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RESEARCH
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Influence of Positive Distractions on Children in Two Clinic Waiting Areas

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Abstract

Objective: To examine the influence of positive distraction on the behavior and activity of children in two clinic waiting areas.
Background: People spend a considerable proportion of time waiting in hospitals. Studies show that the quality of waiting environments influences the perception of quality of care and caregivers, that perception of waiting time is a better indicator of patient satisfaction than actual waiting time, and that the waiting environment contributes to the perception of wait time. In fact, the attractiveness of the physical environment in waiting areas has been shown to be significantly associated with higher perceived quality of care, less anxiety, and higher reported positive interaction with staff. Can positive distractions in waiting areas improve the waiting experience, as indicated by the behavior and activities of children waiting for treatment?
Method: Five distraction conditions were randomly introduced in the waiting area of the dental and cardiac clinics of a major pediatric tertiary care center through a single plasma screen intervention. The attention, behavior, and activities of waiting children were recorded. Data on 158 pediatric patients were collected over 12 days during December 2008 and January 2009.
Results: Data analysis shows that the introduction of distraction conditions was associated with more calm behavior and less fine and gross movement, suggesting significant calming effects associated with the distraction conditions. Data also suggest that positive distraction conditions are significant attention grabbers and could be an important contributor to improving the waiting experience for children in hospitals by improving environmental attractiveness.
Key Words: *Evidence-based design, positive distraction, waiting areas, children, pediatric population*

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Waiting is an integral part of the healthcare experience. Although the exact amount of time patients and families wait in hospitals and clinics varies, there is general agreement that the waiting periods are perceived as long, uneventful, and stressful. Reducing the waiting time before treatment and

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procedures has gained attention, not only from the perspective of reducing wastage (Lean processes), but possibly also because of an implicit acknowledgment that the waiting period is not the best part of a healthcare experience for patients and families alike.

However, until a zero-waiting-time operational model is achieved in practice for both patients and families, modulating the waiting experience is an important component of designing the overall healthcare experience. Thompson, Yarnold, Williams, and Adams (1996) suggest that it is not the actual wait time, but the perception of wait time that is the determining factor in patient satisfaction. According to Pruyn and Smidts (1998), the adverse effects of waiting can be soothed more effectively by improving the attractiveness of the waiting environment than by shortening the objective waiting time.

This is amply supported in the findings from a recent study. In a study across six clinical outpatient practices involving 787 patients located in six facilities within the Weill Cornell Medical Center/ New York Presbyterian Hospital in New York City, the attractiveness of waiting areas was measured independently and correlated with perceived care quality, perceived waiting time, and other perceptions of interest (Becker & Douglass, 2008). Data analysis revealed significant correlations between the degree of attractiveness of the waiting area physical environment and perceived quality of medical care, a reported reduction in anxiety, perceived waiting time, and the quality of interaction with staff.

While the Cornell study suggested that waiting areas play an instrumental role in the overall healthcare experience, the key construct of importance was attractiveness. The attractiveness issue brings into focus the concept of positive distraction. A positive distraction has been defined as "an environmental feature that elicits positive feelings and holds attention without taxing or stressing the individual, thereby blocking worrisome thoughts" (Ulrich, 1991, as cited in Eisen, 2006, p. 20). The term *distraction* itself refers to "the direction of attention to a non-noxious event or stimulus in the immediate environment" (Fernandez, 1986; Vessey, Carlson, & McGill, 1994).

Positive distractions have been studied extensively in the context of treatments and procedures, and they have been shown to have significant influence on patients' clinical and behavioral outcomes. Adult patients in a procedure room reported better pain control when exposed to a nature scene with nature sound in the ceiling (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003). Breast cancer patients reported reduced anxiety, fatigue, and distress during chemotherapy when exposed to a virtual reality (VR) intervention displaying underwater and art museum scenes (Schneider, Ellis, Coombs, Shonkwiler, & Folsom, 2003). Murals (as distraction) resulted in a significant decrease in reported pain intensity, pain quality, and anxiety by burn patients (Miller, Hickman, & LeMasters, 1992). The use of VR where patients were asked to enter a virtual environment by playing video games or wearing a headset produced a similar finding (Hoffman & Patterson, 2001).

