

Psychosocially supportive design: a salutogenic approach to the design of the physical environment

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Abstract: While clinical practice focuses on treating illness, there's also a raft of research to suggest that the quality of our everyday surroundings has a highly important role to play in sustaining wellness. This article considers the advantages of a salutogenic approach to hospital environments which focus on the factors that keep us well and stimulate the mind.

Architecture and design have been influenced by industrial societies for decades, and as a result, public buildings such as airports and hospitals have often been designed to function and look like factories. Clinical practice in hospitals focuses mainly on treating illness while often neglecting a patient's psychological, social and spiritual needs. Environmental qualities that could be considered as psychosocially supportive have not been developed properly. Psychosocially supportive design stimulates and engages people, both mentally and socially, and supports an individual's sense of coherence.

The basic function of psychosocially supportive design is to start a mental process by attracting human attention, which may reduce anxiety and promote positive psychological emotions. Health processes could be strengthened and promoted by implementing design that is salutogenic – ie, that focuses on the factors that keep us well, rather than those that make us unwell. The aim of psychosocially supportive design is to stimulate the mind in order to create pleasure, creativity, satisfaction and enjoyment. There is an important relationship between an individual's sense of coherence and the characteristics of the physical environment.

In this literature review we have studied more than 300 articles as well as other literature that had relevant connection to the field of physical environment, health and behaviour, to shed light on psychosocially supportive design.

Theories and perspectives on health

Health is difficult to define, since it is a subjectively experienced condition¹. It is affected by norms and expectations and is also formed by previous experiences. There are a few different definitions of health. For example, Lawrence² has defined health as a condition where resources are developed in the relationship between humans and their biological, chemical, physical and social environment.



FIGURE 1: A SALUTOGENIC APPROACH TO THE PHYSICAL ENVIRONMENT INCLUDES DESIGN FEATURES THAT SUPPORT OUR WELLBEING

Health can be divided into two different perspectives: the biomedical and the holistic. From a biomedical viewpoint, health is considered to be a condition without diseases³. In the western world, the biomedical perspective has been the leading perspective and has therefore formed the medical and healthcare field⁴. The holistic viewpoint emphasises multiple dimensions of health, including the physical, psychological, emotional, spiritual and social.

From a research perspective, health can be divided into a pathogenic and salutogenic starting point. Pathogenic research focuses on explaining why certain etiological factors cause disease and how they are developed in the physiological organism⁵. The primary aim of pathogenic research is often to find medical treatments (ibid.). Salutogenic research is based on identifying wellness factors that maintain and promote health,



FIGURE 2: WELLNESS FACTORS IN THE ENVIRONMENT, SUCH AS DAYLIGHT AND NATURE, ARE EVIDENT IN THE RADIOLOGY BUNKER AT THE THUNDER BAY REGIONAL HEALTH SCIENCES CENTRE IN CANADA, DESIGNED BY FARROW PARTNERSHIP ARCHITECTS

rather than investigating factors that cause disease⁶. Together, the salutogenic and the pathogenic approach offer a deeper knowledge and understanding of health and disease (ibid.). To be able to answer the salutogenic question – what is causing and maintaining healthy people? – Antonovsky⁶ developed the concept of a sense of coherence (SOC). It maintains that a person with a high sense of coherence chooses the most appropriate coping strategy in a stressful situation. For example, the person may decide to fight, flee or be quiet depending on what kind of stressor the individual is exposed to.

Research has shown that it is possible to measure a person's sense of coherence and thereby predict an individual's health⁷. A strong sense of coherence predicts good DESIGNhealth and a low sense of coherence predicts poor health (ibid.). In his study, Heiman⁸ showed that students with a high sense of coherence did not experience high levels of stress. The research also showed that coping strategies were significantly correlated with the individual's sense of coherence (ibid.).

