J. (2007). In search of the comfortable indoor environment: A comparison of the utility of objective and subjective indicators of indoor comfort. *Building and Environment*, 42, 1886–1890.

- Fried, M. (2000). Continuity and discontinuity of place. *Journal of Environmental Psychology*, 20 (3), 193-205.
- Giuliani, M. V. (1991). Towards an analysis of mental representations of attachment to the home. *Journal of Architectural and Planning Research*, 8 (2), 133-146.
- Goffman, E., (1961). *Asylums: Essays on the social situation of mental patients and other inmates*. New York, NY: Anchor Doubleday.
- Hansson, L. (2006). Determinants of quality of life in people with severe mental illness. *Acta Psychiatrica Scandinavica*, 113 (Suppl. 429), 46-50.
- Harris, P. B., Werner, C. M., Brown, B. B., & Ingebritsen, D. (1995). Relocation and privacy regulation, a cross-cultural analysis. *Journal of Environmental Psychology*, 15 (4), 311-320.
- Harris, P. B., Brown, B. B., & Werner, C. M. (1996). Privacy regulation and place attachment. Predicting attachments to a student family housing facility. *Journal of Environmental Psychology*, 16 (4), 287-301.
- Harkness, J., Newman, S. J., & Salkever, D. (2004). The cost-effectiveness of independent housing for the chronically mentally ill. Do housing and neighborhood features matters? *Health Services Research*, 35 (9), 1341-1360.
- Hidalgo, M. C., & Hernández, B. (2001). Place attachment conceptual and empirical questions. *Journal of Environmental Psychology*, 21, 273-281.
- Hernández, B., Hidalgo, M. C., Salazar-Laplace, E., & Hess, S. (2007). Place attachment and place identity in natives and non-natives. *Journal of Environmental Psychology*, 27 (4), 310–319.
- Holahan, C. (1972). Seating patterns and patient behavior in an experimental dayroom. *Journal of Abnormal Psychology*, 80 (2), 115-124.

- Holahan, C. J., & Saegert, S. (1973). Behavioral and attitudinal effects of large-scale variation in the physical environment of psychiatric wards. *Journal of Abnormal Psychology*, 82 (3), 454-462.
- Holloway, F., & Carson, J. (2002). Quality of life in severe mental illness. *International Review of Psychiatry*, 14, 175-184.
- Huisman, E. R. C. M., Morales, E., Van Hoof, J., & Kort, H. S. M. (2012). Healing environment. A review of the impact of physical environmental factors on users. *Building and Environment*, 58 (0), 70-80.
- Hummon, D. (1992). Community attachment. Local sentiment and sense of place. In: I. Altman & S. M. Low (Eds.), *Place attachment* (pp. 253-277). New York and London: Plenum.
- Johansson, M., & Laike, T. (2007). Intention to respond to local wind turbines. The role of attitudes and visual perception. *Wind Energy*, 10 (5), 435-451.
- Johansson, M., & Brunt, D. (2012). The physical environment of purposed-built and non-purpose built supported housing for people with psychiatric disabilities in Sweden. *Issues in Mental Health Nursing*, 33, 223-235.
- Jorgensen, B. S., & Stedman, R. C. (2006). A comparative analysis of predictors of sense of place dimensions. Attachment to, dependence on, and identification with lakeshore properties. *Journal of Environmental Management*. 79 (3), 316-327.
- Kaltenborn, B. P. (1998). Effects of sense of place on responses to environmental impacts. *Applied Geography*, 18 (2), 169-189.
- Kaplan, S. & Kaplan, R. (1984). *Cognition and environment*. New York: Praeger.
- Kloos, B. & Shah, S. (2009) A Social ecological approach to investigating relationships between housing and adaptive functioning for persons with serious mental illness. *American Journal of Community Psychology*, 44 (3-4), 316-326.

- Knight, C. and Haslam, A. (2010). Your place or mine? Organizational identification and comfort as mediators of relationships between the managerial control of workspace and employees' satisfaction and well-being. *British Journal of Management*, 21, 717-735.
- Korpela, K. M. (1989). Place identity as a product of environmental self-regulation. *Journal of Environmental Psychology*, 9, 241-256.
- Kweon, B., Sullivan, W. C. & Wiley, A. R. (1998). Green common spaces and the social integration of inner-city older adults. *Environment and Behavior*, 30 (6), 832-858.
- Küller, R. (1991_a). Environmental assessment from a neuropsychological perspective. In: T. Gärling and G. W. Evans, (Eds.). *Environment, Cognition, and Action*. Oxford University Press, New York, pp 78-95.
- Küller, R. (2004). An emotional model of human-environment interaction. Paper presented at the IAPS 18. Evaluation in progress. Strategies for environmental research and implementation, Vienna: CD of Abstracts.
- Lawton, P. M. (1970). Planning environments for older people. *Journal of the American Institute of Planners*, 36 (2), 124-129.
- Lawton, P. M. (1983). Environment and other determinants of well-being in older people. *The Gerontologist*, 23 (4), 349-357.
- Lehman, A. F. (1988). A quality of life interview for the chronically mentally ill. *Evaluation and Program Planning*, 11 (1), 51-62.
- Lemke, S., & Moos, R. H., (1987). Measuring the social climate of congregate residences for older people. Sheltered care environment scale. *Psychology and Aging*, 2 (1), 20-29.
- Lewicka, M. (2010). What makes neighborhood different from home and city? Effects of place scale on place attachment. *Journal of Environmental Psychology*, 30 (1), 35-51.
- Lewicka, M. (2011^a). Place attachment. How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31 (3), 207-230.