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Positive distraction interventions on 157 elective colonoscopy patients between 16 and 75 years of age found that a combination of music and visual distraction (home movies of scenic views) resulted in a significant reduction of patient-controlled sedation doses as compared to only visual distraction or no distraction conditions (Lee et al., 2004). In a test comparing the absence of any distraction to a non-VR distraction on a computer screen and a VR distraction (a simulated visit to a gorilla habitat), pediatric cancer patients reported the least pain and recorded the lowest pulse rates in the VR distraction condition (Gershon, Zimand, Lemos, Rothbaum, & Hodges 2003). Similarly, in an experiment comparing 5 conditions—(1) no distractions, (2) aquarium, (3) poster, (4) aquarium + hypnosis, and (5) poster + hypnosis—in a dental surgery waiting room, both aquarium conditions produced higher relaxation (reduced anxiety, increased comfort) compared to other interventions in 42 patients during elective dental surgery (Katcher, Segal, & Beck, 1984).

Positive distractions have also been found to be beneficial with children. Children aged 3.5 to 12 years reported less pain during blood draws when encouraged to use a kaleidoscope (Vessey et al., 1994) compared to a control group. Children reported less pain during injections when distracted by touch and bubble blowing (Sparks, 2001). Interacting with clowns reduced preoperative anxiety for children between the ages of 5 and 12 (Vagnoli & Messeri, 2005).

The premise of this study is that perceived waiting time and the experiential quality of that time can be affected by the quality of the physical environment.

Could positive distractions also enhance the waiting area experience? Hospital waiting environments are characteristically chaotic, typified by highly stressed and disoriented patients and family (Carpman, Grant, & Simmons, 1984; Nelson-Shulman, 1983–84) and highly stressed and fatigued staff (Houle, 2001). In many ways the chaos—the result of disoriented patients and family and stressed staff—contributes further to elevated stress levels. If the influences of positive distractions could be harnessed to enhance the waiting experience and the Cornell Study findings (Becker & Douglass, 2008) are found to be generalizable, positive distraction interventions in the waiting experience could potentially be engineered to target strategic organizational objectives, such as patient satisfaction, referrals, and market share.

However, there are many steps in examining a potential association between positive distraction and organizational objectives. The first logical question pertains to whether the presence of positive distractions in waiting areas is associated with any aspect of a child's behavior and activities. The environment can have a considerable impact on how children experience healthcare, an intrin-

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sically stressful experience. Environmental design can mitigate or accentuate such stress. This study sought to explore the relationship between positive distractions and measurable outcomes within the unique context of children and their family members.

The premise of this study is that perceived waiting time and the experiential quality of that time can be affected by the quality of the physical environment, which from a user's standpoint is often judged by objects or elements of interest that may serve as positive distractions, such as television, artwork, music, and aquariums. These are traditionally considered addendums to a design, not integral parts. Yet these elements could have a significant effect on how one experiences the environment, because previous studies have demonstrated their positive influence on patients during treatment.

Pediatric settings pose unique challenges. It has been seen that children often develop distress behaviors including screaming, hitting, crying, and verbal protests to avoid painful medical treatment (Gorski, Slifer, Kelly-Suttka, & Lowery, 2004). In the case of children suffering from neurological disorders, these behaviors may be more acute. For example, children with attention deficit hyperactivity disorder (ADHD), a neurobehavioral developmental disorder, could display characteristics of attentional problems and hyperactivity, with each behavior occurring infrequently alone (Biederman, 1998). The issue is further compounded in children with autism by their variable sensitivity to sensory stimuli. Studies show that children with autism display significantly more sensory symptoms (sensitivity to touch, taste/smell, and audition) than typically developing children (Rogers, Hepburn, & Wehner, 2003).

The matter of electronic media is also pertinent to healthcare design today. Depending on how they are treated, plasma and liquid crystal display screens can become part of the interior environment. No longer simply television screens, they present an opportunity for a changing display in addition to more permanent environmental features. Can the use of a TV monitor-based (without TV content) positive distraction have an impact on children's waiting room experience?

Study Objective and Question

Based on existing literature, it was posited that the integration of positive distractions into a designed healthcare environment would enhance the healthcare experience of patients and family members. Specific aims were to conduct a comparative analysis of five positive distraction conditions to assess their impact on (a) the behavior of children waiting for treatment and (b) the waiting experience of accompanying family members.

This article focuses on the findings regarding the first key question—the association between the presence of positive distractions and the activity and behavior of children.