The concept of sense of coherence has three vital components (1) comprehensibility, (2) manageability and (3) meaningfulness⁶. A person with a strong sense of coherence scores high on all three components. According to Antonovsky⁶, the term comprehensibility implies that the individual perceives the surrounding environment and that which is happening in the world as coherent. If something unexpected is happening, such as an accident or personal failure, the person who understands why they are happening has a higher sense of coherence than one who cannot. A person with a low sense of coherence perceives himself as unlucky.

Manageability means that the individual experiences that she is disposed of all the required resources necessary to cope with a given challenge or demand. This means that the individual feels that she is influencing that which is happening around her and does not perceive herself as a victim of circumstance (ibid.). Antonovsky⁶ believes that a person's sense of meaningfulness is connected to his or her perception that there are important and meaningful phenomena in life. Meaningfulness is the component that motivates a person's sense of coherence.

The physical environment

There is an interaction between humans and the physical

environment. According to Dilani^{9,10}, the physical environment is not only vital for good health, but can also be a critical stressor for the individual. Physical elements in an organisation can contribute to stress and are therefore essential factors for increasing comfort¹¹. Despite that, the majority of humans in the western world spend most of their time in indoor environments; there is a lack of knowledge about how these environments affect a person's health and wellbeing¹². There is a general belief that humans are always adapting to the environment (ibid.). Often called the theory of adaptation, this belief indicates that people become less conscious of the environment the longer they reside or work in that given environment¹³. A general belief is that if one lets oneself be affected by the physical surroundings then it is a sign of weakness¹⁴.

In order to create supportive physical environments it is crucial to understand an individual's fundamental needs¹⁴. It is also necessary for different professional disciplines to willingly cooperate in creating the best conditions for humans^{2,14}. Before a zoo is built, it is common practice for architects, designers, biologists, landscape architects, animal psychologists and building specialists to collaborate in creating an environment that optimises the living conditions for the animals¹⁴. Factors such as materials, vegetation and lighting are taken into consideration; animals need enough space to eat, sleep and decide when to be social or seek solitude, and even their need for control and choice have been noticed. The aim is to create an environment that will support the animal's physical, psychological and social wellbeing. Ironically, humans do not seem to make the same demands when a workplace is going to be designed¹⁴.

Heerwagen et al.¹⁴, created a framework and guideline for a salutogenic design, which highlighted the following factors: (1) Social cohesion, both formal and informal meeting points; (2) personal control for regulating lighting, daylight, sound, temperature, and access to private rooms; (3) restoration and relaxation with quiet rooms, soft lighting, access to nature and a good view. Stokols¹⁵ has also contributed with design suggestions for health-promoting environments that stem from three different dimensions of health: physical, mental and social. Physical health can be promoted by an ergonomic design with non-toxic environments. Mental health can be promoted by personal control and predictability as well as aesthetic, symbolic and spiritual elements. Social health can be promoted by access to a social support network, and participation in the design process.

It is not a new idea to view the physical environment as a health-promoting factor. During the nineteenth century, Florence Nightingale developed a theory of healthcare that emphasised that physical elements are vital for the individuals' health¹⁶. Examples of physical elements, such as noise, illumination and daylight were considered vital factors for a person's mood (ibid.).

Levi¹⁷ founded the stress theory model, which was later developed by Kagan and Levi¹⁸. The model is based on a system that points to a deeper understanding between the physical environment and different human components¹⁹. According to Dilani⁹, the model describes how the physical environment is the foundation on which societal organisation is built and, in the long run, promotes health or disease. The model is used within the field of architecture to integrate design elements with health and wellbeing (ibid.).

Emdad²⁰ has recently developed a model called Instability of

Pyramids of Stress (IPS), where architecture and art are measurable variables. Emdad²⁰ presents a new framework that, in relation to health at the workplace, has taken neuroergonomics into consideration. For example, there is a risk that the employee will develop stress-related symptoms and disease if he or she experiences high demands from the surrounding environment but does not receive any reward. The employee will experience stress if the reward is too low or not adequate, or if he does not have any suitable effort strategies in relation to psychosocial factors, home and family factors or neuroergonomics. The mode integrates all of these factors and focuses on health, burnout, cardiovascular diseases and short-term memory (ibid.).

