

# The stress-reducing effects of art in pediatric health care: art preferences of healthy children and hospitalized children

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## Abstract

Art is assumed to possess therapeutic benefits of healing for children, as part of patient-focused design in health care. Since the psychological and physiological well-being of children in health care settings is extremely important in contributing to the healing process, it is vitally important to identify what type of art supports stress reduction. Based on adult studies, nature art was anticipated to be the most preferred and to have stress-reducing effects on pediatric patients. Nature art refers to art images dominated by natural vegetation, flowers or water. The objective of this study was to investigate what type of art image children prefer, and what type of art image has potentially stress-reducing effects on children in hospitals. This study used a three-phase, multi-method approach with children aged 5–17 years: a

focus group study (129 participants), a randomized study (48 participants), and a quasi-experimental study design (48 participants). Findings were evaluated from three phases.

**Keywords** architecture • art • children • healing • hospitals • pediatrics

## Introduction

Art is widely assumed (based on adult study results) to possess therapeutic benefits of healing for children (Ulrich, 1992). Healing may be defined as the personal experience of the transcendence of suffering (Egnew, 2005). Art, as referenced in this study, refers to two-dimensional art images. Since the psychological and physiological well-being of children in health care settings is extremely important in contributing to the healing process, it is vitally important to identify elements in the environment which support stress reduction in children. Because art potentially possesses such therapeutic benefits of healing, it is important to understand what type of art children prefer and what it contributes to healing. Research on adult patients suggests that infusing art into the health care setting improves mood, and stress reduction can impact the negative thoughts which could impede the healing process (Ulrich, 1979, 1984; Ulrich et al., 1991, 1993).

## Literature review

The effect of stress on health has attracted considerable attention from researchers, health care providers and designers. Although most of the research deals exclusively with adults, there is growing evidence that children experience stress as well and that their health is adversely affected by it (Dise-Lewis, 1988; Varni and Katz, 1997; Varni et al., 1991). Children in hospitals are faced with many psychological challenges: restricted freedom, trust violation between parent and child, painful procedures, all in unfamiliar settings. Limited cognitive development may limit the array of internal coping skills available to these children to deal with such stresses (Oksala and Merenmies, 1989). Children develop through an intellectual regulatory process geared to adaptation to the environment. During their ongoing relationship with the environment, children assimilate new experiences, fitting the information into existing schemas and then generating accommodations to fit the new environment (Gallagher and Reid, 1981). Theories of child development, such as Jean Piaget's theory of cognitive development, seek to explain the intellectual abilities that occur during development (Gallagher and Reid, 1981).

No theory of cognitive development has had more impact than that of Piaget, who suggested that children move through four separate developmental stages, in a fixed order that is universal for all children (Brainerd, 1978):

1. sensomotor: infancy 0–2 years;
2. preoperational: toddler/early childhood, 3–7 years;
3. concrete operational: elementary/early adolescence, 8–11 years; and
4. formal operational: adolescence, 12–18+ years) (see Table 1).

Consistent with Piaget's cognitive development stages, a number of studies show that younger children's preference evaluations are influenced primarily by subject matter portrayed in paintings (Bernaldez et al., 1987; McGhee and Dziuban, 1993; Ramsey, 1982). Older children also focus on subject matter when making preference evaluations but with decreasing importance, while more complex stimulus aspects such as style, color and other compositional elements increase in importance. This developmental transition is viewed by some researchers as a correlate of cognitive development and is analogous to Piaget's concept of decentralizing focus on singular visual entities (Hardiman and Zernich, 1977).

Thus far, research addressing the effects of the hospital environment on children has gone largely unaddressed and no studies exist that specifically ask the pediatric patient what type of art they prefer, neither has research included art in an assessment of the health effects of the hospital environment. This study attempted to address this gap through the following questions.

