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Implicit and explicit responses of primary school children on murals in a hospital setting

A VR study

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Abstract

Being hospitalized triggers the onset of negative feelings like fear and anxiety and is associated with negative health outcomes. Healing environments, who take the psychological needs of patients into consideration, can positively influence patient outcomes. The Anouk Foundation has developed murals for paediatric hospitals to enhance the physical environment. Existing literature shows that displaying nature has a healing effect on patients, which was found in implicit responses as well as in explicit responses. Therefore, this paper intends to explore the differences of implicit and explicit responses regarding a nature-like mural developed by the Anouk Foundation versus a neutral mural. The features of the murals that might account for these possible differences are of further interest. This is an exploratory study and for the assessment, a mixed method study design has been implemented at a primary school in Enschede with 23 children between the age of eight to eleven. The participants were divided in two condition, one condition was exposed to a nature-like mural and the other condition was exposed to a mural showing sports. They were exposed to it in a virtual hospital room, displayed by a VR headset. A free association task, a word stem completion task and an interview were used as measurement tools to assess the implicit and explicit responses of the children. Results indicate that the murals were both perceived positively and some small differences indicate that the nature-like mural indeed has restorative effects. Although these were not consistent and mostly found in implicit responses. Explicit responses show that the sports mural works out better for children. With regard to future research it is suggested to diminish the side effects of the VR technology, combining implicit and explicit responses more carefully or not at all and select murals on more contrasting features.

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Introduction

The physical environment in healthcare facilities has an impact on the wellness of patients and therefore plays an important role (Lyendo et al., 2016; Monti et al., 2012; Van den Berg, 2005). The Swiss-based “Anouk Foundation” understood well that enhancing the physical environment can benefit the healing process of patients. Their mission is to create soothing environments for patients, families, staff and residents, by using visual art. Their team of artists paint “therapeutic murals” on the walls of hospitals, special needs institutions and nursing homes in Europe. They finished a project in the Maxima’s Children Centre in Utrecht, where they painted murals on the wall to distract children and provide them with comfort as well as diminishing their fear toward the medical institution.

Healing environments

Traditionally, when designing healthcare facilities, the functional delivery of healthcare is emphasized (Ulrich, 1991). This type of care is dominated by the medical model (Biley, 1996) in which medical treatment has to be delivered in the most efficient way possible and the focus lies on curing patients (Schweitzer et al., 2004). According to Ulrich (1991), these traditional facilities are usually functionally effective but psychologically ‘hard’. They often fail to respond to the psychological needs of their patients (Schweitzer et al., 2004).

Research shows that hospitalized patients experience stress. Stress is an important negative outcome in itself and it affects many other outcomes, directly and adversely. It is an unhealthy effect related to psychological and physiological discomfort (Ulrich, 2008). Consequently, these feelings of stress, but also feelings of anxiety, fear and uncertainty that patients experience when encountering a hospital can have a detrimental effect on health (Dijkstra, 2009; Schweitzer, 2004). Even though this stress is unavoidable when experiencing illness and receiving medical treatment, additional stress is produced by a poor design of physical environments (Ulrich, 1991). Ulrich (2008) states that ‘if hospital physical environments contain stressful features or characteristics, patient stress and other outcomes will often be worsened.’ Monti et al. (2012) argues that reducing the negative effects of hospitalization by focussing on the physical environment is especially important in the case of children. Being hospitalized is an intense stressful situation for children, as it changes their routines e.g. food habit, sleep patterns, hygiene. The unknown situation triggers the onset of negative feelings like fear and anxiety (Mabe et al., 1991) and the stress that children experience when hospitalized is associated with negative health outcomes as well.

The design of healthcare facilities has gradually shifted from a psychologically ‘hard’ to a psychologically ‘supportive’ perspective (Dijkstra, Pieterse & Pruyn, 2006; Van den Berg, 2005). In

recent years, the state of knowledge of evidence-based healthcare design has grown rapidly and according to Lyendo et al. (2016) this evidence-based design (EBD) ‘has become the theoretical concept of what are called healing environments.’ Healing environments are healthcare environments that take into consideration the psychological needs of patients (Stichler, 2001; Ulrich et al., 2008). Keeping the patient in mind when creating, changing or making additions to health care facility’s physical environment, can positively influence patient outcomes (Devlin & Arneil, 2003; Ulrich et al., 2008). Well-designed physical settings proved to play an important role in making hospitals safer and more healing for patients (Biley, 1996; Lyendo et al., 2016; Stichler, 2001; Ulrich et al., 2008).

Nature

A healing environment is a wide concept. Different physical environmental factors that can contribute to creating a healing environment within a hospital setting can be distinguished. For example, artwork, light, colour, architectural design, ergonomic design, floor layouts and furnishing (Dijkstra, Pieterse and Pruyn, 2006; Lyendo et al., 2016; Ulrich et al., 2008). Evidence linking specific design features directly to impacts on healthcare outcome is poor (Dijkstra, Pieterse & Pruym, 2006), however positive results with respect to nature were found (Kaplan, 2010; Lyendo et al., 2016; Monti et al., 2012; Ulrich, 2004, 2008). Displaying nature, whether it is real nature or painted/ pictured, seems to have a positive effect when it comes to implicit and explicit responses of patients.

Regarding the implicit responses, displaying nature is linked to the production of positive feelings as much as reducing worries and postoperative anxiety (Ulrich, 2004). Ulrich et al. (2008) state in their review that particularly strong evidence was found for nature interventions in prospective randomized clinical trials: ‘real or simulated *views of nature* can produce substantial restoration from psychological and physiological stress within a few minutes.’ This indicates that displaying nature can evoke involuntary responses within patients, which is also substantiated by Kaplan (2010). According to his attention restoration theory, the restorative effect of environments is dependent on the kind of attention that is evoked with it. Kaplan (2010) states that it is necessary to create a combination of gently attracting involuntary attention on the one hand while reducing the need for directed attention on the other. Involuntary attention does not involve mental effort, in contrast with directed attention which is finite and can be depleted. The depletion of directed attention can lead to fatigue over time, which in turn can be detrimental for health, which makes it important to find ways to restore it. This can be done by utilizing involuntary attention. Features of the environment for example, provide a bottom-up kind of attention (involuntary), which minimises

the requirement for directed attention (voluntary). Soft fascination is a term used to describe the gentle attention that the environment evokes, which means it does not interfere with other thoughts. According to Kaplan (2010) this soft fascination can be captured by natural environments.

Next to implicit responses humans also have explicit responses with respect to nature. There is evidence found that children and adults have a preference for displaying nature in hospitals. For example, Ulrich (1991) found that pictures of nature showing vegetation, was preferred over paintings showing urban scenes without vegetation. According to Monti et al. (2012) the view of nature (whether this is real nature or painted nature) serves as a positive distraction, helps patients cope with the situation by cognitive refocusing as well as having a comforting effect on them by creating a familiar feeling in an unknown place. They state that this is experienced by children in the same manner as adults. Other research indicates that the use of nature in a hospital setting make patients feel calm and relaxed, whether it is the actual use of nature e.g. gardens and plants or nature in paintings or pictures (Kaplan, 1995, 2010; Lyendo et al., 2016; Monti et al., 2012; Ulrich, 1991, 2004, 2008).

The Anouk Foundation

The murals that were developed by the team of artists of the Anouk Foundation for Maxima's Children Centre in Utrecht, partly consist of nature. Considering the previous mentioned literature, these nature-like murals should have a restorative effect on the children in paediatric hospitals. Other murals developed by the Anouk Foundation for Maxima's Children Centre consist of other themes like 'home', 'music', 'art' and 'sport'. The themed murals are meant to be stories that entertain as well as distract children from their treatment. Roger Ulrich, who is one of the leading researchers on this subject, found that the display of pictures on walls increases relaxation and provides distraction from other aspects of the environment (Ulrich, 1991). Kaplan (2010) however states, that distraction can be a short-term pay off when it is provided by hard fascination. Considering his attention restoration theory, restoration finds place when the environment evokes gentle fascination, so the murals should not draw too much attention to it. Although this is one theory regarding restoration, it raises the question whether the nature-like murals indeed have a restorative effect on children and also whether this differs in any kind of way with respect to the other themes that show no or less nature-like components.

This research

Several studies have shown that displaying nature has a healing effect on patients and evidence for this was found in both implicit and explicit responses. Exploring possible healing effects regarding displaying nature in hospitals should therefore involve gathering both implicit and explicit responses. To see whether the nature-like mural developed by the Anouk Foundation is indeed restorative, this study will compare the implicit and explicit responses related to the nature-like mural with the implicit and explicit responses related to a neutral mural. This study will not be conducted among hospitalised children, since this is considered to be a vulnerable group. It is an exploratory study, that will be conducted among healthy children to verify whether both murals have a possible restorative effect on them and could potentially also have a restorative effect on hospitalised children. The following research questions are posed:

1. A. What are the differences in implicit responses of children when being exposed to a restorative mural vs a neutral mural
 B. What are the differences in explicit responses of children when being exposed to a restorative mural vs a neutral mural
2. What kind of features could account for the possible differences in explicit and implicit responses of children regarding a restorative mural and a neutral mural

Methods

Design and participants

A mixed-methods design was employed, including both observation and a semi-structured interview. Both groups were exposed to a mural. There were two conditions, a restorative condition and a neutral condition. The participants, all of them primary school children of group six at the ‘OBS Roombeek’ in Enschede, were recruited by convenience sampling. Group six of OBS Roombeek has a total of 26 children, which all received an opt-out consent form two days before the research started (see Appendix A for the informed consent form). Through this form, parents received detailed information about the about the goal and the nature of the study and were asked to contact the researcher when they did not want their child to participate in the research or if they had any questions. Three children were excluded from the research, because of their parents or caregivers objection. Because of that, there were 23 participants in total ($N = 23$), eleven Dutch boys and twelve Dutch girls ($M_{Age} = 9.1$, $SD_{Age} = .694$) with their age ranging from eight to eleven

years old and with at least half of them having a Non-Western ethnic family background. These 23 participants were divided over the two conditions by using a name list of the class and making sure that the odd numbers were participating in the restorative condition and the even numbers were participating in the neutral condition. However, by following this procedure the genders were not equally distributed over the two conditions. In the restorative condition ($n = 12$) were eight boys and four girls ($M_{Age} = 9.0$, $SD_{Age} = .603$). In the neutral condition ($n = 13$) were three boys and eight girls ($M_{Age} = 9.3$, $SD_{Age} = .786$).

Materials and apparatus

Murals. For the current research, two different murals were selected. One mural displaying a nature-like scene for the restorative condition (nature-like mural) and one mural displaying a sport scene for the neutral condition (sports mural). See Appendix B for the two selected murals. The murals have the same style, because they were developed by the same artists for the purpose of the project in the Maxima Children's Centre in Utrecht. When selecting the murals, it was noted that they were matched on non-relevant features as much as possible, to minimise confounding factors.

First of all, it was noted that the complexity in both murals was minimised and similar, to make sure that this would not become a confounding factor. Complexity in a mural could cause too much effort for the viewers, because the brain has to focus on the mural at one hand and inhibit other stimuli on the other (Goolsby et al., 2009). This research focusses on the possible restorative effect of the murals, which can be translated into soft fascination which in turn means that the mural should evoke little effort. If the composition of the mural evokes too much effort in both murals or in one more than in the other, than this could be a confounding factor.

Second of all, the murals are polychrome, which made it relevant to select murals with similar colours and avoid colours that could have a negative effect on the participants. The colour red evokes a higher arousal level because of its warmth, in contrast to the colours green and blue which are thought to be associated with rest, safety and relaxation according to Wilson (1966). Dijkstra et al. (2008) state that the colours yellow and red are both associated with tension and excitement. If colours evoke arousal, which could indicate the level of effort, this might be a confounding factor as well. The murals of the Anouk Foundation consist of many colours and even though the colours in the selected murals were very similar, they did display yellow. The sports mural displays green and also had a small red circle.

Next to the colours, the murals consist of some conflicting features that might have confounding effects. A tree and water is painted in the neutral mural, which can be associated with nature. So this mural was not entirely non-nature-like. The deer that is painted in the nature-like

mural is running, which can be associated with activeness which could activate arousal. Thus, the selected murals are not free from possible confounding factors, which should be taken into consideration when analysing the results.

360 panorama photo. The 360 panorama photo of a hospital room was taken in the Medisch Spectrum Twente in Enschede, using the Google Street View application. The photo was edited in Photoshop, where anything that was still disfigured was corrected, i.e. some misplaced shadows or badly stitched pictures. Then the photo was duplicated. In one photo, the nature-like mural was added on top of the wall behind the hospital bed and in the middle of the wall across the hospital bed and in the other photo this was done with the neutral mural. The mural was added in two spots in the photo of the hospital room, so it would increase the possibility of the participants noticing it. In reality, the mural is only placed there once.