Research Design

A quasi-experimental design was used to examine pediatric patients' behavior during six distraction

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conditions that included measurements in a control (no-distraction) condition. Systematic observation was used to record the children's activities and behavior. These data were recorded on a predesigned behavioral data recording sheet.

Positive Distraction Interventions

All distraction conditions were created on one flat-screen plasma TV monitor mounted on a stand in the waiting areas. In total, six visual-auditory sensory conditions were used in the study: (1) no stimuli: no positive distractions (no audio), the control condition; (2) visual-static stimuli: still nature photographs in a slide show (no audio); (3) visual-dynamic stimuli: virtual Ambient Art™ (with accompanying audio); (4) visual-dynamic stimuli: virtual Ambient Art (without accompanying audio); (5) visual-dynamic stimuli: natural aquarium (with accompanying underwater sounds); and (6) visual-dynamic stimuli: natural aquarium (without accompanying underwater sounds). The no-stimuli condition was treated as the control condition with which data from the other conditions were compared. The use of a single plasma TV monitor for all the distraction conditions permitted the standardization of the base media across all study conditions. During the entire study period, the hospital TV was shut down. All references to TV in this paper refer to the flat-screen plasma TV monitor that was used to provide the distraction conditions.

The still art condition involved a continuous slide show of nature images. Nature images were chosen based on the substantial body of evidence regarding the positive impact of nature images on stress reduction, anxiety, and pain perception in adult patients (Ulrich & Gilpin, 2003). There have not been many studies using nature images with pediatric populations. However, in a preference study of 5- to 17-year-olds, Eisen (2006) showed that children in hospital settings also prefer representational nature art over abstract art. In fact, contrary to the common assumption that children like only large cartoon-like or fantasy images, a study with 5- to 17-year-old patients at Memorial Hermann Hospital in Houston, Texas, showed that children rate nature images with bright colors, water features, and nonthreatening wildlife quite highly—often higher than typical child art (Nanda, Chanaud, Brown, Hart, & Hathorn, 2009).

The aquarium condition was chosen given the popularity of live aquariums in many facilities and its successful use as a positive distraction (as discussed in the introductory section). Images of fish underwater were also rated highly in the art preference study conducted by Nanda et al. (2009) across all age groups of pediatric hospital inpatients.

The specification of a custom artwork (virtual Ambient Art) serves as a unique addition to the distraction conditions. Starting with a "blank canvas," the artist's strokes gradually emerge into view, thus setting the scene for pictorial adventure. Full-spectrum color and music are added to engage the audiovisual senses simultaneously. The music varies in tempo, thus offering an element of change within a certain time frame. The artist posits that leaving areas of the artwork unfin-

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Figure 1. Snapshot of visual images from the three categories of positive distraction conditions: aquarium (left), nature slide show (middle), and Ambient Art™ (right).

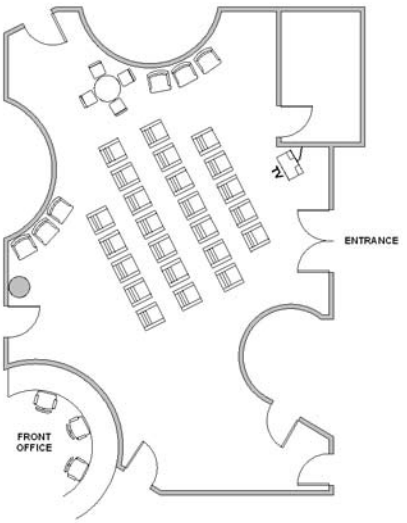

Figure 2. Seating layout in the dental clinic waiting area.

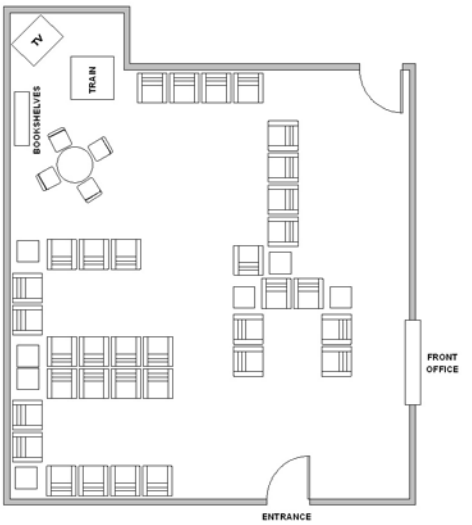

Figure 3. Seating layout in the cardiac clinic waiting area.

ished will engage the viewer, whereby the viewer becomes part of the picture and the experience. The virtual Ambient Art was custom made for the pediatric patients in this study. The mystery involved in the unfolding story offered the potential to engage the children cognitively. The story line of the 3-minute segment included a beach scene that starts with a little boy with a kite biking to a beach with his ball and pet dog, followed by scenes of playing with a little girl on the beach, a scene of a boat on the ocean, and concluding with a brief scene of underwater marine life.

