

Arousing Curiosity: When Hospital Art Transcends

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Abstract

Evolutionary and emotional congruence theoretical perspectives support the use of certain types of artwork to reduce stress and promote improved outcomes in healthcare settings. This paper explores the artwork of three artists whose work falls outside the traditional representational art supported by these theoretical perspectives. The concept of curiosity as a common thread is proposed as the underlying theory in an effort to explain the success of such work in achieving positive outcomes for patients, families, and staff. Other concepts are explored as contributing theoretical frameworks. Research is needed to determine the impact of this emerging type of artwork and the implications of findings for individuals who create—as well as for those who select—art for healthcare settings.

Key Words: *Art, music, exploratory behavior, mind-body, stress, coping, theory, hospital*

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Arts and healthcare programming is flourishing in hospitals throughout the United States, and much of it is devoted to creating a physical environment that promotes healing. It is well known that the physical environment can play an important role in reducing patient and caregiver stress, improving health outcomes, enhancing patient safety and overall quality of care, and reducing costs.

The artwork that resides within the healthcare setting is an important element of this physical environment. Visual art in healthcare environments can mitigate the stress of the environment, educate, and be integral to wayfinding. Over the past 2 decades, individuals have developed expertise in determining and exhibiting appropriate art for hospitals and other healthcare settings. According to the Society for the Arts in Healthcare *State of the Field Report: Arts in Healthcare 2009*, the permanent display of art is the most commonly reported type of arts programming in accredited healthcare facilities in the United States (State of the Field Committee, 2009).

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Program directors use a variety of criteria for selecting art, which is reflected in the vast differences in displays among hospitals, such as those featuring artwork similar to what would be found in contemporary art galleries and others with choices based on research findings. Ulrich and Gilpin (2003) urge that decisions regarding the type of art used in such settings should be based on whether it improves patient outcomes, “not whether it receives praise from art critics and artists or approaches museum standards for quality” (p. 120).

Although the majority of artwork found in hospital settings is created for public consumption and then selected for a particular purpose in the hospital, a movement led by artists dedicated to creating work designed specifically to promote positive outcomes for patients, family, and staff has emerged. This article explores and compares the work of three pioneering artists—Joan Drescher,

Vara Kamin, and Linda DeHart—and proposes a common theoretical thread that unites them.

Background

Research findings reveal two major theoretical perspectives—evolutionary and emotional congruence—that have supported the use of certain types of artwork to reduce stress and promote improved outcomes in healthcare settings (Ulrich & Gilpin, 2003). Evolutionary theory suggests that nature art will best promote restoration across diverse groups of people if it contains calm or slowly moving water, verdant foliage, flowers, foreground spatial openness, park-like or savannah-like properties, and birds or other nonthreatening wildlife (Coss, 2003; Ulrich, 1993, 1999). In addition to nature themes, evolutionary theory proposes that humans are genetically predisposed to pay attention to, and be positively affected by, images of smiling or sympathetic human faces (Darwin, [1872] 1965). Evolutionary theory also provides support for subject matter that should be avoided when selecting art for people under stress; humans are partly predisposed to respond negatively to natural elements and situations that have signaled threats or dangers throughout evolution (e.g., snakes, shadowy enclosed spaces, pointed or piercing forms) (Coss, 1968; Ulrich, 1993; Ulrich et al., 1991).

Emotional congruence theory proposes that individuals’ emotional states bias their perception of environmental stimuli and information in ways that match their feelings (Bower, 1981; Niedenthal, Setterlund, & Jones, 1994; Singer & Salovey, 1988). Research findings indicate

that emotional states also can enhance recall of emotionally similar memories but may inhibit recall of emotionally dissimilar information (Isen, 1987). Thus, emotional congruence theory implies that individuals tend to perceive, interpret, and have associations with art in ways that match their emotional states or feelings (Ulrich, 1999). Given the high levels of stress many individuals experience in healthcare settings, this theory suggests that caution should be exercised when considering ambiguous or abstract art for patient spaces or high-stress waiting and treatment areas (Ulrich & Gilpin, 2003).

As the reader will see, the artwork featured in this article, with perhaps a few exceptions, does not feature realistic nature scenes, and it could be perceived by some as ambiguous, abstract, or even, in one of Drescher's pieces, as containing a threatening image. However, although only one formal study (Rollins, Drescher, & Kelleher, in press) has been conducted on any of the three artists' work, a growing body of anecdotal reports suggests that people are using the work of these artists in very specific ways to help cope with the inherent stress of illness, healthcare settings, and healthcare experiences. For example, children are using Drescher's images to communicate feelings about their illness or hospitalization, feelings that may be too difficult to put into words.

Emotional expression is an important coping strategy for children (Ryan-Wenger, 1992); actively holding back or inhibiting thoughts and feelings can be hard work, and over time it can gradually undermine the body's defenses (Pen-

nebaker, 1997). Anecdotes suggest that Kamin's work has captured viewers' attention in high-stress settings such as waiting areas or treatment rooms, and, with focused attention, it could have the potential to relieve children's anxiety throughout the course of procedures. Reports from women at a breast cancer center imply that DeHart's art may hold the promise of relieving stress associated with waiting for confirmation of a diagnosis or prognosis.