Social support and the physical environment

Social support is an important factor when the aim is to promote an individual's health and wellbeing^{21, 22, 23, 24}. The knowledge and consciousness of social support and its relation to health increased in the 1950s²⁵. At the same time, researchers established that the physical environment and how it influences people's emotions, behaviours and motivation are important to take into consideration when the aim is to promote health and wellbeing (ibid.). It is therefore essential to identify factors in the physical environment and, through design and architecture, create meeting points that can promote spontaneous social interaction and social support^{25, 26}. For example, research has shown that a certain length and layout of student dormitories can increase the number of social activities and promote social interaction, create a higher sense of control and reduce a sense of crowding²⁷.

Crowding

Crowding is closely linked to social support²⁸ and is often defined as the number of persons in a certain area or how much space every individual has received in a certain area (ibid.). Altman²⁹ describes crowding as a condition where a person's private sphere is trespassed. If there is too much undesirable contact, an individual may experience a sense of crowding. On the other hand, if an individual experiences too little contact, there is a risk that he or she may feel lonely and isolated (ibid.). This balance between social interaction and desired loneliness can, according to Maxwell³⁰, be regulated and achieved if one can control his or her own levels of social interaction.



FIGURE 3: RESEARCH SUGGESTS THAT BARN THEATRES, SUCH AS THIS ONE AT BROADGREEN HOSPITAL, LIVERPOOL, UK, DESIGNED BY NIGHTINGALE ASSOCIATES, ENHANCE SURGICAL PERFORMANCE BY PROVIDING SOCIAL AND PROFESSIONAL SUPPORT TO STAFF

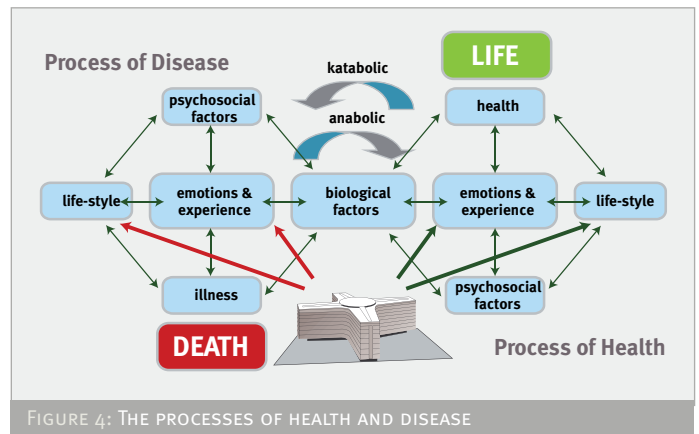


FIGURE 4: THE PROCESSES OF HEALTH AND DISEASE

Nature and its meaning for health

Most people have some kind of relationship to nature and there are many people who greatly value diverse natural environments. Also, there are many people who want to get away from everyday life during weekends and holidays, and regain their strength in relaxing and natural recreational areas. What is it that makes people feel at ease in nature? Does the natural environment affect people in different ways? Is it possible to draw any general conclusions about nature's influence on the human being?

Kaplan and Kaplan³¹ have developed the Attentional Restorative Theory (ART), which identifies two attention systems – direct and indirect attention – and how they are related. Indirect attention does not demand any energy or effort from the person and it is activated when something exciting suddenly happens or when one does not have to focus on something in particular. Direct attention is activated as soon as a person needs to concentrate and focus on a task and simultaneously block other disturbing stimuli. After an intense period of direct attention, a person is in need of restoration; otherwise she will easily become mentally exhausted. People who have been using their direct attention without resting often become impatient and irritated and it has been shown that a mentally exhausted person often commits so called “human errors” (ibid.). A person who does not have the capacity to concentrate often becomes thoughtless, less cooperative and less competent^{31, 32, 33}. Therefore, in order to work efficiently, it is vital to have a well-functioning attention system and find time for restoration.

