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A Co-Created Design Towards Emotionally-Safe Pediatric Hospitalization

POWER TO THE PATIENT

MASTER THESIS
Design for Interaction

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Photo by Vitolda Klein

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Power to the Patient: A Co-Created Design Towards Emotionally-Safe Pediatric Hospitalization

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PREFACE

Dear reader,

Here before you is my master thesis *Power to the Patient: A Co-Created Design Towards Emotionally-Safe Pediatric Hospitalization*. It is the result of my graduation project to conclude the master's *Design for Interaction*, with the specialisation in *Medisign* at the faculty of Industrial Design Engineering at TU Delft.

The master has taught me a lot of skills to be able to create impact as a human-centered designer in the field of medisign. This project has given me the opportunity to use these skills to contribute to the mission towards trauma-free pediatric care; a true way to make positive impact.

I would first like to thank my TU Delft supervisors, Valentijn Visch and Niko Vegt, for their guidance throughout the project. Valentijn, thank you for the enthusiasm and interesting perspectives that have inspired me to approach the project from different angles. Niko, thank you for the critical feedback and in-depth knowledge that supported me to take the project to the next level. I truly appreciate both your support in making this project an impactful one.

Charlotte, Nicole, Dayella, thank you for the opportunity to carry out this project on behalf of Stichting Hospital Hero. Your support and knowledge of (projects in) the healthcare context have made the project possible and helped to bring it further. Thank you for bringing me in touch with the context. Of course I also want to thank you and the rest of the Hospital Hero team for all the interim feedback moments.

I would like to thank the Willem Alexander Children's Hospital (LUMC/WAKZ) and the Juliana Children's Hospital (HagaZiekenhuis/JKZ) for the opportunity to observe and carry out research activities in these hospitals. I would like to express my gratitude to everyone who contributed to or participated in the research and design activities, and especially all children, parents and care professionals. The input and insights have been of great value to the project.

In addition, I would like to thank my dear family and friends who have supported and inspired me throughout the project. This really supported me in having a positive and confident mindset throughout the project.

I hope that with this project I have been able to make a valuable contribution to the healthcare sector and pediatric hospitalization in particular. I hope to inspire designers, policymakers and healthcare professionals to make positive impact following a human-centered innovative approach.

I truly enjoyed this project and I learned a lot of valuable things that will always stay with me in my professional and personal life.

I hope you enjoy reading my thesis.

Kim Ruby Boltjes,
February 2023

EXECUTIVE SUMMARY

This graduation project aims to contribute to an emotionally-safe, i.e. comfortable and trauma-free, hospitalization experience for children. Hospitalization can be emotionally threatening and traumatizing for children. Children have to undergo multiple medical examinations, in a setting that is unfamiliar to them. Resilience is needed to cope with the challenges that come with the hospitalization. A positive emotional state can help children manage fear, stress and anxiety. In this graduation project, the narrative interactive game play intervention *Hideaway* was created to foster resilience and empower children during their short (3-7 days) stay in the hospital, building on the previously developed Hospital Hero app©.

In order to create a valuable design intervention, an iterative research and design process was followed. A literature study and a context mapping study were performed to gain insight into the emotional experience of children (4 to 14 years old) and contributory contextual factors. Data was collected using observations, conversations with (former) patients, parents and healthcare professionals, and interviews with experts specialized in psychological impact of hospitalization in children. Using activity booklets, hospitalized children were asked about their social contacts, emotions and desires. Make-and-say sessions with children and co-creation sessions with children were held to further determine the core intervention strategy.

From the reserach, multiple challenges that negatively influence children's mental state were identified: accumulation of medical procedures, unfamiliar daily routine/environment, not being able to play. This is strengthened by lack of peer-interactions and restricted mobility (i.e. contact isolation, being bedbound). To help children cope with these challenges, an interactive storytelling-based game was designed, integrating peer-contact, social play and child-friendly coping tips. *Hideaway* invites children to work together in a collaborative digital game of 'hide-and-seek', thereby creating connection between peers in and outside the hospital, letting children explore and escape the hospital room, and empowering children.

A prototype of *Hideaway* was evaluated with children and healthcare professionals, showing a promising potential to evoke a positive emotional state in children and with that fostering resilience and empowerment. Research and design recommendations have been made to provide a bridge to future implementation of *Hideaway*.

The eHealth solution *Hideaway* facilitates playful peer-interactions and has the potential to stand in for missed daily peer-interplay. *Hideaway* provides a valuable addition to the Hospital Hero app©, expanding outpatient care support with hospitalization support, and could be applicable to other settings (e.g. pediatric rehabilitation).

