Literature Review

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Exploring the Concept of Healing Spaces

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Abstract

Evidence-based design (EBD) research has demonstrated the power of environmental design to support improved patient, family, and staff outcomes and to minimize or avoid harm in healthcare settings. While healthcare has primarily focused on fixing the body, there is a growing recognition that our healthcare system could do more by promoting overall wellness, and this requires expanding the focus to healing. This article explores how we can extend what we know from EBD about health impacts of spatial design to the more elusive goal of healing. By breaking the concept of healing into antecedent components (emotional, psychological, social, behavioral, and functional), this review of the literature presents the existing evidence to identify how healthcare spaces can foster healing. The environmental variables found to directly affect or facilitate one or more dimension of healing were organized into six groups of variables—homelike environment, access to views and nature, light, noise control, barrier-free environment, and room layout. While there is limited scientific research confirming design solutions for creating healing spaces, the literature search revealed relationships that provide a basis for a draft definition. Healing spaces evoke a sense of cohesion of the mind, body, and spirit. They support healing intention and foster healing relationships.

Keywords

patient, satisfaction, environment, physical, health, outcomes

The application of science to design has had a remarkable impact on healthcare facilities and healthcare over the years. Evidence-based design (EBD) uses scientific methods to build the links between design and outcomes such as safety and efficiency to support design decision-making in healthcare. EBD creates safe, efficient spaces, but patients and families come to healthcare organizations seeking a healing experience. Is there a difference between a safe, efficient, and aesthetically pleasing environment and a healing space? This article explores how we can extend what we know from EBD about health impacts of spatial design to the more elusive goal of healing. The goal of this article is to begin to establish a working definition of healing spaces and build a

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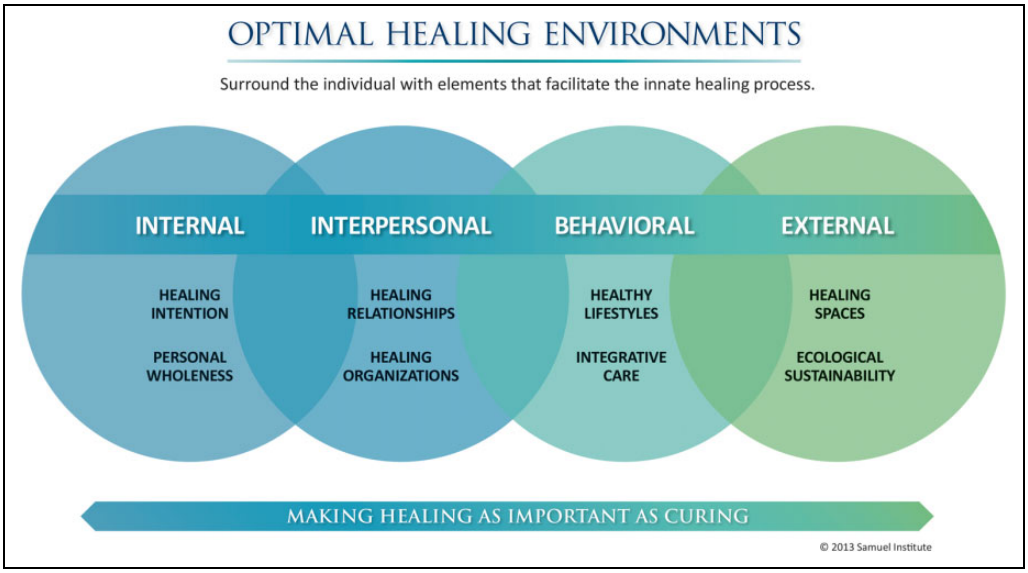

Figure 1. Optimal healing environment framework (Sakallaris et al., 2015).

foundation for the metrics to explore the links between the built environment and healing.

The definition of healing developed by the Samueli Institute provides a good foundation and starting point. "Healing is a holistic, transformative process of repair and recovery in mind, body, and spirit resulting in positive change, finding meaning, and movement towards self-realization of wholeness, regardless of the presence or absence of disease" (Firth et al., 2015, p. 12). This definition allows for the possibility of healing even when cure is not possible. While "cured" is a definitive end state, "healing" is a journey with many possible routes; the role of this literature review is to identify the possible spatial influencers of healing as a process and experience.