Snapshot images from the distraction conditions, which were presented and manipulated using a remote-controlled DVD player connected to the flat-screen plasma TV, are shown in Figure 1.

Settings

Two patient waiting areas at a major pediatric tertiary care center were used in the study. The waiting areas were in the dental and cardiac clinics of the hospital; both had audiovisual facilities and reading materials. In both clinics, the flat-screen plasma TV study monitor was placed securely on a

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TV stand below the existing TV. The dental clinic had 34 seats and the cardiac clinic had 38 seats. A key difference between the two clinics was in the arrangement of seats vis-à-vis the monitor. In the dental clinic, 24 of the 34 seats were positioned to view the TV directly in a theater-style arrangement. In contrast, the cardiac clinic had a more traditional seating arrangement with about half the seats lacking a comfortable angle from which to view the TV monitor. Both seating layouts are illustrated in Figures 2 and 3.

Independent Variables

The study involved two types of independent variables, all of which were categorical in nature. The first type involved the five distraction conditions, namely (1) the nature image slide show, (2) Ambient Art, (3) Ambient Art with sound, (4) an aquarium, and (5) an aquarium with sound. The second type of independent variable was clinic type, namely dental and cardiac.

Control Measures

A number of factors were included in the data collection instruments to serve as potential control measures. These factors included (a) age, (b) gender, (c) ethnicity, and (d) developmental level. Data on control measures were collected using the standardized data sheet for behavioral observations.

Dependent Variables and Measures

Children's activities and behavior were the dependent measures for the study question reported on in this article. Data on children's activities and behavior were collected using a standardized data sheet for behavioral observations. The instrument was developed by adopting and modifying an existing children's observation instrument (Handen, McAuliffe, Janosky, Feldman, & Breaux, 1998) that used a comprehensive procedure to record behavioral data on children with mental retardation and ADHD. They documented the ability of clinic-based observation measures to discriminate between children with mental disorders who may or may not have ADHD and conduct problems. They adapted previously developed and tested clinic-based observation tools (Roberts, 1990; Roberts, Ray, & Roberts, 1984) to capture activity, behavior, and attentional variables in the study population. The constructs measured in the Handen et al. study matched the measurement objectives of this study. Proposed constructs and operational definitions are listed in Table 1.

The observation instrument was tested for reliability following a training session for four observers recruited for the study. The training session focused on arriving at a common understanding of the operational definitions of the observation terms. Inter-rater reliability testing was conducted by simulating data collection at a children's public play area. Inter-rater agreement for the different activities and behavior categories ranged from 85% to 100%. Fleiss's kappa for inter-rater reliability ranged from 0.709 to 1.0.

Sample Size

In the absence of existing or preliminary data to estimate statistical power accurately, an alternative method was adopted to arrive at a safe and meaningful sample size. The estimation focused

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Table 1. Definitions of Observation Terms Used in the Study