These studies have been able to distinguish the following four needs when individuals are in need of restoration and recreation: (1) The need for being away from everyday life and its surrounding sounds, routines, crowding, etc; (2) The need for fascinating stimuli that effortlessly stimulate the individual, and diminish the risk of becoming bored; (3) The need for extent, which at the same time can create a feeling of being in a completely different world^{31, 32}; (4) The need for compatibility while performing one's tasks^{31, 32}.

The restorative environment should be inviting, well-balanced with aesthetic beauty, and allow people to reflect³³. Nature, with its colours, forms and scents, is unparalleled in encouraging people to forget about their everyday life. It is therefore very important that natural environments are accessible at the workplace (ibid.). The ART has been tested and confirmed by different researchers^{33, 34}. For example, one of the studies³³ showed that three of the four components – being measurable indicators of how to create a restorative environment.

According to Van den Berg, Hartig and Staats³⁵, several studies have confirmed that human beings perceive natural environments as more restorative than urban environments. Therefore, when human beings are tired and mentally exhausted, nature is the appropriate place for restoration. Other studies have shown that viewing nature through a window has positive health outcomes^{36, 37, 38, 39}.

Daylight, windows and lighting

There is a great deal of research on daylight's positive effects on humans' psychological wellbeing¹². A lack of daylight can lead to both physiological and psychological difficulties⁴⁰. Research has also shown that daylight in a classroom is necessary for the pupils to maintain a balanced hormone level⁴¹. It is also shown that a window can have positive health outcomes on patients^{42, 43}. The window can contribute by allowing fresh air and daylight to enter as well as providing a view. It can also be the link to the outer world – thus satisfying a patient's or prisoner's need for viewing the season's variations, etc. (ibid.). Another study showed that exposure to direct sunlight via windows at the workplace increased workers' wellbeing and had a positive impact on their attitudes and job satisfaction³⁸.

Research has shown that illumination can have an impact on factors in daily life, such as sleep and work performance. For example, Lack and Wright⁴⁴ showed that exposure to lighting at certain times during a 24-hour period can prolong sleep and improve the quality of sleep. Energy consumption and costs can decrease if the individual has the ability to control the illumination levels (ibid.), which also has positive affects on environmental resources⁴⁵. Research also showed that an individual's general satisfaction was higher when they had the ability to control the lighting levels themselves (ibid.). Küller⁴⁶ concludes that lighting will become more important in the future, especially since it is becoming more common with buildings without windows that have no access to daylight.

Colour, space and landmarks

Colours can possibly affect the brain's activity and create a sense of wellbeing and originality within architecture⁴⁷. Colours can also have symbolic value and in that way contribute to the building's identity and/or cultural meaning. Colours should be of high interest to city planners, mainly because of the aesthetic values, but also because of their symbolic values, which can reflect an organisation's philosophy (ibid.). The so-called warm colours (red, yellow and orange) are considered to have an activating affect, while the so-called cold colours (blue, purple and green) are considered to have a calming effect⁴⁸.

Küller⁴⁸ refers to a well-known colour study from 1958 in which researchers conducted different physiological tests to investigate the brain's activity during exposure to different colours. When the participants were exposed to the colour red, their brain activity increased more than when exposed to the colour blue. The results showed differences in blood pressure, breathing, and blinking frequencies (ibid.).

Goldstein⁴⁹ calls attention to an important viewpoint, which asserts that the individual's former experiences can affect their emotions, actions and behaviour, dependent on what colour they are exposed to. There are also geographical, cultural and historical factors that can affect a person's colour choice; some colours