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Healing is facilitated by an optimal healing environment (OHE), one where the individual is surrounded by elements that facilitate the innate healing process (Sakallaris, MacAllister, Voss, Smith, & Jonas, 2015). The OHE framework (Figure 1) illustrates the four environments and eight constructs that make up an OHE. The four healing environments in the OHE framework—internal, interpersonal, behavioral, and external—were used to further understand the findings of this literature review and their possible influence on healing.

The Impact of the Built Environment on Outcomes

The field of EBD links design strategies to outcomes of interest to healthcare organizations. Recent EBD literature reviews have focused on studies that systematically compared two or more settings or the manipulation of a single setting and associated patient, family, or staff outcomes. These searches have proceeded either from the outcomes (falls, infection, etc.) or from the design variable (same-handed rooms, distributed nurse stations, etc.). For example, the outcomes evaluated in the comprehensive 2008 review of EBD literature, coauthored by Georgia Institute of Technology, Texas A&M University, and The Center for Health Design, are listed in the left-hand column in Table 1. These outcomes

Table 1. Summary of the Relationships Between Design Factors and Healthcare Outcomes.

Design Strategies or Environmental Interventions Healthcare Outcomes	Single-bed rooms	Access to daylight	Appropriate lighting	Views of nature	Family zone in patient rooms	Carpeting	Noise-reducing finishes	Ceiling lifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced medical errors	*		*				*				*
Reduced patient falls	*		*		*	*			*		*
Reduced pain		*	*	**			*				
Improved patient sleep	**	*	*				*				
Reduced patient stress	*	*	*	**	*		**				
Reduced depression		**	**	*	*						
Reduced length of stay		*	*	*							*
Improved patient privacy and confidentiality	**				*		*				
Improved communication with patients & family members	**				*		*				
Improved social support	*				*	*					
Increased patient satisfaction	**	*	*	*	*	*	*				
Decreased staff injuries								**			*
Decreased staff stress	*	*	*	*			*				
Increased staff effectiveness	*		*				*		*	*	*
Increased staff satisfaction	*	*	*	*			*				

* Indicates that a relationship between the specific design factor and healthcare outcome was indicated, directly or indirectly, by empirical studies reviewed in this report. ** Indicates that there is especially strong evidence (converging findings from multiple rigorous studies) indicating that a design intervention improves a healthcare outcome.

include both body (injuries, effectiveness, infections, errors, sleep) and mind (satisfaction, privacy) components, as well as some that span both body and mind (stress). The specific design features that are associated with these outcomes are contained in the top row of Table 1.

The research literature has documented both direct effects, at a point in time, of the built environment on outcomes, such as noise that interrupts sleep, and many examples where the built environment influences, without direct causation, specific outcomes such as the relationship between providing comfortable spaces for families and increased social support. While the research findings have demonstrated connections between environmental components and positive outcomes, few studies have explored the association of the physical environment and the individual's healing experience. Because of the difficulty in measuring healing over time, it is more typical for research questions to be framed in the negative, for example, the environmental factors that increase stress or compromise well-being (Boex & Boex, 2012).

Healing is a process that occurs over time, it is not a sudden discrete event. Positive change, finding meaning, and realization of wholeness occur in the home, community, and even in nature. The clinical encounter may not necessarily be where healing occurs, but it can become an important catalyst for helping the patient move toward healing within their life space (Schweitzer, Gilpin, & Frampton, 2004). Focusing on healthcare spaces provides a basis for understanding the necessary elements and developing metrics that can be used to evaluate the broader range of spaces that support the healing process. Therefore, this research focused on healing experiences and its precursors that occur in the hospital.

Method

The initial research strategy was to duplicate the database searches used in the 2008 EBD literature review by Ulrich et al., but with the addition of the Medical Subject Headings terms (MeSH are standard terms used in the National Library of Medicine) for healing (MM "holistic health," MH "spirituality," MH "mental healing," MH "anxiety prevention and control"). This initial search yielded 40 potentially relevant articles, but upon more detailed analysis, it was clear that while these papers used the term "healing," or something related, they were still primarily about curing.

Based on the limited usefulness of the retrieved articles, a different search strategy emerged. Understanding that healing is a complex constellation of experiences, it was more useful to break out those different elements, the essential preconditions that must be present to allow healing to occur, and look for research linking space to each of those. To do this, a new set of MeSH terms were established, reflective of the antecedents of healing based on the Samueli definition: focusing on repair and recovery in mind, body, and spirit resulting in positive change, finding meaning, and movement toward self-realization of wholeness, regardless of the presence or absence of disease (Firth et al., 2015).