**Table 1: Preference (percentage and Standard Deviation) of respondents from four age groups for different art types comparing phase 1 and phase 2**

Art code	Phase 1		Phase 2		Mean <sup>†</sup>
	Mean <sup>†</sup>	SD	Mean <sup>†</sup>	SD	
Abstract, chaotic	8.38	9.46	10.95	16.71	9.67 <sup>b</sup>
Abstract, with strong color	6.84	7.98	5.13	7.11	5.99 <sup>bc</sup>
Abstract, with animal	4.27	6.83	7.81	12.29	6.04 <sup>bc</sup>
Impressionistic	17.89	11.49	8.78	9.96	13.33 <sup>b</sup>
Abstract, calm color	0.00	0.00	2.50	7.07	1.25 <sup>c</sup>
Representational, nature	62.61	15.62	64.82	9.15	63.72 <sup>a</sup>

<sup>†</sup> Averaged across art groups and phase 1 and phase 2

<sup>‡</sup> Averaged across age groups, phase 1 and phase 2, and genders. Means followed by the same letter are not significantly different from each other based on the 0.05 probability level using the least significant difference test

Phase 1: What type of art do schoolchildren or adolescents prefer? Are there differences in art preferences based on gender?

Phase 2: What type of art do hospitalized children or adolescents prefer? Are there differences in art preferences based on gender? Are there differences in art preferences between schoolchildren and hospitalized children?

Phase 3: What type of art is most effective in reducing stress with pediatric patients? Are there differences among cognitive developmental age groups and the types of art that are most effective in lowering stress with pediatric patients?

## **Method**

### ***Participants***

Phase 1 involved a focus group study to discern art preference among four age groups in four schools (elementary,  $N = 1$ ; middle,  $N = 2$ ; and high school,  $N = 1$ ) in Texas. These schools were selected in Beaumont, Texas due to the broad socioeconomic status of the students, including both private and public school participants. Participants were selected randomly from science classes, with an even distribution of males and females, creating a total of 129 from four different schools ( $N = 62$  males,  $N = 67$  females). Demographics and ethnicity data were not collected for any of the three phases of this study, with focus on cognitive developmental age differences.

Phase 2 involved a preference study conducted with pediatric patients from two hospitals in Texas. A total of 48 participants (12 in each age group) were in phase 2 ( $N = 24$  males,  $N = 24$  females), with the total from each health care facility (hospital A,  $N = 29$ ; hospital B,  $N = 19$ ).

Phase 3 was a quasi-experimental study with a total of 78 participants ( $N = 36$  males,  $N = 42$  females), with the total from each health care facility approximately equal (hospital A,  $N = 35$ ; hospital B,  $N = 41$ ). Participants were selected randomly as patients were admitted to the hospital pediatric unit, equally distributed among four age groups and the three study groups.

### ***Ethical approval***

Written permission for the research studies at the schools was secured either from the superintendent for the relevant independent school district, as well as by verbal permission from the principals for each individual school (in the private schools, through verbal permission directly from the respective principals). Research permission for the hospitals was via their institutional review boards.

### **Art categories**

Selection of the six art images for phases 1 and 2 was based on the research on adult art preferences (Ulrich et al., 1993), in which the majority of adult patients preferred representational, nature art images over abstract images. The researcher selected a representational nature art image containing the evidence-based elements recommended by Ulrich and Gilpin (2003): depth perspective with visibility, trees and a water element, coupled with animal content. Consistent with the preference for nature, one impressionistic, nature (beach) scene with people socializing was included. In order to compare art preferences, four different abstract art images were selected, differing in degree of complexity and color. The images ranged from those in which the dominant theme was nature to a complex, chaotic art image with a variety of intense colors (red, blue, orange). Abstract art images were selected to help determine whether colors, complexity or animal content would affect preference (see Figure 1).

**Figure 1: Phase 1 and phase 2 – art images**



1. Impressionistic nature beach scene with human subjects with calm color  
(source: Dina Art, 2002)

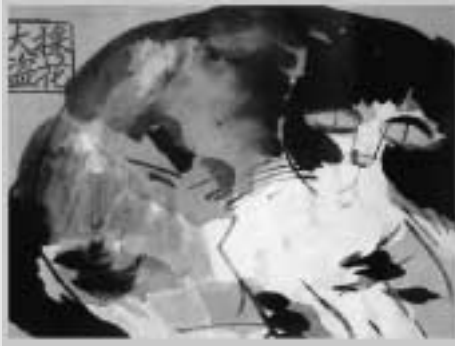


2. Abstract, no identifiable subject  
(Source: Gregory Garrett, 'Stabile Orb', exclusively published and distributed by Grand Image, Ltd, Seattle, WA)



