



Pictorial intervention in a pediatric hospital environment: Effects on parental affective perception of the unit

Fiorella Monti^a, Francesca Agostini^{a,*}, Sara Dellabartola^a, Erica Neri^a, Laura Bozicevic^a, Mauro Pocecco^b

^aDepartment of Psychology, University of Bologna, Viale Bertini Pichat 5, 40127 Bologna, Italy

^bPediatric Unit, M. Bufalini Hospital, Viale Ghirelli 286, 47521 Cesena, Italy

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ABSTRACT

In recent decades, research on health care design and planning has highlighted the strong relationship between environmental characteristics and human health. According to a patient-centered model, the focus on the hospital environment is important in reducing the negative effects of hospitalization on the patient, especially in the case of children.

In a hospital Pediatric Unit, a pictorial intervention, characterized by natural landscapes with cartoon characters, was introduced. The study sought to evaluate the effects of this intervention on the affective qualities attributed to the hospital environment by parents whose children were hospitalized; our main hypothesis was that the pictorial intervention would benefit parents, enhancing the positive and reducing the negative affective perception of the hospital environment.

A total of 502 parents of admitted children aged 0–11 completed a questionnaire to describe the affective perception of the hospital environment, 200 before the pictorial intervention was performed, and 302 (200 parents of children with acute illness, 102 of children with chronic pathology) after it. Results revealed that the parental affective perception of the hospital environment significantly improved after the pictorial intervention, with almost no differences in relation to severity of child illness (acute versus chronic); a younger child age was negatively related to parental affective perception of the unit only in the condition without the intervention.

Data suggest that the pictorial intervention represents a useful technique to create more welcoming hospital environments, reducing the negative affective perception of the unit in parents facing the stress of their child's hospitalization.

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1. Introduction

In recent decades, modern hospitals have had to address complex design and planning issues, similar to the challenges faced in urban environments. The central tenet is the understanding that human health is strongly linked to environmental conditions (Cesario, 2009; Grahn & Stigsdotter, 2010; Jackson, 2003). While in the 1970s and the 1980s priorities in healthcare design emphasized the centrality of technology, in the last 20 years creating a welcoming environment for the patient has become more important (Devlin & Arneill, 2003).

Based on the assumption that hospital environments can affect mood, stress levels, and well-being of patients and their families,

architects and landscape designers have begun to plan hospital settings focusing on the users' needs, according to a patient-centered model (Whitehouse et al., 2001). Specifically, noteworthy is the Planetree model, founded in 1978 as a nonprofit organization with the aim of reclaiming for patients a holistic and patient-centered focus in medicine. The Planetree model was first implemented in San Francisco in a facility that emphasized primary nursing and provided more patient-oriented hospital care (Martin et al., 1998).

There is evidence that changes in healthcare design with a greater attention to the users' needs can positively influence patients' outcomes (Cesario, 2009; Davidson, 1994; Ulrich, 1984; Verderber & Reuman, 1987), enhancing recovery and reducing hospital stays (Lemprecht, 1996). Many aspects of the hospital setting have already been taken in consideration, such as the presence of a naturalistic view from the windows, the presence of green spaces, lighting, sounds, and colors (Devlin & Arneill, 2003; Verderber & Fine, 2000).

* Corresponding author. Tel.: +39 0 512091337; fax: +39 0 51243086.

E-mail addresses: fiorella.monti@unibo.it (F. Monti), f.agostini@unibo.it (F. Agostini), sara.dellabartola2@unibo.it (S. Dellabartola), erica.neri4@unibo.it (E. Neri), laura.bozicevic@gmail.com (L. Bozicevic), mpacecco@ausl-cesena.emr.it (M. Pocecco).

1.1. Nature in healthcare environment

The impact of natural views has received particular interest. People under stressful conditions appear to receive benefits from the view of a natural setting, which reduces physiological arousal more effectively than does the view of urban scenery (Sternberg, 2009; Ulrich, 1981, 1984; Van den Berg, Koole, & Van der Wulp, 2003). Following stressful or demanding experiences, a visual exposure to nature can reduce stress by eliciting positive emotions, such as pleasantness and calmness; sustaining non-vigilant attention and positive interest; and reducing negative thoughts, arousal, or stress (Ulrich, Lundén, & Eltinge, 1993; Ulrich et al., 1991; Van den Berg et al., 2003).