To arrive at specific MeSH terms, the team explored how medical professionals such as occupational therapists, nurses, and others assess whether patients are ready for reintegration into a fulfilling life, particularly after serious injury or illness. While these do not provide a full view of healing, they provided a picture of how able an individual is to engage the world in an empowered way and provided a framework for a very wide review to understand how the physical environment helps support the transition to these states.

To focus this investigation on the literature unique to healing, the topics in Table 1 were excluded, since they have been well covered in previous EBD literature reviews (Ulrich et al., 2008; Zimring, Denham, et al., 2013; Zimring, Jacob, et al., 2013). This review focused on the mind and spiritual components of healing, since these have not been adequately reviewed to date. Additionally, these components represent the most challenging parts of healing in terms of definition and measurement and therefore warranted further examination.

The team explored 8,337 references and found searching 71 MeSH terms from the

medical and EBD literature published prior to February 2016 to understand how the academic medical community identifies and measures progress toward healing and how the built environment supports these steps. The team excluded all articles that did not meet the following criteria: in English, in peer-reviewed journals, measured a built environment metric, included an outcome variable indicating healing or a precursor of healing, and done in a hospital setting. This resulted in the 34 articles with sufficient relevance to contribute to this discourse.

Findings

Framework

While these articles were identified through a variety of MeSH terms, we found that they could be grouped into four major categories that characterize healing or a healing experience:

- Psychological: Environmental support for managing emotions and reactions, especially the ability to diffuse aggression and avoid or mitigate anxiety and depression.
- Self-efficacy: Environmental facilitation of a sense of coherence and control and the ability to adapt to and accept new situations.
- Social: Environmental support for developing and maintaining relationships and connections with others.
- Functional: Environmental support for safely performing the basic activities of daily living with minimal assistance.

These constructs can be mapped to the inner to external continuum that underlies the four components of the OHE developed by Samueli Institute (see Figure 1). The psychological and self-efficacy constructs correspond to the internal environment, the social construct maps to the interpersonal domain, and the functional construct relates to the behavioral and external environments.

The built environment can facilitate healing through a variety of mechanisms. In some cases, architectural elements have direct impact on healing, but for the most part, architecture influences behaviors that then impact the healing experience as is exemplified by Figure 3. While a direct impact of the built environment on physical outcomes has been demonstrated in previous literature reviews, the impact on healing is less direct. Healing is much more dependent on participation and receptivity of the individual. Built environments can support or hinder healing, but healing is ultimately a very personal process that is heavily influenced by individual characteristics and social relationships. The environment cannot cause healing to occur but can facilitate engagement in behaviors and emotions that support healing; the environment can induce physical and emotional responses such as happiness, joy, and relaxation; and the built environment can enhance individual control and functionality—all of which are antecedents to healing.

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A recent doctoral thesis examined the research linking design to healing in psychiatric settings and arrived at similar conclusions. Using the Rashid and Zimring (2008) framework that equates healing to reduced stress, reduced anxiety, and improved mood, the author stated, "Overall, the quality of the research on OHEs is not high, but results were reasonably consistent across studies" (Linebaugh, 2013, p. 13). After reviewing over 6,000 search results, the author ended up with 27 articles and identified 7 specific design strategies that contribute to healing: single rooms; calm, naturalistic, and domestic artwork or photographs; east-facing windows; plants; acoustic ceiling tiles; patient rooms removed from noise-producing unit areas; and a window view of nature (Linebaugh, 2013).

Healing is a much more difficult outcome to measure in comparison to restoring health. Healing is a process that takes time and rarely happens as a result of a singular intervention. Healing is an

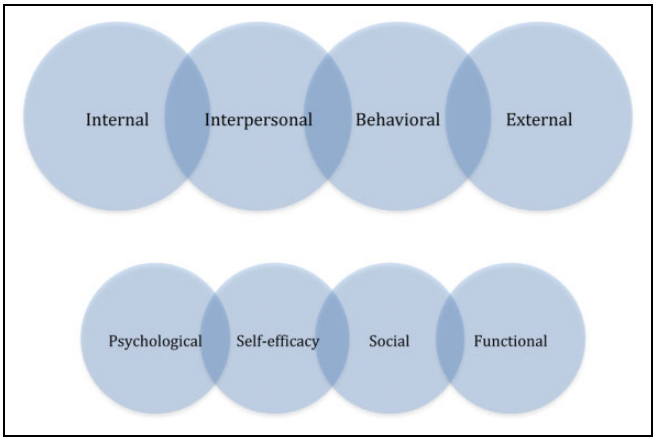

Figure 2. Healing spaces domains and healing constructs.