It may be reasonable to assume that artwork that offers the potential to promote emotional expression, reduce anxiety, or relieve stress could result in positive outcomes for patients, their families, and staff, and thus be appropriate for healthcare settings. However, for such artwork to gain a firm footing in hospitals, anecdotal evidence is not enough; rigorous research is needed. A likely reason for the current lack of evidence is that art of this kind is often grouped under the general category of "abstract art." As noted previously, emotional congruence theory cautions against the use of ambiguous or abstract art in healthcare environments. Thus, researchers may have had little interest in exploring such art. Perhaps another reason for lack of evidence is that this kind of interactive artwork does not yet have a name or a theoretical framework to support it. Although at this stage no name for this type of art comes to mind, one can hypothesize that the common thread among the art of Drescher, Kamin, and DeHart is that their work arouses intense *curiosity* in the viewer, draws the viewer in, and has the potential to bring about cognitive and/or perceptual change.

Curiosity Theory

Curiosity has been defined as a disposition to inquire, investigate, or seek after knowledge, or, quite simply, a state of mind in which an individual wants to learn more about something (Binson, 2009). It is both a complex feeling and cognition accompanying the desire to learn what is unknown. Kang et al. (2009) describe two domains of curiosity and propose the likelihood that curiosity works differently in these dissimilar domains. The first, *epistemic curiosity*, is the desire for a particular piece of information and is often associated with motivations for academic achievement and scientific discovery (Berlyne, 1954). The second type, called *diversive perceptual curiosity*, is sensation driven by stimulus novelty or the desire to avoid boredom or sensory deprivation (Berlyne, 1954). Could it be that both domains can be activated by art in healthcare settings?

The *incongruity theory of curiosity* builds on Berlyne's ideas but considers curiosity an internally motivated drive. The theory posits that our curiosity is raised when we encounter something that does not fit our normal worldview (Berns, 2005). The world is seen as a place that follows an orderly and predictable set of rules. When that order is challenged, people try to figure it out. Loewenstein (1994) suggested a modification to the theory, based on the observation that curiosity often increases with one's expertise in a particular domain. For example, if someone is really interested in trains, he or she might have intense curiosity about a certain steam engine, whereas someone else might not even notice it.

Most scholars agree that, in addition to two domains of curiosity, there are two types of curiosity, variously referred to as *dispositional curiosity* and *situational curiosity* (Guthrie, 2009). Dispositional curiosity, which also is called "trait" or "individual" curiosity, refers to a general tendency to experience interest or curiosity (Kashdan & Fincham, 2004; Loewenstein, 1994). People with this characteristic have a lifelong interest in learning, simply for the sake of learning. Trait curiosity has been linked to all kinds of behavior, from experimentation with drugs and arson to high intellect and fearlessness (Clark, 2010). For the most part, however, trait curiosity is considered a positive characteristic.

Trait curiosity is further classified based on the variation of interests pursued, with *breadth of curiosity* being the type where an individual may be interested in a wide array of topics, and *depth of curiosity* being the level of interest in a single topic (Clark, 2010). Situational curiosity, also called "state" or "task" curiosity, refers to a transitory feeling of curiosity that arises in a particular situation (Kashdan & Fincham, 2004). It is a temporary state evoked by an ongoing internal or external activity, which implies a transaction between the person and the environment. Loewenstein (1994) points out that curiosity can arise, change focus, or end abruptly. He believes that despite its transience, curiosity can be a powerful motivational force, often producing impulse behavior and attempts at self-control.

Curiosity is central to motivation and believed to be a motivational prerequisite for exploratory behavior (Berlyne, 1960). Intrinsic psychobiological human motivation may account for seeking

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activities enjoyable for their own sake (White, 1959). Berlyne believed that exploration might be triggered and rewarded for situations that include novelty, surprise, incongruity, and complexity. His observations revealed that the most rewarding situations were those with an intermediate level of novelty, between already familiar and completely new situations. Investigations in neuroscience concerning neuromodulation systems have complemented these findings, with some work lending credence to the idea that such neuromodulators might be involved in the processing of types of intrinsic motivation associated with novelty and exploration (Dayan & Belleine, 2002; Kakade & Dayan, 2002). For example, Kakade and Dayan confirm that dopamine plays a role in processing novelty. Dopamine is heavily associated with the pleasure system in the brain, and its continued release provides feelings of enjoyment and reinforces the activities that provide those feelings.

Boredom is believed to be a factor in curiosity-seeking behavior. Berlyne (1960) argued that boredom produces high levels of arousal. Stimulus intensity is low and arousal high in an impoverished environment, and the individual attempts to increase arousal by seeking curiosity-inducing stimuli. Clark (2010) explains that human minds crave distraction, an idea supported by sensory deprivation studies carried out in the 1950s and -60s.

Panksepp (1998) has compiled a set of evidence suggesting the existence of a seeking system responsible for exploratory behaviors. This system drives and energizes many mental complexities that humans experience as persistent feelings of interest, curiosity, sensation seeking, and, in the presence of a sufficiently complex cortex, the search for higher meaning.

The Artists and Their Work

Over the years the author has been following the work of three artists who create what she considers innovative art for hospitals and has been intrigued not only by the art itself, but also by the responses of individuals who view the art or who observe others in the process. The reader is reminded that, with one exception, evidence to support the efficacy of this artwork to help individuals cope with stress in healthcare settings is anecdotal. Although the images of the first artist are more representational than that of the others, and the second and third artists enhance their more abstract images with light or other technology, it is proposed that, despite differences, they all share

the ability to engage the viewer in an interactive experience brought about through curiosity. Once aroused, the curious viewer is exposed to features that could have the potential to help the individual cope with stress. This examination begins with a closer look at these features and how this art is being used in healthcare settings, offers a rationale to support its use, and follows up with a discussion that compares the three artists' work through the lens of curiosity theory.