3. Abstract, subject with intense color  
(Reprinted with permission of Waugh-Louise Modern Art, 2000)

**Figure 1: Phase 1 and phase 2 – art images (cont.)**



4. Abstract, with animal subject  
(Source: Ting-Art wise, 1999)



5. Abstract, complex, chaotic scene with water and animals  
(Source: Hockney-graphique De France, 2000)



6. Representational nature of forest  
(Reprinted with permission of Agard-Top Art, 2001)

### **Measures**

De-stress was measured using the Varni PedsQL™ Present Functioning Module (PFM), which was analyzed by the researcher to determine whether there were significant differences between the three groups of patients (Sherman et al., 2005). Each participant was given the Child-Teen Self-report PedsQL™ PFM prior to being shown the art images, in order to test their emotional state prior to viewing art. Each parent was given the Parent Proxy Report PedsQL™ PFM. These questionnaires were administered a second time, two hours later. The PedsQL™ PFM is a six-item questionnaire which asks about anxiety, sadness, anger, worry, fatigue and pain in the present moment using six developmentally appropriate visual analogue scales based on the well-established Varni/

Thompson Pediatric Pain Questionnaire Pain Intensity Visual Analogue Scales format.

All versions of the PFM utilize a visual analogue scale: a 10cm line anchored at one end with a happy face and at the other end with a sad face, used to answer each of the items. For this study, the Parent Proxy Report and the Child–Teen Self-report were utilized. The study was structured to obtain self-reported information directly from the children in addition to that from the parents or other caregivers, in order to ensure that children's emotional states were reported accurately. This design was based on the research conducted by Yamamoto and Felsenthal (1982), in which only a moderate correlation between children's and adults' ratings of stressfulness was found.

The Varni PedsQL™ PFM provided a validated measurement instrument that is designed to be explicitly sensitive to children and adolescents' particular cognitive developmental stages (Varni and Bernstein, 1991). This instrument is similar to the Wong–Baker Faces Pain Rating Scale used to evaluate children's predictions of pain. Wong and Baker (1988) reported the validity and reliability of this instrument for children aged 3–18. Children also prefer the face instrument to other assessment tools in evaluating pain (Wong and Baker, 1988). In the past, efforts at emotional evaluation of children have been based on parent assessment tools.

The PedsQL™ Present Functioning Visual Analogue Scales (PedsQL™ VAS) were designed as an ecologically momentary assessment instrument in order to measure rapidly present or at-the-moment functioning in children and adolescents. Developments in ecologically momentary assessment suggest the benefits of measuring symptoms at-the-moment in ecologically relevant environments (Stone and Shiffman, 1994). The measurement of present or ecologically momentary assessment functioning has been well established for pediatric emotion and pain using visual analogue scales for more than 20 years (McGrath, 1990; Varni and Bernstein, 1991).

Medical chart data collected included heart rate and respiratory rate taken at admittance, then two hours later by nursing staff for additional data to evaluate the stress reduction effect of the art intervention on patients. Room numbers, dates, patient gender and age were used to reference medical chart data to the PedsQL™ PFM.

## Procedure

### *Phase 1: focus group study*

A study was conducted with four developmental age groups in three schools in Texas: 5–7 years, 8–10 years, 11–13 years and 14–17 years. Each focus group was composed of 15 students, with two groups from each age group (for a total of eight groups). Students were selected from science classes, rather than art classes,

so as to avoid a bias toward art. Every science student was invited to participate in the study. A letter outlining the research was sent home to parents via the children, accompanied by an informed consent for the parents to sign and return to the researcher for approval for their child's participation and permission to be videotaped for the research study. Acceptance for participation was based on the student returning informed consent forms to the researcher. All the participants remained anonymous. In the letter, students were asked to bring their favorite picture for discussion, in an effort to avoid any predetermined bias based on pictures provided by the researcher. Discussions lasting from 45 to 60 minutes were conducted in the classroom for each group. Each student shared their respective pictures and discussed what they liked about their pictures and why.

During the last 10 minutes of the discussion, the researcher showed the students six different art images:

1. impressionistic nature beach scene with human subjects;
2. abstract, no identifiable subject with calm color;
3. abstract, subject with intense color;
4. abstract, with animal subject;
5. abstract, complex, chaotic; and
6. representational nature of forest scene with water and animals (see Figure 1).