Samsung Gear VR. The Samsung Gear VR, which is a consumer friendly virtual reality headset that was developed by Oculus, was used for the exposure of participants to the photo because of its ability to provide participants with an augmented reality view and its ease of use. Virtual reality is advancing and showed to be effective for the purpose of treatment, sports training or skill training (Gilson, Fitzgibbon, & Glennerster, 2008). For example, it is used as treatment for patients who are afraid of flying or heights (Krijn et al., 2004), as a training strategy for handball goalkeepers (Vignais et al., 2015), for effectively teaching leadership skills by using virtual simulation (Putman, 2013) and also for teaching persons with an autistic spectrum disorder to engage in social situations or other behaviours (Cheng, Huang, & Yang, 2015). The use of VR technology is simplified for this research. Participants are only expected to look at the virtual hospital room that is displayed in the Samsung Gear VR and answer questions while doing so. Previously mentioned applications of VR technology used interactive virtual environments. This research used a static virtual environment, which is used by means of exposure only.

The Samsung Gear VR only has to be connected to a Samsung Galaxy smartphone (> S6) in order to create an augmented reality. It has a wide stereoscopic sight which immerses the user inside a virtual world, in this case a hospital room. The headset measures the head movements of the user, which are translated into the virtual environment. This way, it enables the participant to fully rotate in the virtual hospital room, which gives them the feeling that they are actually present in the hospital room. To be able to use the Samsung Gear VR, the Oculus application had to be downloaded on the Samsung Galaxy S6 smartphone and an account was made to register the phone. After that, the phone was connected to a laptop, a Lenovo Thinkpad T460S. After every session, glass wipes were used to clean the inside glasses of the Samsung Gear VR for hygiene as well as good sight.

Measures

Free association task. First, the indirect implicit responses of the participants regarding the mural were measured, to see if they would implicitly respond to the mural and if this possibly affected other spontaneous responses as well. The participants were asked to freely associate while being exposed to a hospital room with the Samsung Gear VR. This free association task was conducted according to one of the proposed procedures by Kenett, Anaki & Faust (2014). The participants were given five minutes to give as many (free) reactions as possible. Three prompts were used during these five minutes: “What else do you see?”, “What do you think when you see this?” and “What do you think of this room?”. Next to answering these prompts, the participants were asked to say everything that comes up in their minds, which is a think aloud method. This method was used to give insight in the ongoing thought processes of the participants during the ‘free association task’ (Jaspers et al., 2004). For the protocol of the Free Association Task, see Appendix C.

The view of the participants during the exposure was displayed on the laptop by using the MirrorOP application. The MirrorOP application has a Sender application that was downloaded on the Samsung Galaxy S6 (which was connected to the Samsung Gear VR) and a Receiver application that was downloaded on the laptop. The MirrorOP Sender application mirrored the view of the participants to the MirrorOP Receiver through the WiFi of the research location. By mirroring the view onto the laptop screen, this data could be captured with a screen recorder program called ‘Ezvid’, so it could be used for analysis. Ezvid captured both the visual data of the participants and the audio data (reactions of the participants). Next to that, the voice recorder of a Samsung Galaxy S3 mini and the voice recorder of the laptop were used as back up for recording the audio of the participants.

Word stem completion task. Secondly, right after being exposed to the virtual hospital room, the direct implicit responses of the participants were measured by conducting a word stem completion task on paper. This is a word association method. Word association methods have proven to be a valid measurement for implicit cognitions (Rooke, Hine, & Thorsteinsson, 2008; Stacy, Ames, & Leigh, 2004; Tiggeman et al., 2003) and have been established for substance use research as well as research regarding drugs and drug-related outcomes (Stacy, 1995; Stacy, Ames, & Grenard, 2006; Stacy, Ames, & Leigh, 2004).

An example of a word association test is the word stem completion task that was constructed by Tiggeman et al. (2003). This test only shows the first few letters of possible words i.e. word stems. Participants are asked to generate a word that comes up first in their mind when looking at the word stems. A similar procedure was used for this research, although it was not pilot tested. The

construction of the word stem completion task for this research was based on the assumption that participants would produce words related to the mural they were exposed to more often than words related to the other mural. Two dimensions were created in this test, one restoration dimension which was based on the nature-like mural and one activity dimension which was based on the sports mural. Both dimensions were then divided into two subdimensions. A dimension related to the theme (nature/sport) of the mural and a dimension related to arousal. Lang et al. (1993) state that viewing interesting stimuli increase arousal levels and Kahneman (1973) states that the arousal levels are accompanied by variations of effort. The arousal could therefore indicate the amount of effort the mural is evoking and whether this can be seen as soft fascination or not. Which in turn could say something about the possible restoration. Rook et al. (2008) mention two approaches to measure implicit arousal, assessing arousal via psychophysiological measures or indirectly by assessing automatic arousal-related cognition. In this study it is assessed by conducting a word stem completion task in this research.

Mehrabian (1996) states that arousal is a dimension, with inactivity, sleep and relaxation at the lower end of arousal and alertness, excitement and wakefulness at the higher end. Because the sports mural shows forms of activity, it is therefore expected to evoke more excitement than relaxation. Considering this, the restoration dimension is divided into the dimension *low arousal* regarding to the possible calming effect that nature could have and the dimension *nature* regarding to the theme of the mural. The activity dimension is divided into the dimension *high arousal* regarding to the possible arousal increasing effect that sports could have and *sports* regarding to the theme of the mural. The arousal dimensions should however be viewed with caution, considering the fact that they are usually not assessed with a word stem completion task.

Starting with this idea, an initial pool of 50 words covering words according to the two dimensions of *restoration (nature and low arousal)* and the two dimensions of *activity (sports and high arousal)*, was generated by using an online dictionary. With the knowledge that children have a more limited vocabulary than adults, the easiest words were selected. After that, the pool was reduced to 14 words, with the criterion that each word stem could provide a word related to one of the dimensions of either the nature-like mural or the sports mural or an alternative word unrelated to any of the dimensions (see Appendix C). For example “Lui... (*Luieren (idle)/Luizen/Luik*)” for the restorative mural and “Spo...(*Sport(sports)/Spoor/Spoel/Spons*)” for the sports mural. However, 3 out of the 14 words were bipolar, meaning that they could either link to the restorative mural or to the sports mural, for example “Dru..” could be “Druk (Busy) or “Druif (Grape)”. The word stem completion task was controlled, because the participants were asked not to create any names of the word stems.

To increase the accuracy of coding, a modification of the self-coding procedure that was tested by Frigon & Krank (2009) was used (see Appendix C). The self-coding procedure they assessed on validity ‘suggests that self-coding may be used to improve concurrent validity, decrease ambiguities in coding, and reduce the cost of measuring memory associations.’ In their procedure participants were asked to classify their response in the word stem completion task as belonging to a category, as means of disambiguation. In this research, the researcher quickly scanned the answers that were given on disambiguation. When this seemed to be the case according to the researcher’s own estimate, the participant was asked to explain the word or to classify the word either as ‘sports’, ‘activity’, ‘nature’ or ‘rest’. The low and high arousal dimensions were named ‘rest’ and ‘activity’ as simplification for the children. For example, one participant wrote ‘bladeren’ and explained it as ‘turning over pages’, while this word also means ‘leaves’ in Dutch.

Interview. After the direct and indirect implicit responses of the participants were measured, the explicit responses were measured by conducting a semi-structured interview method. The participants were asked to focus directly on the mural they had seen during exposure that was now printed on a paper. The interview was conducted to gather the participant’s free associations while focussing on the mural directly, their motivations for their responses and also their preferences (reflective part). The interview scheme can be found in Appendix C. First, four questions were asked regarding their findings, thoughts and feelings, for example “What do you see when you look at this image?” This was followed by two or three probe questions, like “What more do you see/ do you think/ do you feel?” and “Why?” Ultimately, a scenario was presented in which the participants were asked to imagine lying in a hospital room where the mural that they were exposed to is painted on the wall. Then two questions regarding this scenario were posed. First, they were asked how they would feel about lying down in that hospital room when the mural they were exposed to was painted on the wall. Secondly, the mural they were not exposed to was presented to them as well and they were asked to choose the mural they preferred to be displayed in their hospital room. After both questions the participants were again asked to reason their choice.

Procedure

The data was collected within three mornings between approximately 8.30 am and 12:30 am. Before the data was collected, the participants were divided in two conditions by using the name list of the class and exposing the odd numbers to the nature-like mural (condition one) and the even numbers to the neutral mural (condition two). Then the research started with the first session where participant one underwent the procedure, with a total of nine participants completing the session on Wednesday, again nine participants on Thursday and the remaining five participants on

Friday.

After preparing the procedure i.e. setting up the Samsung Gear VR, the laptop, the paperwork and the voice recorders, participants entered the 20 square meter room that was located in the same hallway as their classroom. They took place on a black stool that was placed approximately 1.5 meters from a large table, to provide them with some space. Because of the different spatial perception, they could lose their stability which would increase the risk of falling. Sitting on a stool allowed them to rotate. After this, the procedure of all three sessions was briefly explained to the participants according to the protocol (see Appendix C). Next, the first session started with the participants being exposed to the virtual hospital room once the Samsung Gear VR was placed on their heads. It was made sure that the participants looked at the right mural and received a sharp image. One participant did not receive a sharp image because of his poor sight. This participant held the Samsung Gear VR against the forehead while wearing glasses. Some participants had a tendency to replace the Samsung Gear VR with their own hands and by doing so, touched the touchpad and thereby accidentally switched to the other mural or to an irrelevant image. This was resolved quickly. While being exposed to the hospital room, the participants started to answer the questions and freely associate about everything they perceived.

After the free association task, the Samsung Gear VR was taken off the heads of the participants and they were directed to the table, where they took place on a chair and started the word stem completion task. Meanwhile, the screen recorder program Ezvid was stopped and the file was saved. Some participants did not fill in the whole task, because some words were too hard for them. When the participants finished the task, the researcher started the previous mentioned self-coding procedure for disambiguation.

Next, the participants were shortly interviewed according to the semi-structured interview scheme (see Appendix C), while focussing on the mural that they were exposed to earlier, which was presented to them printed on a paper. At the end of the interview the other mural was presented on a paper as well for them to answer the final question according to the scheme. After they finished the procedure, the researcher thanked them for their participation and asked their opinion on what they thought of doing this research. Ultimately they were asked not to tell any classmates about what they did, so the following participants were not biased. To make sure they did not, this was verified with the participants before every session started. Only one of the participants confessed that she already knew what she was going to do in this session, because a classmate told her this. However, the information she received was not relevant for the topic. There are no indications that other participants also knew. After their session, the participants went back to the

classroom. The following participant according to the name list was sent to the research location by the teacher, after a five minute break.

Data-analysis

The transcripts of the free associations were analysed in a quantitative and qualitative way. The quantitative part consisted of demographic information and the amount of details the participants named according to the first prompt ‘what do you see (what more do you see)’ plus the time it took them to name these details. Next to that, the total amount of time was reported and also at what point they mentioned the mural. The possible differences in this data could indicate whether one group was perhaps more activated than the other and if this could have been initiated by the exposure to the mural. The qualitative part consisted of identifying codes inductively within the data of the second and third prompts (what do you think/ what is your opinion about this room). The intention was to find out whether the participants had any spontaneous responses regarding the mural and/or if these responses differed between the conditions and if this possibly had to do with the mural they were exposed to. See Table 1 for the coding scheme.

Table 1

Coding scheme Free Association Task

Code	Sub code	Definition
Hospital		A health care facility that provides treatment with specialised medical equipment and nursing staff
	I am in the hospital	Being in the hospital physically
	I am sick	The state of not feeling well/sick
	Family member is in the hospital	A family member is physically in the hospital
Memory		A thought that refers to the past
	Oneself	A thought about oneself that refers to the past
	Someone else	A thought about someone else that refers to the past

Room size		The spatial dimension or proportion of anything
	Big	Of considerable size
	Small	Of limited size
Affect		A certain emotion related to a thought or feeling
	Negative	A negative or non-wanted thought or feeling
	Positive	A positive or wanted thought or feeling
	Neutral	A thought or feeling that is not negative or positive
Room aspects		Aspect of a room
	Bed	A piece of furniture that people sleep on
	Position	Condition with reference to place
	Missing objects	An object that the person would have expected to be in the room
Virtual reality		A virtual reality is an augmented reality created by a computer to make the user feel present in a different environment
	Reality check	An <u>occasion</u> that <u>causes</u> you to <u>consider</u> the <u>facts</u> about a <u>situation</u> and not <u>your</u> <u>opinions</u> , <u>ideas</u> , or <u>beliefs</u> :
	VR- Feeling	A positive, negative or neutral feeling caused by the experience of VR technology

Second of all, the data of the word stem completion task was analysed in a quantitative way. The word stem completion task was developed to study the associations related to the two murals which were each linked to a dimension. The nature-like mural was linked to the restoration dimension, which consisted of the subdimensions ‘nature’ and ‘low arousal’ and the sports mural was linked to the activity dimension which consisted of the subdimensions ‘high arousal’ and ‘sports’. If the participants created a word that was connected to any of these dimensions, it was counted as one hit. The amount of hits of each participant on each subdimension was calculated, as well as the averages per dimension and subdimension.