Figure 1: Overview of the Hideaway elements

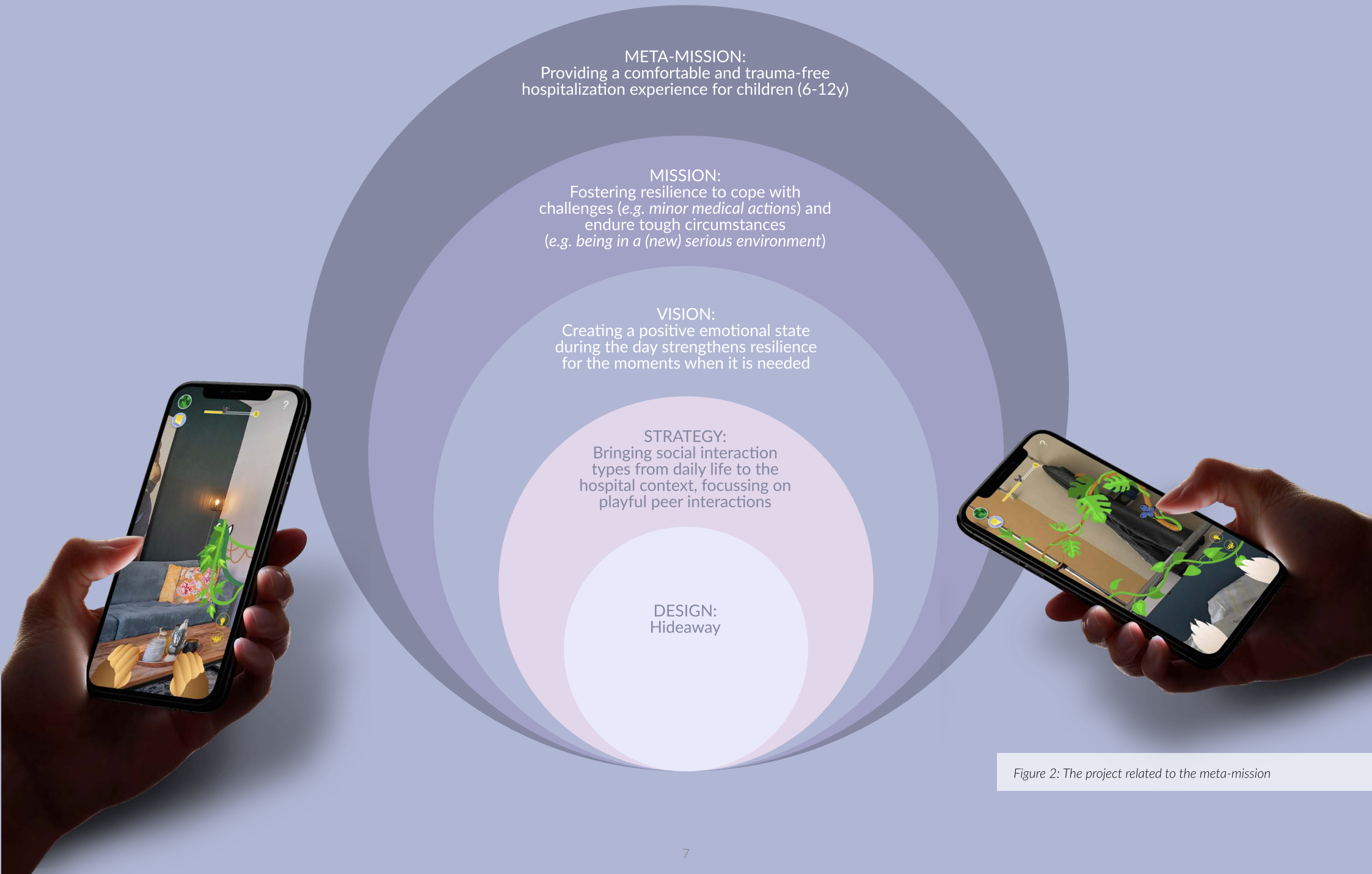

Figure 2: The project related to the meta-mission

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GLOSSARY

CLINICAL ADMISSION | HOSPITALIZATION
A stay in a ward equipped for nursing, for which one or more nursing days are registered.

WAKZ
Willem-Alexander Children's Hospital *(Dutch: Willem-Alexander Kinderziekenhuis)*. The child department of the Leiden University Medical Centre (LUMC), situated in Leiden.

JKZ
Juliana Children's Hospital *(Dutch: Juliana Kinderziekenhuis)*. The child department of the Haga Hospital, situated in the Hague.

1 INTRODUCTION TO THE PROJECT

Photo by Piron Guillaume

1 | INTRODUCTION TO THE PROJECT

This chapter will introduce you to the project. Why is it initiated and important? What is the approach? What is expected?

1.1 | Introduction
1.2 | Stakeholder
1.3 | Project brief

1.1 | INTRODUCTION

Background

Every year, about 30,000 children between the ages of 5 and 15 years are hospitalized in the Netherlands (CBS, 2022). On average, these children stay in the hospital for 3 to 4 days. Most children in this group are hospitalized due to accidental injury or poisoning, diseases of the respiratory system or diseases of the digestive system. These pediatric hospitalizations include both scheduled and acute admissions, and admissions to both academic and peripheral hospitals.

Hospitalization is no fun for most children: children commonly report experiencing fear or anxiety before and/or during hospitalisation. This is the direct result of the pain and unfort related to their medical condition or reason for hospitalisation, the discomfort of the necessary medical procedures they have to undergo, as well as to the fact that they are in a setting that feels unfamiliar (Van Wageningen, 2004). As such hospitalisations an be 'emotionally threatening and psychologically traumatizing' for children (Lerwick, 2016). Stress and anxiety may manifest itself in a strong emotional responses such as anger, feeling of helplessness or sadness and elicit behavioural responses such as withdrawal, lack of cooperation, regression. The umbrella term for the emotional and behaviour response is known as distress and can be defined as unpleasant or negative psychological (and physical) states related to medical procedures (Porter, 1995).

Procedural distress has a large impact on the child itself in the short-term (increased pain sensation, decreased patient-satisfaction, complicating coping) as well as in the longer term, including severe mental health issues (anxiety, depression, behavior problems), negatively influence physical growth, personality and emotional development. Subsequently, it can decrease compliance with care in adulthood. In a broader perspective, it can delay medical treatment, make it more time-consuming to complete treatment, and stress staff and parents - with rising healthcare costs and mistrust to top it off (Leroy et al., 2016; Lerwick, 2016). Figure 3 on the next page provides an overview of (effects of) procedural distress.

Towards emotionally-safe pediatric hospitalization

To prevent this possible series of negative consequences, it is important to identify the factors that can be considered 'emotionally threatening' and intervene accordingly. However, what can be experienced as emotionally threatening can differ per situation and individual. Hence, an emotionally-safe hospitalization experience for every child is not easily achieved in a one-size-fits-all solution. Since distress can be present 'regardless of the incidence of invasive or painful healthcare' (Lerwick, 2016), emotional burden can develop in any child, at any age, with any disease and at any moment. This makes it challenging for healthcare workers to provide a complete stress-free experience for every child, especially with the increasing burden on care and shortage of healthcare staff.