Semi-structured interview questions were asked of children to determine preferences and justifications for their selections from the art provided by the researcher. Questions included the following: what do you like about your picture? How do you feel when you look at your picture? What do you think about when you look at your picture? What is your favourite? All focus group discussions were videotaped. Data from the videotaping were analyzed according to student art preference, age, gender and the number of students preferring each art image.

### ***Phase 2: study of hospitalized pediatric patients***

A randomized study was conducted with pediatric patients at two hospitals in which participants were selected randomly on admittance to the pediatric unit, based on age and gender categories. The typical profiles of pediatric patients in both hospitals were either Caucasian or African American from a range of socioeconomic levels, with varying non-chronic medical conditions (e.g. respiratory infections, broken appendages, post-operative recuperation, etc.). A total sample group of 48 participants were selected randomly from patients admitted to the pediatric units at each hospital, from information provided by admittance. Twelve patients comprised each of the four age groups, with an even distribution of males and females. Once the participants were located in their hospital rooms, the purpose of the research study was explained to patients. They were informed



that the researcher was seeking to understand what type of art pediatric patients prefer. Written acceptance was secured through informed consent forms signed by the parents and assent forms from patients aged 5–17 years.

Each patient was shown six art images on a laptop computer (see Figure 1) for approximately 10 minutes. The researcher asked patients to express their art preferences and documented the responses. The patients were asked to state whether they liked it and how it made them feel. From this analysis two art images were selected for phase 3: one chaotic (very complex) abstract and one representational, nature. This would provide images from the extremes of the continuum of most favored to least favored. Participants for both phase 2 and phase 3 were excluded from the experiment if they were mentally disabled or heavily sedated, in which case cognitive impairment would prevent effective responses to the study.

### ***Phase 3: pilot study of health-related effects***

The purpose of phase 3 was to determine whether art placed in the hospital room was stress-reducing, and which type of art image was the most therapeutic. A study was conducted with pediatric patients at two hospitals. Pediatric participants were selected randomly on admittance to the pediatric unit, based on gender and age categories, with non-chronic medical conditions. A total of 12 patients from each age group were selected for a total sample group of 48 participants. The study used a randomized, controlled quasi-experimental method to measure health-related outcomes by taking measurements before (T1: time before art exposure) and after a brief (two-hour) exposure (T2: time after art exposure) to art or to no art in their hospital room. Quasi-experimental methods were selected as the most suitable for measuring health outcomes, due to the need to generate scientific evidence to influence health care decision-makers of the importance of environmental influences on the healing process of patients (Ulrich, 1984, 1996; Ulrich et al., 1993). Once patients were located in their hospital rooms, the researcher explained the study and obtained written informed consent from a parent or carer and written assent from the subjects aged 5–17 years. The nursing staff assisted with data collection at hospital B by administering the initial T1 PFM forms to the patient and parents, once they were located in their hospital rooms, while the researcher collected T2 data. Prior to data collection, nurses were trained in the procedure of administering the PFM forms and provided with a script describing the study purpose and procedure. Nurses at both the hospitals took and provided information on vitals (blood pressure and respiratory rate) for all the participants. The sample group was evenly divided in thirds. Two different art images, one representational nature and one abstract, were placed randomly in two-thirds of the patients' hospital rooms. The other one-third, the control group, had no art displayed. Each 24" × 36" art image was placed on the wall opposite each patient bed for a two-hour period.

## Results

### ***Data analysis: phase 1 – focus groups***

A total of 129 subjects participated at four different schools ( $N = 62$  males,  $N = 67$  females). Overall, in all four age groups, 66 percent ( $N = 77$ ) preferred the representational nature art. A chi-square analysis was conducted to determine that there was not a significant gender difference in art preferences between male and female age groups, except in the 14–17 age group, in which the representational nature image was preferred by a greater number of males versus females ( $df = 5$ ,  $p = 0.023$ ). In the 5–7 age group, the chaotic abstract art image was preferred more frequently by males ( $N = 3$ ) compared to females ( $N = 1$ ), where a greater number of females ( $N = 2$ ) preferred the abstract w/animal subject (cat). In the 8–10, 11–13 and 14–17 age groups, a greater number of female versus males preferred the impressionistic art image (8–10 females:  $N = 3$ , 8–10 males:  $N = 0$ , 11–13 females:  $N = 4$ , 11–13 males:  $N = 2$ , 14–17 females:  $N = 6$ , 14–17 males:  $N = 2$ ) (see Figure 2). The gender difference was greatest in the 14–17 age group, in which more males ( $N = 10$ ) preferred the representational nature art image compared to females ( $N = 6$ ).