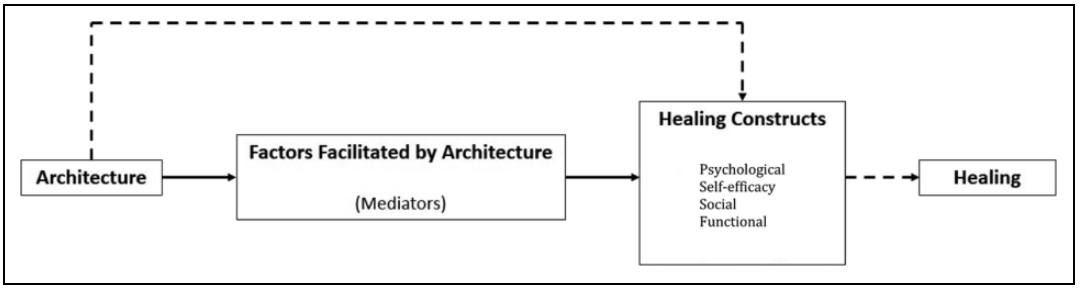

Figure 3. Causal model for architectural impact on healing.

emergent process, making it difficult to associate the experience of healing with a particular cause. The feedback loop between environment and healing is opaque and lengthy and makes causal determination elusive. The challenge of using the standard scientific approach to measuring healing was recognized by Miller and colleagues in their 2005 paper on healing places, where they stated "Much of science is rooted in linear causation; however, we now know that instead of every effect having a discoverable cause, there is often interdependence and unpredictable, emergent surprise unpredictable, emergent surprise . . . ." (p. 47).

In the following sections, we summarize the studies that were found within each of the four constructs. Based on the literature review, six environmental variables were identified and shown to have impact on the psychological, self-efficacy, social, and functional constructs related to healing: homelike environment, access to and view of nature, light, noise control, barrier-free environments, and room layout (see Figure 2).

Psychological. The psychological components of healing relate to the internal mechanism of thoughts and feelings that patients have about themselves, their lives, and their surrounding environment. Architecture creates an environment that positively or negatively impacts individuals' sense of control and emotional responses to their care.

Studies show that homelike environments can reduce patients' pain and emotional distress (Kligler et al., 2011). In addition, it appears that environments that provide opportunities for leisure activities and visual art making can help patients in identity maintenance and reconstruction (Reynolds & Prior, 2006), giving patients a sense of wholeness. Several studies have suggested that environments that provide a connection to the outside world, have a view of nature, or

provide connections to plants in indoor spaces can help decrease patients' stress level and increase their satisfaction with care (Lechtzin et al., 2010; Linebaugh, 2013; Park & Mattson, 2009). Positive, hopeful, and supportive thoughts were the outcome of providing views of nature and natural light in patient rooms (Timmermann, Uhrenfeldt, & Birkelund, 2015). Environments that support nursing practices involving spiritual intervention can help decrease patients' stress level and enhance a sense of personal wholeness (Kreitzer, Gross, Waleekhachonloet, Reilly-Spong, & Byrd, 2009).

Positive engagement of the senses facilitates a healing experience. For example, exposure to natural lighting is a very important factor in creating a healing environment. A study reported that east-facing windows facilitate natural light progression that helps reduce stress and therefore supports healing. Similarly, spaces with acoustic ceiling tiles, or that are removed from noise-producing areas, reduce intrusive noises and therefore patients' stress (Linebaugh, 2013; Park & Mattson, 2009).

Music therapy may have psychological benefits to patients by helping them connect with moments in their past and encouraging introspection (Bradt et al., 2015; Potvin, Bradt, & Kesslick, 2015). Music can reduce stress if the music style matches patient preferences but can have a negative effect if the wrong style of music is played (Chlan, Engeland, Anthony, & Guttormson, 2007; Cooper & Foster, 2008). Research has found that music impacts emotions and can reduce anxiety and pain, improve patients' well-being (Bauer et al., 2011; Dunn, 2004; Engwall & Duppils, 2009; Lee, Chao, Yiin, Chiang, & Chao, 2011; Weeks & Nilsson, 2011), and may even reduce the patients' length of stay (Korhan et al., 2014; Zhou et al., 2015).