At last, the interviews were also analysed in a qualitative and quantitative way. For the qualitative analysis, codes were identified deductively and inductively. Deductive coding was done

by creating a short list of codes containing the features that were shown in both murals and the affect it would evoke, because of the high possibility that these were mentioned or shown by participants. The remaining codes were identified inductively, using the first interviews to contextualize themes until saturation was reached across the sample, see Table 2. After the qualitative analysis and describing the diversity of the first response of participants, a quantitative analysis was conducted to explore the frequencies of the responses in both conditions with the intention to compare these responses across the conditions.

Table 2

Coding scheme interview

Code	Definition	Subcodes
Nature	Everything that preserves and sorts out itself, and is not or almost not influenced by human activity. Living and not living nature, flora and fauna.	Nature Animal(s) Tree(s) Plant(s) Sky (air) Sand Water Grass Ground Wild (life) Forest Sun Flower(s)
Sports and play	<u>Sports</u> A physical or mental game, either competitive or recreational, that involves physical movement or mental tasks. <u>Play</u> An activity that falls outside normal daily activities and involves one or more persons taking part in it for the purpose of joy or maintaining/developing skills or talents	Puppets/humans/ children Soccer (playing) Swim(ming) Cycling (bike) Running (jogging) Swing(ing) Play(ing) Sport(ing) Ball Keeper Jumping rope/ Jumping Skating/ Skiing Sportive Movement/moving
Arousal	A response regarding the arousal dimension, with rest on the lower end and excitement on the higher end.	Busy Active Rest

		Quiet Lying down
Features of the mural	Aspects on which the murals can be recognized, which do not have to be unique and can be tactile or intangible	Skateboard Wheels Rope Colour(s) Form(s) Art Composition Drawing Mural Illustration Painting Wallpaper
Affect	A certain emotion or feeling regarding the mural	Positive Negative Neutral
Health	Everything that has to do with the health of a person	Hospital Surgery Healthy
Reminiscing	Remembering something from the past or recognizing something from a memory	VR environment Memory Pets Friends
Additional thoughts	Everything that does fall into previous mentioned categories	Vacation Africa Distraction Fantasising View Nightmares Old Shadow Statues Number Television Alone

Results

Implicit free associations during VR exposure

Descriptive statistics

The amount of details that were given during the free association task when the participants were asked *what they saw*, differed a lot between the participants, ranging from 6 to 25 details in the

restorative condition and from 6 to 31 details in the neutral condition. The average amount of details that were given by the participants did not differ across the conditions with an average of 14.83 details in the restorative condition and an average of 15 details in the neutral condition. On the other hand, the time taken to provide the details did differ, with an average of 1.78 minutes in the restorative condition and an average of 1.54 min in the neutral condition.

With respect to gender, it was noticeable that boys seemed to verbalize less details than girls in both conditions (see Table 1), regardless of the unequal distribution. Table 1 also shows that the amount of time the participants took to verbalize the details, did not differ between boys and girls within both conditions separately (see Appendix D for all data of the free association task).

Mural

It was noticeable that the mural was detected almost immediately by the participants in the neutral condition ($m = 2^{\text{nd}}$ place), which was not the case in the restorative condition ($m = 6^{\text{th}}$ place), even though the participants all started off with the mural in their scope. Next to that, all participants in the neutral condition mentioned they saw *a skateboard* on the wall, whereas the participants in the restorative condition used different terms, like *a painting*, *an illustration*, *some sort of paint*, *figures* or *a mural*. In the neutral condition, one participant mentioned *the illustrations* in the skateboard and another participant mentioned *the persons* in the skateboard. In the restorative condition, one participant mentioned the trees and grass in the mural, one participant associated the mural with *laying on the beach* and another participant associated it with *Africa*.

Table 3

Average amount of details and related time with respect to gender during VR exposure

Condition	Gender	N	Minutes	Details
Restorative	Girls	4	1.76	17
	Boys	8	1.79	13.75
	Total	12		
Stress	Girls	8	1.55	16.25
	Boys	3	1.53	11.67
	Total	11		

Immersiveness

During the exposure more than half the participants in both conditions mentioned that they

either felt like they were sick and had to lay down in the hospital room that they perceived through the VR glasses or kept it less concrete and said they were present in the perceived hospital room. It is noticeable that this distinction in association is different between the conditions. In the restorative condition participants described it as *being in the hospital* (x4) more than as *being sick* (x2), whereas participants in the neutral condition described it as *being sick* (x5) more than just *being in the hospital* (x2). Also, in the neutral condition participants reported some negative thoughts, which was not the case in the restorative condition. For example, a participant in the neutral condition thought of *something dangerous*, whereas another participant thought of a *bad disease*. A third participant mentioned *surgery* and another participant said that it was *not nice* to lay there. In the restorative condition participants only mention being in the hospital/being sick, but do not associate it with negative words such as dangerous, bad or not nice.

Affect

In general, the majority of participants expressed positive associations while verbalizing their opinion regarding the hospital room. These positive associations all include the word *beautiful*. Some participants expressed negative associations, a few of which mention the word *boring*. It was noticeable that only five participants link their opinion regarding the room directly to the mural and when they do, it is mostly linked to a positive opinion.

In the restorative condition, one participant mentioned that the painting was nice and the other participant said:

“Quite beautiful. The drawing is, like you are on the beach”

In the neutral condition, one participant mentioned that the mural is nice for kids and the other participant said:

“Beautiful. Looks like a hospital room; skateboard on the wall, all these *colours*, I think it’s beautiful.”

Only one participant in the neutral condition linked a negative opinion regarding the room to the mural and mentioned to find it *weird*.

Spontaneous responses

In general, some associations during the exposure were given regarding *the size of the room* or regarding *a memory*. For example, three participants in the restorative condition and one participant in the neutral condition perceived the room to be *big*. Only two participants in the neutral condition found it *small*. Also, two participants in both conditions brought up *a memory*, either one where they were in the hospital themselves or one where a family member was in the hospital.

Virtual reality

Other associations were made regarding the virtual reality. Four participants in both conditions mentioned something about their '*high*' position in the room, which was next to the bed and also a bit higher than the bed. Four participants in both conditions mentioned that the *bed was big, huge or bigger than normal*. Three participants in the restorative condition and four participants in the neutral condition spontaneously mentioned that it felt *weird to be in this room*, most likely because of the technology being used i.e. the perception of a virtual room. Five participants in the restorative condition specifically mentioned that they could *not see themselves or the researcher* or said they were in *another world*, whereas one person in condition two specifically mentioned this.

Conclusion

The average amount of details given by participants regarding what they saw in the room was similar in both conditions as well as the range of the amount of details between participants within each condition. However, the details seemed to be given slightly faster in the neutral condition. With respect to gender, boys seem to name less details in both conditions, even though they were unequally distributed.

Participants in the neutral condition mentioned the mural faster than participants in the restorative condition and all verbalized the shape of the mural in doing so, whereas participants in the restorative condition used different terms for mentioning the mural.

Next to that, participants in the neutral condition felt as though they were sick more often than participants in the restorative condition, who describe it as 'being in a hospital' more often. It is noticeable that only participants in the neutral condition spontaneously associated the hospital room (or being sick) with negative thoughts.

The general opinion of the participants regarding the hospital room was mostly positive, but only a few participants in both conditions linked this opinion directly to the mural.

Word stem completion task

Most participants in both conditions completed the word stem completion task, besides four participants in the restorative condition and two participants in the neutral condition who were not able to finish the task entirely because they could not come up with suitable words (see Appendix E for all hits on the word stem completion task). Both conditions were exposed to a mural. The murals were first linked to two dimensions for generating words with the word stem completion task. The nature-like mural was linked to *the restoration dimension*, which consisted of the subdimensions the *nature dimension*, which included words about nature itself according to the theme of the mural,

like ‘trees’ or ‘animals’ and the *low arousal dimension*, which included words related to the possible low state of arousal that can be evoked by watching nature, like ‘rest’ and ‘silence’. The sports mural was linked to the *activity dimension*, which consisted of the subdimension the *sports dimension*, which included words about sports according to the theme of the mural, like ‘soccer’ and ‘sports’ and the *high arousal dimension*, which included words about the possible high state of arousal that can be evoked by watching sports like ‘activity’ and (or) ‘busy’.

As shown in Table 4, both conditions nearly had the same total amount of implicit associations on both subdimensions of restoration. Remarkably, the distribution of these hits regarding the ‘nature dimension’ and the ‘low arousal dimension’ were almost equal between and within the conditions. This equal distribution of implicit associations did not occur with both subdimensions of activity, as shown in Table 4. Remarkably, participants in the restorative condition had more hits on the ‘high arousal dimension’ and the ‘sports dimension’, than participants in the neutral condition.

With respect to gender across the conditions, it is noticeable that the boys had a higher average amount of hits on the ‘sports dimension’ in the neutral condition than in the restorative condition. Next to that, girls had a lower average amount of hits on the ‘sports dimension’ in the neutral condition than in the restorative condition. At last, girls had a higher average amount of hits on the ‘high arousal dimension’ in the restorative condition than in the neutral condition.

Table 4

Distribution of hits regarding the four dimensions of the word stem completion task within and between conditions

Condition	Gender	N	Hits restoration dimension			Hits activity dimension		
			‘Nature’ dimension (M)	‘Low arousal’ dimension (M)	Total (M)	‘Sports’ dimension (M)	‘High arousal’ dimension (M)	Total (M)
“Restorative”	Total	12	17 (1.41)	16 (1.33)	33 (2.75)	13 (1.08)	31 (2.58)	44 (3.67)
	Boy	8	10 (1.25)	11 (1.37)	21 (2.63)	6 (0.75)	19 (2.38)	25 (3.13)
	Girl	4	7 (1.75)	5 (1.25)	12 (3.00)	7 (1.75)	12 (3.00)	19 (4.75)
“Neutral”	Total	11	18 (1.64)	14 (1.27)	32 (2.91)	8 (0.72)	22 (2.00)	30 (2.73)
	Boy	3	4 (1.33)	3 (1.00)	7 (2.33)	4 (1.33)	6 (2.00)	10 (3.33)

Girl	8	14 (1.75)	11 (1.38)	25 (3.13)	4 (0.50)	16 (2.00)	20 (2.5)
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Conclusion

Whether the participants were exposed to a nature-like mural or to a sports mural, they almost had the same amount of implicit associations regarding ‘low arousal’ (for example silence, calm, rest) and ‘nature’ (for example animals, leaves, grasshopper), which are both dimensions of restoration. However, they did not have the same amount of implicit associations regarding ‘high arousal’ and ‘sports’, both dimensions of activity. Remarkably, participants who were exposed to a nature-like mural had more implicit associations regarding ‘high arousal’ and ‘sports’ than the participants who were exposed to a sports mural. The boys who were exposed to the nature-like mural had less implicit associations regarding ‘sports’ than the girls, who also had more implicit associations regarding ‘high arousal’. When being exposed to a sports mural however, boys had remarkably more implicit associations regarding ‘sports’ than girls.

Interview (explicit free associations and a reflective part)

During the interview, the participants answered questions regarding the mural they were exposed to earlier on, which was now printed on a paper. Seven out of twelve participants in the restorative condition immediately mentioned that they recognised the mural from the hospital room they had seen during exposure, whereas nine out of eleven participants in the neutral condition recognized it. When the interview started, they were asked about what they saw, thought and felt when looking at the mural. They could freely associate, but were explicitly directed to the mural. After this free association part, the reflective part followed. A scenario was described in which the participants had to imagine lying in the hospital themselves. Then they were asked to think about how they would feel when the mural that they were exposed to was painted on the wall. With the same scenario still in mind, they were asked to choose which mural they would like in that hospital room: the one they were exposed to or the one the other group was exposed to, which was presented to them during this last question. In this way, the explicit associations of the participants regarding the murals was collected, coded and are described in the following paragraphs (see Appendix F).

Descriptive statistics

When the interview started, the participants were first asked to verbalize what they saw in the mural that was presented to them printed on a paper. The participants in the restorative condition expressed an average of 7.7 details (yet two participants did not receive the prompt ‘what more do you see?’), with an average of 7.3 details for boys and an average of 8.5 details for the

girls. The participants in the neutral condition expressed an average of 7.3 details, with an average of 7.67 details for the boys and an average of 7.13 details for girls.

Restoration

While freely associating about what was seen in the mural, participants in the restorative condition all noticed the animals that were displayed. Most participants also noticed *the tree*, *the grass* and *the plants* which were painted in the mural. Some participants mentioned *the sky*, *the sand* and *water*. One participant also expressed seeing the *sun*, while this was not painted in the mural. More than half of the participants associated the mural in general with *nature*. The things they saw in the mural were similar to the thoughts they expressed as well. More than half of the participants thought of *nature* because of the trees, animals or plants. Two participants thought of nature because of the *colours*.