This project seeks to find a common element that can be acted upon so as to improve the hospital experience for as many children as possible, regardless of their reason for hospitalization. Although it is impossible to make hospitalization pleasant in all ways, it is important that it is experienced as little emotionally-heavy (i.e. causing negative feelings, stress, mental pressure) as possible. Only in this way do children have the chance to be resilient, and might, instead of feel traumatized, even feel powerful.

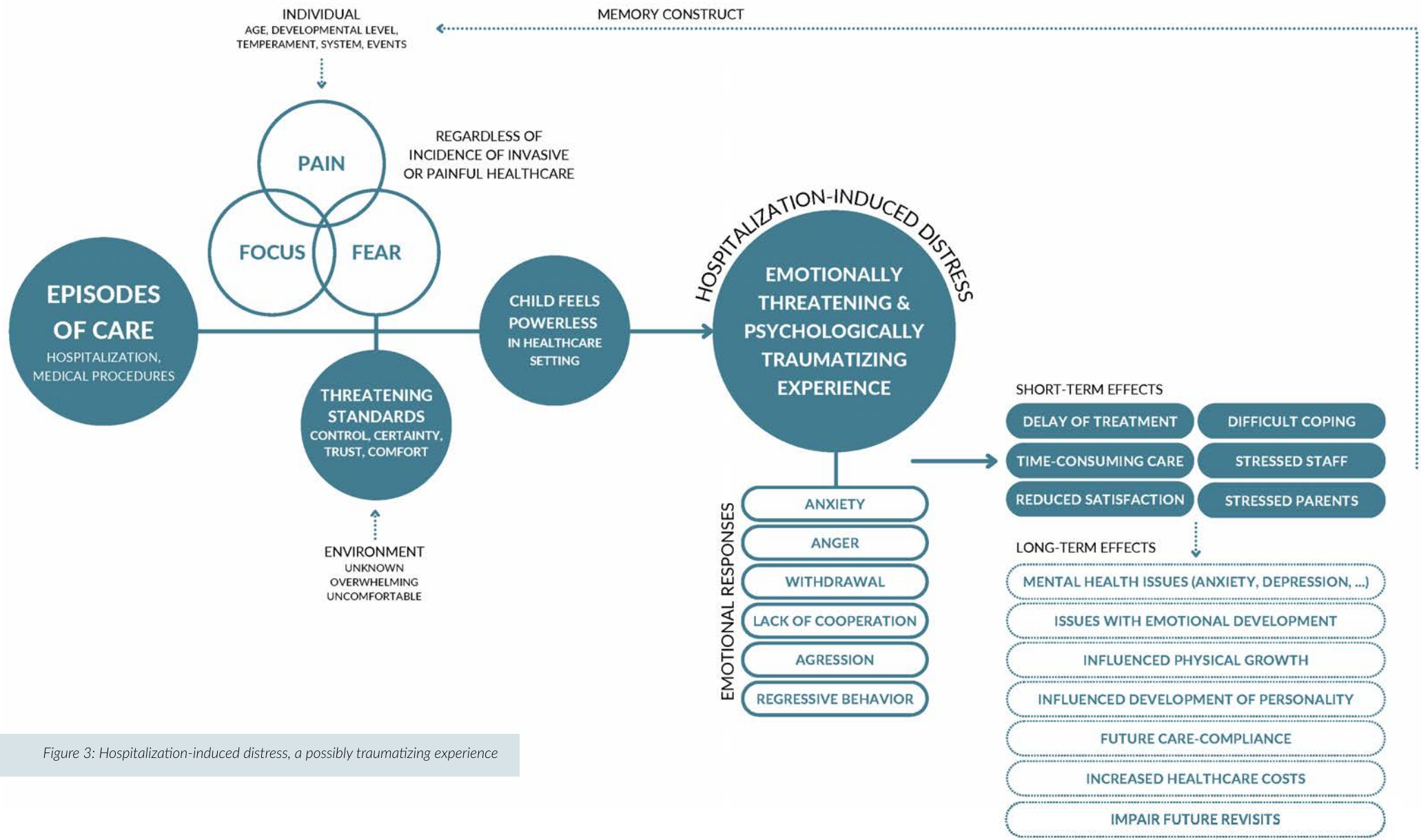

Figure 3: Hospitalization-induced distress, a possibly traumatizing experience

1.2 | STAKEHOLDERS

Pediatric patients

There are many different reasons why children need to go to a hospital and what type of care they encounter. In general, four categories can be distinguished:

- Outpatient care, where the child can go for a medical consultation or minor treatment. This appointment takes place in a separate department in the hospital and usually does not take long (~10 minutes to 1 hour).
- Observations, where the child does not stay overnight, but is admitted and observed for a number of hours (> 4 hours) in a nursing ward.
- Day admission, where the child is admitted for a number of hours to a (day) nursing ward, where a medical specialist examination or treatment takes place on the same day. The child does not stay overnight.
- Clinical admission, where the child is admitted to a nursing ward for one or more nursing days and therefore normally stays overnight.

In this project, the primary focus is on children in a short-stay clinical admission (~ 3-7 days) who are admitted to a regular nursing ward (i.e. not in intensive care). In such nursing wards, there are children of all ages, however, without directly excluding older or younger children, the project mainly focuses on supporting children in the age group between 6 and 12 years old (primary school age).