Sensory rooms that provide music, comfortable seating, relaxing imagery, and tactile stimulation are an environmental therapeutic tool for calming psychiatric patients but have not been demonstrated to reduce the need for seclusion of disruptive patients (Kreitzer et al., 2009; Smith & Jones, 2014). Martin (2006) showed that aromas can affect perceived pain level, and although music and aroma are not directly linked to the design of environment, they can be explored as additional environmental interventions to create OHEs. Positive engagement of the senses, specifically sight, hearing, smell, and touch, is a powerful way to use the physical environment as a healing space.

Self-efficacy. The self-efficacy construct reflects the patient's sense of control over their situation and internal emotional state. Architecture can provide patients with opportunities to be more independent, to have more control over the environment, to act more autonomously, and to feel more secure. Studies have shown that patients in homelike environments, which less resemble hospitals (e.g., in lighting and color), experience an increased sense of connection to the environment and thus feel more control over it (Kligler et al., 2011; Moore, Carter, Hunt, & Sheikh, 2013). Homelike environments provide a personal, reliable, and intimate place with a secure atmosphere for patients (Fenner, 2011) as do single-bed rooms when compared to multibedded rooms (Linebaugh, 2013). Enhancing self-efficacy can be as simple as allowing patients to choose the artwork for their walls, providing them with a degree of control (Suter & Baylin, 2007), or providing access to changing visuals, such as the C.A.R.E. Channel, to provide control over visual stimuli (MacAllister, Bellanti, & Sakallaris, forthcoming). Barrier-free environments that accommodate patients' visual, auditory, and kinesthetic impairments help patients to be more independent, have more autonomy, and therefore have a better self-perception (Crews, 2005). Skillful use of technology has been shown to have positive impacts by giving patients an increased sense of dignity and independence through enabling them to have more control over their activities and their surrounding environment and helping them to feel more secure (Erikson, Karlsson, Söderström, & Tham, 2004; Gagnon, Lamothe, Hebert, Chanliau, & Fortin, 2006; Mann, Ottenbacher, Fraas, Tomita, & Granger, 1999).

Social. The social construct reflects the status and behavior of patients in relation to other people

around them and the support they receive from those relationships. Design of the healthcare environments can provide opportunities for better communication between patients, their families, and the caregivers. Design also can enhance social relationships between patients and their community. A specific example of this comes from a study that found that barrier-free community environments helped patients improve their social relations, whereas the presence of mobility barriers decreased the social relations (Keysor, Jette, Coster, Bettger, & Haley, 2006). In addition to modifications to the environment, devices such as home environment assistive technologies and telemedicine have been shown to be affective in improving patient–caregiver relations, which is important for faster healing (Gagnon et al., 2006). Patient preference for receiving care at home appears to be driven by their desire to be with loved ones, suggesting that the ability to accommodate visitors is an important feature to support healing (Brogaard, Neergaard, Sokolowski, Olesen, & Jensen, 2013).

Functional. The built environment can support patients' functionality and those aspects of physical activities and abilities that represent or facilitate healing. Functionality is an essential aspect of patients' overall quality of life and sense of comfort and well-being. Design of the environment can impact patients' functionality by either facilitating or inhibiting their movement. Presence of mobility barriers can decrease patients' ability to function in their immediate domestic environment, and the inpatient environment, and decreases their ability for self-care in either environment (Keysor et al., 2006). On the other hand, prepared environments equipped with carpeting, handrails, uncluttered hallways, large clocks and calendars, elevated toilet seats, and door levers better accommodate patients with declining senses and disabilities, helping them have better functionality and perform their activities of daily living (Landefeld, Palmer, Kresevic, Fortinsky, & Kowal, 1995). In addition, design can enhance patients' functionality by creating homelike environments that improve patients' quality of life as well as comfort (Bauer et al., 2011; Kligler et al., 2011; Moore et al., 2013). Access and views of nature and outside environments have shown to improve patients' quality of life (Rowlands & Noble, 2008; Timmermann et al., 2015). Architecture can also impact patients' healing by providing environments that enhance patients' personal control and therefore improve patients' quality of life (Duncan-Myers & Huebner, 2000).

Metrics

No outcome measure or standard set of physical characteristics for healing spaces was found in this literature review. The literature supports specific components of the environment that enhance the relationship between the environment and the people experiencing the space. For a space to be considered a healing space, there must be a good person–environment fit, especially where functionality is concerned. A number of tools were identified that are useful in measuring human response to environments, personal progress toward healing, and fit between specific persons and specific environments. Because people do not have the same physical abilities, and often have impaired abilities while hospitalized, special attention needs to be paid to how the built environment facilitates or impedes activities of daily living and promotes independence and control for individuals. One tool for measuring the degree of person–environment fit is the housing enabler assessment developed in Sweden (Mitty, 2010). Activities of daily living are just one aspect of healing but an important one.