Joan Drescher

Drescher's work focuses on the use of positive images to support the healing process. Images can be powerful tools for healing. Studies with sophisticated genetic analysis have shown that mind-body exercises can change the way that genes interact or express themselves, especially in relation to a variety of medical conditions (Benson & Proctor, 2010). Simonton, Matthews-Simonton, and Creighton (1981) recommended mental imaging as an adjunct to standard cancer therapies, suggesting that patients form a mental picture of their cancer and of the immune system's victory over the disease. An ancient notion that a picture or image held in the mind can effect bodily change provides the rationale for this technique: "Psychologists have long recognized that images are preverbal, deeply linked to our emotions and unconscious mind.... Whenever we say that a painting, a photograph, a piece of music or the smell of a flower moves us in a way we cannot express, we are acknowledging the power of images" (Simonton et al., p. 117).

How might Drescher's images help individuals cope with stress in healthcare settings? Research findings suggest that a physiologic process may actually take place through contact with certain images. In his 1980 study, Goldstein described "thrills"—tingling sensations individuals may experience when exposed to emotionally arousing stimuli. The results of his study showed a relationship between these experiences and the release of endorphins—the body's own pain reliever, "relaxer," and mood enhancer. This is one of a growing number of studies concerned with the relationship between mind and body.

Kites Series

Drescher created a series of kites with symbols of healing for the Joint Center for Radiation Therapy at Children's Hospital Boston (see Figure 1). Children seem to be drawn to certain kites. For example, a 5-year-old girl looking at a painted kite resembling a fish said, "My special fish kite is always up there waiting for me" (Drescher, 1994, p. 10). The kite, a Japanese carp, is a symbol of courage.



Figure 1. *Kite Series.* Joint Center for Radiation Therapy at Children's Hospital Boston, Boston, MA.
© Joan Drescher

Nurses have mentioned that some children pat and talk with the life-size figures of people flying kites, which Drescher added to the wall by the entry to the room. The nurses say they believe this personal contact with the art helps to make the process of radiation treatment less stressful.

Symbols of Courage Murals

The chief of oncology for Boston's Floating Hospital for Children commissioned Drescher to create a series of six murals, titled "Symbols of Courage," for the oncology waiting area and treatment rooms. The murals would depict the journey that children and families travel, from before diagnosis when feeling well, to not feeling well and diagnosis, through the entire treatment protocol.

Drescher was charged with painting the dark shadows as well as the rays of hope (Drescher, 2007). She spent time in the clinic, observing and drawing the children. Her sketches were hung in the doctors' conference room, where children, their families, and staff had an opportunity to review them. They verified themes and recommended images to be incorporated, such as the oncology chief in one of his favorite neckties.

An 8-year-old boy undergoing chemotherapy appears in the mural *Goldfish Tank*, riding a giant goldfish, triumphant because he has transformed his chemotherapy solution into magical stars to conquer his cancer cells (see Figure 2). And, as instructed, Drescher depicted the darker side of the journey as well—hugs that cannot dry tears, the longing to play outside with friends (see Figure 3). The final mural in the series celebrates coming home again;

yet at the end of the project, Drescher created a seventh mural to honor a child who died and all the special children who communicated their courage through poetry and drawing for the project.

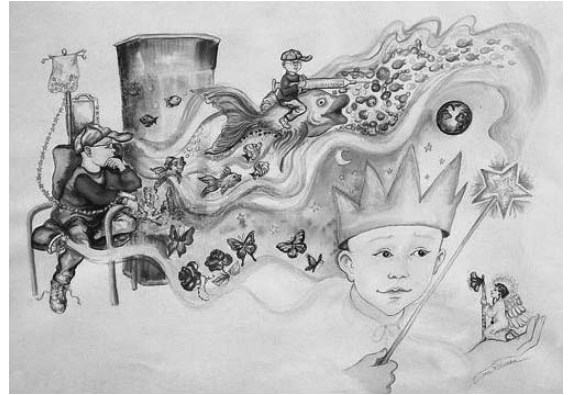


Figure 2. *The Goldfish Tank.* Transforming cancer cells into goldfish and chemo into stars is the visual theme of this mural. Developed as a result of studies that show positive results when patients fight cancer through visualization, this mural helps children in the clinic with the visualization process. Floating Hospital for Children, Boston, MA.

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Figure 3. *Not Feeling Well.* Painted in blue, cold colors of fear and uncertainty, this mural depicts the feelings experienced upon receiving a diagnosis. Sometimes a mother's touch is what is needed most; sometimes only a pet can bring comfort and understanding. Floating Hospital for Children, Boston, MA.

© Joan Drescher

Children told the staff that when they looked at the murals they felt that someone understood where they were. Parents, too, expressed a sense of being seen and heard, saying that at last someone knew what they were going through. Caregivers have said that the murals have helped them better understand what patients and their families undergo.

The Moon Balloon Project

The Moon Balloon Book, written and illustrated by Drescher, leads children on a journey in the Moon Balloon, giving them a magical ride to visit the field of balloons where they can draw symbols or words in special balloons to safely express their feelings. As artist-in-residence at MassGeneral Hospital for Children, Drescher frequently uses the book at bedside. On large chart paper she draws hot air balloons, and within them she draws symbols and images that children tell her represent the feelings they are experiencing (see Figure 4). She leaves the drawings on the walls of the room, and comments from staff suggest that the children often seem very pleased to have their feelings visualized for all to see.