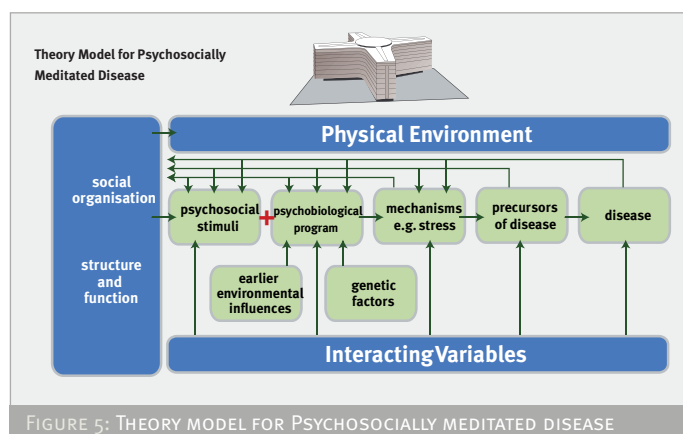


FIGURE 5: THEORY MODEL FOR PSYCHOSOCIALLY MEDITATED DISEASE

have religious meaning (ibid). Berlyne⁵⁰ and Janssen⁴⁷ highlight that the colour should suit the contextual environment and it is important that colour activation be well balanced to fit the environment.

In his book *The Language of Space*⁴³, Lawson considers that space is both that which separates people from one another and that which bonds them together. It is the architecture, with its buildings, rooms, surfaces, dormitories and facilities, that create the prerequisites for individuals to cooperate, work in privacy, create relationships and fulfill their general social, psychological and physiological needs (ibid.).

According to Vischer⁵¹, the organisation's image and identity are viewed and expressed through the architectural facilities. Vischer⁵¹ also maintains that the employee's working identity and role are associated with the working environment and therefore the architectural design partly forms the employee's identity.

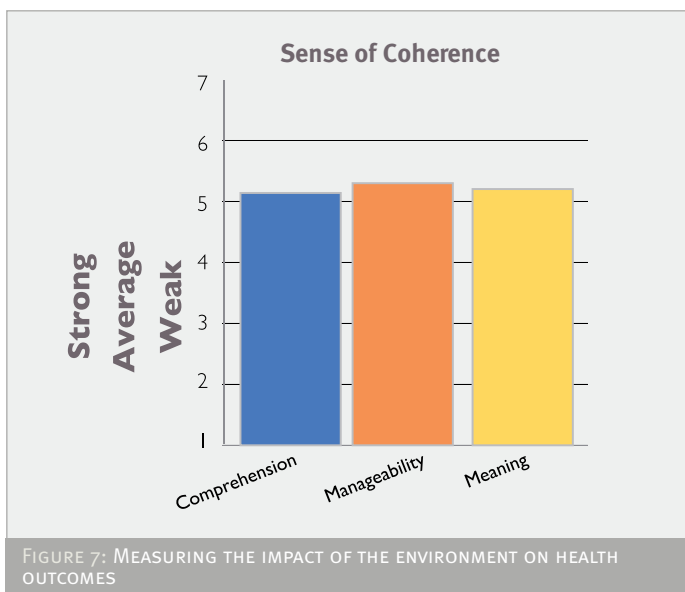
Furthermore, the physical work environment's design has a pronounced effect on worker performance and in the long run affects the organisation's productivity.

Physical, psychological and functional comfort can have positive outcomes on employee performance and morale (ibid.). Taylor⁵² uses the concept of therapeutic design. He maintains that a well-designed physical environment within the hospital can positively affect the rehabilitation process. An inviting lobby or reception area may decrease anxiety (ibid.).

Edvardsson's research⁵³ showed that healthcare environments that are welcoming, inviting, enriched by beautiful objects and that create space for social meetings, affect patients by making them



FIGURE 6: RESEARCH SUGGESTS THAT THE SOUND OF MUSIC CAN DECREASE STRESS AND ANXIETY



more receptive to rehabilitation. The research also showed that it was easier for patients, visitors, relatives and personnel to relax, follow their own rhythm and feel secure and safe in these kinds of settings.

Other factors for wellbeing are, according to Dilani^{54,55}, landmarks in buildings. These landmarks are closely related to the perception of stress⁵⁴ seeing as these landmarks can serve as reference points in the buildings for easy orientation and creating our cognitive maps of the environment⁵⁵. These landmarks could be objects such as sculptures, paintings, aquarium or different colours in different rooms.