Stichting Hospital Hero

This project is being carried out commissioned by Stichting Hospital Hero (Hospital Hero Foundation). The mission of Stichting Hospital Hero is to limit fear and stress in all children who have to undergo a medical procedure. In the Hospital Hero app, guidance is provided in outpatient care, through preparation and distraction. An important spearhead of the foundation is to support all pediatric patients. In order to provide this support, it is important to look beyond outpatient care. This project will design an intervention that can be added to the foundation's toolbox to help children during their hospitalization process. The intervention not only seeks to reduce stress, but aims to go a step further by making the pediatric hospital experience more positive and making children feel empowered rather than powerless.

Children's hospitals

The project is carried out within the context of the academic Willem-Alexander Children's Hospital (WAKZ, part of Leiden University Medical Centre) and the peripheral Juliana Children's Hospital (JKZ, part of The Hague's HagaZiekenhuis). Both hospitals are affiliated with Stichting Hospital Hero and jointly offered a broad overview of the challenges young patients may face.

1.3 | PROJECT BRIEF

The problem

Children frequently find hospitalization to be a stressful experience (Stichting Kind en Ziekenhuis, 2017), leading to a series of negative consequences (increased pain sensation, decreased satisfaction, mental health issues, care-compliance, ...). In order to achieve effective health, something about this experience must be changed. During hospitalization, mental health should be as much of a priority as physical health.

Reducing the risk for distress and trauma responses (and therefore creating a more comfortable hospitalization-experience), applies to the vision of the Council of Europe to incorporate children's values (rights, needs, feelings, opinions) into the healthcare process (Expert Committee et al., 2014), and supports the aim of Stichting Hospital Hero to limit anxiety and stress in children during hospital visits. While the previously develped Hospital Hero App is already making progress in the field of trauma-free (outpatient) care, there is still room for improvement within hospitalization. While hospitals are increasingly aware that effective care goes beyond physical wellbeing, current intraprocedural strategies mainly focus on distraction during a medical action. However, a clinical admission goes beyond a medical action and thus a brief distraction at one time is not enough to provide an emotionally-safe hospitalization experience. Children have to spend a long time in difficult circumstances and face various challenges. Resilience is needed to be able to endure this mentally healthy.

Goal

META-MISSION
Providing a comfortable and trauma-free hospitalization experience for children (6-12y)

MISSION
Fostering resilience to help children cope with hospitalization-induced challenges and endure tough (environmental) circumstances.

Research questions

CONTEXT What are the challenges pediatric patients face during hospitalization?

VISION How can resilience be fostered in pediatric patients during hospitalization?

STRATEGY How can this be achieved through a design intervention?

CO-DESIGN What design elements should be incorporated to establish a child-friendly and engaging design intervention?

Approach

The design process of the project was an ongoing iterative process of diverging and converging, trying to understand the context by empathizing and defining and using this as input for ideating. Prototyping and testing was used as a learning input to spark new ideas and to improve on promising solutions. At the same time it helped to gain knowledge and insights about the context, users and problem. This in turn provided input for developing and improving the concept further, to finally come up with a valuable design for the context.

The design process followed an iterative double diamond model, continuously diverging and converging to gain new insights and deepen gathered insights (see Figure 4). The model covers the entire process as well as every small intermediate step.

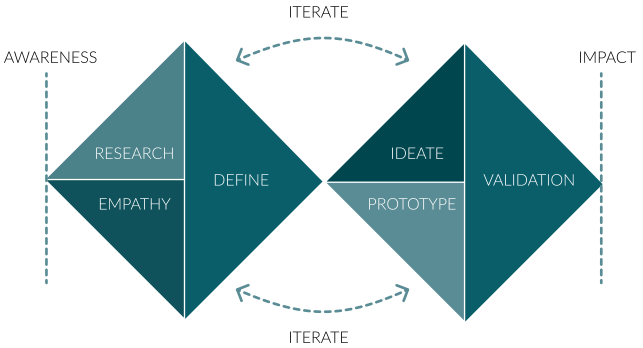

Figure 4: The different phases of the design process, in which the shape (double diamond) represents the effect on the project

2 EXPLORING LITERATURE

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2 | EXPLORING LITERATURE

2.1 | Fear, stress and trauma in children
2.1 | Factors inducing fear and stress responses
2.3 | Tackling procedural distress

To be able to come up with an appropriate strategy and ultimately a valuable design, it is important to have a complete understanding of the context, challenges and possibilities to intervene (RQ1, RQ2). Next to a context study (chapter 3), a literature study was done to learn more about stress-inducing factors (challenges) and protective factors. This chapter includes the key learnings from the literature.

2.1 | FEAR, STRESS AND TRAUMA IN CHILDREN

To understand what factors contribute to feelings of stress and play an important role in the challenges children face during (fear for) hospitalization, it is important to understand the difference between the three concepts (fear, stress, trauma).

Fear can be defined as a fundamental emotion that is triggered when a certain threat is perceived (American Psychological Association, 2022). It results in an immediate alarm response. Fear can therefore be a useful emotion, however, in the modern hospital context, the fear emotion has no useful function and is rather impractical. Doctors, nurses and medical procedures generally do not (intendedly) pose any real danger. The actions are done precisely to avert (health) danger. However, that does not mean that fear cannot be felt. The typical tendency is to worry, have fearful thoughts or recall fearful memories (Stichting Kind en Ziekenhuis, 2017). It is closely related to anxiety, a term that is frequently used in place of fear. The difference between fear and anxiety can be described as that fear is more related to a 'clearly identifiable threat', and anxiety to a more future-oriented and more general potentially threatening situation (American Psychological Association, 2022). Both can arise in children in relation to hospitalization, however there is often referred to 'fear'.

Stress can be described as causing physical, emotional or mental strain (WHO, 2021). It is a tension that people experience when they feel threatened or challenged because they believe that their capacity to handle the issue effectively could be compromised (Van der Ploeg, 2013). It is about an experience, how someone perceives something (whether or not consciously). In addition to the source of stress, stress therefore also has to do with the nature of a person (Lazarus, 1993). There is, often unconsciously, a consideration (*appraisal*) of what the situation means for the individual and their own well-being. Primarily the danger is estimated, secondarily what can be done about it. Figure 5 shows the relationships of concepts of stress with two models from Van der Ploeg (2013).