- Lewicka, M. (2011^b). On the varieties of people's relationships with places. Hummon's typology revisited. *Environment and Behavior*, 43 (5), 676-709.
- Marans, R. W. (2003). Understanding environmental quality through quality of life studies. The 2001 DAS and its use of subjective and objective indicators. *Landscape and Urban Planning*, 65 (1), 73-83.
- Marcheschi, E., Brunt, D., Hansson, L., & Johansson, M. (2013). The influence of physical environmental qualities on the social climate of supported housing facilities for people with severe mental illness. *Issues in Mental Health Nursing*, 34 (2), 117-123.
- Marcheschi, E., Johansson, M., Brunt, D., & Laike, T. (2014). Physical-environment qualities of supported-housing facilities for people with severe mental illness. *Journal of Architectural and Planning Research*, 32 (2), 128-142.
- Mehrabian, A., & Russell, J. (1974). *An approach to environmental psychology*. Cambridge, MA: MIT. Press.
- Moderato, P., & Rovetto, F. (2006). *Psychologist towards the profession* (3rd Ed.) [in Italian]. Milano, McGraw-Hill.
- Moos, R. H., & Houts, P. S. (1968). Assessment of the social atmospheres of psychiatric wards. *Journal of Abnormal Psychology*, 73 (6), 595-604.
- Moos, R. H. (1972). Assessment of the psychosocial environment of community oriented psychiatric treatment programs. *Journal of Abnormal Psychology*, 79 (1), 9-18.
- Moos, R. H., Shelton, R., & Petty, C., (1973). Perceived ward climate and treatment outcome. *Journal of Abnormal Psychology*, 82 (2), 291-298.
- Moos, R. H., Gauvain, M., Lemke, S., Max, W., & Mehren, B., (1979). Assessing the Social Environments of Sheltered Care Settings. *The Gerontologist*, 19 (1), 74-82.
- Moos, R. H. (1987). *Community Oriented Program Environmental Scale* (2nd Ed.). Palo Alto, CA: Consulting Psychologists Press.

- Morgan, P. (2010). Towards a developmental theory of place attachment. *Journal of Environmental Psychology*, 30 (1), 11-22.
- Newman, S. J. (2001). Housing attributes and serious mental illness. Implications for research and practice. *Psychiatric Services*, 52 (10), 1309-1317.
- Newman, S. J., & Goldman, H. (2008). Putting housing first, making housing last. Housing policy for persons with severe mental illness. *American Journal of Psychiatry*, 165 (10), 1242-1248.
- Oliver, J. P. J., Huxley, P. J., Priebe, S., & Kaiser, W. (1997). Measuring the quality of life of severely mentally ill people using the Lancashire Quality of Life Profile. *Social Psychiatry and Psychiatric Epidemiology*, 32 (2), 76-83.
- Power, M., Harper, A., Bullinger, M., & WHOQOL (1999). The World Health Organization WHOQOL-100. Tests of the universality of quality of life in 15 different cultural groups worldwide. *Health Psychology*, 18, 495-505.
- Priebe, S., Huxley, P., Knight, S., & Evans, S. (1999). Application and results of the Manchester Short Assessment of Quality of Life (Mansa). *International Journal of Social Psychiatry*, 45 (1), 7-12.
- Priebe, S., Reininghaus, U., McCabe, R., Burns, T., Eklund, M., Hansson, L., Junghan, U., Kallert, T., van Nieuwenhuizen, C., Ruggeri, M., Slade, M., & Wang, D. (2010). Factors influencing subjective quality of life in patients with schizophrenia and other mental disorders. A pooled analysis. *Schizophrenia Research*, 121 (1-3), 251-258.
- Proshansky, H. M., Fabian, A. K., & Kaminoff, R. (1983). Place identity, physical world socialization of the self. *Journal of Environmental Psychology*, 3 (1), 57-83.
- Rollero, C., & De Piccoli, N. (2010). Does place attachment affect social well-being? *Revue Européenne de Psychologie Appliquée*, 60 (4), 233-238.