Because the children have determined the imagery, they have a sense of ownership in the art, which has been associated with a perception of control over one's environment (Killeen, Evans, & Danko, 2003). Physicians and other members of the healthcare team have expressed surprise and gratitude for what they have learned about children through these drawings. Results of a recently completed quantitative/qualitative study of this experience, in which the child determines the content of

the art, indicate a statistically significant ($p = .001$) reduction in child and parent perceptions of the child's fear, sadness, anger, worry, fatigue, and pain or discomfort following the one-time Moon Balloon intervention (Rollins et al., in press).

As the reader will see, Drescher's work is more representational than Kamin's or DeHart's. The author proposes that Drescher's work strikes the balance that Berlyne (1960) believed most rewarding for triggering the curiosity that motivates exploratory behavior: situations that feature an intermediate level of novelty, between already familiar and completely new situations. See <http://www.joandrescher.com/> and <http://www.themoonballoonproject.org/> to view additional images by Drescher.

Vara Kamin

Kamin's abstract paintings have been described as mosaic-like, soothing and restful, calming, and peaceful. In 1998, at the request of healthcare architects and designers, Kamin began replicating her original multilayered paintings for placement in backlit ceiling and wall installations in healthcare environments (Impressions of Light®). Various color theories are frequently used to substantiate the use of abstract art in healthcare settings (Tofle, Schwarz, Yoon, & Max-Royale, 2004). For example, abstract art featuring red might be appropriate for rehabilitation areas where the intent is to excite rather than calm. However, although the literature regarding the healing characteristics of color and light is vast in both the academic and lay press, it has become very difficult to separate the facts from the myths.



Figure 4. Moon Balloon drawings. Drescher creates art based on the symbols and images that children tell her represent the feelings they are experiencing. The drawings are left on the wall of the child's room for all to see. Courtesy of Betty Raymond.

What is it about Kamin's art itself that attracts the viewer's attention and encourages exploration? In presenting a theory of human artistic experience and the neural mechanisms that mediate it, Ramachandran and Hirstein (1999) proposed a set of heuristics that artists either consciously or unconsciously deploy to optimally titillate the visual areas of the brain. At least two of the principles are apparent in Kamin's work. For example, regarding *grouping*, the very process of discovering correlations and of binding correlated features (e.g., the blue in one part of the painting carried over and thus grouped visually with the blue in other parts of the painting) provides an incentive for discovering such correlations. Ramachandran and Hirstein tell us that the discovery of these correlations generates a pleasant "aha!" sensation and suggests that

there may be direct links in the brain between the processes that discover such correlations and the limbic areas of the brain that give rise to the pleasurable rewarding sensations associated with feature binding.

Kamin's paintings also offer *contrast*. Cells in the retina, the lateral geniculate body (a relay station in the brain), and the visual cortex respond mainly to edges, i.e., step changes in luminance. As with grouping, such contrast may be intrinsically pleasing to the eye (Ramachandran & Hirstein, 1999). When Kamin's images are installed in rooms with dimmer switches, contrast is further enhanced as the lighting is lowered. Although the concepts of grouping and contrast seem antithetical (grouping on the basis of similarity is rewarding; its opposite, contrast, is also



Figure 5. Sacred Passages—Equanimity. Magnetic Resonance Imaging Suite, Children’s Hospital of Philadelphia, King of Prussia Specialty Care Center, Philadelphia, PA.

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rewarding), Ramachandran and Hirstein explain that they actually complement one another in that they are both concerned with the discovery of objects, which is the main goal of vision.

Thus, it is proposed that while there exists tension within Kamin’s paintings that could generate curiosity and discovery, there also is harmony that soothes and relaxes. These char-

acteristics separate Kamin’s work from the chaotic abstract art that Ulrich and Gilpin (2003) classify as generating negative responses in patients. We return to Goldstein’s research for an explanation for the ability of Kamin’s work to promote positive responses: exposure to aesthetically pleasing stimuli can result in the release of endorphins, which help the body relax and enhance mood (Goldstein, 1980).

THEORY

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Healing Spaces

It is well known that stress, depression, and anxiety can have a deleterious effect on health, yet modern hospitals, with their emphasis on diagnosing, curing, and treating, often become noisy, cluttered, institutional environments with seemingly little regard for the potentially detrimental effects these environments have on patients' physical or psychological well-being (Schweitzer, Gilpin, & Frampton, 2004). According to Press-Competence theory, the more compromised individuals are with regard to their physical or emotional health, the more susceptible they may be to negative aspects of the physical environment (Lawton & Nahemow, 1973). Kamin's work in such settings may help to counteract the visual impact of the institutional environment and its technology with beauty, providing an internal place for people to go when there is no place to go externally (see Figures 5 and 6).

Gilmore and Pine (1997) propose that if an experience is designed to be in tune with what an individual needs at an exact



Figure 6. Moon Drops. Lobby Atrium, Lake Erie College of Osteopathic Medicine, Medical Fitness and Wellness Center, Erie, PA.
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uncture in time, “you cannot help but change that individual—guiding him to (and through) a life-transforming experience” (p. 14). A hospital visitor related the effect of one of Kamin’s images on him during a difficult time for his family. He noticed Kamin’s backlit painting while waiting in the family room at the intensive care unit (ICU) at Fairview Southdale Hospital in Edina, Minnesota. He reported, “Its soothing green and blue colors and intricate patterns kept drawing my attention to it, even as we were literally facing life and death decisions regarding my father-in-law.” His words suggest that the image aroused his curiosity. He also expressed pleasant surprise that the physical space was taken into account as an integral part of the care-giving environment, adding, “It shows compassion and mindfulness for a hospital to put a piece of healing artwork up on the wall.” Although purely an anecdote, this implies that the image was just what this individual needed at this very stressful juncture.