Once the situation has stabilized and control has been regained, the stress reactions can disappear. However, recovery takes longer the more acute and intense the stress response (Stichting Kind en Ziekenhuis, 2017). *Trauma* or *medical traumatic stress* is referred to when stress responses don't diminish (Stichting Kind en Ziekenhuis, 2017). With talking about (possibly) traumatic events, it refers to incidents that might cause physical, emotional, spiritual, or psychological harm (Healthline, 2021); situations that are beyond a child's or adolescent's capacity to handle them (U.S. Department of Health & Human Services., 2022). These types of events do not necessarily have to be very large; even small or non-physically invasive things can be so stressful that there can be a trauma, or development of Post-Traumatic Stress Disorder (Healthline, 2021). Trauma can cause difficulties in daily functioning (post-hospitalization), e.g. hindering school-attention, participation in routine activities or sleep (Stichting Kind en Ziekenhuis, 2017).

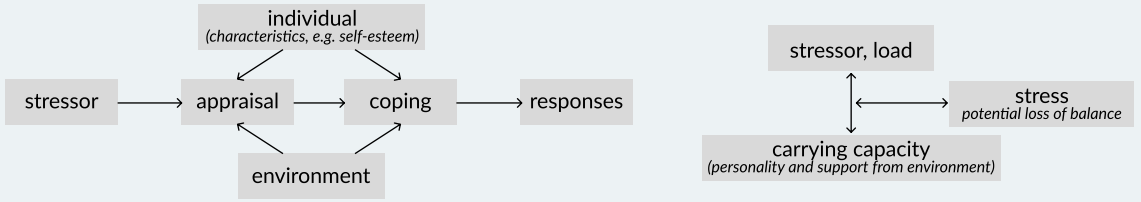


Figure 5: Stress models, visualizing the relationship of concepts of stress (Van der Ploeg, 2013)

2.2 | FACTORS INDUCING FEAR AND STRESS RESPONSES

Literature search revealed a wide variety of factors that could induce fear and stress responses in pediatric patients. All factors were collected, mapped and clustered by topic (Figure 6), searching for patterns and dividing the topics in overarching themes. These were used to gain a better understanding of the context and to identify starting points for possible design directions.

Insecurity about what will happen

Hospital and treatment are often full of unpredictable elements (). Especially (young) children do not have a clear sense of cause and effect and also have a reduced awareness and knowledge of the body. This makes it difficult to explain what is going to happen and why this is happening. The lack of understanding of the child can cause insecurity, confusion and the feeling of being powerless. Also, actions can be perceived as threatening because it is not clear what the outcome will be.

Environmental difficulties

Although children's hospitals are increasingly concerned with creating a child-friendly environment, the main goal remains to treat the patient - with all the associated medical devices and stimuli (in sight/around).

Mental pressure of/through others

Children often mirror themselves to adults, especially to their parents/carers. When these adults behave themselves stressed, children easily take over this stress. After all, they learn from their parents from an early age what is safe and what is dangerous. So if they panic, "it must be very bad/dangerous". At the same time, haste, an obnoxious remark or a bad experience play a role.

Unfamiliair and inverse daily life

In the hospital, children find themselves in an environment and routine that is completely different from their normal day-to-day lives. A few examples: surrounded by peers vs. surrounded by adults; freedom of play vs. limited play-opportunities; freedom of movement vs. restricted mobility; familiarity vs. nescience; being part of a group vs. (feeling) outstanding/lonely.