Next to associating the mural directly with nature, two participants associated the mural with *the forest* and two other participants associated it with *wild life*. One of these participants explained: “[...] I am thinking rather of, the wild. Because you do not just spot deer anywhere, you see them in the wild sometimes [...]”

Another two participants thought of *Africa* when looking at the mural, but gave the same reasons as the participants associating it with nature in general, namely the trees and the animals:

“Africa, because they have the same trees there and also that kind of grass. And they have a lot of those animals there too.”

Although previously mentioned results will obviously differ from the neutral condition considering the different themed mural the participants were exposed to, a similarity was found as well. In the neutral condition, two participants noticed *the tree* in the sports mural, which is a sign of nature.

Sports and playing

While freely associating about what was seen in the mural, eight participants expressed the word *sport* (sporting/sportively) and three participants associated it with *playing*. Most of the participants in the neutral condition mentioned *the soccer play* as well. It is noticeable however, that the behaviour i.e. ‘they are playing soccer’ or ‘they are sporting’, was mentioned more than just ‘sports’ or ‘soccer’. Next to that, most participants mentioned *swimming* and *cycling*. Some participants named the *puppets*, *people* or *children* in the mural. One participant who thought of *sport and movement*, also thought of *a match*.

The thoughts of the participants were similar to what they saw in the mural, seven out of

eleven participants said that they thought of *sports* (one participant called it *being sportive* and another called it *being active*). One participant explained:

“Playing and sporting; because they are running, that is sporting. Playing soccer too. And cycling too. But swinging not really. Playing outside.”

A similarity was found in the restorative condition, where two participants also thought of something that can be seen as activity. One participant mentioned *swimming* and another participant mentioned that the deer was *running* for something:

“That deer for example, is running away for something, something that hunts him, then I will help to protect the animals there. I will protect the animals there. Because I love animals.”

Colours

At first, participants in both conditions mentioned what they saw in the mural and what they thought of it, which was mostly related directly to the theme and therefore obviously differed between the conditions. There were no remarkable differences found with respect to *colour*, which most participants in both conditions mentioned when they were asked what *more* they saw.

Although *colours* were mentioned in similar ways in both conditions, it was noticeable that a few participants in the restorative condition went into the colours a bit more thoroughly, whereas none of the participants in the neutral condition did. For example:

“Beautiful. I like the animals and the plant and those colours. And also, even the, that thing, that part of that tree: this is at the blue section and that colour is not blue but rather pink. I find a combination like that beautiful.”

In both conditions, a participant mentions the white walls of a hospital room in general and associate it with a negative thought, i.e. *nightmares* or *feeling alone*.

Memory

Five participants in the restorative condition were verbalizing a memory, two of which reminisced about the *hospital room* they had seen through the VR glasses, one reminisced about *being in the hospital* in the past, another participant reminisced about *animals like the one in the mural who killed his rabbits* and the remaining participant thought of *a painting he once got as a present during a school trip*. Only two participants in the stress condition brought up memories. One reminisced about her aunts (aunt's) *dog* ‘because he was sitting on a skateboard once.’ The other one also reminisced about a *hospital visit* where ‘they also had those nice illustrations on the wall to make children happy.’

Distraction

The participants in both conditions were asked about whether they would like the mural to be painted on the wall if they were ever hospitalised. In both conditions, most participants said they would like this. One of their reasons for liking it is *as means of distraction*, pointing out it would make them think of something else. It was noticeable that five participants in the neutral condition mentioned this and only two participants in the restorative condition did.

In the restorative condition, one participant said it would be nice because the mural would make the participant think of something other than being in the hospital and being sick and the other participant said it would be beautiful and make the participant think of nature all the time.

In the neutral condition, one participant mentions:

“I would first think of my friends, to play with them like I used to. I would also like to swim or swing, but I can’t because I am in the hospital.”

A similar thought was shared by another participant who said it would remind him/her of how he/she used to play sports and while acknowledging the inability to play sports when lying down in a hospital, the participant mentioned he will be able to do so later on. The third participant said the mural would be a memory of the past and that when someone is sick, it would remind the patient of that past, whereas the fourth participant mentions the ability to ‘look away to something’, because when he was in that room, it was *quiet*. The last participant who mentioned it would be some kind of distraction said:

“I would like it, because I would be able to think of other things other than the surgery which is scary, then I am able to look at this.”

Affect

No obvious differences were found regarding affect. The distribution of affect is similar in both conditions, positive thoughts and feelings were much more expressed than negative or neutral thoughts or feelings. Most participants in both conditions found the mural *beautiful*, mostly because of *the colours*.

A small difference was found when participants were asked directly about their feelings. Most participants in general mentioned feeling as though they were in the mural, wanted to be there or wanted to do what was displayed. On the other hand, there were four participants in the neutral condition and only one participant in the restorative condition that answered this question with an explicitly positive feeling. The four participants in the neutral condition immediately mentioned having a nice feeling (x2), a beautiful feeling or a happy feeling. The only participant in the restorative condition who mentioned it, said:

“[...] very positive feeling, because I want to go to, which country does not matter, but to the wild nature to see wild animals, for a long time now. So that gives me a happy feeling.”

Composition mural

The way the mural was made received some attention in both conditions. It is noticeable that a few participants mentioned that the mural was weird. In the neutral condition mentioned this was linked to the different objects, whereas in the restorative condition it was linked to the the different colours. A participant in the neutral condition said:

“You suddenly see him swimming here and it stops there. Weird how you can go from the swimming pool to the skate track.”

A participant in the restorative condition said:

“I do like it, but I also think it is rather weird. With all those colours, that the animals have two or four different colours, and the tree also has three different colours and the plant also has three different colours. And that all the sudden, sand in between grass which is a little brighter and a little browner, sand lies.”

Imagination

Participants mentioned imaginative thoughts regarding the scene of the mural when their feelings about it were asked. It was noticeable that almost half of the participants in the restorative condition felt like they were present in the nature-like scene, whereas only one participant mentions this in the neutral condition: ‘that I am playing outside now [...].’

In the restorative condition, one participant felt as though he/she was present in nature and wanted to protect the animals. Another participant said:

“That I am laying down in the grass, closing my eyes and yes.. just that. And that the sun is shining. And when I am laying down and then I think of animals.”

A third participant mentioned feeling as though he/she was looking at the illustration while sitting in nature, whereas the fourth participant got the feeling of being in ‘wild life’, looking around and making an illustration of that view. The imagination of the last participant deviates from the rest:

“ [...] As if I am at that puddle. That I am swimming, not in a puddle, but at a pool. And then those are statues and that is what I will be seeing. Except this.”

The same participant had deviating associations during his session in comparison with the other participants. During the exposure he mentioned that he saw bowels and a heart on the wall of the hospital room twice, he saw a rainbow somewhere in the room and heard a butterfly but could not see one.

What was also noticeable, is that two participants in the restorative condition verbalized *wanting to be* in the scene of the mural and three participants in the neutral condition mentioned *wanting to do* what was displayed in the mural. Also, two participants in the neutral condition imagined that they would not be able to do these things if they were sick. One participant argues:

“That I want to do this myself, playing soccer. Because I just saw that I was laying down in the hospital and then you cannot do that because you are sick.”

Preferences

At the end of the interview, the mural that the participants were not exposed to was presented to them as well and they were asked which mural they would prefer in their room if they were staying in the hospital. Fifteen participants (five girls and ten boys) chose the sports mural, whereas eight participants (seven girls and one boy) chose the nature-like mural. Therefore, it can be noted that all boys except for one chose the sports mural while the girls were almost equally divided in their choice. Also, it is noticeable that of the eight participants who chose the nature-like mural, five participants were not exposed to it and these five participants were all girls. Of the fifteen participants who chose the sports mural, nine were not exposed to it and seven of these participants were boys.

In general, five participants reasoned their choice for the nature-like mural by their love for animals (one boy and four girls) and four participants chose the sports mural (one girl and three boys) because of their love for sports.

Next to this similarity, a difference was found for the remaining reasons. It is noticeable that the participants who chose the sports mural, verbalised much more variation in their reasoning than participants who chose the nature-like mural. For example, the remaining participants who chose the sports mural said that it was more lively because of the children playing in it, it was nicer because more things were displayed in the vehicle, it was looking like a riding hotdog, it was funny because it looked like a whale on wheels, because it was more colourful or it would motivate you to start playing sports once you are healed.

The remaining participants who chose the nature-like mural mentioned features of the mural they did not choose in their reasoning. One participant likes quietness more than bustle, the other one found the sports mural creepy and according to the third participant:

“When you are really sick, you cannot do those things, it makes you jealous and that is not nice. Then I rather look at nature.”

Conclusion

Overall, the participants seem to be positive regarding the mural in both conditions and only a few differences were found regarding some participants. It seems that more participants in the restorative condition mention memories and express the feeling of being present in the scene of the mural, than participants in the neutral condition. In turn, more participants in the neutral condition verbalize a positive feeling explicitly and mention that the mural could serve as some sort of distraction. Next to that, some participants in the neutral condition mention wanting to do what is displayed in the scene of the mural, which was not the case in the restorative condition. At last, more participants chose the sports mural rather than the nature-like mural and their reasons also vary more than the reasons of the participants who chose the nature-like mural.

Integration implicit and explicit associations

The implicit and explicit associations should be considered separately. However, there are a few examples of how implicit and explicit associations might be linked to each other. For example, all participants (except for one) noticed the mural on the wall during exposure, but the majority of participants did not go into detail about it. Yet, when they imagined to be in the hospital themselves during the interview, almost half of the participants in the neutral condition considered the mural to be a distraction while only a few participants in the restorative condition thought so.

Another example is that the participants in the restorative condition implicitly noticed the mural in the virtual hospital room later on during exposure than participants in the neutral condition, who noticed it almost immediately. Next to that, all participants in the neutral condition called the mural a skateboard when mentioning it, whereas participants in the restorative condition used different terms for the mural. Almost half of the participants in the restorative condition did not recognize the printed mural when it was presented to them during the interview, while only a few participants in the neutral condition did not.

Next to that, although all participants were mostly positive throughout all sessions, only some participants in the neutral condition spontaneously expressed negative thoughts during the exposure in the hospital room. However, when they were asked directly and explicitly what they feel when looking at the mural, more participants in the neutral condition expressed a positive feeling than participants in the restorative condition.

Also, even though some participants in the neutral condition spontaneously mentioned negative thoughts while being exposed to the hospital room where the mural was painted on the wall, their explicit thoughts regarding the mural are mostly positive.

After being exposed to a nature-like mural, participants have unexpectedly more implicit associations regarding sports and high arousal than participants who were exposed to a sports mural. Looking at the explicit associations, it is noticeable that the great majority of participants who were exposed to nature, preferred the sports mural.

Next to that, when boys are exposed to the nature-like mural they have less implicit associations regarding sports than girls, yet when they are exposed to the sports mural they have more implicit associations regarding sports than girls. Explicit associations however show that almost all boys preferred the sports mural.

Discussion

This study aimed at finding possible differences in implicit and explicit responses between a group of children that were exposed to a restorative mural which displayed nature and a group of children that were exposed to a neutral mural which displayed sports. In general the murals were perceived positively by most children. Next to that, small differences were found between the two groups of children, some of which were unexpected. Based on existing literature, the nature-like mural should be more restorative than the sports mural and there are some indications that this was the case. However these findings were mostly found in implicit responses and were not consistent. Explicit responses show that the sports mural is received more positively. Next to that, this study also indicates with caution that some features of the murals could evoke negative side effects.

Implicit responses

One of the findings showing that the nature-like mural might be more restorative is the feeling of being a patient while being exposed to the hospital room. This feeling emerges more with children that were exposed to the hospital room with the sports mural, than with children who were exposed to a nature-like mural. This can be seen as an unfavourable effect regarding the sports mural and therefore less restorative than being exposed to the nature-like mural.

An explanation for this could be that children in the neutral condition might have implicitly associated the sports mural with a paediatric hospital and this might have triggered a more 'real' feeling of being sick. One child mentions this spontaneously, saying it reminded of a past hospital stay because of the skateboard on the wall. A reason for this association, other than a memory, could be linked to the colours of the sport mural which were way darker than the nature-like mural and therefore drawing more attention. It could also have been linked to another feature of the sports mural, i.e. the shape of a skateboard. All children refer to the mural as a 'skateboard' while being exposed to the hospital room, giving the mural a meaning. For example, skateboarding might be

associated with something mostly children do. This could have caused the children to think of a paediatric hospital, which usually displays illustrations that are created especially for children. Children in the restorative condition mostly referred to the mural as an illustration, some figures or something that was painted on the wall. This could have caused the children in the restorative condition to feel more 'distance' with the hospital room because they might have associated it less with a paediatric hospital. This might be the case why children in the restorative condition mentioned being 'in the hospital' more than 'being sick' and why a few children in this condition getting the feeling that someone else is laying in the hospital, which was not mentioned by children in the neutral condition. This could be a favourable effect of the nature-like mural, although the question remains whether this would also be the case with sick children.