Another positive effect is linked to pain reduction (Malenbaum, Keefe, Williams, Ulrich, & Somers, 2008; Tse, Ng, Chung, & Wong, 2002; Ulrich, 1983; Ulrich et al., 2008; Ulrich, Zimring, Quan, & Joseph, 2006). According to the distraction theory, viewing naturalistic scenery may have a positive influence on the experience of pain, distracting patients through a pleasant stimulus that can divert attention, enhancing pain reduction (Ulrich et al., 2008). Other studies have underlined the importance of also using audio as well as visual distraction, for example, classical music or nature sounds, to reduce pain (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003; Lee et al., 2004; Schneider, Prince-Paul, Allen, Silverman, & Talaba, 2004). These data give strength to evolutionary theories, suggesting that nature is innately preferred by humans and that the attributes of natural settings trigger responses that allow individuals to function more effectively (Barnhart, Perkins, & Fitzsimonds, 1998). In particular, Berman and colleagues (Berman, Jonides, & Kaplan, 2008) have emphasized the role of Attention Restoration Theory (ART; Kaplan, 1995, 2001) as a new approach toward identifying and restoring executive attention. According to ART, interacting with environments with fascinating stimuli (e.g., natural landscapes) allows one to restore directed attention (Kaplan, 1995).

For these reasons, nature within the hospital environment has been introduced in order to bring about comfortable settings, reduce patients' stress, and enhance healing. Researchers have shown that direct exposure to natural settings (such as gardens) is effective in reducing emotional distress and pain, improving mood and increasing healthcare satisfaction (Cooper-Marcus & Barnes, 1999; Sherman, Varni, Ulrich, & Malcarned, 2005; Varni et al., 2004). Well-designed gardens provide restorative naturalistic views that could reduce stress and improve emotional well-being fostering a restorative escape (Ulrich, 1999; Whitehouse et al., 2001).

Artwork displayed in healthcare environments can also assist with the healing process. Most studies have found that patients prefer nature paintings and prints, and a significant body of research has shown how artwork depicting nature influences patients' conditions. These effects are demonstrated by measuring health outcomes, such as clinical indicators (blood pressure, heart rate, pain perception) or health-related quality of life measures (Ulrich, 1992, 2009).

Pictorial interventions with naturalistic views have been shown to positively influence the patients' and staff's satisfaction and to promote physiological and psychological changes, as well as clinical and behavioral outcomes (Daykin, Byrne, Soteriou et al., 2008; Nanda, Eisen, Zadeh, & Owen, 2011; Ulrich & Gilpin, 2003). For example, a recent study by Nanda et al. (2011) explored the positive impact of visual art that depicted restorative naturalistic scenes in reducing mental health patients' anxiety and agitation in healthcare settings. The scenes of naturalistic artwork, in fact, could provide a positive distraction, producing positive feelings, promoting sustained attention and interest, and reducing worrisome thoughts and postoperative anxiety (Douglas et al., 2002; Rollins, Sonke, Cohen, et al., 2009; Ulrich, Zimring, Quan, Joseph, & Choudhary, 2004).

1.2. Child hospitalization and environmental factors

Attention to all these aspects becomes even more relevant when the patient is a child: hospitalization can represent an intense stressful situation, as it changes the child's routines (e.g., sleep, hygiene, food habits) and triggers the onset of negative feelings, like anxiety and fear, tied to the unknown situation (Santa Roza, 1997). It has been widely documented how the stress experienced by children during hospitalization is associated with negative health outcomes (Jones, Fiser, & Livingston, 1992; Varni & Katz, 1997; Varni et al., 1996; Ward-Begnoche, 2007). In particular, children respond differently to stressful events depending on their level of cognitive, social, and personality maturity. The negative effects of hospitalization have been particularly evident in younger children, with the greater suffering linked to the separation from the family (Small, 2002). The findings suggest how Pediatric Intensive Care Unit (PICU) hospitalization can result in negative psychological sequelae in children, which can manifest themselves up to one year post-discharge, showing adverse emotional and behavioral outcomes (for a review, see Rennick & Rashotte, 2009).

With a view of improving health processes and outcomes, pictorial intervention is one of the strategies used by health institutes; these so-called humanization projects have undergone evaluations, indicating an improvement in healthcare quality (Ceribelli, Nascimento, Pacífico, & Lima, 2009). Especially in case of young patients, the pictorial intervention can indeed help preserve a kind of continuity between where they came from and what they are presently experiencing, creating a sort of continuity with a familiar environment, in which ludic and welcoming patterns play a protective role against feelings of disorientation and fear (Monti, Agostini, Lupi, Gobbi, & Pocecco, 2008). Specifically, the application of large panels, on which many fantasy characters can "play" and "live" in natural landscapes, is effective for creating an environment appropriate for the psycho-physical care of children in a Paediatric Unit. In a manner similar to adult patients, the available literature suggests that children, hospitalized children in particular, are attracted to landscapes that provide the opportunity for refuge, diverting their focus from the pain: the view of nature serves as a "positive distraction," promotes an important coping strategy, "cognitive refocusing" (Appleton, 1996; Kirkby, 1989; Varni et al., 1996; Whitehouse et al., 2001) and helps the young patients feel more comfortable and familiar in an unknown place (Bonaiuto, Bonnes, Parenti, & Rabazzi, 2001; Fornara, 2004).