Sound, music and health

The experience of sound is highly individual⁵⁶ and Kryter⁵⁷ describes that there are three variables that affect an individual's sound experience; volume, predictability and possibilities for control.

Studies have shown that noise can lead to physiological, psychological and social health consequences. Noise is a regular factor in the physical environment, which can contribute to stressful experiences⁴⁰ and irritation, which can lead to stress and cause stress related diseases⁵⁸.

Leather, Beale and Sullivan⁵⁹ have shown that noise can have a significant relation to working demands, where workers' perception of work stress decreases with lower noise levels. Leather et al.⁵⁹ explain that workers in a less noisy environment possibly need fewer coping strategies for adapting to the physical environment and can therefore focus their energy and coping strategies on other stressful events. In that way, the physical auditory environment can be a vital factor in helping individuals cope with other stressors (ibid.).

Lang, Fouriaud and Jacquinet-Salord⁶⁰ and Evans, Bullinger and Hygge⁶¹ proved that noise can increase an individual's blood pressure, and other researchers⁶² showed that noise can increase cortisol levels. Research has also shown that noise can negatively influence the healing process⁶³. Noise can contribute to mental exhaustion, which in turn can affect the amount of medication that a patient takes^{64,65}. Investigations have also established the connections between noise, irritation and lack of concentration⁵⁸. Finally, other studies indicate that the perception of life quality

decreases in a noisy environment⁶¹ and that high noise levels can also inhibit social interaction⁶⁶.

There are sounds that promote health and Lai, Chen, Chang, Hseih, Huang, Chang and Peng⁶⁷ maintain that music can promote health, since it may contribute to a decreased activation in the sympathetic nervous system. Music may also lead to lower heart and breathing frequencies, and increase body temperature (ibid.). Lee, Chung, Chan and Chan⁶⁸ conclude that music can be an efficient method for decreasing negative physiological affects when people are suffering from anxiety and stress. Music, or music in combination with therapeutic treatment, can improve a patient's rehabilitation process⁶⁹. McCaffrey and Good⁷⁰ showed that patients who listened to music after surgery experienced less pain, anxiety and fear than those who did not. The patients claimed that, instead of being frustrated over pain and fear, music helped them to focus on healing, (ibid.).

In her research, Spychiger⁷¹ showed that music lessons in school had emotional, social and cognitive effects and that the pupils with more music education cooperated better than the control groups. The atmosphere was better and motivation for learning was stronger (ibid.).

Art, health and wellbeing

According to art historians, humans live nowadays in a more aesthetic world, where art, fashion and design offer countless aesthetic experiences⁷². When a person observes and appreciates different visual scenes, such as a piece of art, complex cognitive and emotional processes arise⁷³.

In order to understand the meaning of a painting one often has to understand its different parts before one can understand the whole. During the observation of a painting and in the process of understanding it, a person can, for example, experience joy, participation, discomfort or interest. These emotional and cognitive responses are called aesthetic experiences (ibid.) and, according to Leder et al⁷², often lead to positive, satisfying and rewarding experiences for the viewer.

According to Kreitler and Kreitler⁷⁴, art psychology is an empirical, scientific discipline that focuses on a person's internal and external behaviour and how they are related to art. They believe that psychological models regarding art perception should be based on the homeostatic behaviour model, which suggests that there is an optimal physical condition in which humans strive to reach the balance between tensions and relief. This condition of tension and relief can explain some parts of the individual's relationship to art, and that the art experience can help the person to restore the homeostatic balance (ibid.).

The physical environment and productivity

When a company's management wants to increase productivity, they often focus on employee competence and personal motivation rather than on the physical environment and design¹⁴. In his study, Herzberg⁷⁵ observed the employee's motivation and the relationship between workers' behaviour and the physical environment. When the physical environment is perceived as disturbing, it can negatively affect the employee's motivation and thereby productivity. Herzberg emphasised that it is necessary to have access to a physically supportive environment, which can contribute to the employee's motivation (ibid.).