Observation Category	*Observation Terms*	*Operational Definitions*
Attention	Attention (in general; specific items shown below)	Eye fixation on any object/person. Objects can include artwork, toys, furniture, etc.
	Positive distraction	The flat-screen TV in the waiting room on which artwork/music was displayed
	Other artwork	Any other artwork in the waiting area, e.g., painting, sculpture, at any location in the waiting lounge
	Toy	Any piece of a toy/game in the waiting area or brought in by the subject
	Book	Book or books in the waiting lounge or brought in by the subject
	Wall	Any blank portions of the wall(s) in the waiting room
	Ceiling	Ceiling of the waiting room
	Floor	Floor of the waiting room
	Door	Any of the doors in the waiting room
	Window	Any window—external or internal—in the waiting room, including the reception desk/window
	Furniture	Any unoccupied furniture in the waiting lounge with no person or thing on the furniture
	People	Any person in the waiting room
	Themselves	Any portion of the patient's own body
Physical Behavior		
	Calm	No visible major motor movement
	Fidgety	Repetitive, **restless motor movement** that appears to be primarily purposeless (e.g., tapping a pencil, kicking one's foot)
	Fine movement	**Fine motor movement** involving very low-intensity, purposeful movements of body parts
	Gross movement	**Gross motor movement** involving taking one or more steps or, if sitting, moving the buttocks from one spot to another
	Intense	Engaging in inappropriate or excessively **vigorous physical activity** (e.g., throwing toys, running around, yelling, or singing loudly)
Activity		
	Playing with toys	Playing with toys in the room (if available)
	Playing with nontoys	Playing with nontoy objects in the room (e.g., a doorknob, a table)
	Nonplay activity/ Other play	Neither playing with a toy or nontoy item (e.g., standing and gazing at the door, reading, eating, drinking) **or** Other play activities (not involving toys or nontoys)
Location		
	Out of seat	If a child left a seat entirely at the time of observation
	In-seat	If a child remained in his/her seat at the time of observation
	Parent's lap	If a child is sitting on the lap of an accompanying adult
Social Behavior		
	Positive interaction	All vocalizations directed to sibling/parent/objects excluding screams, shouts, cries, and whines; all cooperative responses involved with sharing an object; hugs and holding hands
	Negative interaction	Screams, shouts, or other utterances that indicate rejecting and oppositional behavior; hitting, pinching, kicking, and a "nonplaying" push or pull; grabbing objects from a sibling/parent; destroying possessions of a sibling/parent
	Solitary behavior	All solitary activity (excluding parallel play conducted between two children within two feet of one another)

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on the desired level of observed difference to render the findings meaningful. Using PASS 2000 (Hintze, 2001), the required sample size with statistical power set at 85% and alpha at .05 is n = 45 to test a regression model of behavioral outcomes. This sample size was calculated using an estimated six variables (five distraction conditions and one covariate) in a regression model, with each hypothesized to contribute (at least) 5% of the variance to the ultimate dependent variable (children's behavior and parents' experience). A minimum study sample of 50–60 was targeted in each clinic to ensure meaningful statistical power.

Procedure

The institutional review board of the pediatric hospital that hosted the study approved the study protocol. Subsequently, 6 days were selected for data collection at each clinic. A six-person research team collected data between 7:30 a.m. and 4:30 p.m. during the data collection periods. Data were collected from the dental and cardiac clinics in December 2008 and January 2009, respectively.

A 20-minute window was used to collect data for each child. The data collection duration per subject was established based on the average waiting time at the two clinics. During each 20-minute window, the positive distraction condition was presented for 10 minutes. The remaining 10 minutes had the no-distraction condition. The sequence of positive distraction conditions, which was changed remotely, was randomized using a simple randomization routine.

During each 20-minute window, observers recorded the activities and behavior of participants for both the distraction and no-distraction conditions. At any given time, a maximum of two to three children were observed, depending on the number of observers in the waiting room. Each observer recorded the activities of only one patient at a time. The observers attempted to be as unobtrusive as possible by occupying one of the waiting area seats; they did not interact with the children. Behavior and activity data for each child were recorded for a period of 20 minutes or less. During the observation, data were recorded as a snapshot of behavior and activity at the beginning of each minute. Each child was assigned an identification number, which served as the only reference to the child and parent.

Study Population

To ensure that the children had the communication skills needed to provide assent, the minimum age for the survey was defined as 5 years. All pediatric patients 5 years or older who visited the two clinics on data collection days were considered qualified subjects for the study. A considerable proportion of the patients in the dental clinic had various forms of developmental disability and/or neurological disorder. As a result, study subjects included children with and without developmental and neurological challenges.

A total of 158 valid patient observation data were obtained from the two clinics. Table 2 shows the data distribution across the two clinics and some key attributes of the patient population. Owing to the fast pace of work during peak periods at

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Irrespective of the seating arrangement (theater-style or conventional), attention to the positive distraction condition increased significantly between the two conditions, suggesting that positive distractions are major attention grabbers.

both clinics, demographic information could not be collected for all the subjects. Because identifiable information was not collected as part of the protocol, post hoc collection of demographic information was not feasible. The valid counts for each type of demographic data are shown in parentheses in the table.

The sample size of pediatric patients obtained from the two clinics is similar, as were the gender ratio and age distribution. Two major differences between the clinics were in ethnicity distribution and the proportion of patients with developmental or neurological disorders. It is notable that the dental clinic population was predominantly Hispanic (almost 60%). In contrast, no specific ethnic group was predominant at the cardiac clinic. Despite the small number of valid counts obtained regarding developmental disorders, the significantly higher proportion of patients with such disorders in the dental clinic matches the general population profile of the clinic.