Treatment/Procedure Rooms

Anecdotal reports from healthcare professionals suggest that Kamin’s work may have the ability to help individuals cope with the stress associated with treatments and procedures. At Children’s Hospital of Philadelphia (CHOP), Kamin’s images have been installed in 21 sedation rooms. As children await sedation, they gaze at the images, focusing on favorite colors, finding images, naming them, and sometimes narrating stories about them. Child life specialists use the images for leading the children in guided imagery, a mind/body technique that involves focused concentra-

Keeping the perimeter of the room darker and having a brighter area in the center produces a “campfire effect” that will draw individuals to the brighter area and encourage relaxation.

tion and produces relaxation as well as distraction (Hart & Rollins, 2011). Sometimes child life specialists use the images for relaxation exercises such as breathing in the calm colors and breathing out the pain.

Because of the backlighting of the images, the ability of Kamin’s work to attract and hold an individual’s attention may be supported by lighting theory. Lighting theory is concerned with the type, color, intensity, and placement of light. Lighting experts tell us that light can dictate the activity in the room it is illuminating. Bright light creates motion and activity and is good for encouraging individuals to mingle at receptions; keeping the perimeter of the room darker and having a brighter area in the center produces a “campfire effect” that will draw individuals to the brighter area and encourage relaxation (Rollins, 2005). Furthermore, if people are sharing the experience, the campfire effect has the potential to bind people together on a spiritual level (Architectural Association of Ireland, 2002).

Child life specialists at CHOP currently use observation with quantitative and qualitative methods to record children's responses to the images in the sedation rooms. A review of this preliminary data suggests that Kamin's images may be reducing children's anxiety and providing a coping tool that children can use to manage difficult health-care experiences. For example, a child life specialist described a 7-year-old girl who had been coming to CHOP for magnetic resonance imaging for more than 4 years. Each visit required an intravenous line, and although Versed was always administered, her anxiety levels remained high. On a visit after the images were installed, the child life specialist introduced the child to the image, "Pool of Reflection." The child became immediately engaged and described objects and animals she saw within the image. She needed guidance and redirection during her IV start, but she allowed herself to continuously refocus on the image. During the IV insertion, she became so engaged in the image that she did not even flinch. Because of exciting reports such as these, plans currently are underway for a formal research study, which will include the use of the artwork in guided imagery.

Kamin's art seems to arouse diversive perceptual curiosity. The novelty of a stimulus may engage the viewer, who then takes the image and discovers his or her own way to make sense of it. See <http://www.varakamin.com/> to view additional images by Kamin.

Linda DeHart

Linda DeHart's *Colors in Motion*[™] uses technology and dynamic digital media derived from

original art forms (e.g., painting, music, dance, poetry) with the goal of engaging the emotions and senses while calming the mind and body. To date, no research has been conducted on *Colors in Motion*. Thus, the intent of the art and anecdotal evidence of its effectiveness are presented here.

Colors in Motion: The Human Journey

In her early work, "Colors in Motion: The Human Journey," DeHart synchronized 1,000 of her watercolor paintings from a body of work entitled "A Thousand Windows: A Long Walk in Beauty," to 10 musical scores, some composed specifically for *Colors in Motion*. Just as visual arts counteract the technology inherent in healthcare settings, music, too, has a soothing capacity and the ability to offset overly technological approaches to care (Rockwood-Lane, 2005). Among other benefits, music has been shown to decrease anxiety (Brice & Barclay, 2007; Choi, Lee, & Lim, 2008; Peterson, 2001) and depression (Cassileth, Vickers, & Magill, 2003; Choi et al., 2008) and decrease the use of sedation during procedures (Loewy, Hallan, Friedman, & Martinez, 2005; Walworth, 2005). Krout (2006) reports that listening to music can calm neural activity in the brain, which may lead to reductions in anxiety and help restore effective functioning in the immune system.

Each part of the Journey, called a *Sojourn*, represents a life passage, such as "Invitation," "Growth," "Abundant Nature," "Deep Resonance," and "Inner Stillness." The set of 10 Sojourns runs 103 minutes and may be viewed one Sojourn at a time, several in one sitting, or all

at once. This “story” without words was designed to evoke commonly shared emotions that individuals experience as they move through life. Color and beauty, visuals and music are artfully synchronized with the intent to elicit conscious healing, restoration, and balance from one’s own experience and knowing.

“Colors in Motion: The Human Journey” is being used in a variety of settings. For example, recently “Colors in Motion” was acquired by The Village at Waterman Lake in Rhode Island, a retirement facility that includes assisted living for people with Alzheimer’s disease. When “Colors in Motion” was shown in the Alzheimer’s building, residents remarked on the beautiful colors, and staff noted that some residents gradually calmed from high-energy speaking to relaxed enjoyment. Residents said they were reminded of places they had been. Research has found that reminiscing can promote positive outcomes for older adults, such as reducing depressive symptoms and loneliness (Bohlmeijer, Smit, & Cuijpers, 2003; Chiang et al., 2010; Wang, Hsu, & Cheng, 2005), and increasing life satisfaction (Cook, 1998), socialization (Cook, 1991), and self-esteem (Chao et al., 2006).