Maslow's⁷⁶ theory of motivation is one of the most well-known

theories related to human need and motivation: it was developed to analyse and explain the social environment, but it can be applicable to the physical environment¹⁴. For instance, the need for safety can be achieved through designed environments that allow people to have a good visual overview (ibid.). If humans are not stimulated by their surroundings, they can easily lose interest and this can result in reduced performance⁴³. On the other hand, too much stimulation can lead to stress, since a person may not have the capability to deal with the stimulation (ibid.).

Increased knowledge and consciousness about the relationship between improved health and increased profitability would affect how designers, architects and managers design, build and maintain buildings⁷⁷. For instance, improved indoor climate could improve employees' health, decreases the number of sick days, reduces healthcare needs and increases productivity, which in turn strengthens the humane capital and leads to higher company profitability. Ergonomic improvement for the employees has also been proven to increase a company's profitability (ibid.).

For instance, IBM invested US\$186,000 in ergonomic education and implemented extended ergonomic changes, whereby they changed the design of the workplace and different working tools⁷⁸. The improvements contributed to better working positions, improved illumination, lower noise levels and better support with heavy work routines. The project decreased sick days by 19%, which generated a profit of US\$68,000 per year. In addition, the changes contributed to higher productivity and improved quality, which lead to a profit of US\$7,400,000 per year. In other words, investments and changes within the physical environment lead to profits through an increase in health conditions and productivity (ibid.).

Research in the field of health is still primarily focused on risk and prevention of diseases – a pathogenic approach – rather than applying the salutogenic perspective that focuses on factors that promote and strengthen individual health and wellbeing. A new research field, which focuses on the relationship between different factors in the physical environment and positive health promoting factors, should be developed. Knowledge of which environment factors contribute to health and wellbeing can thereafter be guidelines in making subsequent political decisions.

It is also important to have an interdisciplinary perspective where different individuals with different backgrounds and knowledge work together in this field – people like psychologists, architects, landscape architects, doctors, behavioural scientists, health promoters and so on.

The salutogenic approach provides a basic theoretical framework for psychosocially supportive design, which can promote health and wellbeing.

Psychosocially supportive design should incorporate and consider factors such as access to symbolic and spiritual elements; access to art; good lighting; attractive space for social interactions; private spaces; and an interior environment that provides positive experiences. Other factors include visual and physical access to nature, and personal control over, for example, lighting, daylight, sound, indoor temperature and contact with other people.

These factors can stimulate, engage and improve a person's sense of coherence, thereby enhancing his or her coping strategies and health. Psychosocially supportive design is not only the task for one person, but requires that the entire organization



FIGURE 8: RESIDENTS ENJOYING A SUN-DRENCHED COURTYARD AT COLLIER'S GARDENS IN BRISTOL, UK, DESIGNED BY PENYOYE & PRASAD. DESIGNING PLACES FOR RESTORATION AND RELAXATION HELP TO SUPPORT OUR HEALTH AND WELLBEING (PIC: TIM CROCKER)

understands the meaning of salutary management.

A new health paradigm

In summary, one of our intentions with this article was to shed light on factors in the physical environment that could promote health, wellbeing and increase a organisation's productivity and profitability.

There is a need to systematically conduct more empirical studies that investigate and verify the salutogenic model and identify a range of wellness factors in psychosocially supportive design.

The study encourages decision-makers to implement psychosocially supportive design that in turn promotes health and wellbeing. It is time to step into the new millennium where the salutogenic approach and psychosocially supportive design lead the way for a new paradigm. Finally, it is necessary to understand Winston Churchill's quotation – "We shape our buildings, then they shape us" – which states the buildings we design have a significant impact on human behaviour. □

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References

This research is supported by a large number of references, which we are unfortunately unable to publish here for space considerations. For a downloadable copy of this paper with a full list of references, please visit: www.designandhealth.com