- Rog, D. J. (2004). The evidence in supported housing. *Psychiatric Rehabilitation Journal*, 27 (4), 334-344.
- Rubinstein, R. L., & Parmelee, P. A. (1992). Attachment to place and the representation of the life course of the elderly. In I. Altman, S. Low, R. L. Rubinstein and P. A. Parmelee (Eds.), *Place Attachment, human behavior and environment* (139-163). New York, NY: Springer US.
- Scannell, L., & Gifford, R. (2010^a). Defining place attachment. A tripartite organizing framework. *Journal of Environmental Psychology*, 30 (1), 1-10.
- Shadish, W. R., Orwin, R. G., Silber, B. G., & Bootzin, R. R. (1985). The subjective well-being of mental patients in nursing homes. *Evaluation and Program Planning*, 8 (3), 239-250.
- Shamai, S. (1991). Sense of place and empirical measurement. *Geoforum*, 22 (3), 347-358.
- Shamai, S., & Ilatov, Z. (2005). Measuring sense of place. Methodological aspects. *Tijdschrift voor Economische en Sociale Geografie*, 96 (5), 467-476.
- Sommer, R., & Ross, H. (1958). Social interaction on a geriatric ward. *International Journal of Social Psychiatry*, 4, 128-133.
- Stedman, R. C., (2003). Is it really just a social construction? The contribution of the physical environment to sense of place. *Society & Natural Resources*, 16 (8), 671-685.
- Steg, L., & Gifford, R. (2005). Sustainable transportation and quality of life. *Journal of Transport Geography*, 13 (1), 59–69.
- Swedish National Board of Health and Welfare (2003). *Housing for people with psychiatric disabilities. A national evaluation of housing types in the municipalities' social services* [in Swedish].
- Swedish National Board of Health and Welfare (2010). "It is my home". Guidelines for housing and housing support for people with psychiatric [in Swedish].

- Tabol, C., Drebing, C., & Rosenheck, R. (2010). Studies of “supported” and “supportive” housing. A comprehensive review of models descriptions and measurement. *Evaluation and Program Planning*, 33 (4), 446-456.
- Tuan, Yi-Fu. (1977). *Space and Place. The perspective of experience*. Minneapolis: University of Minneapolis Press.
- Tuan, Yi-Fu. (1980). Rootedness versus sense of place. *Landscape*, 24, 3-8.
- Twigger-Ross, C. L., & Uzzell, (1996). Place and identity process. *Journal of Environmental Psychology*, 16, 205-220.
- Twigger-Ross, C., Bonaiuto, M., & Breakwell, G. (2003). Identity theories and environmental psychology. In *Psychological Theories for Environmental Issues*, Bonnes M., Lee T., Bonainto M. (eds). Ashgate: Aedershot, pp. 203–234.
- Tyvima, T. (2010). Social and physical environments in senior communities. The Finnish experience. *International Journal of Housing Markets and Analysis*, 4 (3), 197–209.
- Ulrich, R. (1991). Effects of health facility interior design on wellness. Theory and recent scientific research. *Journal of Healthcare Design*, 3, 97-109.
- Ulrich, R. (2002). *Health benefits of gardens in hospitals*. Conference paper, Plants for People. International Exhibition Florida, 1-10.
- Weber, C. F.M. (2013). *Exploring physical facilitators of place attachment and place identity while monitoring the effect of social dimension of place* (Master’s thesis). University of Surrey, Guildford, England.
- Wiles, J. L., Allen, R. E. S., Palmer, A. J., Hayman, K. J., Keeling, S., & Kerse, N. (2009). Older people and their social spaces. A study of well-being and attachment to place in Aotearoa New Zealand. *Social Science & Medicine*, 68 (4), 664-671.
- World Health Organization Group (1993). WHOQOL study protocol. WHO (MNH/PSF/93.9).

Wright, P. A., & Kloos, B. (2007) Housing environment and mental health outcomes. A levels of analysis perspective. *Journal of Environmental Psychology*, 27 (1), 79-89.

Zimring, C., Reizenstein Carpman, J, & Michelson, W. (1987). Design for special populations: Mental retarded persons, children, hospital visitors. In D. Stokols and I. Altman (Eds.). *Handbook of environmental psychology* (99-950). New York: John Wiley.

Appendix A

For reason of clarity the items in this appendix are presented in an order that mirror the different dimensions investigated by the POE. However, the questionnaire dispatched to the participants presented the items in a different order.