Environmental metrics. A range of different environmental interventions or strategies were discussed in the healing literature (see Table 2 for a summary listing). The environmental metrics reported in the final group of healing spaces studies are very general and mostly typological. For example, many of the studies evaluated the impact of music and compared conditions with music to those without music; the metric is simply the presence or absence of music, no other descriptors were provided such as sound level, quality, or tone. Other studies that investigated preference for place of care or place of death had similarly basic metrics, categorizing the patients into groups of home, hospital, or hospice, without

Table 2. Environmental Interventions From Healing Literature.

Place/location (home vs. hospital)	Music
Setting (single- vs. multibed rooms)	Art
Assistive technologies	Odor
Homelike aesthetics	Plants
	Light

Table 3. Healing Outcomes Found in Literature Review Organized by Healing Characteristics.

Psychological	Self-Efficacy	Social	Functional
Mood	Autonomy	Trust	Well-being
Anxiety	Control	Sense of dignity	Quality of life
Stress	Freedom	Isolation	Activities of daily living
Satisfaction	Patient experience		Pain
Relaxation			Security

providing any more detail about the environmental conditions in each of these settings. Art was another frequently studied intervention, and again the categorization was not very detailed; the descriptions sometimes included the size of the piece of art, the content (nature or urban), and, less frequently, it's placement in relation to the patient. Nature and natural light in the room were shown to reduce anxiety of patients, but no descriptions were provided about what constitutes nature or any qualities of the natural light.

Outcome metrics. The research found no single metric for healing as a whole, but there were many intermediary outcomes that make up healing and were used as the basis for the literature search strategy (see Table 3). Even though many of the healing outcomes are subjective, the metrics used in the identified healing studies are generally better developed than those for the environmental interventions. The most commonly used tools are visual analog scales that ask subjects to rate their satisfaction/pain/anxiety/stress/relaxation on a visual scale. Patient-reported outcomes are subjective, but it is possible to make meaningful judgments about the effect of an intervention by comparing the change in an individual's rating from before and after exposure to an intervention. There are also a variety of validated tools that have been used to measure specific outcomes, such as the Quality of Life Rating Scale, Duncan Choice Index Profile of Mood States Brief-Form, and State-Trait Anxiety Inventory Form (Duncan-Myers & Huebner, 2000), but tools tend to be very culturally dependent and therefore may have limited value for broad swaths of the population (Selman, Harding, Gysels, Speck, & Higginson, 2011). Biological measures such as biomarkers of stress response (levels of corticotrophin, cortisol, epinephrine, and norepinephrine) and heart rate variability have been used in some studies and are gaining acceptance.

Discussion

This review found that while there is emerging information linking design to the antecedents of healing, there are only a few studies that link design directly to the journey toward the recognition of wholeness. The relatively small number of relevant articles uncovered in the first search strategy demonstrates the current scientific emphasis; researchers seek to address questions of scientific interest and of concern to decision makers. While recognition of their importance is growing, end points of healing such as ''finding meaning'' and ''realizing wholeness'' are still less common in the scientific literature. The small number also reflects the emphasis in the scientific literature on establishing unambiguous causal links between single predictor and single outcome variables for maximizing internal validity. Such straightforward causality is challenging to determine with healing, which is a complex constellation of emotion, cognitions, and behaviors linked to multiple aspects of the built environment.

The term healing environment is prevalent in the literature, but there is no clear universal definition or description of a healing environment or healing space. There is evidence of the architectural contribution to the antecedents and consequences of healing, specifically, stress reduction, emotional stability, self-efficacy, social cohesion, and return or enhancement of function. Figure 4 shows the links from the literature between architectural variables and the healing constructs