Another finding might add to the previous finding. Being exposed to the sports mural, caused some children to spontaneously mention negative thoughts such as bad, dangerous, (scary) surgery and not nice. An explanation for this is that the possible association of the sports mural with a paediatric hospital and the feeling of being sick, might have made it feel more 'real' for the children. According to Monti et al. (2012), being hospitalized is a very stressful situation for children and the uncertainty of this situation triggers negative feelings like fear and anxiety (Mabe et al., 1991). Thus, the fact that more children in the neutral condition expressed being sick themselves could also be the reason they expressed more negative thoughts than children in the restorative condition. If the mural contributed to these feelings and thoughts, it still remains unclear how. An explanation could be that the sports mural drew more voluntary attention, because of the dark colours, the shape of 'a skateboard' and therefore interfered with the thoughts of the children in a negative way because of the association with a paediatric hospital. In other words, it might have directed their attention more than the nature-like mural did, which means it could be less restorative (Kaplan, 2010).

Although previously mentioned implicit responses might indicate that the nature-like mural indeed has a restorative effect on children, these findings are not consistent. It was expected that being exposed to a nature-like mural, would cause children to have more implicit associations regarding restoration in the word stem completion task, which was not the case. The exposure to a nature-like mural caused children to have more implicit associations regarding activity instead. An explanation could be that children are more responsive to environments that reflect their mood (Olds, 2001). During the sessions, there was quite a lot of background noise i.e. children playing in the hall or at the play court outside the school. If this was of any influence to the mood of the children i.e. wanting to play themselves as well, it could be that this was the reason that the children did not respond to the nature-like mural as they were expected to i.e. with words associated to

restoration like ‘rest’ or ‘animals’. However, if this was the case, then it remains unclear why children who were exposed to the sports mural, still had less implicit associations regarding activity. Although the boys who were underrepresented in this condition had remarkably more implicit associations regarding sports in particular than girls. When the distribution of gender would have been equal, the implicit associations regarding sports and therefore activity, could have been higher.

Explicit responses

Explicit responses show that the sports mural was perceived more positively. The Anouk Foundation mentions that distraction is one of the purposes for creating the murals. It seems that the sports mural evoked the idea of being a possible distraction during a hospital stay more than the nature-like mural. Perhaps an explanation for this can be found in previous mentioned findings, which indicate that the sports mural might have received more voluntary attention. Another explanation for this could be found in the preferences of the children in both conditions. In general, most children chose the sports mural and their reasons for choosing it vary way more than the reasons for choosing the nature-like mural. For example, some of these children argue that the sports mural is more lively, more active, more human, more joyful or funny. This might indicate that it is favourable for children to see more in the sports mural and why children think it might distract them.

However, it raises the question whether this also makes the sports mural restorative. When the mural draws too much attention to it, it could evoke hard fascination, which means it might be less restorative. Children in the neutral condition also felt like they were doing what the children in the sports mural were doing, felt like they want to do it or thought this is what they would want to do when looking at the mural while being hospitalized. This might indicate that the sports mural activates them, while being hospitalized means lying in bed. Playing sports is a behaviour that is the opposite of lying in a bed. Lying in bed consequently means the inability to do sports or move. Nature is not a behaviour, but a physical surrounding which does not directly emphasise an inability of behaviour of the person who is sick. So when nature is ought to evoke gentle fascination, the question remains whether looking at sports for previous reasons might not.

Strengths

Firstly, all 23 children of group 6 of the primary school that were allowed to participate in this study, participated and finished the entire session. Only 6 out of 23 participants could not fully complete the word stem completion task. Everything went according to schedule, with each participant taking around the anticipated 20 minutes to complete all three tasks. The five minute

breaks in between proved to be sufficient for the preparation of documents, software files and cleaning the VR glasses. There was no delay, nor were there complications when conducting the study.

Next to that, the technical application of the VR technology went well. The Samsung Gear VR proved to be very user friendly and suitable for displaying a 360 degrees photo of a hospital room. At certain points, participants touched the touchpad which changed the image they perceived through the glasses. However, this was easily resolved. All participants had the feeling to be in the hospital room, as intended. Also, the programs that were used to mirror the Samsung Gear VR view on the laptop screen, to record what was displayed on the laptop screen and to record the audio, worked out very well. All the data that was recorded was very suitable for analysis.

Limitations

Even though conducting the study went well, there were some limitations that could have influenced the results. First of all, the sample size of this study was small and consisted of healthy primary school children. Some differences that were found could be related to the fact that the responses belonged to healthy children instead of sick children. Perhaps sick children already accepted being sick and therefore would not link the sports mural to being sick and have negative thoughts, but instead would feel more comfortable in the room because of recognizing the shape. To deal with this anticipated limitation as good as possible and give these healthy children a sense of being a patient in a hospital, VR technology was used to create a simulation of a hospital room. All children indeed felt as if they were in the hospital room and some children even felt like they were the patient themselves. However, this was not the only feeling that was created. The use of VR technology also evoked a lot of positive excitement in the children. The children were clearly not used to this technology. It was very new to them and this excitement could have interfered with the purpose of creating a feeling of sickness. This in turn might have affected the results on the word stem completion task as well, because most associations were made regarding activity in both conditions. So, even though the VR technology helped create a lifelike simulation of the hospital room, the fact that children were not used to this technology yet made it not applicable for creating the intended state of feeling sick.

Besides that, a lot of time and effort was put into creating the visual aspect of the simulation. However, while focussing on the visual aspect of the simulation, no attention was given to the audio aspect of the virtual environment. While conducting the research there were background noises i.e. children playing in the courtyard of the school or in the hallways of the school and also a telephone that was located in this small room went off several times. Some participants mentioned this

background noise when they were immersed in the virtual hospital room. The sound of children talking, screaming and playing, could have evoked a feeling of activeness while looking into this hospital room and could have interfered with creating the feeling of sickness as well. This could be another reason why both conditions scored highest on the activity dimension during the word stem completion task.

Secondly, this study distinguishes implicit and explicit associations which were measured in different ways and there are indications that they could have biased the results. First of all, the implicit and explicit associations were not as delimited as was anticipated, they seemed to overlap. The interview was meant to measure the explicit associations of the children, yet it also possibly measured implicit associations considering the fact that the first part caused the children to freely associate about the mural. This could indicate that they drew on implicit associations. For example, nothing was asked about the colours in the mural, but most children still mentioned them. Thus, the distinction in implicit and explicit associations that is made, cannot be fully substantiated.

Next to that, it is questioned whether combining the data generated with different qualitative methods, is a right thing to do. During the free association task, the indirect implicit associations regarding the mural were measured and with the word stem completion task, the direct implicit associations were measured. However, word associations tasks draw on memory associations and usually take place after being exposed to a word or picture directly. This was not the case in this study, where the children were exposed to a hospital room without being directed to the mural. This indicates that perhaps the exposure to the mural might have been too weak for them to activate memory associations regarding the what was displayed in the mural. This could explain the unexpected results on the word stem completion task. In turn, the word stem completion task could have influenced the answers given during the interview. According to the affect heuristic model of Slovic et al. (2005), implicit responses can undermine explicit responses i.e. rational decision making and also mentions that explicit cognition often falls in line with initial implicit responses. Considering more words were generated regarding sports and high arousal, this might have influenced children to think about it more and perhaps influenced their preferences. Comparing this data has not been done systematically and therefore could have biased the results.

Third, the murals consisted of some features that might be contradicting to the restorative effect or influenced the results in other ways. As mentioned earlier on, the shape of the sports mural and the darker colours, could have caused it to draw attention to it during exposure. The nature-like mural was edited into the hospital room way brighter. Although it was noted that both murals had the same colours in them, the brightness of the colours turned out to be unequal and could therefore have influenced the attention drawn to it and the responses made. If the mural evoked directed

attention, this would be considered 'hard fascination' by Kaplan (2010) and is not restorative.

Next to that, the nature-like mural should be restorative and provide children with a calm and resting feeling. One of the children associated it with Africa, correlating the blue colour with a flood which would drown the animals in Africa. The child verbalized having a sad feeling because of that. So the colour blue, which according to Wilson (1966) should provide a feeling of rest, safety and relaxation, evoked a negative feeling because of the association with water. Water is a doubtful natural element that can be harmless as well as threatening. Another child mentioned wanting to be in the mural to protect the animals, because of getting the feeling that the running deer was being hunted. Next to the threat the child saw in the mural, this also implies that the child saw activity which is contradicting to the calm and resting feeling the mural should have provided. A negative memory was activated in another child because of the deer that was displayed, who had killed the child's rabbits. These findings show that nature can also be threatening and therefore less restorative than it is thought to be.

Next to the shape, the colours and the natural elements, ambiguity could also have evoked side effects. Some children found the way the mural was made weird, referring to the different colours within the objects or to the way the content was displayed. One child even mentioned getting a creepy feeling regarding the sports mural. Schweitzer (2004) emphasises that all visual art should contain subject matter that is unambiguous and this is also substantiated by Ulrich (1991), who mentions for example that ambiguity, emotionally negative or forms that are optically unstable or appear to move should be avoided.

Other limitations refer to the researcher, a lacking pilot test and the arousal dimension. This study was conducted by a single researcher, who could have biased the results due to possible misinterpretation of the information that was given and this could have been confounding with respect to the results. For example, the self-coding procedure was subjective and used inconsistently. Therefore some associations could have been missed. Next to that, even though all tests were structured by using prompts, some prompts were omitted.

Also, the free association task and the word stem completion task were not pilot tested. This questions the reliability of the tests, which is especially the case with the word stem completion task. Some words related to the 'high arousal dimension' were not discriminating enough. For example, the words *jumping* and *moving* were considered to relate to 'high arousal', yet were mentioned by most children in general during the word stem completion task. Although it is a form of activity, it is also a behaviour that is being used when playing sports. Classifying these words as 'high arousal' instead of sports, can therefore not be substantiated. One can also note how difficult it was to find words related to 'high arousal', especially when working with children. Next to that,

high arousal implies a form of activity. Kaplan (2010) mentioned that walking in nature could also provide the restorative effect, yet walking is an activity that might also raise the level of arousal. Therefore, arousal does not seem to be the right concept to measure in relation to restoration.

Further research

Further research is needed to find out whether the small differences found in this research can be further substantiated. First of all, since some results show that gender might be a confounding factor, it is recommended to compare gender in further research. Also, a larger sample size and studying sick children would give more insight into the restorative effect of the murals. However, considering the fact that sick children are vulnerable and parents might not allow them to participate, it is important to simulate a hospital setting as good as possible. This study tried to do that with the use of VR technology. Although the simulation worked out fine, the use of this technology evoked side effects. To limit the side effects in further research, the following steps are recommended. Firstly, applicable audio should be added to the virtual environment. This way the children will not be distracted with ambient noises and will therefore be less reminded of the world around them, which in turn might improve the feeling of being present in the virtual environment. Secondly, attention should be paid to familiarising children with the VR technology. Conducting a longitudinal study would offer a solution for children to get used to the VR technology. Another solution that would take less time is to let children get acquainted with the VR technology by letting them play a game or look around in a virtual environment right before they start with their task. This way, the initial excitement might be decreased by the time they start it. Thirdly, when the side effects are limited as much as possible, the question remains whether simulation with VR technology is indeed a beneficial method. It is therefore recommended to compare it with traditional modes.

Next to that, attention should be given to systematically combining implicit and explicit responses, considering the ongoing debate of how implicit and explicit responses interact. Perhaps getting a more complete image of the implicit responses first, is a right thing to do. After all, restoration is related to involuntary attention.

At last, when selecting the murals for this research it was noted that one mural consisted of nature and the other mural was neutral. However, to see if the nature-like mural indeed evokes gentle fascination, it should be compared to a mural that might evoke hard fascination. Although there were some indications that the sports mural evoked hard fascination, in further research this difference can be made more clear. For example, to evoke hard fascination, a mural should consist

of contrasting features i.e. colours and shapes.

Conclusion

It was assumed that nature evokes gentle fascination and therefore has a restorative effect. Based on current results, this can be partly argued. This effect was mostly found in implicit responses, yet restoration takes place when the environment evokes gentle fascination which means drawing involuntary attention. Which is an implicit process. Although there are many unresolved issues, this study gained some insight and initiated thinking for further research.

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Appendix A
Informed consent

OBS Roombeek
Locatie Roombeek
Bosuilstraat 3
7523 BJ ENSCHEDE

Enschede, 2 november 2016

Betreft: Onderzoek 'kindvriendelijk inrichting ziekenhuizen'

Beste ouders,

Via deze brief wil ik u informeren over een onderzoek dat ik uit wil voeren in groep 6 op OBS Roombeek in week 45 (van 7 november – 11 november). Mijn naam is Susanne Beernink (26), ik ben een derdejaars student Psychologie aan Universiteit Twente in Enschede en voor mijn afstudeeropdracht wil ik graag onderzoeken hoe de inrichting van een ziekenhuis kindvriendelijk gemaakt kan worden door het gebruik van kleuren en kunst.