A center for treating breast cancer is another “Colors in Motion” site. The atmosphere in the waiting area at Cambridge Breast Center in Cambridge, Massachusetts, can be very intense. Women arrive prepared to spend 3 to 4 hours seeing several physicians and undergoing medical imagery, all the time faced with the uncertainty of their diagnosis or prognosis. “Colors in Mo-

tion: The Human Journey” plays continuously on a small television monitor. Although at this point it is unknown whether anxiety is reduced, anecdotal reports from staff suggest that the women watch the images while waiting.

Custom Installations

Using a variety of state-of-the-art display solutions including digital projection and large-scale light-emitting diode and liquid crystal displays, the “Colors in Motion” creative team—which, in addition to DeHart, includes dance and movement artist Meg Brooker, media director Christopher Graefe, poet and publisher Jeff Volk, and composer Josh Hummel—works with clients to create scalable, timeless, cross-cultural, dynamic media installations intended to captivate viewers and enhance the space.

Imagine the movement of colors on a large scale, for example, moving across a wall or the ceiling of a soaring atrium (see Figure 7) or creating a quiet space in a meditation room. To experience the movement of DeHart’s work, go to <http://colors-inmotion.com/customdesign.html>. The viewer can move slowly through the images, focusing on the colors as they gradually move and change.

The effects of “Colors in Motion’s” custom work, which merges music, poetry, and/or dance with the visual stimulation of DeHart’s watercolor paintings, may assist in the stabilization of the body’s physiological functions. Gibson (1961) claimed that the senses are not mutually exclusive; rather, they make up a complex sensory system, providing multisensory data from which humans

make an environment meaningful. Evidence suggests that bland, monotonous environments cause sensory deprivation and are detrimental to healing: “The brain needs constant change and stimulation in order to maintain homeostasis” (Malkin, 1992, p. 56).

Sound is part of the complex physical environment that is heard, understood, and perceived within a social and physical context (Craik, Price, & Walsh, 2000). Although studies have shown that visual stimuli are more dominant than either aural or haptic stimuli (Hecht & Reiner, 2009), sound is a robust primary sensory interface, providing cognitive information, emotional context, and spatial and temporal data, often helping the other senses to make sense of what is happening (Mazer, 2010). For the acutely ill patient who may be too ill to use any sense other than hearing to interface with his or her environment, aural information takes priority over visual stimuli and makes the issue of the auditory environment even more critical (Mazer). An interesting note: Smith (1986) reported that patients rest better in a hospital environment with varied patterns of auditory input (music or stories) than with quiet ambience.

DeHart’s most recent work has incorporated the vision of a dancer and words of poetry moving within the watercolor images of “Colors in Motion” (see Figure 8). Curiosity is aroused as one engages in anticipating what will appear or be heard next. Under these circumstances, the activation of both the desire for a particular piece of information (epistemic curiosity) and curiosity



Figure 7. Relax room. Colors in Motion™. Artists Linda DeHart and Christopher Graefe.



Figure 8. Colors, poetry, and movement. The Colors in Motion™ creative team works with clients to create scalable, timeless, cross-cultural dynamic media installations that captivate viewers and enhance the space. Colors in Motion™. Artists Linda DeHart, Christopher Graefe, Jeff Volk, and Meg Brooker.

driven by stimulus novelty or the desire to avoid boredom or sensory deprivation (diversive perceptual curiosity) is possible.

Discussion

According to the preceding review of curiosity theory, curiosity is aroused by a desire for knowledge; by a desire to avoid boredom or sensory

According to this review of curiosity theory, curiosity is aroused by a desire for knowledge; by a desire to avoid boredom or sensory deprivation; by novelty, surprise, incongruity, or complexity; and by the search for higher meaning.

deprivation; by novelty, surprise, incongruity, or complexity; and by the search for higher meaning. Each of these concepts is explored within the contexts of the hospital environment and the three artists' work.

A Desire for Knowledge

Although curiosity within the healthcare environment seems to fit most comfortably in the domain of diversive perceptual curiosity, each of the three artists' work in a hospital could arouse epistemic curiosity, especially among individuals with trait curiosity or a specific interest in the content of the artwork, its style, or art in general. Viewers of Drescher's images may be curious about their meaning. Interacting with the images provides an opportunity for viewers to learn about themselves and their feelings and to gain an understanding of their experience. For example, the Symbols of Courage murals provide images that are familiar to children undergoing treatment for cancer.

Familiarity may produce interest and expertise, which Loewenstein (1994) tells us increases curiosity in a particular domain.

Regarding Kamin's work, individuals may wish to explore how the intensity of the colors changes when the lights are dimmed. Viewers of DeHart's work may be intrigued by the technology and want to figure out how things work. It is proposed here that these explorations of Kamin's and DeHart's work can distract viewers and remove them, at least for a time, from the stress of the here and now. Those who become more deeply engaged in the work could experience a desire to learn more about it.

A Desire to Avoid Boredom or Sensory Deprivation

Among the components of an optimal healing environment, Jonas and Chez (2004) list the physical space in which healing is practiced, including characteristics of light, music, architecture, and color, among other elements. Research confirms that features of the healthcare environment may help or hinder healing (Schweitzer et al., 2004). For example, certain significant characteristics may be observed in the healthcare setting and in individuals undergoing sensory deprivation, including (a) reductions in the amount or intensity of stimulation in each sensory modality (sight, hearing, touch, internal bodily sensations, taste, and smell); (b) reductions in meaningful patterns of stimulation in each sensory modality; and (c) changes in stimulation other than decreases, such as the many new stimulations in the hospital environment (Schofield & Da-

vis, 1998). In some instances, a short duration of sensory deprivation may result in boredom; in other cases, for example, a lengthy stay on an ICU that couples sensory deprivation with lack of sleep, immobility, and stimulus overload, may result in ICU syndrome, a disorder in which patients in an ICU or a similar setting experience a cluster of serious psychiatric symptoms (Tiegs, 2006).