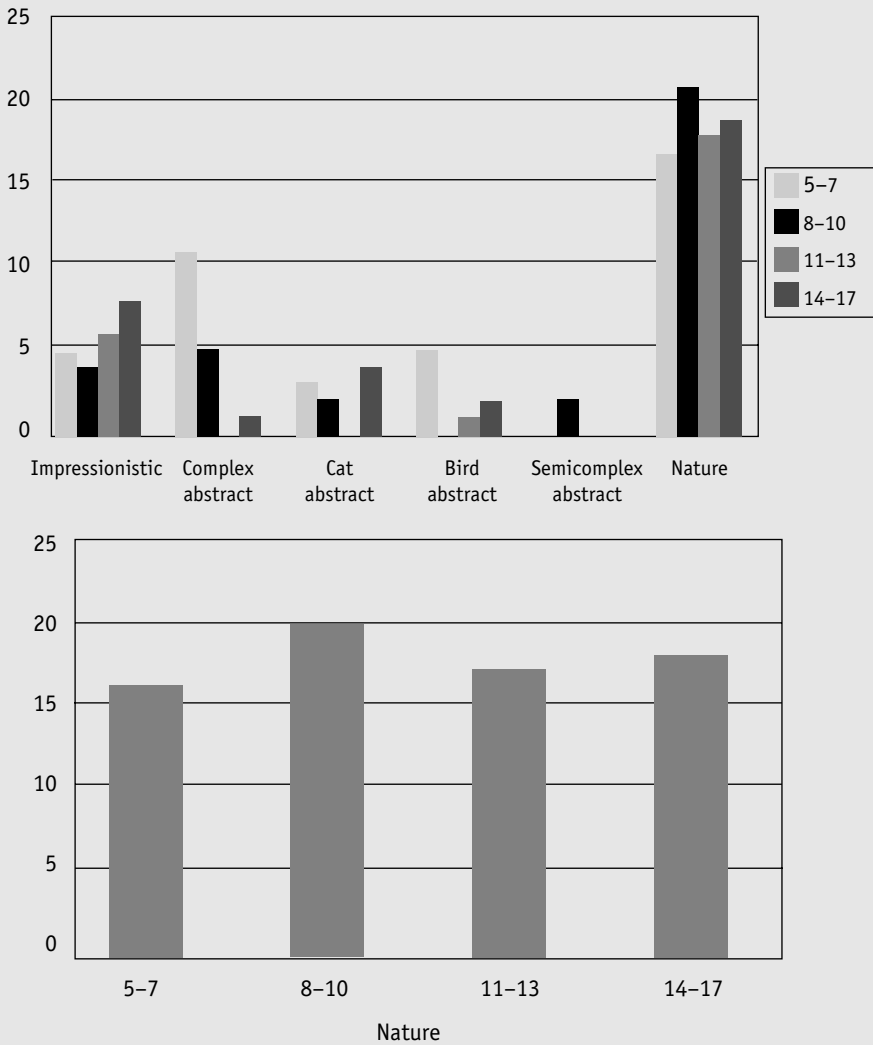
Although not statistically significant, there was a trend for representational nature art to be rated as highest in art preference. In the 5–7 age group, 50 percent ( $N = 17$ ,  $df = 4$ ,  $p = 0.515$ ) preferred the representational nature image, with the next highest preference being impressionistic nature at 23 percent ( $N = 6$ ). In the 8–10 age group, 70 percent ( $N = 28$ ,  $df = 3$ ,  $p = 0.155$ ) preferred the representational nature image, with the next highest preference being chaotic abstract at 24 percent ( $N = 7$ ). Of the 11–13 age group, 70 percent ( $N = 18$ ,  $df = 2$ ,  $p = 0.071$ ) preferred the representational nature, with the next highest preference being the impressionistic nature scene (33 percent,  $N = 6$ ). Of the 14–17 age group, 50 percent ( $N = 16$ ,  $df = 4$ ,  $p = 0.071$ ) preferred representational nature images, with the next highest preference being impressionistic nature at 25 percent ( $N = 8$ ) (see Figure 2).