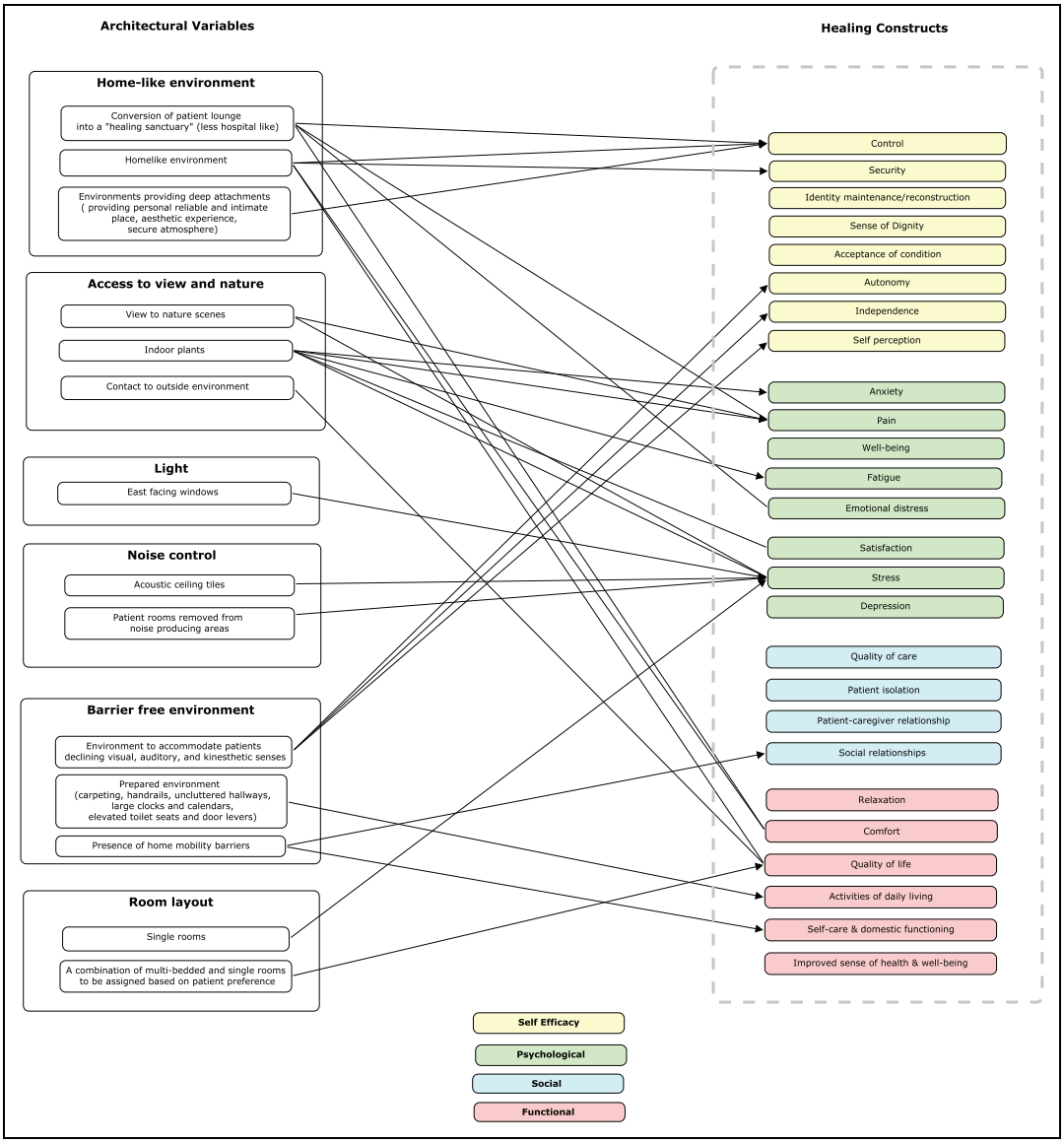

Figure 4. Relationship between architectural features and healing constructs.

discussed above. The six groups of variables found in the literature—homelike environment, access to views and nature, light, noise control, barrier-free environments, and room layout—directly affect or facilitate one or more dimensions of healing. The multiple relationships between these six architectural variables with the four healing constructs demonstrate the broad role that the architectural features play in healing.

This literature review identified some outcome measures associated with healing constructs. These constructs can be arranged into the four defined groups that overlap the four domains of the OHE framework. The exploration of research in the field identified positive and negative measures that are used in this investigative work. The negative measures (e.g., pain, isolation, stress, anxiety) could be considered inhibitors to healing. The positive measures (e.g., autonomy,