Daar kunnen wij als volwassenen allerlei ideeën over hebben, maar hoe denken kinderen hier zelf over? Daar wil ik achter komen door uw kind met behulp van een virtual reality (VR) bril te laten rondkijken in zo'n aangepaste inrichting en hun spontane reacties te verzamelen over wat ze zien en denken. Daarnaast wil ik ze nog een aantal gerichte vragen stellen over hun gedachten en gevoelens bij de aangepaste inrichting.

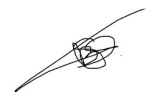
Het onderzoek vindt onder leiding plaats op OBS Roombeek, locatie Roombeek. Het kind wordt individueel meegenomen uit de klas naar een kamer waar het onderzoek circa 20 minuten duurt. Het onderzoek zal op geen enkele manier vervelend of belastend voor de kinderen zijn. Er worden geen beelden laten zien waar ze bang of verdrietig door kunnen worden en ze hoeven niks tegen hun zin te doen.

Mocht u er bezwaar tegen hebben dat uw kind hieraan meedoet, dan vraag ik u vriendelijk dit aan mij te melden. U hoeft daarvoor geen reden op te geven. Dat kan per email, telefonisch, of per SMS: tel.: 06-21606833; Email: S.m.beernink@gmail.com.

Als u wel toestemming geeft voor het meedoen van uw kind, dan hoeft u niks te doen. Zonder bericht ga ik ervan uit dat u toestemming geeft.

Na afloop van het onderzoek zal ik een samenvatting van de resultaten via school aan uw kind meegeven naar huis, zodat u meer kunt lezen over de uitkomsten.

Met vriendelijke groet,



Susanne Beernink

Appendix B

Murals of Anouk Foundation



Figure B1. Nature-like mural - Restorative condition



Figure B2. Sports mural – Neutral condition

Appendix C

Protocol

Deel 1 – Intro

Hoi!

Je mag op deze stoel plaatsnemen.

- Wat is jouw naam?
- Wat is je leeftijd?
- Waar woon je?

Oké. Ik leg je nu even kort uit wat we gaan doen. Ik doe straks eerst de virtual reality bril bij je op, dan gaan we praten over wat je ziet. Als we daarmee klaar zijn, zet ik de bril bij je af en dan mag je meteen daarna een testje maken → “Test laten zien”: hier staan woorden die niet afgemaakt zijn. Die mag jij straks dus afmaken als ik de bril bij je af doe. Je schrijft dan gewoon een woord op dat als eerste in je opkomt. Er zijn geen goede of foute woorden, zet er maar gewoon neer wat het eerste in je opkomt. Als je klaar bent met de test stel ik je nog wat vragen. Voordat ik de VR-bril bij je op zet, heb je nog vragen voor mij?

Anticipatie mogelijke vragen:**→ Wat is een Virtual Reality bril?**

- Dat is een bril waarin het net lijkt of je ergens anders bent. Dus als je om je heen kijkt, dan zie je een andere omgeving dan deze kamer.

→ Waar ga ik naar kijken dan? (Is het een game? Een video?)

- Je gaat naar een foto kijken.
- Wat er op de foto staat, dat zie je zo als ik de bril op zet

→ Wat voor test is het (Krijg ik daar een cijfer voor?)

- Het is een woordentest, waarbij je een woord mag verzinnen die het eerst bij je opkomt
- Je krijgt er geen cijfer voor
- Er bestaan geen goede of foute woorden

→ Wat voor vragen ga je me stellen na de test?

- Na de woordtest laat ik je weer iets zien, dit keer niet met de VR-bril maar op een blaadje. Daar stel ik je vervolgens wat vragen over.
- Wat ik je precies laat zien, kan ik nog niet verklappen

Je mag altijd stoppen als je het niet meer leuk vindt, oké?

Part 2 – Free Association Task (VR exposure)

Stel je voor: je bent een week geleden ziek geworden en niet meer naar school gegaan. Na een paar dagen kwam de dokter en die zei dat je naar het ziekenhuis moest. Nu ben je in het ziekenhuis en straks kun je rondkijken in de kamer waar je zal blijven....

Als je straks de bril op hebt, mag je mij vertellen wat je allemaal ziet en hard op zeggen waar je aan denkt als je dat ziet. Goed? Dan zet ik nu de bril bij je op [...] Hoe zit de bril?

Goed. Dan mag je nu om je heen kijken. Je kan overal naar toedraaien met je hoofd. Wil je mij vertellen wat je allemaal ziet? Je mag echt alles zeggen wat in je opkomt.

Prompts:

1. Waar denk je aan als je dat ziet?
2. Wat zie je nog meer?
3. Wil je nog iets zeggen?

➔ *Recording free associations*

Top. Dan zet ik nu de bril bij je af en dan mag je meteen de test invullen.

Part 3a – Word Stem Completion Task

Maak de volgende woorden af. Vul het eerste woord in dat in je opkomt, en dat begint met de letters die je al ziet staan. Er zijn geen goede of foute antwoorden!

Bijvoorbeeld:

Sch..ool.....

Ru.....

Dru.....

Kal.....

Zwe.....

Boo.....

Sti.....

Spo.....

Die.....

Voe.....

Lui.....

Act.....

Bla.....

Spri.....

Bewe.....

Part 3b – Self-coding procedure

Checking the following categories:

Nature / Rest / Sports/ Activity

Part 4 – Interview

Ik wil je nu wat vragen stellen over deze tekening (*Recording answers*)

Vragen	Doorvraag	Doorvraag	Doorvraag
Wat zie je als je naar deze afbeelding kijkt?	Wat zie je nog meer?		
Waar denk je aan als je naar deze afbeelding kijkt?	Waarom?	Waar denk je nog meer aan?	Waarom?
Welk gevoel krijg je als je naar deze afbeelding kijkt?	Waarom?	Wat voor gevoel geeft het je nog meer?	Waarom?
Wat vind je van deze afbeelding?	Waarom?		

Scenario:

Stel dat je in het ziekenhuis ligt,
bijvoorbeeld op de kamer die je net zag.

Vraag 1

Je ziet daar ook deze afbeelding op de muur in je kamer. Wat zou je daar van vinden?

Waarom?

Kun je dat uitleggen?

Vraag 2

Stel dat je zou mogen kiezen, een kamer met de eerste afbeelding of met de 2^e, welke kamer zou jij dan willen liggen?

Waarom?

Kun je dat uitleggen?

Dan zijn we aan het einde gekomen van het onderzoek! Hoe vond je het om te doen?

Bedankt voor het meedoen! Ik breng je terug naar je groepsgenoten, het is belangrijk dat je ze niet verteld wat je hier hebt gedaan, dat is geheim. Kunnen we dat met elkaar afspreken?

Appendix D

Data - Free Association Task

Table D1

Descriptive statistics first prompt of the restorative condition

Participant	Gender	Time first prompt in minutes (Total session)	Amount of details	Mural mentioning (place)
1	M	1.01 (1.56)	13	X
3	V	1.38 (3.00)	12	16
5	V	1.59 (3.23)	16	6
7	M	1.05 (1.56)	6	6
9	V	2.57 (4.45)	24	7
11	M	2.10 (3.10)	7	3
13	V	1.51 (5.00)	16	5
15	M	1.21 (2.12)	14	1
17	M	2.27 (3.21)	9	6
19	M	2.33 (3.37)	17	7
21	M	2.35 (4.25)	19	4
23	M	2.03 (3.42)	25	3
Mean average		1.78 (3.19)	14.83	5.8 (6th place)

Table D2

Descriptive statistics first prompt of the neutral condition

Participant	Gender	Time in minutes (total session)	Amount of details	Mural mentioning (place)
2	V	3.01 (3.45)	22	2
4	M	1.45 (2.37)	9	3
6	M	1.14 (2.36)	18	1
8	M	2.00 (2.30)	8	2
10	V	0.51 (1.24)	6	1
12	V	1.13 (2.38)	14	1
14	V	0.59 (1.57)	10	1
16	V	1.41 (2.20)	16	1
18	V	3.12 (4.15)	31	1
20	V	1.37 (2.55)	19	2
22	V	1.29 (2.10)	12	7
Mean average		1.54 (2.42)	15	2nd place

Table D3

Second and third prompts of the restorative condition

Participants	Thoughts	What do you think of the room	General comments
1	Laying in Hospital	‘Quite beautiful (posi)’	‘Looks like I’m sitting very high’
3	I have a fever Someone broke their leg	‘Quite beautiful; the drawing is, like ur on the beach (posi)’	‘It felt like the doctor did something to me. Felt weird. I was in another world’
5	Looks like the bed fell apart	‘Beautiful, but don’t want to lay here → (posi/nega)’	‘I would not like laying here, because I want to play outside. I would get bored, to be in a hospital is not fun’
7	That I am in the hospital	‘Beautiful (posi)’	--
9	Feels like I am laying here and am here	‘Beautiful. Big. Lots of space (posi)’	‘Looks like I am really here. This is what my room looked like.’ ‘Bigger bed than in normal hospitals. Bigger, longer and fatter’
11	I think of the hospital It’s scary when you look down	Don’t know	‘The bed is quite big’

13 (no intro, guessed to be in a hospital)	That I am.. that maybe my mother or so lays here Or that we are waiting for the doctor to arrive and I can't lay in the bed yet	[unclear]	'Looks like I am floating' 'I can't see myself' 'Do you think that when I walk there it will get closer?' 'The bed is huge' 'This is not the same space as before; I can't see my hand' 'Where is the toilet?'
15	I think it is scary because you are above the ground and bed	'Beautiful. Big. Quiet (posi)'	'See first comment!!'
17	Of a hospital I was once laying in	'Big [neutral]'	'You don't see your own body'
19	--	'Kind off beautiful (posi)'	--
21	That I am sick (I was once in a hospital, that's where it looks like) I hear you, but I don't see anything, I don't see my chair	'Quite beautiful (posi)' 'But weird (virtual effect)' 'Looks like I'm sitting high'	'Looks as if I am on the bed and I don't see you anymore' 'It is really weird' 'I'm looking for the TV, which is in every hospital' 'Do you know what I am scared of? It feels like someone is

			about to pop up out of the bed' 'Very cool'
23	That someone of my family is in the hospital, my father and grandfather were in the hospital I am used to it	'More colours should be added (nega)' 'Paintings are nice, but more colour is needed'	'What a big bed' 'I'm floating' 'It's very awesome' 'I hear voices' 'It's a rainy day outside'
	<p>[I am in the hospital / sick] 6 out of 12 participants mentions to think they are in the hospital their self (4)/ are sick (2)</p> <p>[Family in the hospital/ general person] 2 out of 12 mention a family member is in the hospital (memory), 1 out of 12 mentions someone in general</p> <p>[Memory of being in the hospital] 2 out of 12 have a memory of them laying there once</p>	<p>[Positive] 8 out of 12 participants mention the word 'beautiful' which is positive. 2 link it to the mural</p> <p>[Negative] 2 out of 12 mention a negative thought/feeling: More colour needed, don't want to lay herea(would get bored),</p> <p>[Size/ Neutral] 3 out of 12 mention the room to be big</p>	<p>[Bed] 4 out of 12 mention the bed is big</p> <p>[Place in the room] 5 out of 12 mention that they are either floating or sitting very high (perception of height in the room)</p> <p>[Reality check] 4 out of 12 mention that they are in the room and notice this was different than the actual room they were in (can't see you, my hands, my body, another world)</p> <p>[VR Feeling] 5 out of 12 find have a negative feeling</p>

			<p>regarding the VR reality, 3 find it weird and 2 find it scary.</p> <p>2 out of 12 find it awesome/cool</p> <p>[Missing something]</p> <p>2 participants miss something, a television and a toilet</p>
--	--	--	---

Table D4

Second and third prompts of the neutral condition

Participants	Thoughts	What do you think of the room	General comments
2	That I am in the hospital. Because of the broken arm	Big. Big bed. Quite beautiful (neutral/posi)	‘Very strange’ ‘Looks like I’m standing on the bed’
4	That I am sick	Small. Weird (its unlike your own room with your own stuff)	‘The bed is huge’ ‘There is no shower’
6	It’s boring → It’s a huge bed. I could play soccer on it	Quite nice, but to be in here it’s quite boring (posi/nega) Huge bed	