### ***Phase 2: hospitalized patients***

A total of 48 subjects (12 in each age group) participated in phase 2 ( $N = 24$  males,  $N = 24$  females), with the total from each health care facility approximately equal (hospital A,  $N = 29$ ; hospital B,  $N = 19$ ). Representational nature art was the preferred art image for males and females for more than 60 percent in each of three older age groups: 8–10 ( $N = 8$ ), 11–13 ( $N = 8$ ) and 14–17 ( $N = 8$ ).

For the 5–7-year-olds, 50 percent ( $N = 6$ ) preferred nature, with the impressionistic nature scene being the next favorite at 1 percent ( $N = 2$ ). For the 8–10 age group, the chaotic abstract was the next preferred at 1 percent ( $N = 2$ ); for the 11–13 age group, the cat abstract was their next preferred image at 1 percent ( $N = 2$ ). There was no second favorite in the 14–17 age group. Chi-square analysis

Figure 2: Phase 1 – comparison of art preferences



determined that there was no significant difference between male and female art preferences in any age group.

Least square means differences for favored art images within each of the specific age groups were analyzed and consistent preference across all age groups for nature was found ( $p < .0001$ ). There was no significant difference between phases 1 and 2 in preference for representational nature. Using least square means to compare favored art images among the four age groups with combined

**Table 2: Preference (percentage and Standard Deviation) of respondents from four age groups for different art types**

	5–7 years		8–10 years		11–13 years		14–17 years		
Art code	Mean <sup>†</sup>	SD	Mean <sup>†</sup>	SD	Mean <sup>‡</sup>	SD	Mean <sup>†</sup>	SD	Mean <sup>‡</sup>
Abstract, chaotic	14.22	14.71	18.96	17.75	0.00	0.00	5.49	6.89	9.67 <sup>b</sup>
Abstract, with strong color	11.95	8.33	3.57	7.14	1.92	3.85	6.51	7.59	5.99 <sup>bc</sup>
Abstract, with animal	6.07	7.01	1.19	2.38	12.50	15.96	4.41	8.82	6.04 <sup>bc</sup>
Impressionistic	13.60	10.56	7.14	8.25	16.35	13.62	16.24	14.51	13.33 <sup>b</sup>
Abstract, calm color	0.00	0.00	0.00	0.00	0.00	0.00	5.00	20.68	1.25 <sup>c</sup>
Representational, nature	54.17	8.67	69.14	6.18	69.23	5.13	62.34	10.00	63.72 <sup>a</sup>

<sup>†</sup> Averaged across genders and phase 1 and phase 2

<sup>‡</sup> Averaged across genders, phase 1 and phase 2, and art groups. Means followed by the same letter are not significantly different from each other based on the 0.05 probability level using the least significant difference test

data from both phases, the findings indicate a significant difference in art preference based on age group ( $p > 0.05$ ) (see Table 2).

Within the 5–7 age group, 51.1 percent ( $M = 54.17$ ) preferred nature, compared to 71.2 percent ( $M = 69.14$ ) in the 8–10 age group, 70.3 percent ( $M = 69.23$ ) in the 11–13 age group and 57.1 percent ( $M = 62.34$ ) in the 14–17 age group (see Table 3).

A comparison using least square means was used to determine art preference by category between genders (see Table 3).

There was a significant difference between all females versus males ( $p = 0.05$ ). Of all males, 69 percent ( $M = 70.65$ ) preferred representational nature art, compared to 55.59 percent ( $M = 56.78$ ) of all females. Of the males, 12 percent ( $M = 10.62$ ) preferred chaotic abstract versus 6.5 percent ( $M = 8.71$ ) of females. Of the males, 6 percent ( $M = 4.95$ ) preferred abstract art with strong color (bird) compared to 7.5 percent ( $M = 7.02$ ) of females. Of the males, 1 percent ( $M = 2.08$ ) preferred animal abstract art (cat) compared to 9.7 percent ( $M = 10.00$ ) of females. Of the males, 10 percent ( $M = 9.19$ ) males preferred impressionistic art compared to 20.4 percent ( $M = 17.48$ ) of females. Based on the number of variables examined, the level of statistical significance was  $p < 0.001$  (see Table 3).