In relation to this aspect, it is interesting to note that while the child's perspective has been widely explored, adolescents' points of view have been infrequently investigated. In a recent study, Blumberg and Devlin (2006) explored adolescents' perspectives regarding the hospital environment; in their study, adolescents expressed a unique need for privacy and preference for cheerful, colorful décor, but discouraged the use of decorations associated with childhood, such as teddy bears. They also expressed the need for spaces for their own posters, which they preferred over traditional landscape art and wall hangings. Other researchers studied art-preferences of schoolchildren and hospitalized pediatric children, and they indicated how, independent of age or gender, their preferences were similar. The children preferred naturalistic art over abstract images, which were perceived negatively by the majority of patients (Eisen, 2006; Nanda, Hathorn, & Neumann, 2007; Ulrich & Gilpin, 2003).

The child's admission to the hospital is also immensely stressful for parents. For parents, the hospital environment can cause a deep sense of fear and anxiety, other than stress (Hallstrom, Runesson, & Elander, 2002; Polkki, Pietila, Vehvilainen-Julkunen, Laukkala, & Ryhanen, 2002), when a child faces a long recovery for a severe illness and parents lack appropriate support (Mu et al., 2001; Ygge

& Arnetz, 2004). Caregivers of children hospitalized in PICUs have been recognized to be at risk of developing negative emotional outcomes as well as post-traumatic stress disorders (Heiney, Neuberg, Myers, & Bergman, 1994; Melnyk, Alpert-Gillis, Hensel, Cable-Billing, & Riibenstein, 1997). Parental anxious and/or depressed mood can influence the course of illness and the choice of medical treatment (Watson & Visram, 2003), and it has been recognized as prognostic of child maladjustment (Mabe, Treiber, & Riley, 1991; Tiedeman, 1997; Tiedeman & Clatworthy, 1990).

In the present study, we started from the assumptions that the health and well-being of a child is inextricably linked to his/her parents' physical, emotional, and social health, social circumstances, and child-rearing practices. These pressures operate during hospitalization as well (Schor et al., 2003). Further, a pictorial intervention may represent a useful tool in a period of particular psycho-somatic vulnerability, favouring the support of caregivers and the interaction among the hospital setting, the hospitalized child, and the family. Taking into consideration the paucity of empirical research on the evaluation of humanized healthcare environments, the objective of this study was to investigate the effects of a pictorial intervention on the parental perception of a pediatric setting.

1.3. Objectives and hypotheses

The current study sought to evaluate the environmental perception of a Pediatric Unit in parents of admitted children, before and after an intervention using a pictorial mural to increase humanization of the environment. Specifically, the walls of the Unit, where both acute and chronic pediatric patients were admitted, were decorated through a large pictorial intervention, realized thanks to the Juxi Project (Sally Galotti, cartoonist, 2005) to improve the quality of hospital humanization, by setting up the walls of the Pediatric Unit, usually white and aseptic, with murals characterized by fairytales and cartoon characters in a natural landscape. A very crucial role is played both by the colors and the materials chosen for the intervention because, while it is true that painted walls should be attractive and capture the child's attention, on the other hand they should not be too strong or striking. This was the last of a long series of interventions done by the cartoonist in other hospital Pediatric Wards in Italian towns (such as Bologna); because of this, she had already experienced the positive impact of her paintings on children (younger and older) and their families.

The assessment of environmental perception, before and after this pictorial installation, was carried out on a sample of parents of children admitted in the Pediatric Unit. Before the pictorial intervention, the walls were not completely blank but had small individual paintings hung side-by-side. According to the assumption that "the first level of environmental response is affective" (Ittelson, 1973, p. 16), the aim of this research was to investigate the effects of the pictorial intervention on the environmental evaluation processes, the so-called "environmental attitudes." Specifically, the objectives of the study were to: 1) evaluate whether the pictorial intervention produced a better effect on parental perception compared to a condition in which no pictorial intervention was carried out. In this control condition, the walls were characterized by small individual paintings hung side-by-side; 2) investigate whether the severity of the child illness was related to the parental perception of the environment; 3) analyze whether child age and gender were related to the parental affective perception of the Unit.