8	That I have a disease (a bad one) and that I am laying in the hospital	Beautiful (posi)	
10	Not nice to lay here. It is quiet.	Boring (nega)	
12	That something is up with me. Something dangerous. Sick or something	Beautiful. Looks like a hospital room; skateboard on the wall, all these colours, I think it's beautiful (posi)	'Very weird' 'I am sitting very high'
14	That you get surgery. That you're sick. The dentist. Anything	Small. Bed is huge	Looks very weird
16	'That someone would walk in' 'That I am here to, that I have to lay here.' 'I've seen this before, my grandma has also..'	Quite beautiful (posi)	'Cool. You don't see ur own legs' 'I am a bit dizzy'
18	'The past. When I was about 4, 3'	Nice for kids because of the skateboard, makes me happy because I had stuff like that on my walls (in the hospital) (posi)	--
20	'That I am sick and have to wait for an appointment with the doctor'	Weird. Quite weird. Who puts a skateboard on the wall in a doctors ward? (nega:	I am sitting very high

		weirdness is about the painting)	
22	‘About my mom, who has to clean a room like this every day’	Nice. Also colourful (posi)	I am sitting very high on the bed
	<p>[I am in the hospital / sick] 7 out of 11 mention that they think they are in the hospital (2)/ sick (5) (3 of them mentioning a feeling (negative) to describe this: dangerous, a bad disease, surgery).</p> <p>[Memory] 3 have a memory (2 from a family member, 1 own)</p>	<p>[Negative] 5 out of 11 mention something negative (boring, weird (painting), small, not nice (because of quietness)</p> <p>[Positive] 7 out of 11 mention a positive thought/feeling (beautiful, nice)</p> <p>[Size] 2 mention the room to be small, 1 mentions the room to be big</p>	<p>[VR Feeling] 4 out of 11 mention it is weird/strange 1 out of 11 mentions to feel dizzy</p> <p>[Place in the room] 4 out of 11 mention to be very high on the bed or standing; 1 mentions not to see his/her legs</p> <p>[Reality check] 1 mentions not to see his own legs</p> <p>[Bed] 4 out of 11 mention the bed to be big or huge</p> <p>[Missing something] 1 participant misses the shower</p>

Appendix E

Data - Word stem completion task

Table E1

Data word stem completion task of the restorative condition

Partici- pant (gender)	Total hits within restoratio n	Hits 'low arousal'	Hits 'nature'	Total hits within neutral	Hits 'high arousal'	Hits 'active/ sport'
1 (M)	1	1 (rust)		4	3 (sprinten/ bewegen/a ctief)	1 (sport)
3 (V)	3	2 (rustig/kal m)	1 (bladeren)	6	4 (drukte/ springen/ bewegen/ activiteit)	2 (sporten/v oetballen)
5 (V)	2	1 (stil)	1 (sprinkhaa n)	4	2 (druk/ beweging)	2 (voetbal/ sport)
7 (M)	3	1 (stilte)	2 (kalven/di eren)	3	2 (sprinten/ bewegen)	1 (sporten)
9 (V)	1	1 (rustig)		6	4 (drukte/ actieve/ springen/ bewegen)	2 (sport/ voetbal)
11 (M)	1		1 (blaadjes (selfcode: van bomen)	3	2 (druk/ beweging)	1 (springtou w)

13 (V)	6	1 (stille)	5 (runderen (selfcode: eten/natuur/ r)/ kalven/ boom/ luiaard (selfcode: natuur) bladeren	3	2 (springen/ bewegen)	1 (sporten)
15 (M)	3	1 (stil)	2 (bladeren/ boom)	3	3 (druk/ springen/ bewegen)	
17 (M)	4	1 (stil)	3 (kalkoen/b oom/ sprinkhaan	2	2 (druk/ beweging)	
19 (M)	3	2 (stille/luide)	1 (dieren)	2	2 (springen/ bewegen)	
21 (M)	4	3 (Kalm/ stil/ luieren)	1 (boom)	4	3 (drukte/act ief/ bewegen	1 (voetbal)
23 (M)	2	2 (stille/ luisteren)		4	2 (springen/ bewegen)	2 (sporten/v oetbal)
TOTAL	33	16 ‘passive’	17 ‘nature’	44	31 ‘arousal’	13 ‘sport/active’
MEAN	2.75	1.33	1.42	3.67	2.58	1.08
TOTAL ‘RESTORATION/NEUTRAL DIMENSION’:				77 (total)/ 6.42 (total mean)		

Table E2

Data word stem completion task of the neutral condition

Partici- pant (gender)	Total hits within neutral	Hits ‘high arousal’	Hits ‘sport’	Total hits within restoration	Hits ‘low arousal’	Hits ‘nature’
2 (V)	3	2 (drukte/ bewegen)	1 (springtouw)	2	--	2 (kalven /bladeren)
4 (M)	5	3 (druk/spri ng/ beweeg)	2 (voetbal/sport)	3	2 (kalm/sti l)	1 (blad)
6 (M)	3	1 (bewegen)	2 (sporten/voet bal)	2	1 (stilte)	1 (bladeren)
8 (M)	2	2 (springen/ bewegen)	--	2		2 (rupsen/dr uppel)
10 (V)	2 (vd 3 ingevulde)	2 (drukte/ bewegen)		1	1 (stil)	
12 (V)	4	3 (drukte/spr ingen/ bewegen)	1 (sporten)	5	2 (stilterui mte/ luieren)	3 (boomsta m/ dieren/ bladeren)
14 (V)	1	1 (bewegen)	--	4	1 (kalmere n)	3 (sprinkhaa n/ dier/stier)
16 (V)	3	2 (druk/spri nten)	1 (sporten)	2	2 (kalm/sti lte)	

Appendix F

Data - interview

Table F1

Amount of hits on sub codes of the interview in the restorative condition

Restorative condition		Participant												
Code	Sub codes	1	3	5	7	9	11	13	15	17	19	21	23	Total
Nature	Nature		1	3	2	3		2	3				1	15
	Animal(s)	2	2	5	3	2	1	3	2	2	2	2	2	28
	Tree(s)	1	1	1	1	2	1	2	2	1	2	1	1	16
	Plant(s)		1		1	2	1		1		1	1	1	9
	Sky (air)	1				2			1			2	1	7
	Sand	1				1	1				1		1	5
	Water					1	1				1			3
	Grass	1	1	1		2		2	1	1	1		1	11
	Ground	1						1						2
	Wild (life)				3				1				2	6
	Forest	1							1					2
	Sun		1											1
	Flower(s)								1					1
	Total	8	7	10	10	15	5	10	13	4	8	6	10	106
Sport and play	Movement					1	1	1					1	4
	Swimming											2		2
	Total					1	1	1				2	1	6
Arousal dimension	Busy				1									1
	Rest				1									1
	Lying down		1											1
	Total		1		2									3
Features mural	Colour(s)	3	2	1	1	1	1	2		1	1		1	14
	Form(s)							1						1
	Art	1						2						3
	Composition (differences/splitting)	2			1								1	4
) Painting						1						2	3
	Mural			1	1								1	1
	Illustration													2
	Total	6	2	2	3	1	2	5		1	1		5	28
Affect	Positive	3	2	5	4	5	2	5	1		2		5	34
	Negative								1	1	3	1	2	8
	Neutral	1	1	2	2		1		2	2	1	2		14
	Total	4	3	7	6	5	3	5	4	3	6	3	7	56
Additional	VR environment	1		1		1		1		1		2	1	8
	Memory		1					1					1	3

	Vacation								1	2		1	1
	Africa		1										4
	Distraction		1										1
	Hospital		1			1	1	1					4
	Fantasising			2		1	3			1	1		8
	View					1							1
	Nightmares						1						1
	Old							1			1		2
	Pets								1				1
	Shadow										1		1
	Statues										1		1
	Television										1		1
	Number											1	1
	Total	1	3	3		3	1	7	2	3	3	7	38

Table F2

Amount of hits on sub codes of the interview in the neutral condition

[illegible]

	Total		2									2	
Features mural	Skateboard	1	1	2	1		1	1		1	1	1	10
	Wheels			1									1
	Rope			1		1	1				1	1	5
	Colour(s)	2			1	2	1	1	1		1	2	11
	Form(s)										1		1
	Composition		1					1			1		3
	Drawing						1						1
	Mural						1						1
	Wallpaper							1					1
	Art								1				1
Illustration										2		2	
	Total	3	2	4	2	3	5	4	2	1	7	4	37
Affect	Positief	4	2	5	2		2	2	5	4		3	29
	Negatief				1	3		1	1		6		12
	Neutraal		2		1	2	2	2					9
	Total	4	4	5	4	5	4	5	6	4	6	3	50
Additional	VR environment	1	1	1	1		2	2		1	1	1	11
	Memory	1	1		1	1		1		1		2	8
	Hospital	1				1					1		3
	Friends	1											1
	Distraction		1		1			1	1				4
	Fantasy		1			1		1		1			4
	Surgery								1				1
	Healthy									1			1
	Alone										2	1	3
	Total	4	4	1	3	3	2	5	2	4	4	4	36

Table F3

Transcript questions 2-6 interview of the restorative condition

Participant	2. What do you think? (Why?)
1	Aan het ziekenhuis . Want dat plaatje stond ook daar in . In het bos , een beetje. Omdat dit leeft in het bos , en die ook, die in het zand maar.
3	Denk ik nu wel een beetje aan de natuur . Omdat daar een hert staat volgens mij. En daar staan.. het is wel een beetje groen, de lucht is blauw er staan bomen en ook wel een plant. / Aan toen ik in het ziekenhuis lag toen zag ik dit ook. (Natuur: Dieren/bomen/kleuren)
5	Natuur . Dit lijkt mij niet dat het in de woonkamer is. Omdat die dieren meer in de natuur.. muskietratten kan je aanvallen en die wil je denk ik niet in huis hebben.
7	Beetje naar de natuur . Ik denk een beetje aan de, het wild . Want herten zie je ook niet zomaar ergens, zie je ook soms in het wild en stokstaartjes volgens mij ook.
9	Aan de natuur . Omdat je, in de natuur heb je heel veel planten en heb je heel mooi uitzicht .
11	Weet ik niet.
13	Natuur . En aan beweging bij die. En leuk kleurrijk . Voor de rest nergens.
15	De natuur . Je ziet ook wat dieren , losgelaten dieren. Je ziet ook wat bomen, heel veel bomen .
17	Afrika . Omdat ze daar ook zulke bomen hebben en vaak van zulk gras . En die dieren zijn daar ook heel vaak. / Mijn konijnen. Die beesten hebben ze vermoord.
19	Afrika . Omdat het op dieren van afrika lijken en er is zand . En die bomen lijken op de bomen van afrika. Aan overstromingen .
21	Dan denk ik. Toen ik die bril op had, dan denk ik daaraan . Alsof dit zo'n plas is, dus bij zo'n straat, en dat dit er dan allemaal voor staat en dit een schaduw is.

23	Dan denk ik toch echt wel aan een schilderij . Dan denk ik alsof ik net weer terug kom van schoolreis en alsof ze mij een gratis schilderijtje hebben meegegeven. Vorig jaar zijn we naar museum op vak.. op schoolreis geweest, dus denk ik daaraan. En alsof ik die nou weer heb terug gevonden en dus kwijtgeraakt ben. Daar denk ik aan. / Dit lijkt wel een beetje op het cijfer 9. Voor de rest niet heel veel.
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Participant	3. What do you feel? (Why?)
1	Niks.
3	Dat ik in het gras lig , mijn ogen dicht doe en ja.. gewoon alleen dat. En dat de zon schijnt. En als ik dan lig en dan denk ik aan dieren .
5	Dat ik in de natuur zit . Dat ik na een plaatje zit te kijken.
7	Beetje het gevoel dat ik een beetje in het, een beetje in het wild zit . Zit rond te kijken. En dat ik een plaatje daarvan heb gemaakt.
9	Dan krijg ik het gevoel dat, ik weet niet hoe ik dat moet zeggen. Het gevoel dat ik een, dan vind ik het wel mooi, dat heb ik veel vaker dat als ik mooie dingen zie, dan heb ik heel vaak dat ik er zelf dan ben . Dat hert rent bijvoorbeeld weg voor iets, dat hem wegjaagt, dan help ik de dieren daar beschermen. Dan bescherm ik daar de dieren. Want ik ben best wel dol op dieren.
11	Helemaal geen gevoel
13	Zou ik zelf ook wel in willen zitten . En dat als je er dan doorheen loopt. Want dan ben ik hier zo, en dan ben ik groen, en dan ben zo hier zo en dan ben ik die en die. Dat als je dan zo loopt over dit dat je dan verkleurd in alle kleuren.
15	Ook naar de natuur. Je ziet toch wat dieren, je ziet toch wat bomen en wat planten. Je hebt het gevoel dat het een bos is of de natuur .
17	X missed
19	Zelig gevoel . Omdat die dieren dan verdrinken. En dan zijn er steeds minder dieren. Dat is ook jammer voor die bomen. Want bomen en planten horen bij natuur.
21	Dat weet ik niet. Alsof ik ook bij die plas ben . Dat ik aan het zwemmen ben, niet in een plas, maar bij een zwembad. Dan zijn dat ervoor standbeelden en dat ik dan dat zie. Behalve dit.
23	Een heel blij gevoel . Omdat ik eigenlijk al wel heel erg lang graag naar, ja maakt ook niet echt uit welk land, maar gewoon naar de wilde natuur wil , waar wilde dieren loslopen. Daar krijg ik dus een beetje een blij gevoel van.