Positive Distraction and Children's Behavior

A series of paired-sample *t*-tests were conducted separately for the two clinics to identify significant differences in activities and behavior between the distraction and no-distraction conditions. The fundamental question underlying these tests was whether the introduction of positive distractions in a waiting area was associated with any changes in the behavior and activities of waiting pediatric patients. Comparisons were made across all subcategories of attention, physical behavior, activity, location, and social behavior. Tables 3 and 4 provide a summary of the test results for the dental and cardiac clinics, respectively. The clinics are treated as individual cases in the analysis.

Findings include several noteworthy differences between the distraction and no-distraction (control) conditions. In both clinics, attention to the TV monitor increased substantially when the distraction conditions were switched on—a 26% increase in the dental clinic and a 20% increase in the cardiac clinic. Irrespective of the seating arrangement (theater-style or conventional), attention to the positive distraction condition increased significantly between the two conditions, suggesting that positive distractions are major attention grabbers. The fact that attention increased in the case of neurologically challenged patients as well as those who are not neurologically challenged is noteworthy.

The increase in attention to the positive distraction condition corresponded with a parallel reduction in attention to other objects in the envi-

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Table 2. Sample Size and Subject Attributes at the Two Clinics

Attribute	*Dental Clinic*	*Cardiac Clinic*
Patient sample size obtained	81	77
Age	10.95 (mean); 5–17 years (*valid count = 57 of 81*)	11.57 (mean); 5–17 years (*valid count = 49 of 77*)
Ethnicity	White: 25.3% Black: 13.9% Hispanic: 58.2% Asian: 2.5% (*valid count = 79 of 81*)	White: 40.8% Black: 22.4% Hispanic: 35.5% Asian: 1.3% (*valid count = 76 of 77*)
Gender	Male: 59.3% Female: 40.7%	Male: 53.9% Female: 46.1%
% of subjects with a developmental or neurological disorder	47.8% (*valid count = 46 of 81*)	12.5% (*valid count = 16 of 77*)

ronment. In the dental clinic, there was a parallel significant reduction in attention to toys (3.98%) and other people (15.52%) in the waiting area. Similarly, in the cardiac clinic, there was a parallel significant reduction in attention to books (8%), other people in the waiting area (12%), and themselves (5%).

It should be noted that a considerably larger number of patients were reading books in the cardiac clinic compared to the dental clinic, where the percentage of time patients were observed to be focused on books was negligible. This may be partly explained by the difference in patient attributes between the two clinics, the difference in seating arrangement, or both. It is important that the presence of positive distraction conditions in the cardiac clinic was associated with an 8% reduction in attention to books. It fell from a high of 16% (without distraction) to 8% (with distraction). This suggests that positive distractions could possibly divert attention from other pleasurable activities, such as playing with toys or reading books.

The most intriguing finding, however, is the change in attention to toys in the cardiac clinic. Unlike the dental clinic, cardiac clinic patients' attention to toys actually increased by 6% during the positive-distraction condition as com-

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Table 3. Summary of Test Results of Behavioral Differences Between Distraction and No-Distraction Conditions at the Dental Clinic

Attention Type	*Mean (%) During Distraction Conditions*	*Mean (%) During No-Distraction Condition*	*(%) Difference*	*Significance Level*
TV monitor	27.73	2.16	25.57	**0.000*** **
Other artwork	0.36	0.42	-0.06	0.886
Toy	4.24	8.22	-3.98	**0.007** **
Book	1.97	2.17	-0.2	0.829
Wall	7.1	7.57	-0.47	0.818
Ceiling	2.91	2.52	0.39	0.723
Floor	2.66	3.83	-1.17	0.373
Door	3.65	3.5	0.15	0.910
Window	3.52	5.7	-2.18	0.179
Furniture	3.19	5.16	-1.97	0.245
People	36.12	51.64	-15.52	**0.000*** **
Themselves	6.53	7.10	-0.57	0.792
Physical Behavior Type				
Calm	64.92	58.3	6.62	**0.080**$^{+}$
Fidgety	20.99	19.41	1.58	0.570
Fine movement	10.79	15.36	-4.57	**0.051**$^{+}$
Gross movement	2.63	5.18	-2.55	**0.079**$^{+}$
Intense movement	0.67	1.75	-1.08	0.153
Activity Type				
Play with toys	6.17	5.73	0.44	0.829
Play with non-toys	8.55	10.81	-2.26	0.339
Nonplay activity OR Other play	85.28	83.46	1.82	0.526
Location Type				
Out of seat	15.99	15.75	0.24	0.935
In seat	78.86	79.35	-0.49	0.887
On lap	5.15	4.90	0.25	0.897
Social Behavior Type				
Positive interaction	20.33	32.16	-11.83	**0.000*** **
Negative interaction	3.6	2.38	1.22	0.229
Solitary behavior	76.07	65.45	10.62	**0.002** **