Our hypotheses can be summarized in three main statements. *Hypothesis #1*: compared to the condition with no pictorial intervention, the pictorial humanization would produce a better environmental parental perception. *Hypothesis #2*: environmental parental perception would be associated with the severity of the

child's illness. A child's chronic illness affects the family's relationship with the child, the need for care, and self-esteem (Hopia, Paavilainen, & Astedt-Kurki, 2004). For this reason, although pictorial intervention would be expected to globally increase parental perception, we hypothesized that, in case of chronic pathologies in the children, the parents' positive evaluation would be lower than in the case of acute illnesses in the children. *Hypothesis #3*: environmental parental perception would also be related to the child's age. Based on the studies that highlight negative consequences of hospitalization in younger children and their families (Becker, 1980; Kanizsa & Dosso, 2006), we expected to find that the younger the children were, the less positive the parents' perception would be. Regarding gender, our hypothesis was mainly exploratory.

2. Method

2.1. Experimental design and participants

The total sample included 502 parents of children hospitalized at the Pediatric Unit in M. Bufalini Hospital, Cesena (Italy), recruited before and after the pictorial intervention took place in the healthcare setting.

In order to verify our hypotheses, the research consisted in three phases. In the first phase, between December 2004 and September 2005, 200 parents (mean age: 37.47 ± 5.05 years) of children (mean age: 4.16 ± 4.36 years) admitted into the Pediatric Unit were recruited before the pictorial intervention was carried out (see Fig. 1). The purpose of this phase was to learn the qualities of affective perception of a non-humanized environment through the administration of a self-report measure. This group of parents represented the control condition and, for each of them, it was the first time they had visited the hospital.

In the second phase, between December 2005 and September 2006, a group of 200 parents (mean age: 37.87 ± 3.58 years) of children (mean age: 3.58 ± 3.77 years) admitted into the Unit for acute pathology (e.g., fever, bronchitis, gastrointestinal disease) was recruited, specifically three months after the humanization intervention (see Figs. 2 and 3). The parents completed the self-report measure during the same period of the year compared to the controls to avoid the law of effect. This sample represented experimental condition A in the research design. This was the first visit to the hospital for this group of parents.

In a third phase, 102 parents (mean age: 34.84 ± 6.38 years) of children (mean age: 3.63 ± 4.00 years) with chronic pathology admitted into the Pediatric Unit were recruited, again in the same period of the year (December 2005–September 2006), three



Fig. 1. Main corridor of the pediatric unit before the pictorial intervention.



Fig. 2. Main corridors of the pediatric unit for acute illness after the pictorial intervention.

months after the humanization intervention (see Figs. 4 and 5). These patients were suffering from more serious pathologies (e.g., cystic fibrosis, diabetes, epilepsy), than were the patients with acute illnesses, and they needed special care and attention. This sample was smaller than the other two because of the patients' longer hospitalization in the Unit due to their chronic illnesses. This third phase represented experimental condition B. Obviously, for some of these parents this was not the first visit to the hospital, as the children were suffering from a chronic disease and had been admitted previously. If this were the case, we checked that this admission had happened before the pictorial intervention had been carried out.

This study was approved by the Hospital Ethics Committee.

2.2. Procedure and measures

All the parents were directly contacted by a psychologist inside the Unit and given an informed consent form to participate in the study. Parents were randomly recruited in all the 3 different conditions of the study. One day a week a psychologist went to visit the hospital Pediatric ward, asking the parents present in the Unit to take part in the study. If they agreed, the psychologist collected the information on whether it was their first visit to the hospital or not.

During the recruitment, they were asked to take part in a research evaluating their general perception of the hospital environment. Specifically, they were asked to stay for 5 min in the room/corridor where the pictorial intervention had been carried out and, after that, they were asked to fill out a specific questionnaire. It is important to emphasize that, when giving the instructions to the parents, no specific references to the mural pictorial



Fig. 3. Corridor of the pediatric unit for acute illness after the pictorial intervention.



Fig. 4. Room of the pediatric unit for chronic illness after the pictorial intervention.

intervention or to the pictures on the walls were made, to avoid influencing the parent's answer. Parents were just asked to express their perception of the Unit.