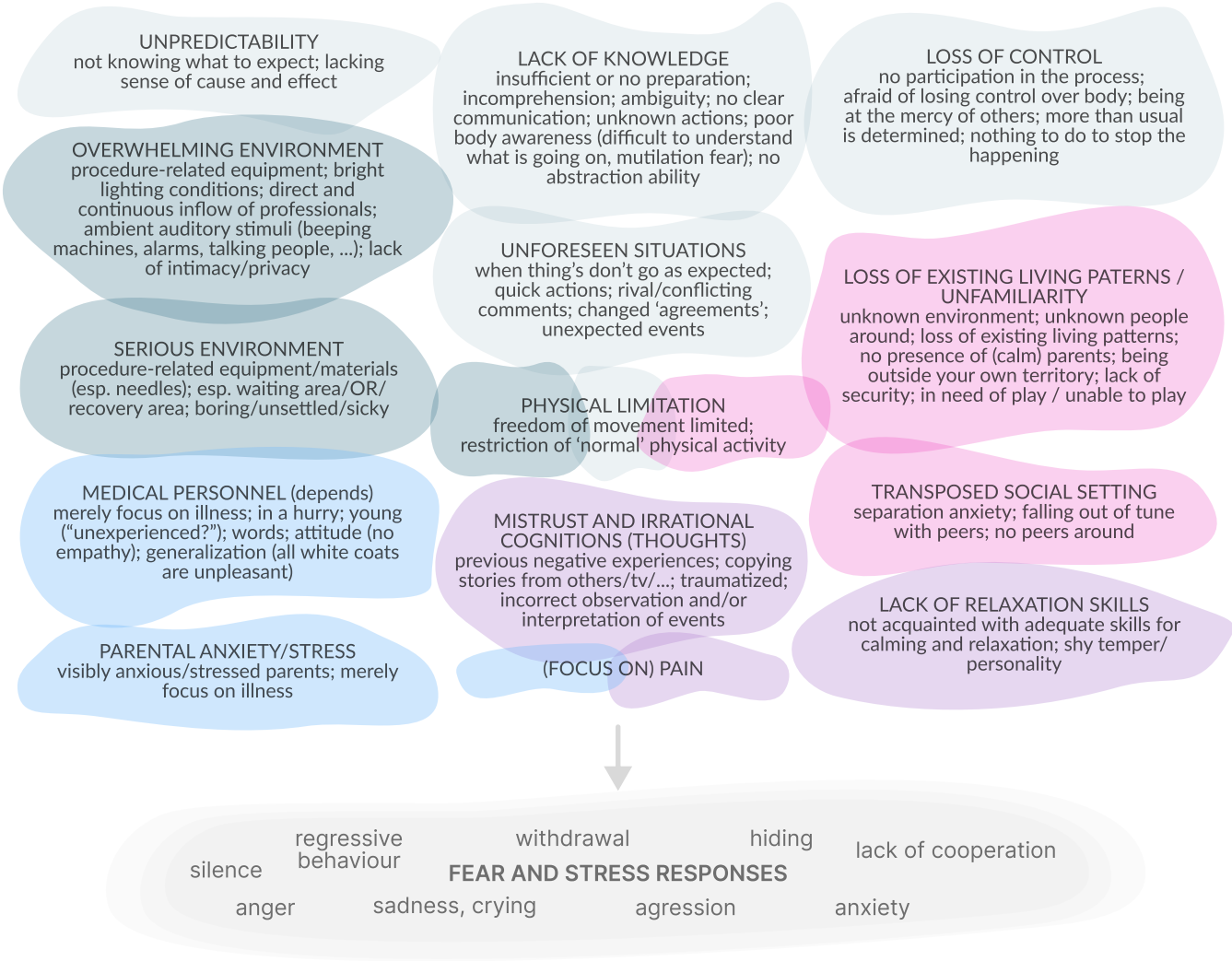


Figure 6: Overview factors inducing fear and stress responses; a combination from literature resources (Knipping (2004); Leroy, Russ, Vranken (2016); Karisalmi, Stenhammar, Kaipio (2018); Mendels et al. (2021)

2.3 | TACKLING PROCEDURAL DISTRESS

Protective characteristics

With the large variety of factors that may cause anxiety and stress reactions in the hospitalization context, which are also so specific to an individual, and can differ in every situation and at every moment, it seems impossible to avoid distress. A completely stress-free experience is also a utopia in many cases. However, stressors should be minimized and should be able to overcome: resilience is crucial. A number of protective factors that are important in (increasing) the level of resilience are identified.

First of all, personal characteristics of the individual play a role (Van Rooijen, 2018; Lazarus, Deese & Osler, 1952). Important determinants are self-esteem and self-efficacy: low levels regarding the perceived or expected challenges during hospitalization can result in higher risk of developing stress. On the other hand, higher belief in oneself can rather provide a powerful feeling; feeling able to overcome the challenge. A positive "can-do"-cognition helps to cope with stressors and can promote resilience (Schwarzer & Warner, 2013). According to the Self-Efficacy Theory from Bandura (1986), multiple factors influence one's self-efficacy, see figure 7. This can work both negatively and positively. A self-efficacy enhancing example from child-hospitalization is the use of 'positive language' in care, and is considered a form of social persuasion (e.g. "I am with you and will help you to make sure it goes well", Stichting Kind en Ziekenhuis, 2021).

Second, is the significant impact of emotional state. A child's emotional well-being is often compromised during hospitalization. This is partly due to (the factors that trigger) the stress response and, thinking of the Fundamental Psychological Needs (Desmet & Fokkinga, 2020), to the needs for wellbeing that cannot be met. Most hospitalized children experience a certain loss of control, certainty and trust; they entered an environment which is or feels unknown and where they can't do what they are used to. Needs like autonomy, security and comfort can be compromised.

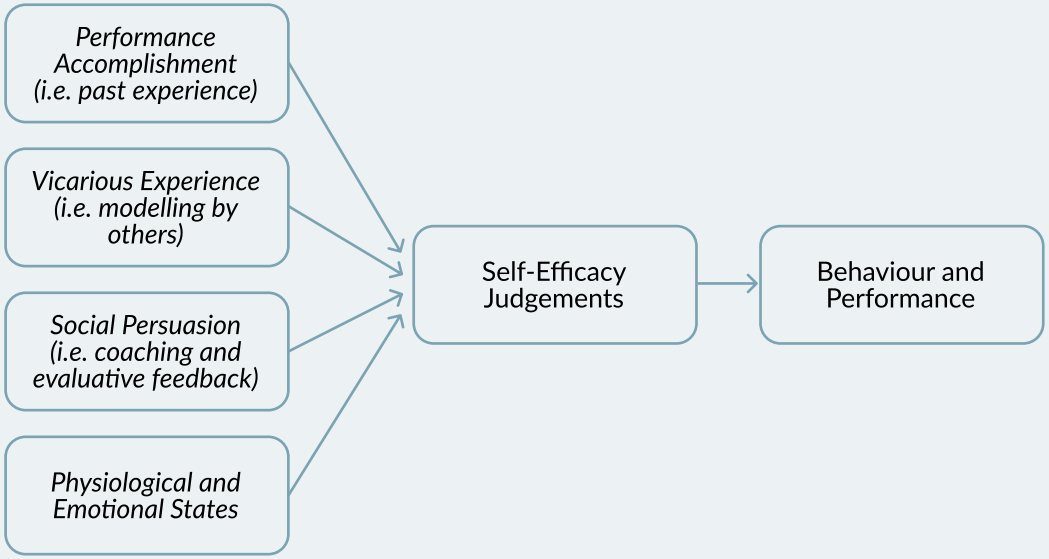


Figure 7: Self-Efficacy Theory (Bandura, 1986)

This not only leads directly to a negative experience, but also negatively influences how the child assesses itself and thus how the child deals with challenges. Naturally, a positive emotional state can therefore contribute to self-efficacy and resilience. Fulfilling needs can contribute. Where it is difficult to meet needs in all parts of a hospitalization - to ensure successful treatment and patient safety -, opportunities could be explored where a sense of fulfillment can be achieved. This can be described as 'providing power in a powerless environment'. According to Lerwick (2016), this can mitigate and reduce the risk for distress and trauma responses.