It is a rare person who has not experienced the boredom of being in a waiting area with blank walls or unexciting prints or posters, and tables with old or uninteresting magazines. The author proposes that the art of Drescher, Kamin, and DeHart is unique, and because of this uniqueness, a work of any of the three could arouse curiosity, capture an individual's attention, and provide positive distraction to help endure the stress of boredom or sensory deprivation. A positive distraction is an environmental-social condition marked by a capacity to improve mood and effectively promote restoration from stress. Art, access to nature, and music are the environmental variables that are most commonly known to contribute to positive distraction (Shepley, 2006). Ulrich (1991) cites access to positive distraction as a key factor in helping patients, families, and staff to cope with stress in healthcare settings, which in turn can result in improved health outcomes.

Novelty, Surprise, Incongruity, or Complexity

Beswick (2004) argues that to be fascinated, interested, puzzled, or intrigued by an unexpected, strange, unusual, novel, marvelous, wonder-

ful, even conflicting or contradictory event, and hence to feel an urge to understand, discover, or make sense of something, is one of the most basic and yet elevating experiences. Curiosity can arise from sensitivity to some overtly or covertly experienced incompleteness, incongruity, or disturbance of one's cognitive map of the world, including oneself.

This author proposes that Drescher's images, such as a boy riding a goldfish, provide stimulus novelty. The backlit element of Kamin's work, and the movement, images, words, and sounds of DeHart's work also are unique. Thus, their work could provide the stimulus to trigger curiosity and draw the viewer in. Loewenstein (1994) suggests that, despite its transience, curiosity can be a powerful motivational force that can produce self-control, something that is often needed to successfully navigate healthcare experiences.

On the other hand, Perry argues that when an individual's world is chaotic or when he or she is afraid, the individual will not like novelty (Perry, 2001). The individual will seek the familiar, staying in the comfort zone, unwilling to leave and explore new things. This seems to echo the principle of Environmental Competence/Press Theory, which implies that individuals will seek less challenging environments as they become stressed (Lawton & Nahemow, 1973). When an individual's internal emotional stimulation increases, he or she will seek a less stimulating external environment to balance the overall experience.

Regarding art, Zuckerman, Ulrich, and McLaughlin (1993) noted that abstract art was more often preferred by high-sensation seekers, suggesting that more representational work would be preferred by people seeking a less stimulating environment. An individual in a healthcare setting who is trying to reduce the intensity of the visual experience and achieve greater sensory control of the environment might prefer more representational work. Furthermore, part of this preference for representational work may be associated with color choice, with representational art tending to use the subdued colors of the natural environment, and abstract art often using more surprising color choices and combinations. Research indicates that anxious individuals tend to prefer less saturated colors (Ireland, Warren, & Herring, 1992).

Why, then, do some hospitals welcome the art of Drescher, Kamin, and DeHart and believe that it promotes coping? This paper proposes that in the case of some of Drescher's images, novel though they may be, there is much content that is familiar and universal. For example, children, families, and staff in a pediatric oncology clinic nearly anywhere would likely find much that is familiar in the images found in the Symbols of Courage mural series. Kamin's and DeHart's work, though abstract, is very organic and features a palette of colors more in tune with the natural environment. Many of their images have names associated with nature, such as Kamin's "Sea Garden," "Moondrops," and "View from the Mesa;" and DeHart's series of "Landscapes," "Mounds," "At Waters Edge," and "Horizon Lines." Further, some abstract

artists have argued that not all patients have a negative perception of abstract art (Shepley, 2006). McGhee and Dzuiban (1993) suggest that previous exposure to art genres may influence preference.

Finding art of this type in a healthcare setting can be unexpected and may offer incongruity, which is known to arouse curiosity. The complexity of all of the artists' images provides additional curiosity triggers. Perhaps intense curiosity overrides other aspects of the fearful environment, contributing a positive distraction to help cope with the stressful environment.

The Search for Higher Meaning

The curiosity of human nature dictates that individuals wonder about what they do not know. Kashdan (2010) points out that curiosity creates openness to unfamiliar experiences, laying the groundwork for greater opportunities to experience discovery, joy, and delight:

When we are curious, we see things differently; we use our powers of observation more fully. We sense what is happening in the present moment, taking note of what is, regardless of what it looked like before or what we might have expected it to be. We feel alive and engaged, more capable of embracing opportunities, making connections, and experiencing moments of insight and meaning—all of which provide the foundation for a rich, aware and satisfying life experience.

(Kashdan, 2010, section 2)

In a study that examined curiosity as a mechanism for achieving and maintaining a high level of well-being and meaning in life, Kashdan and Steger (2007) found that, on days when they are more curious, people high in trait curiosity reported more frequent growth-oriented behavior and greater presence of meaning, search for meaning, and life satisfaction. Furthermore, these individuals reported that greater curiosity on a given day also predicted greater persistence of meaning in life from one day to the next.