In the current study, the Italian version of the "Scale of the Affective Quality Attributed to Place" was used (QAL; Perugini, Bonnes, Aiello, & Ercolani, 2002; Russell & Lanius, 1984; Russell, Ward, & Pratt, 1980, 1981), based on the circumflex model of affective quality attributed to places. This measure consists of 48 items, divided into 8 domains (each one consisting of 6 items) creating 4 bipolar dimensions: Relaxing-Distressing, Exciting-Gloomy, Pleasant-Unpleasant, and Arousing-Sleepy. Users have to answer the questionnaire using a 7-point rating scale, indicating to what extent each adjective is adequate in describing the place (0 = "not at all appropriate," represents the minimum level of



Fig. 5. Corridor of the pediatric unit for chronic illness after the pictorial intervention.

suitability perceived by users in describing the place; 6 = “completely appropriate,” represents the highest level of appropriateness). The global score for each domain, which can range between 0 (minimum) and 36 (maximum), is calculated by adding each adjective score. The psychologist also asked the parents to fill out a demographic form (including parent's and child's gender and age, and the duration of the child's admission).

2.3. Data analyses

For descriptive purposes, percentages, means, and standard deviations (*SD*) were computed. First of all, Pearson's Chi Square analyses were conducted to investigate the homogeneity of the three conditions relating to the main demographic variables: children's and parents' gender, children's and parents' age, length of hospitalization. We then explored, by one way-ANOVA, whether the QAL scores were related to parents' primary data (age and gender). This step was important in order to subsequently include, in case of relationship to the parents' scores, any of the previously mentioned variables as covariates.

We then compared the three conditions in order to verify our research hypotheses: (1) Control group: parents of children hospitalized before the pictorial intervention took place; (2) Experimental Group A: parents of children with an acute illness, hospitalized in the Pediatric Unit with pictorial intervention; (3) Experimental Group B: parents of children with a chronic illness, hospitalized in the Pediatric Unit with pictorial intervention.

A General Linear Model was used to analyze the significance of differences in the QAL scores among the three conditions, also including child's age as quasi-independent variable. Tukey post hoc analyses were performed to specify which conditions were significantly different among the three samples. When significant interactions between factors were found, simple effects analyses were run to detect which levels of the variables contributed to them. We also included child's gender, in order to see if parental attitude might differ depending on this. Data were analyzed using SPSS for Windows version 17.0.

3. Results

3.1. Descriptive characteristics: homogeneity of the three samples

Data were analyzed in order to see whether the three groups were homogeneous with respect to the following descriptive characteristics: child's and parent's gender, child's and parent's age, length of stay. The three groups were not significantly different on these variables (see Table 1).

3.2. Relationship between parent's gender and age and the evaluation of the pediatric environment

We then investigated whether the QAL dimensions were associated with parent's gender and age. In relation to gender, no significant differences between women and men emerged in any scale of the QAL (see Table 2), not even when we considered the age variable (see Table 2) or the interaction between gender and age (all *p* values > 0.05).

3.3. Parental evaluation of the environment in relation to pictorial intervention, child's illness severity, age and gender

Given that the three conditions were similar in relation to the main demographic characteristics and that parental evaluations were not related to gender and age, we investigated the differences

Table 1
Descriptive characteristics of the three samples.

	Control group (<i>n</i> = 200) %	Acute illness (<i>n</i> = 200) %	Chronic illness (<i>n</i> = 102) %	Pearson Chi Square	<i>p</i>
<i>Parent gender</i>					
Male	27	26	29.4	0.40	0.82
Female	73	74	70.6		
<i>Child gender</i>					
Male	50	53.9	51.3	0.55	0.76
Female	50	46.1	48.7		
<i>Parent age</i>					
29–39 yrs	63.5	61.5	68.6	1.49	0.47
40–52 yrs	36.5	38.5	31.4		
<i>Child age</i>					
0–5 yrs	69	76.5	70.6	2.99	0.22
6–11 yrs	31	23.5	29.4		
<i>Length of hospitalization</i>					
1–4 days	81.5	85	75.5	4.09	0.13
More than 4 days	18.5	15	24.5		

in QAL dimensions among the three groups, in order to evaluate our first hypothesis.

Significant differences emerged among the three conditions in every scale (see Table 3). Particularly, in all of the 4 positive scales (Relaxing, Exciting, Pleasant, Arousing), both A and B conditions showed significantly higher scores than did the control (Tukey HSD post hoc analyses showed all *p* values < 0.0005). Looking at the 4 negative scales (Distressing, Gloomy, Unpleasant, Sleepy), A and B conditions always showed significantly lower scores than did the control group (Tukey post hoc analyses, all *p* values < 0.0005).