***significance at 0.001 level; **significance at 0.01 level; *significance at 0.05 level; $^{+}$significance at 0.1 level

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Table 4. Summary of Test Results of Behavioral Differences Between Distraction and No-Distraction Conditions at the Cardiac Clinic

Attention Type	*Mean (%) During Distraction Conditions*	*Mean (%) During No-Distraction Condition*	*(%) Difference*	*Significance Level*
TV monitor	20.58	0.41	20.17	**0.000*** **
Other artwork	1.52	1.24	0.28	0.825
Toy	19.13	13.16	5.97	**0.081**[+]
Book	8.09	15.47	-7.83	**0.017***
Wall	1.95	3.0	-1.05	0.333
Ceiling	0.52	0.37	0.15	0.737
Floor	3.42	3.04	0.38	0.726
Door	0.75	1.02	-0.27	0.737
Window	4.03	5.11	-1.08	0.369
Furniture	0.97	1.21	-0.24	0.730
People	32.27	44.36	-12.09	**0.008****
Themselves	6.75	11.6	-4.85	**0.028***
Physical Behavior Type				
Calm	68.88	59.92	8.96	**0.029***
Fidgety	11.50	13.08	-1.58	0.473
Fine movement	18.33	23.32	-4.99	0.183
Gross movement	1.28	3.49	-2.21	**0.049***
Intense movement	0.00	0.19	-0.19	0.176
Activity Type				
Play with toys	18.03	14.07	3.96	0.190
Play with Non-toys	9.24	14.95	-5.71	**0.058**[+]
Nonplay activity OR Other play	72.73	70.98	1.75	0.627
Location Type				
Out of seat	16.88	15.19	1.69	0.543
In seat	82.21	84.67	-2.46	0.391
On lap	0.91	0.13	0.78	0.319
Social Behavior Type				
Positive interaction	24.76	31.45	-6.69	0.126
Negative interaction	0.61	1.11	-0.5	0.424
Solitary behavior	74.62	67.43	7.19	0.101

***significance at 0.001 level; **significance at 0.01 level; *significance at 0.05 level); [+]significance at 0.1 level

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pared with the no-distraction condition. This is the only case of a statistically significant increase in attention to an object other than the positive-distraction condition. The study data do not provide a reason for this finding, but it could be attributed to the fact that the toys in the cardiac clinic were located close to the TV monitor, in the area labeled "train" in Figure 3. Consequently, greater attention to the TV also increased attention to the toys.

The diversion of attention from people and themselves warrants additional discussion. In the dental clinic, there was a 16% reduction in watching other people; the corresponding reduction for the cardiac clinic was 12%. Although watching other people may be fun, it could threaten the privacy of the individuals being watched. In urban spaces such as plazas and malls, people participate in watching with full knowledge of its two-way implications. In a confined area like a waiting room, the people being watched may perceive an erosion of individual privacy. The data, however, do not indicate whether most of the watching was occurring largely between children, in which case privacy erosion would not be an issue. More detailed data are needed to explore this issue further. Depending on who is being watched, diverting attention away from people by means of positive distractions suggests a potent method to address privacy concerns in healthcare environments.

Data on watching themselves (defined as attention to any portion of a patient's own body) is another area of intriguing findings. When the distraction conditions were switched on, the proportion of subjects' attention to themselves was comparable in both clinics (7%). However, during the no-distraction condition, a considerably higher proportion of attention to themselves was observed in the cardiac clinic (12%) compared to the dental clinic (7%). Although this percentage did not change when the distraction condition was turned on in the dental clinic, it fell by 5% in the cardiac clinic. The higher initial percentage in the cardiac clinic and the larger magnitude of the reduction associated with switching on the positive distractions warrant further investigation. Furthermore, whether watching themselves is considered positive or negative is a matter that deserves examination. Watching themselves could possibly be a symptom of boredom. If so, diverting the attention of children from watching themselves via positive distraction implies a potential means to address boredom in waiting pediatric patients.