Post Occupancy Evaluation (POE) items derived from Johansson and Brunt (2012)

Dimension of POE	Items
Social interaction	I am usually with other people in my room or in my flat.
	There is usually someone else to talk to in the common areas.
	I meet a lot of people who I talk to when I am in the garden or the yard.
Privacy (Perceived control)	I can furnish and decorate my room or flat just as I want to.
	I am allowed to be part of deciding what the common areas should look like.
	I can influence how the housing facility's garden or yard should look like.
Possibilities for restoration	I can be left in peace in my room or flat if I want.

There is a place in the common areas where I can take it easy and relax.

There is a place in the garden or yard where I can be by myself.

General evaluation I think that the housing environment is bad – good here.

Appendix B

Items composing the social relationship dimension of the Community Oriented Programs Environmental Scale (COPES, Moos, 1987)

Dimension	COPES	Items
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	This is a lively and active place
	The residents are proud of this residence
Involvement	There is not much companionship in the residence
	The discussions are very interesting here
	The staff are very interested in following up the residents after they have left the residence
Support	The staff always praise the residents who do things properly
	The staff know what the residents want
	Each resident gets quite a lot of attention here
	It is difficult to tell what the residents feel here
	The residents are careful about what they say when the staff are near to them
Spontaneity	When residents disagree with each other, they keep it to themselves
	The residents can generally do as they please here

Table 1 Place attachment's dimensions and the items composing each of them

Dimensions of place attachment	Items
Placelessness	I might as well live somewhere else I have no particular feelings for this dwelling I feel like I belong to this dwelling
Attachment	I am emotionally attached to this dwelling I identify myself with this dwelling
Involvement	I would like to contribute to make my dwelling an even better place to live I am willing to make personal sacrifices to protect, preserve, maintain this dwelling
Rootedness	What is your level of attachment towards your dwelling?

Table 2 Correlation coefficients (Pearson's r) for the variables involved in the analysis (N = 72) (physical-environment quality POE, social-environment quality COPES, place attachment PA and perceived quality of life MANSA)

Variable	M	SD	Min	Max	1	2	3
1 POE	3.53	.69	1.40	5.00			
2 COPES	2.68	.41	1.18	3.73	.52**		

3 PA	3.62	.93	1.50	5.00	.45**	.50**	
4 MANSA	4.88	.97	1.73	7.00	.39**	.54**	.59**

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3 Hierarchical regression analysis with MANSA as dependent variable and POE and PA as predictors (N = 65)

<i>Step 1</i>	B	SE B	β
Constant	2.65	.96	
Gender	.42	.23	.22
Age	.01	.01	.10
Length of living	-.19	.13	-.18
POE	.49	.16	.36**
<i>Step 2</i>			
Constant	2.18	.84	
Gender	.35	.20	.18
Age	.00	.01	.05
Length of living	-.19	.11	-.18
POE	.19	.15	.14
PA	.51	.11	.51***

$R^2 = .18$ for step 1 ($p < .01$), $\Delta R^2 = .22$ for step 2 ($p < .001$), (* $p < .05$, ** $p < .01$, *** $p < .001$).

Table 4 Hierarchical regression analysis with MANSA as dependent variable and COPES and PA as predictors (N = 65)

<i>Step 1</i>	B	SE B	β
Constant	1.65	.94	
Gender	.38	.22	.19
Age	-.00	.01	-.03
Length of living	-.19	.12	-.17
COPES	1.3	.28	.52***
<i>Step 2</i>			
Constant	1.46	.84	
Gender	.34	.19	.17
Age	-.00	.01	-.02
Length of living	-.20	.11	-.18
COPES	.75	.28	.31**
PA	.44	.11	.44***

$R^2 = .30$ for step 1 ($p < .001$), $\Delta R^2 = .15$ for step 2 ($p < .001$), (* $p < .05$, ** $p < .01$, *** $p < .001$).

Table 5 Hierarchical regression analysis with MANSA as dependent variable and POE, COPES and PA as predictors (N = 65)

<i>Step 1</i>	B	SE B	β
Constant	2.65	.96	

Gender	.42	.23	.22
Age	.01	.01	.10
Length of living	-.19	.13	-.18
POE	.49	.16	.36**

Step 2

Constant	1.33	.97	
Gender	.41	.22	.21
Age	-.00	.01	-.02
Length of living	-.20	.12	-.18
POE	.21	.17	.16
COPES	1.07	.31	.44***

Step 3

Constant	1.38	.88	
Gender	.35	.20	.18
Age	-.00	.01	-.02
Length of living	-.20	.11	-.18
POE	.08	.15	.06
COPES	.85	.32	.33**
PA	.39	.11	.39***

Notes: $R^2 = .18$ for step 1 ($p < .01$), $\Delta R^2 = .14$ for step 2 ($p = .001$), $\Delta R^2 = .13$ for step 3 ($p < .001$), (* $p < .05$, ** $p < .01$, *** $p < .001$).