**Table 3: Preference (percentage and Standard Deviation) of female and male respondents for different art images**

Art code	Female		Male		
	Mean <sup>†</sup>	SD	Mean <sup>†</sup>	SD	Mean <sup>‡</sup>
Abstract, chaotic	8.71	13.74	10.62	13.48	9.67 <sup>b</sup>
Abstract, with strong color	7.02	7.70	4.95	7.35	5.99 <sup>bc</sup>
Abstract, with animal	10.00	11.59	2.08	5.89	6.04 <sup>bc</sup>
Impressionistic	17.48	13.40	9.19	7.73	13.33 <sup>b</sup>
Abstract, calm color	0.00	0.00	2.50	7.07	1.25 <sup>c</sup>
Representational, nature	56.78	12.09	70.65	8.63	63.72 <sup>a</sup>

<sup>†</sup> Averaged across art groups, and genders

<sup>‡</sup> Averaged across age groups. Phases 1 and 2, and genders. Means followed by the same letter are not significantly different from each other based on the 0.05 probability level using the least significant difference test

### ***Phase 3: pilot study of health-related effects***

Non-parametric chi-square analyses were performed to evaluate whether there were significant differences between gender groups, groups exposed to different art images and age groups at T1 and T2. Comparing all psychophysiological data across both T1 and T2, there were no significant differences between the gender, art or age groups. Even within the nature art group, there were no significant differences between genders, art images or age groups ( $N = 5$  males,  $N = 15$  females). Chi-square analyses were performed, with results indicating that within the abstract art group there was a significant difference between genders in their psychophysiological responses ( $N = 16$  males,  $N = 15$  females,  $\chi^2 = 3.857$ ,  $p = <0.05$ ). Within the no art group, there was no significant difference in psychophysiological responses.

Between the age groups, there were no significant differences in the 5–7, 11–13 or 14–17 age groups. However, there was a significant difference in gender in the 8–10 age group ( $N = 12$  males,  $N = 4$  females,  $\chi^2 = 4.000$ ,  $p = 0.046$ ). Significantly more males than females were affected positively by exposure to nature art, demonstrated by positive changes in PFM scores, blood pressure and respiratory rates between T1 and T2. One-way analyses of variance (ANOVAs) were performed to compare each of the three art intervention groups (nature, abstract and no art) within each of the four individual age groups (based on PFM, blood pressure and respiratory rate). Measurements for T1 ratings were taken to test for individual differences at T1, indicating that there were no significant differences in blood pressure and respiratory rates of pediatric patients between T1 and T2. In T2, there were no significant differences, except in the

child PFM abstract art group ( $N = 21$ ) on the rating score for 'worry what will happen to me' ( $M = 42.62$ ,  $SD = 35.38$ ). The abstract group rated this category of 'worry' higher compared to the nature art group.

In T1, for the 14–17 age group, there were significant differences in ratings for diastolic blood pressure, with the nature art group ( $N = 6$ ,  $M = 125.17$ ,  $SD = 6.21$ ) performing worse than the no art group. Based on PFM scores, blood pressure and respiratory rates tended to improve over time. To test the differences at T2 while controlling for T1, a repeated measures ANOVA was performed with the findings. Repeated-measures *t*-test compared within subjects (nature, abstract and no art groups) between T1 and T2 revealed no consistent effect for art exposure on PFM scores, blood pressure or respiratory rates, but rather a general trend of functional improvement on these measures associated with the passage of time between T1 and T2, regardless of art exposure.

## Discussion

Representational nature art was clearly indicated as the highest preferred art image for all age groups, as revealed by the results from phases 1 and 2. Overall, in all four age groups in phase 1, 66 percent preferred representational nature art. In phase 2, representational nature art was preferred by 60 percent of the older three age groups and by 50 percent of the 5–7 age groups. These results support hypothesis 3, that there would be no difference between preferences of school and hospitalized children and adolescents who preferred representational nature art to abstract. A preference for realism has long been noted in the literature. Consistent with study results from Ramsey (1982), the majority of elementary school children preferred realism to abstract art images. According to study results from Sebba (1991), adults' favorite remembered places in childhood, indicated nature–outdoors as the most significant environment by 95.6 percent of males and females. Of the adolescent subjects in Owens' (1988) study, 70 percent valued outdoor places where they could be with nature. Phase 1 and phase 2 results for nature preference were consistent with Hart's (1979) study, in which nature was the choice destination where children sought out quiet places to be alone to replenish their psychological and physiological well-being.