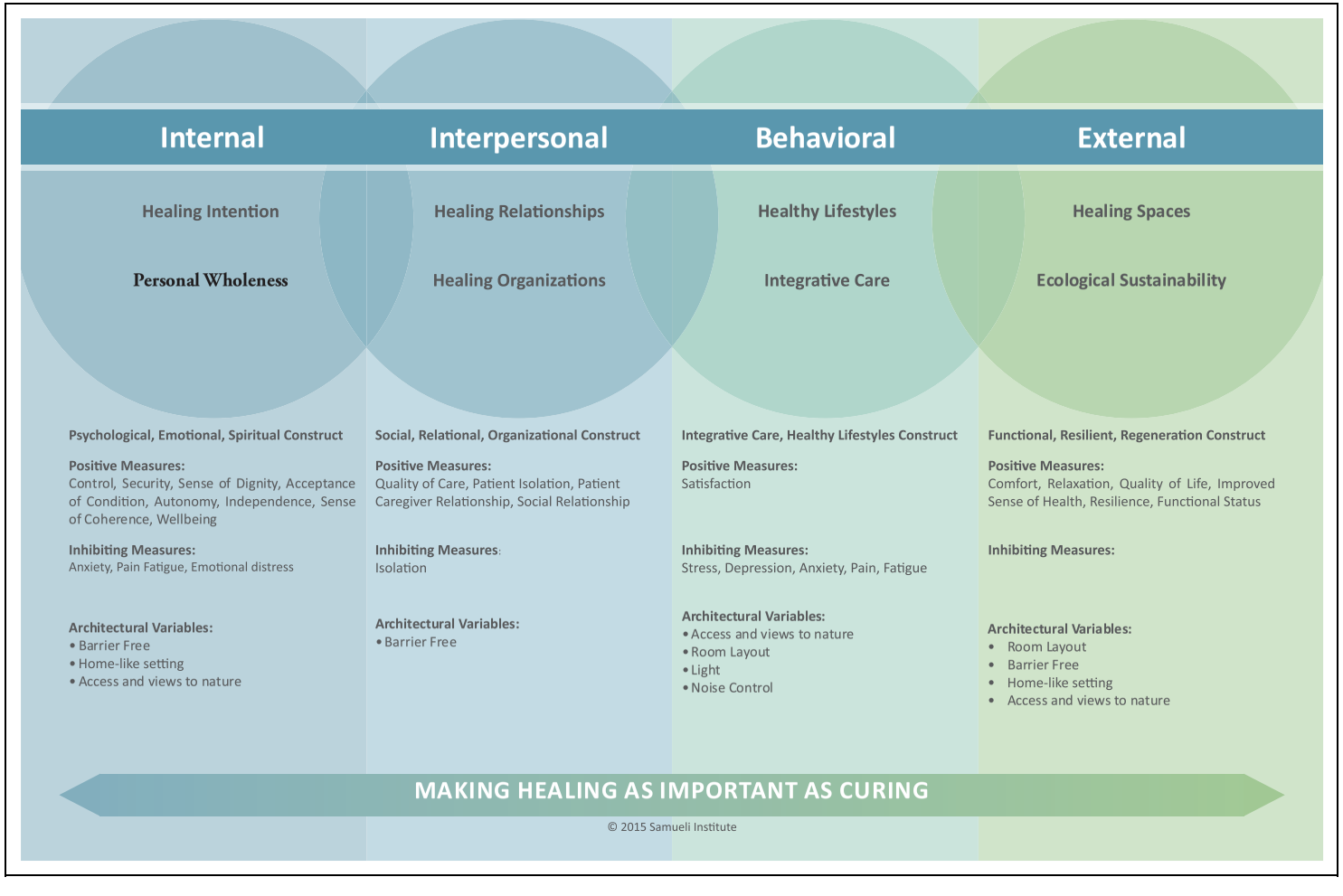

Figure 5. Positive and inhibitory measures of optimal healing environments. Adopted from Optimal Healing Environments Linked Initiatives (Sakallaris et al., 2015).

satisfaction, relaxation, comfort) are seen as contributors to healing. As each measure is placed in the zone of influence within the four domains of healing, it is clear that healing spaces influence all aspects of a healing experience. In review of the healing outcomes found in the literature, it is clear that these outcomes fit within the four-part framework (Figure 5).

Conclusions

With the understanding of the contribution of the architectural features in Figure 4 to healing, and informed by the healing definition from the Samueli Institute cited earlier, the definition of healing spaces emerged as: *Healing spaces are spaces that evoke a sense of cohesion of the mind, body, and spirit. They support healing intention and foster healing relationships*. This holistic definition, as well as clear outcome measures tied to architectural features, forms a foundation for the work to advance the field of understanding and creating healing spaces.

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Implications for Practice

- Readers will begin to learn the aspects of a healing space.
- Provides a working definition of healing space.
- Learn the architectural elements that are contributors and detractors from healing space.
- Discover the four main categories that characterize healing—psychological, self-efficacy, social, and functional.

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