Research findings also indicate that curiosity fosters spiritual development over the lifespan by stimulating exploratory behavior (Berlyne, 1960; Kashdan & Roberts, 2004; Loewenstein, 1994). As an individual develops spiritual awareness and begins to integrate thoughts, actions, and behaviors that promote growth and transcendence, he or she tends to develop a well-defined worldview that defines the individual's reality and allows him or her to maintain a positive, optimistic outlook on life and death. The individual is able to act in selfless, giving, altruistic ways; to act with meaning and purpose; to maintain a strong value system that promotes wellness of self and others; and to retain idealism for the betterment of the world (Purdy & Dupey, 2005).

It has been said that art is the result of inspiration, and that inspiration itself has its basis in spirituality (Buzzle, n.d.). If so, then any definition of art might include the understanding that art is a form of communication that delivers the artist's understanding of existence. Also, the theme of any particular piece of artwork, along with the

techniques and style used, is the means for communicating that message.

It has been proposed that the artwork of Drescher, Kamin, and DeHart features characteristics known to arouse curiosity. Anecdotal evidence suggests that some individuals become deeply engaged and experience a transformation when viewing this work. Could it be that this art is providing a tool for some individuals in their search for higher meaning in an effort to make sense of their experience? If so, the impact could be worth noting. Mitchell (2002) reports that research involving people with human immunodeficiency virus, heart disease, and cancer indicates that finding positive benefits from the illness experience may favorably affect not only subjective experience but also physiology, immune response, and even health outcomes.

Future Directions

In recent years, the aesthetic aspects of the hospital environment have become increasingly important. However, their purpose typically has been to enhance patient satisfaction as a means of attracting consumers (Schweitzer et al., 2004). As the literature demonstrates, the arts in the health-care environment can do much more (State of the Field Committee, 2009; Ulrich, Zimring, Joseph, Quan, & Choudhary, 2004).

Of primary importance for research are the possible health outcomes of engagement in this type of interactive art. Many similar, overlapping definitions of health outcomes exist, but they all involve change in health status attributable to

an intervention, planned or, in some instances, unplanned. Ulrich and Gilpin (2003) suggest that meaningful health or medical outcomes to explore include (a) clinical indicators, e.g., length of hospital stay, blood pressure, intake of pain medication, anxiety; (b) patient/family/staff outcomes, e.g., patient ratings of perceived pain, family satisfaction with services; and (c) economic outcomes, e.g., cost of patient care, recruitment or hiring costs caused by staff turnover.

Both quantitative and qualitative studies are needed. Research designs that incorporate the gold standard, randomized controlled trials, are necessary. Yet at this early stage, a variety of research designs can provide important information. Further, the National Endowment for the Arts and Society for the Arts in Healthcare (2003) point out that qualitative methods that convey information about patient, family, and staff responses to their experiences and the healthcare environment are especially useful to healthcare institutions because emotions such as loneliness, fear, joy, and relief are difficult to measure quantitatively.

Curiosity theory may offer an appropriate starting point for hypothesis development for the important research that is needed to measure the impact of this art. Kashdan (2009) refers to curiosity as the engine of well-being: "...there are few things in our arsenal that are so consistently and highly related to every facet of well-being—to needs for belonging, for meaning, for confidence, for autonomy, for spirituality, for achievement, for creativity" (Kashdan in Britton, 2009,

p. 1). In his research on individuals with anxiety, he argues that curiosity is the counter-motivation to anxiety.

Many questions need answers. The first concerns the theory itself: Does this artwork actually generate curiosity? Will the simpler pieces promote curiosity in a computer-savvy child or adult? And if artwork arouses curiosity, can it result in positive outcomes for patients, family, and/or staff? Curiosity research literature has been described as "messy" (Guthrie, 2009, p. 65). The numerous definitions and descriptions of curiosity, together with a wide range of terms to describe curiosity, have led to redundant and isolated research that has impeded scientific progress (Kashdan & Fincham, 2004). Research on curiosity theory applied to the topic of art in hospitals is lacking. If artwork can arouse individuals' curiosity in hospital settings, what are the characteristics within the art that seem to cause this? In which areas of a hospital setting does this occur? What about other healthcare settings? How long and under what circumstances do people become curious and engaged?

Research has shown that there are age-related differences in curiosity, with stimulation-seeking curiosity decreasing across the life span (Giambra, Camp, & Grodsky, 1992). Do these differences still hold true when individuals are confronted with the stress inherent in healthcare settings? What about gender differences? Peterson and Seligman (2004) report that gender differences are notably absent in general and specific curiosity, but men do tend to report greater novelty-seeking

ing than women. How do gender differences in response to this type of artwork compare to gender responses to nature art and other types of artwork, and what is the relationship of both types of art and gender to levels of curiosity?

Curiosity related to culture is another area of exploration. Although evidence exists regarding cross-cultural similarities in exploratory behavior (Edelman, 1997), cultures generally vary in attitudes toward both exploration and information seeking as well as in the range of situations allowing the expression of the various manifestations of exploration and curiosity. This is especially true for the sensation-seeking motive. More research is needed to study curiosity behavior in its own cultural context to gain a better understanding of the functional relationships between various environmental—including art—and social facilitators and inhibitors of curiosity in a given society.

Bakken (2007) argues that high-tech treatment (e.g., subspecialty care and advanced imaging) accounts for 20% of healing, while “high-touch” treatment (complementary and alternative medical therapies) and a healing environment account for the remaining 80%. The author proposes that the interactive kind of artwork featured here holds great promise for improving the healthcare environment for patients, families, and staff. It is hoped that a greater understanding of the work of these three artists will arouse curiosity and encourage research to determine its impact. Positive results could produce more of this “art that transcends” to make a meaningful contribution to healthcare settings for patients, their families, and staff.

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