In phase 1, there was no dramatic gender difference in art preferences between the age groups, except 14–17, in which more males ( $N = 10$ ) preferred the representational nature art image compared to females ( $N = 6$ ). This partially supported hypothesis 2, which stated that 'gender will impact art preferences'. In phase 2, there was also no major gender difference in art preference. Of all males, 69 percent preferred nature art compared to 55.59 percent of all females, with 20.4 percent of females preferring impressionistic art compared to 12 percent of males. Consistent with the literature review on children's preference for nature, the outdoors was indicated most often as the most significant envi-

ronment in their childhood by 95.6 percent of both males and females (Sebba, 1991).

Based on cognitive developmental stages, children's art preferences remained consistently in favor of nature. This proved inconsistent with hypothesis 1, which stated that 'distinct differences in art preferences would exist among four cognitive developmental age groups', and hypothesis 4, which stated that 'younger children (5–10 years) will prefer nature, with older children (11–17) preferring more abstract art as a function of their cognitive developmental stage'. Based on Piaget's (1930) theory of cognitive development, the researcher anticipated that children's cognitive development would affect their art preference. Hypotheses 1 and 4 were proved to be unsupported, as children's preferences remained the same over the four age groups and cognitive development appeared to have no impact on art preference. The phase 3 study results for psychophysiological measures from the PFM, blood pressure and respiratory rates did not support hypothesis 5, in which nature art which was expected to have therapeutic benefits of stress reduction. There were no differences in physiological measures between the two art interventions of nature versus abstract art.

These findings with pediatric patients were inconsistent with the literature on adult hospital patients, where views of nature and nature art were therapeutic in contributing to positive health outcomes (Heerwagen and Orians, 1990; Ulrich, 1984, 1996; Ulrich and Simons, 1986; Ulrich et al., 1993). The researcher had anticipated that pediatric patients would respond similarly to adult patients, with nature art proving to have positive physiological outcomes. It is important to note that the study methodology was not designed to control for any intervening variables. A possible explanation for the lack of significant psychophysiological differences among the three art intervention groups is the comparatively long duration (two hours) of art exposure between T1 and T2. This study could be replicated with a shortened time period (e.g. 10 minutes) between T1 and T2.

The researcher anticipated that the art intervention would serve as a positive distraction to reduce stress. The review of literature confirmed that positive distraction theory with pediatric patients has been shown to reduce pain perception. However, based on the literature review, pediatric patients responded to direct, focused forms of positive distraction that reduced pain perception (Sparks, 2001). The art image intervention was not an isolated, focused form of positive distraction, so it clearly did not have the same effects as other visual distractors, such as a kaleidoscope, which was found to reduce venepuncture pain significantly in children aged 3–12 years (Vessey et al., 1994).

## Conclusion

The results of this study may indicate that pediatric patients may be less in tune with art and possibly more affected by social support, such as child life advocates

and parental care. Both pediatric units were very child-friendly, providing a high level of social support. In addition, patients were not in an isolated environment, as adult patients often are. Furthermore, pediatric patient hospital care is not the same as hospital care for adults. In a typical pediatric unit, there is much more social support and positive diversion, such as art activities. Adult patients often find themselves with much higher levels of isolation during their hospital stay. Perhaps the difference between data results was due to the high levels of social support for pediatric patients, as opposed to those for adult patients. The study findings indicated that children and adolescents prefer nature art, but hospitalized pediatric patients clearly respond more to social support.

Since this study was conducted with non-chronic pediatric patients, perhaps a sample group examining high anxiety which remains high over time would be a better study group to provide significant results, i.e. those who are experiencing very acute levels of stress. An example might be cardiac patients, a similar sample group to that of the Ulrich et al. (1993) study of cardiac patients, who viewed a nature and an abstract art image in their hospital rooms. Based on what we have learned from this study, it is highly recommended that children have a choice of art placed in their hospital rooms. One optimal recommendation would be to provide for an art cart, which would give several options for patients to select a preferred picture to place in their room, although most selections should be nature-based images.

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