Besides attention, there were additional significant differences in activities and behavior between the two conditions. Differences in physical behavior were considerable. In both clinics, the presence of the distraction conditions was associated with a significant increase in calm behavior, which increased by 7% in the dental clinic and 9% in the cardiac clinic. This is important, because calm behavior is associated with a reduction of chaos—a major contributor to stress in staff and families—in waiting areas. The potential calming effect of positive distractions is, perhaps, their most important contribution to the healthcare experience.

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In both clinics, the presence of the distraction conditions was associated with a significant increase in calm behavior.

The increase in calm behavior is possibly associated with a corresponding decrease in movement when the distraction condition was switched on. In the dental clinic, it significantly reduced both fine (5%) and gross movement (3%). In the cardiac clinic, gross movement lessened by 2%. Together, this reduction in movement and increase in calm behavior offer the potential for reducing chaos in waiting areas. More importantly, considering the neurological condition of a large proportion of the patient population in the dental clinic, maintaining a calm environment constitutes a major challenge for the clinic staff. The calming effect of positive distractions in combination with a reduction of gross movement offers an additional tool for reducing chaos in waiting areas.

Finally, significant changes in social behavior also were observed. Although the presence of distraction conditions did not have a significant effect on social behavior in the cardiac clinic, it had a pronounced effect in the dental clinic. An increase in solitary behavior (11%) possibly reflects the corresponding increase in attention to the TV monitor. Whether or not solitary behavior is desirable in waiting areas needs further examination, however. The introduction of positive distractions also decreased positive interaction in the dental clinic (12%). One could surmise that the decrease in positive interaction and the increase in solitary behavior were, perhaps, the result of a substantial increase in attention to the positive distraction condition. The study data do not suggest a reason for this. However, if true, another important area of inquiry arises: What serves the healthcare experience better, greater attention to positive distractions (hence less positive interaction and more solitary behavior) or more positive interaction (hence more socially reinforcing behavior)? Could the increase in calmness and decrease in chaos possibly be achieved without compromising positive social behavior?

Discussion

To summarize, the study objective was to examine the associations between introducing positive distractions in hospital waiting areas and the waiting experience of patients. Data analyses show that the introduction of distraction conditions was associated with higher calm behavior and less fine and gross movement, suggesting significant calming effects of the distraction conditions. In turn, this suggests that the use of positive distractions can affect the stress and anxiety associated with the waiting experience. Data also indicate that positive distraction conditions are attention grabbers. This is reinforced by the fact that in both clinics the TV monitors attracted the second-largest percentage of attention; other people in the waiting room attracted more attention than the monitor.

It is also noteworthy that the TV monitors attracted more attention than fixed interior ele-

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It is also noteworthy that the TV monitors attracted more attention than fixed interior elements such as doors, windows, floor, ceiling, furniture, and so forth, which are typically manipulated to enhance environmental attractiveness.

ments such as doors, windows, floor, ceiling, furniture, and so forth, which are typically manipulated to enhance environmental attractiveness. This suggests that positive distractions have the potential to increase the attractiveness of waiting areas in hospitals. Considering the possible associations between the degree of attractiveness of waiting areas and perceived quality of medical care, a reported reduction in anxiety, perceived waiting time, and the quality of interactions with staff (Becker & Douglass, 2008), the scope of applications to modulate the healthcare experience is evident.

Considering the potential impact of positive distractions in waiting areas, replication of this study is essential in other clinical settings and other positive distraction media. The use of electronic media in this study is also relevant. Because more and more distractions are anticipated to be provided via electronic media in the future, testing the comparative performance of different distraction conditions on a flat-screen plasma TV monitor was considered to be timely. Given the increasing use of flat-screen monitors in patient areas today, comparing these conditions was expected to inform their more effective use.

In this context, follow-up studies are needed to compare different types of content that could be delivered via electronic media. The three categories of distraction conditions in this study had essentially nature-based themes. Future studies should compare other content, such as movies, cartoons, news, and so forth, which are typically projected on TV screens in hospital waiting areas.

Finally, this study focused on pediatric patients. The influence of positive distractions on adult patients and their waiting experience is an important topic that needs to be explored.

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