The magnitude of effect that a challenge has on the child is also determined by the child's coping styles (Van der Ploeg, 2013). This refers to how a child 'copes with' (handles) a difficult situation. Certain coping skills such as expressing emotions or having comforting thoughts can help the child to calm down. This can help to make situations more manageable or to control or reduce stress feelings after a difficult experience. This can be seen as a form of self-control (Van Wageningen, 2004). Coping skills can be taught to a child (Stichting Kind en Ziekenhuis, 2017). According to Streng (2003), children's stress levels considerably drop after practicing coping mechanisms.

Play to cope

An important factor in the normal daily life of children is play. Hospitalization is likely to influence the possiblity of play during the daily routine, considering difficulties regarding physical condition and mobility (social isolation, being bedbound). Not being able to engage in social and playful activities, is a stress factor in itself, considering the transposed daily life, but also influences a child's potential for adaptation and resilience (Nijhof et al., 2018).

Turning the perspective, several studies argue that play can be used purposefully in the hospital context. It can be used to prepare or process a hospital experience (Knipping, 2004), but also has possibilities during hospitalization. Nijhof et al. (2018) argue that play and resilience are related and that play can help coping with stress. After a play activity, hospitalized children had lower cortisol levels, which showed that even in a stressful environment, play can have a stress-reducing effect (Potasz et al., 2012).

According to Knipping (2004) play can be a way to empower children: in a play situation, the child can have influence on the circumstances and thus feels the personal strength. This feeling can be transferred to the opposed real world. *"In this way, the child can better cope with the situation in which the child feels helpless and can tolerate the treatment better. The carrying capacity is increased and the healing process is positively influenced."*

Further, Potasz et al. (2012) emphasizes the difference play can make in feeling more comfortable in the unfamiliar environment, due to the possibility that play activities could help the child see connections to their life outside of the hospital. Hence this could make the contrast less big making it more easy for the child to adjust to the hospital stay.

KEY TAKE-AWAYS

- Fear, stress and trauma are closely related. Fearful thoughts can trigger a stress response. When this stress is very intense or lasts for a long time, it is difficult to recover from the stress and trauma can eventually arise.
- There is a variety of factors inducing fearful thoughts and stress responses. This completely depends on the situation and the individual. Roughly, four themes can be distinguished: insecurity about what will happen; environmental difficulties; mental pressure of/through others; transposed daily life. Stressors in and across these themes can work simultaneously and influence each other.
- Therefore in many cases it seems impossible to provide a complete stress-free experience. However, stressors should be minimized and should be able to (mentally) overcome.
- Resilience is thus needed to be able to deal with the challenges and endure the though circumstances. Self-esteem, self-efficacy and coping skills influence resilience level. These elements are impacted by factors like emotional state.
- Play could provide opportunities to positively contribute to a child's emotional state.

3 INTO THE CONTEXT

Photo by Jon Tyson

3 | INTO THE CONTEXT

3.1 | Context mapping in the children's hospital
3.2 | Data analysis
3.3 | Being a child in the children's hospital
3.4 | Statements from the context

To build towards a complete understanding of the context, situation and possibilities to intervene (RQ1, RQ2), a context mapping study was done to gain more insight into the emotional experience of hospitalized children and contributory contextual factors.

3.1 | CONTEXT MAPPING IN THE CHILDREN'S HOSPITAL

A collection of methods to gain rich insights

The literature research provided insight into what fear, stress and trauma means and what factors contribute to fear and stress responses regarding hospitalization. It further provided insight into ways to deal with stressors in general. To come up with a strategy that eventually really fits the needs and wishes of the users and the implications of the Dutch hospitalization system, a context mapping study was performemd, following the approaches from Sanders & Stappers (2012). The context mapping study was performed in the academic Willem-Alexander Children's Hospital (WAKZ, part of Leiden University Medical Centre) and the peripheral Juliana Children's Hospital (JKZ, part of The Hague's HagaZiekenhuis). In the study, the focus was primarily on the physical environment, daily routine, interactions with/around the child, faced challenges and possibilities for (emotional) relaxation. Multiple methods were used to gain rich insights from the context. Figure 8 provides an overview of the methods. The methods will be further described in the following pages with some examples from the gathered data. More data can be found in Appendix A.