Participant	4. What do you think of this painting? (Why?)
1	Mooi. Omdat het kijk, want dit is allemaal gesplitst en dan allemaal kleurtjes .
3	Ik vind hem best wel leuk. Omdat die dieren allemaal verschillende kleuren hebben.
5	Best wel mooi. Omdat ik die 3 diertjes mooi vind en die boom vind ik mooi getekend en alles zeg maar wel. Is wel leuk.
7	Mooi. Ik vind die dieren mooi en die plant en die kleuren . En ook, zelfs die, dat ding, dat deel van die boom: die is bij het blauwe gedeelte en die kleur is dan niet blauwe maar een beetje roze. Zo'n combinatie vind ik wel mooi.
9	Mooi.
11	Mooi. [onduidelijk].. al die kleuren is
13	Heel mooi. Gewoon, ik vind hem gewoon heel mooi.
15	Mooi. Kan ik niet zo uitleggen. Maar ik vind het ook wat leeg. Deze bomen. Maar 1 boom.
17	Weet ik niet echt. Nee weet ik niet.
19	Wel mooi. Omdat er veel kleuren zijn .
21	Ik vind het eigenlijk een klein beetje ouderwets. Het lijkt ouderwets.
23	Ik vind hem wel leuk, maar ik vind hem ook wel een beetje raar. Met al die kleurtjes, dat de dieren 2 of 4 verschillende kleuren hebben, en de boom ook 3 verschillende en de plant ook 3 verschillende. En dat er zo maar opeens, zand tussen gras wat wat lichter is en wat wat bruiner is, zand ligt.

Participant	5. How would you feel if this painting was painted on the wall in your hospital room? (Why)
1	Mooi . Zelfde reden als net, kleuren mooi en de verschillen .
3	Dan zou ik het leuk vinden want dan kan ik ook ergens anders aan denken , dat ik dan in het ziekenhuis lag en ziek was.

5	Wel leuk in mijn kamer, als ik echt ziek zijn zou het wel leuk zijn, maar ook andere postertjes zou ook wel leuk zijn.
7	Mooi. Zou ik het wel mooi vinden, want tekenen op een muur is niet zo heel makkelijk. En eigenlijk ook zo precies, zo goed mogelijk gemaakt ik vind het eigenlijk wel mooi.
9	Heel mooi en dan zou ik ook altijd wel aan de natuur denken.
11	Mooi. Omdat, normale ziekenhuizen vind ik saai , en als er nog wat op de muur geschilderd is ofzo of iets anders dan vind ik dat wel leuk.
13	Zou ik wel leuk vinden want dan, ja, je hebt het niet zo fijn als je in het ziekenhuis ligt. Ja ik heb wel een keer in het ziekenhuis gelegen, zijn de muren helemaal wit en dan, ja dat is niet zo heel leuk. En als je dit er nou op zet, ja dan krijg je er ook een fijn gevoel van. Niet dat je de hele tijd nachtmerries krijgt..
15	Dan zou ik het wel, niet zo nieuw vinden. Dan vind ik het wel een paar jaar oud. Want misschien kom je het een paar keer tegen dat schilderij, in het ziekenhuis. Als je het 1 keer ziet vind je het wel mooi, maar als je het 5 keer ziet of 2 keer, dan vind je het niet zo mooi meer.
17	Weet ik ook niet
19	Weet ik niet.
21	Kijk ik er gewoon niet na. Ik zocht eigenlijk na een televisie, want bij elke ziekenhuis zit televisies.
23	Zou ik wel leuk vinden. Dan lig je daar en dan wordt je toch wel een beetje weer vrolijk. Want je ligt daar in zo'n kamer en misschien kun je dan niet meer ja, beter worden en dan wordt je toch wel weer een beetje blij. Van dus die muur tekening, schilderij, geval.

Participant	6. Choice 1 = nature-like mural 2 = sports mural	Why?
1	2	Meer actief. Met sport denk je 'ik wil dat ook'. Skateboard is mooi. En kleur
3	2	Omdat ik meer van sport hou dan van natuur
5	1	Als je echt ziek bent, dan kan je die dingen niet doen , maakt je jaloers en dat is niet leuk . Dan kijk ik liever naar natuur
7	1	Ik vind rust fijn en druk niet fijn . Hier is het druk (active) en hier niet (passive).
9	1	Ik ben dol op natuur en dieren . Ook wel op sport. Maar natuur is beter en belangrijker. Belangrijk voor de wereld.
11	2	Hier zie je kinderen spelen , daar alleen maar een boom, plant, dieren. Dat maakt het levendiger en dat is leuk
13	2	Hier zie je maar 5 dingen (passive); hier heel veel en het is ook in een wagen getekend. Dat is leuker
15	2	Ik vind sport leuk . Ik zit zelf op voetbal en zwemmen. Leuk busje. Het is menselijker .
17	2	Ik vind het er geinig uitzien . Lijkt op een walvis met wielen en mensen spelen erin
19	2	Omdat ik daar niet aan denk (passive) en daar wel (active) en dan wil ik zelf op sport en dat is gezond voor mij. En sport is leuk , ik zit zelf ook op sport.
21	2	Omdat hier met sport te maken heeft, ik hou van sport
23	2	Het is vrolijker. Qua kleur en hoe het gemengd wordt. Er staat sport op en het lijkt op een rijdende hotdog; wie wordt daar nou niet blij van.

Table F4

Transcript questions 2-6 interview of the neutral condition

Participant	2. What do you think? (Why?)
2	Spelen en sporten; omdat ze rennen, dat is sporten; voetballen ook; fietsen ook. Maar schommelen niet echt. Buiten spleen
4	Actief; dat je sport. Voetbal is sport, springtouw weet ik niet. Hardlopen en fietsen kan ook een sport zijn.
6	Best leuk . Voetbal vind ik het leukst, zwemmen daarna. Vind het best vrolijk .
8	Sportiviteit; want hier springen ze, voetballen ze, fietsen ze, alles wat met sportiviteit te maken heeft
10	Sporten en bewegen; omdat ik zelf ook heel veel beweeg en sport, daarom doet me dat denken aan dat. Wedstrijden.
12	Sport. Sporten; Omdat dit allemaal sporten zijn. Spelen. Voetbal spelen kinderen ook vaak en zwemmen. En natuurlijk het skateboard.
14	Het lijkt alsof het het behang zelf is.
16	Spelen. Al die sporten. Beetje aan de kunst van het sporten. Omdat ik het heel mooi vind en sport zelf vind ik kunst. En heel mooi gemaakt.
18	Aan dat ziekenhuis; Omdat ik dit nog nooit eerder heb gezien, behalve in dat ziekenhuis waar net ik moest kijken. Aan vroeger. Toen hadden ze ook van die mooie plaatjes op de muur om kinderen blij te maken.
20	Alsof ik in een aparte dokterzaal zit, zoals net alleen dan een beetje creepy. Beetje raar. Raar gevoel als je in een dokterkamer zo'n raar plaatje ziet en je ook nog alleen bent . Gewoon een beetje raar.
22	Aan sporten en met een skateboard (herinnering hond op skateboard)

Participant	3. What do you feel? (Why?)
2	Leukheid. Rennen, sporten, voetballen, fietsen, schommelen, buiten spelen is leuk.
4	Dat je gaat sporten. Zin om te sporten.
6	Beetje leuk. Er staan heel veel leuke dingen op.
8	Eigenlijk een soort van herinnering. Als iemand dood is gegaan. Is dit een herinnering op de muur.
10	Dat ik het zelf ook wil doen , het voetballen. Omdat ik net keek dat ik in het ziekenhuis lag en dat kan dan niet omdat je dan ziek bent.
12	Dat ik nu aan het buitenspelen ben. Allemaal buiten dingen. Zwemmen kan binnen en buiten.
14	Dat je zelf ook gaat sporten. Toen ik keek leek het, ik heb zin in sporten. Omdat je iedereen ziet sporten. Dan wil ik dat zelf ook.
16	Mooi gevoel. Ik vind sport mooi en ik zit zelf ook op een sport.
18	Blij gevoel. Voel ik dat andere kinderen die in het ziekenhuis liggen ook blij worden.
20	Creepy. Alsof er niemand in het gebouw is, dat ik daar alleen moet rondsluipen.
22	Moet ik weer aan mijn hond denken.

Participant	4. What do you think of this painting? (Why?)
2	Mooi; allemaal kleurtjes en leuke poppetjes
4	Apart; ik wist niet wat dat was en toen keek ik daar en toen was dit de keeper
6	X prompt gemist
8	Mooi; gewoon mooie kleuren en verschillend
10	X prompt gemist
12	Kleurrijk. Mooi... misschien. Weet ik eigenlijk niet. Omdat ik van sport hou.. ik hou van sport!
14	Raar, maar ook mooi. Raar om hoe ze dat hebben gemaakt en mooi; allemaal verschillende kleuren
16	Cool. Ja cool en mooi.
18	Heel mooi: omdat de mensen in het ziekenhuis dan zien van ja als ik weer beter wordt kan ik weer voetballen, sport doen, keeper worden of gaan zwemmen. Dat is beter en gezond voor je.

20	Ja gewoon een beetje raar . Hier zie je plotseling dat 'ie aan het zwemmen is en daar zie je niks meer. Raar hoe je van het zwembad naar de schaatsbaan kan gaan.
22	Mooi ; Sport en kleurrijk .

Participant	5. How would you feel if this painting was painted on the wall in your hospital room? (Why?)
2	Denk ik eerst aan mijn vriendinnen, om te spelen wat ik vroeger heb gedaan. Wil ik ook graag zwemmen/schommelen, maar dat kan niet omdat je in het ziekenhuis ligt
4	Dan heb je tenminste iets waar je naar kunt kijken : Toen ik in die kamer was, was het stil
6	Best leuk . En als de ene afbeelding was en de ander een echt skateboard, dan helemaal leuk.
8	Dan zou ik sowieso weten dat het een herinnering is aan vroeger , als iemand ziek is, bijvoorbeeld een hersenschudding en hij weet niks; dan kun je hem dit laten zien van dit had je
10	Niet echt leuk. Omdat andere kinderen dat wel kunnen en dan moet ik daar blijven liggen en dat is een beetje saai.
12	Dan zou ik hem heel mooi vinden . Helemaal als ik hem van iemand had gekregen. (Op de muur geschilderd?): Teken en is knapper.
14	Leuk , dat ze dat voor je doen. Dan kan je denken aan hoe je eerst ging sporten. Dan denk je zo sport ik, nu kan ik dat even niet meer, maar straks later kan ik dat weer. Kan je denken wat je allemaal deed.
16	Zou ik wel leuk vinden, want daar kan ik ook nog aan andere dingen denken en niet aan de operatie die eng is, dan kan ik hier naar kijken.
18	Heel leuk.
20	Niet zo heel mooi en gewoon niet passen op die plek. Je bent in een dokterzaal, waarom zou je dan zo'n raar plaatje op de muur willen hebben
22	Daar word ik wel blij van, want dan zit ik niet zo alleen in dat wit.

Participant	6. Choice 1 = nature-like mural 2 = sports mural	Why?
2	2	Is vrolijker , kan je aan vriendinnen denken . Bij die andere (1) alleen aan natuur. Hier zijn <u>heel veel leuke dingen</u> , bij die (1) <i>ook wel</i> , maar niet zo veel.
4	2	Want ik hou van sport . En bos hou ik niet van. <i>Lopen in het bos vind ik niet leuk.</i>
6	2	Deze is vrolijker en deze is één en al <i>natuur, is ook best leuk</i> , maar deze is leuker omdat hier mijn sport bij staat en <u>heel veel leuke dingen</u> .
8	2	Dit is <u>eigenlijk</u> wat je allemaal doet als je kind bent en bij die bomen, <i>is ook wel mooi</i> , maar dit is naar mijn mening mooier .
10	1	Omdat ik van dieren hou en dieren is leuk, en je kan niet zo maar naar een ander land en zo, sporten kun je overal doen. Teken en vind ik leuk en <u>kleurtjes kijken</u> .
12	1	Ik hou meer van dieren , dan van sport. Die is mooier. Ik hou meer van dieren en <u>heeft veel kleuren</u> .
14	1	Daar zijn mooie dieren en ik hou heel veel van dieren . En <u>die kleuren vind ik ook heel mooi</u> . Dit is een beetje kunst (1), dit ook wel, maar is anders.
16	2	<u>Ja, ik vind deze toch wat kleurrijker</u> , deze is ook kleurrijk (1), maar deze vind ik kleurrijker en hier kan ik meer in bedenken; "nadenken hoe je dat doet, wat je lichaam doet → bij natuur alleen wat je ziet.
18	2	Omdat je dan beter kan kijken en later ook echt aan sport gaat doen . Bijvoorbeeld je zit daar omdat je suikerziekte hebt, dan denk je van ja als ik weer beter ben zou ik maar beter kunnen sporten want dan kan ik er miss vanaf (vriend van moeder heeft

		suikterziekte en sport daarom). (1) ook wel, maar deze is belangrijker.
20	1	Die is beter, want deze is raar (2) en hier kun je nog wat beter plaatjes zien en niet in een skateboard van die rare figuren, dit is gewoon een echt een plaatje zeg maar. Ook qua kleur 'echter'.
22	1	Omdat het met dieren is en ik hou heel erg van dieren.