Moreover, post hoc analyses showed a significant difference in relation to our second hypothesis. In fact, according to the severity of child illness, a significant difference between the two experimental conditions emerged in the Exciting Scale: the environmental perception of parents of children with an acute illness was significantly better compared to parents of children with a chronic illness (Tukey HSD post hoc analysis, *p* = .001). No significant differences emerged between A and B conditions in any of the other positive and negative scales.

We then verified whether the QAL scores were related to child age (hypothesis #3): with the exception of three scales, all scales showed no significant difference (see Table 4). For the three scales, Relaxing, Exciting and Pleasant, scores were significantly higher for the parents of children aged 6–11 years, compared to those of children aged 0–5 years. Considering child's gender, we did not find significant results for any of the scales, nor did this variable interact with the child's age or intervention condition (see Table 5).

Instead, when we looked at the possible interactions between the two factors (Intervention & Child's age), significant results only emerged in the Exciting and Arousing Scales ($F_{(2, 499)}=5.05$, *p* = .007; $F_{(2, 499)} = 3.78$, *p* = .02, respectively). In the first case, simple effects analyses showed that the significant interaction was due to the Control group, in which parents of children aged 6–11 years showed a more positive perception of the environment compared to the parents of younger children; no relevant differences in relation to the child's age were found in the two experimental conditions, where parents of both groups showed similar values (see Fig. 6). The same result emerged from simple effects analyses in relation to the Arousing Scale, as only in the control condition did parents of children aged 6–11 years show higher scores than parents of younger children (see Fig. 7).

4. Discussion

Considering the main objectives of the study, we can conclude that the pictorial intervention had a significantly positive impact on

Table 2
Means (and standard deviations) of QAL dimensions as a function of parents' gender and age.

QAL scale	Gender		F	p	Age		F	p
	Men (n = 136)	Women (n = 366)			20–39 yrs (n = 320)	40–52 yrs (n = 182)		
Relaxing	21.12 (7.86)	22.09 (8.02)	2.64	0.10	22.57 (7.96)	21.07 (7.88)	0.91	0.34
Distressing	9.42 (7.87)	8.84 (7.72)	0.07	0.79	8.93 (7.52)	9.31 (7.92)	0.11	0.75
Exciting	20.07 (9.04)	20.49 (10.15)	0.37	0.54	20.16 (10.07)	20.74 (9.47)	0.41	0.52
Gloomy	7.93 (8.45)	8.10 (8.76)	0.20	0.65	7.75 (8.44)	8.60 (9.05)	1.62	0.20
Pleasant	24.67 (8.79)	24.44 (9.74)	0.002	0.97	24.17 (9.61)	25.08 (9.25)	0.64	0.43
Unpleasant	7.16 (7.83)	7.68 (8.18)	0.67	0.41	7.37 (7.91)	7.85 (8.38)	0.66	0.42
Arousing	20.06 (6.33)	19.96 (6.70)	0.001	0.97	19.88 (6.70)	20.17 (6.43)	0.16	0.69
Sleepy	8.45 (7.94)	8.05 (8.33)	0.05	0.82	7.86 (7.87)	8.68 (8.79)	0.83	0.36

parental affective perception of the environment. It is important to underline that the effect was specific to the kind of pictorial intervention, i.e., wall murals, compared to the previous presence of small individual paintings. Our results are in line with those of other studies (Devlin & Arneill, 2003; Martin et al., 1998), showing that better environmental perception of users is strongly related to the quality of humanization of the healthcare setting.

In our study, the evaluation of the Pediatric Unit of the hospital, both in the area for acute and for chronic illnesses, was perceived to be significantly better for the parents, compared to the previous condition in which no pictorial intervention had been made. The benefit of the pictorial humanization was clearly visible by looking at the positive connotations of place, evidenced by the QAL dimensions, which were all higher after the intervention; further, all the negative affective descriptions of the unit were significantly lower after the pictorial humanization.

When we also considered the variables related to the child, i.e., illness severity and age, significant elements were highlighted in respect to parental perception. First of all, illness severity (acute versus chronic) seemed not to differently relate to the affective evaluation of the environment by parents; in fact, significant differences in the description of the Pediatric Unit did not emerge between the two groups of parents, except for one QAL dimension (Exciting). In the case of acute illness, parents seemed to get more benefit from the pictorial intervention, compared to the parents of children with a chronic pathology.

These results are interesting as they underline some psychological features of the parental point of view. As literature has documented, negative emotions in parents are heightened during child hospitalization, a moment where families play a relevant role in promoting the children's abilities to cope with their illness, but, at the same time, are themselves facing more stress because of the children's illness and hospital treatments (Monti et al., 2008). Literature has shown the importance of creating more welcoming environments for patients and users, to reduce stress, increase healthcare satisfaction, and enhance the quality of healthcare (Devlin & Arneill, 2003; Sherman et al., 2005). Our results showed that a certain kind of pictorial intervention, aimed at depicting a humanized environment, can in fact represent a tool to help

parents more adequately face the stress of having a hospitalized child.

It is also evident that, when the illness is very serious (as in the case of a chronic pathology, such as cystic fibrosis), the parents may need special support, supplying them with emotional resources. Coping with a child with a chronic illness, in fact, means that the parents have to deal with mixed feelings, ranging from fear of death to optimism, from uncertainty and instability to trust and sense of stability. This variability in emotions could explain why different results between acute and chronic illness emerged for the Exciting dimension. This variability notwithstanding, in our study the pictorial humanization showed similar beneficial effects on parents in both conditions of child illness, highlighting that this kind of intervention can have a general positive effect in enhancing positive feelings, even if poor child health conditions are quite different and due to a wide range of reasons.

When we considered the main effects of the child's age, we observed that parents of older children were getting more advantage from the pictorial humanization in relation to the positive descriptions of the unit (Relaxing, Exciting, Pleasant but not Arousing) than were parents of younger children. This result was in part expected, as negative effects of hospitalization have been evidenced in younger children because of their level of personality maturity and the separation from the family that hospitalization involves (Small, 2002). Further, as several studies show, younger children, compared to older ones, are at greater risk in coping with difficulties when their parents are not able to function and provide care as they usually would at home, as in the case of a child's admission (Colville et al., 2009; Melnyk, 2000; Melnyk et al., 1997; Small, 2002). These factors suggest why the parental perception of the environment was related to the child's age. It is interesting to note that no differences emerged in relation to all the negative descriptions of the unit, and this finding would suggest the need for further investigations.

When we took into consideration the interactions between factors, further elements emerged. Results showed that a significant difference between parents of older and younger children was only evident in the control condition (with parents of younger ones describing the environment as less Exciting and Arousing). In the

Table 3
Means (and standard deviations) of QAL dimensions in the three samples.

QAL scale	Control group (n = 200)	Acute illness (n = 200)	Chronic illness (n = 102)	F
Relaxing	19.41 (8.00)	22.37 (7.37)	23.76 (7.94)	10.05**
Distressing	11.39 (7.89)	8.23 (7.79)	6.84 (6.59)	14.08**
Exciting	11.95 (7.28)	27.01 (6.72)	23.87 (6.93)	180.43**
Gloomy	13.74 (8.55)	4.39 (6.57)	4.10 (8.12)	84.94**
Pleasant	16.22 (7.90)	30.52 (5.68)	28.54 (6.04)	198.78**
Unpleasant	11.63 (8.30)	4.78 (6.46)	4.17 (5.89)	56.78**
Arousing	17.14 (6.89)	22.11 (5.53)	21.38 (5.93)	21.78**
Sleepy	12.40 (8.48)	5.32 (6.60)	5.40 (6.96)	48.21**

Note. ** $p < .0005$.

Table 4
Means (and standard deviations) of QAL dimensions as a function of child age.

QAL scale	0–5 years (n = 363)	6–11 years (n = 169)	F
Relaxing	21.02 (8.04)	22.64 (7.52)	4.89*
Distressing	9.23 (7.58)	9.14 (8.40)	0.30
Exciting	20.14 (10.15)	20.98 (9.02)	5.03*
Gloomy	7.73 (8.50)	8.91 (9.06)	0.16
Pleasant	24.27 (9.63)	25.09 (9.10)	5.71*
Unpleasant	7.26 (7.86)	8.27 (8.60)	0.08
Arousing	19.80 (6.64)	20.47 (6.48)	2.09
Sleepy	7.87 (8.14)	8.89 (8.40)	0.16

Note. * $p < .05$.

Table 5
Means (and standard deviations) of QAL dimensions as a function of child gender.

QAL scale	Male (n = 261)	Female (n = 241)	F
Relaxing	21.60 (8.11)	21.3 (7.73)	0.33
Distressing	9.23 (7.58)	9.14 (8.40)	0.40
Exciting	20.70 (9.74)	20.02 (9.97)	0.15
Gloomy	7.52 (8.43)	8.64 (8.89)	0.42
Pleasant	24.95 (9.32)	24.01 (9.65)	0.63
Unpleasant	7.22 (8.07)	7.89 (8.09)	0.05
Arousing	20.15 (6.73)	19.81 (6.46)	0.20
Sleepy	7.87 (8.24)	8.46 (8.20)	0.01

two experimental conditions, parents of both groups perceived the unit in a similar way and always significantly better compared to the control. This result seems to suggest that the pictorial humanization of the Unit had a strong positive effect, enough to reduce the impact of having a younger child to take care of during hospitalization. This point is worth stressing, because in a recent review by Small (2002), younger child age was found, among others factors, to be predictive of poorer child coping outcomes during hospital stays. When considering the gender variable, we did not find any significant differences in parental perception, but this element would need to be further explored in future studies.

Some important limitations of the study must be underlined, which could partly affect the results.

First, in our study we looked at a comparison between a control condition, represented by the presence of individual paintings hung side-by-side, and an intervention condition, represented by the painted walls and corridors. In this case, we were not able to determine the specificity of the effects of the size (single paintings hung vs. wall coverage) and content (simple images vs. natural landscapes with cartoons). So, all our results showed a positive impact of the wall murals and probably both the size and the content could have influenced parental perception. A future study could try to better differentiate the impact of size and content on parental affective perception of place. In addition, another suggestion for future studies would be to investigate whether representing more abstract images, of the same size, compared to natural landscapes and cartoon characters, would affect parental perception in the same way or differently. Future studies could also specify and analyze the influence of and the possible differences between the effects of a first time impression or of repeated exposure.

Second, even if we compared different conditions before and after the pictorial intervention, we did not have a comparable control group for the three assessments, measured in a hospital environment where no pictorial interventions had been carried out.

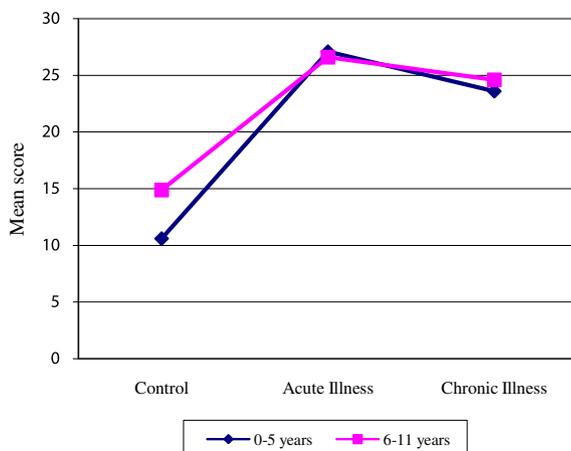


Fig. 6. QAL Exciting dimension: mean scores in the three samples including child age.

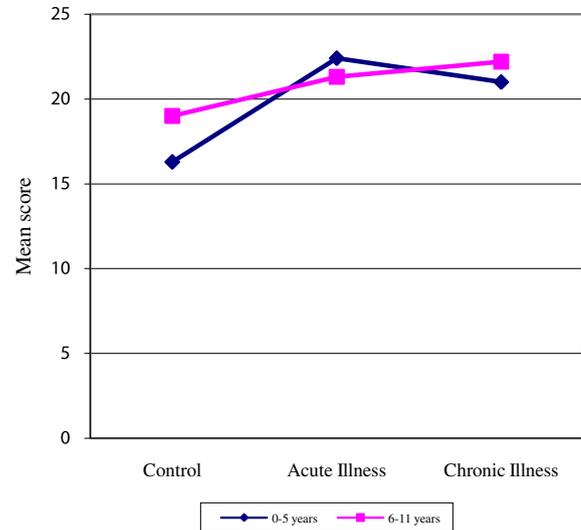


Fig. 7. QAL Arousing dimension: mean scores in the three samples including child age.

Aware of this limit, we did pay attention to keeping some elements in the methodology constant: throughout the three assessments, the administration of the questionnaire was always done in the same period of the year and with the same modalities, giving the same instructions to all the parents involved in the research.

Other variables could have exercised their influence and thus explain part of the results. Moreover, in the present study we just used one questionnaire in order to assess parental environmental perception, and we did not measure other indicators, for example, the level of parental stress, which would have allowed more inferences on the usefulness of the intervention. We suggest that further investigations be conducted to show the benefits of a pictorial intervention, addressing the limitations of this study. Further, in our study we did not consider data on child health outcomes, such as a faster recovery, which would have represented a very interesting element to assess in relationship to parental affective perceptions of the unit and the characteristics of the wall murals.

In summary, our data highlight the importance of dedicating great attention to the design of health-related environments, including humanization as a preventive action, a normal step in the process of hospital environment planning, capable of promoting positive affect in patients and users.

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