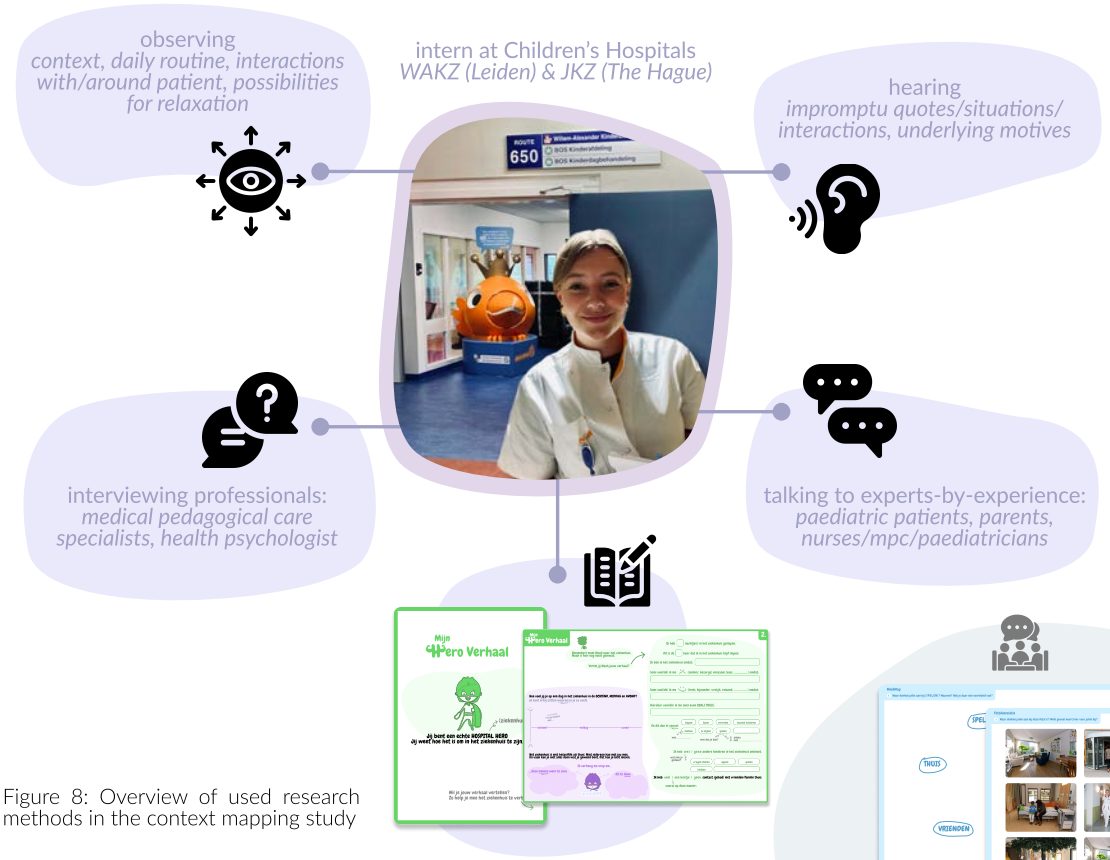


Figure 8: Overview of used research methods in the context mapping study

Observations and hearings

Method
An important part of the context mapping study was to include observations. Observations can reveal more information about what people really do and use in the context. It can cover data about things people forget or don't want to tell directly. Particularly in the sensitive context of hospitalization, in which you want to disturb (vulnerable) people as little as possible, observations are a good way to get an idea of the course of events. To be able to do the observations and get a complete understanding of the context, I walked along care workers from various specialities: doctors, nurses and medical pedagogical care workers in the WAKZ and doctors visits in the JKZ. I did observations during the complete hospitalization journey, from preparation to operation to recovery.

Gathered data
The observations provided a clearer picture of a hospitalized child's daily routine and challenges. Although the specific routine differs per situation and individual, it has been noticed that a day is filled with minor medical procedures, such as changing bandages or measuring blood pressure. While these are not painful or threatening procedures in themselves, they proved exciting for many children.

"I think this is worse than the surgery itself." - Hospitalized child, 9 years old

It was also striking that children are quite 'alone', albeit with a parent by their side, but separated from other children. Modern hospitals appear to have individual rooms. In addition, children often appear to be unable to leave this room, because they are nursed in contact isolation (for example, if a nose cold is suspected) or because they are bed-bound due to their condition or related medical devices. At the same time, children remain children: looking for play and peers.

"Can my son please go to the play area?" - Mother of hospitalized child (not possible due to contact isolation)

Conversations / unstructured interviews

Method
Whenever possible, in-context conversations with pediatric patients and their parents and with care workers (nurses, medical pedagogical care workers, paediatricians) were held (WAKZ and JKZ). These were either triggered by an explanation of the study focus or by a situation that happened and was observed. The focus in the conversations was primarily on stressors, the daily routine and factors inducing a positive mental state. When conversations were held with children, by casual chitchatting it was tried to create a comfort space. Although none of the questions were completely predetermined, the focus of the context study and the in-context situations evoked questions around the following themes:

- *What does a day in the hospital look like (for you)?*
- *What can be stressors during the day?*
- *What do you like least about the hospital?*
- *What do you like most about the hospital?*
- *What are you most looking forward to (when you get home) / what do you miss in the hospital?*
- *What do you do to relax in the hospital?*
- *Have you had contact with people from home? In what way?*

Gathered data
The in-hospital conversations with healthcare workers and children and their parents provided more insight into the (emotional) experiences of children in the hospital. What do they experience as challenges? What are they looking forward to? What emerged most was the desire to be in normal life and to be able to do what they normally do: playing with friends, playing sports, being in their own familiar home environment with familiar interactions.

"I desire school and friends and being home in my own room." - Hospitalized child, 13 years

"He misses school and his friends very much." - Mother of a hospitalized child of 9 years

Semi-structured interviews

Method
To further include a specialist's point of view, two semi-structured interviews were conducted: one with the team lead of the medical pedagogical care team (WAKZ) and one with a health psychologist (WAKZ). These interviews mainly focused on stress factors, (effectiveness of) used strategies and interventions to reduce stress, considerations with regards to the target group and where improvements could take place. The full interview set of predetermined questions can be found in Appendix A.

Gathered data
The interviews with the professionals also identified a number of challenges that children face and provided more insight into the emotional and psychological reasons and impact of the challenges on children.

"Unfamiliar spaces, strange people, ad hoc things that have to take place, white coats, previous experiences, environment..." - Summarized sayings from medical pedagogical care about challenges in the hospital

"Your brain reacts differently when you are already stressed, it filters information differently. When you are stressed, the brain will interpret information negatively that you can interpret in two ways." - Health Psychologist

In addition, it was discussed what can have a positive influence on reducing or dealing with these challenges. Among other things, it emerged that being able to continue 'as normal as possible' is an important factor in stress reduction and resilience level. This includes play, contact with friends, contact with other children.

"The more that normal development can continue, that also gives a lot of resilience and distraction and stress reduction." - Health Psychologist

"What the child recognizes and knows as normal." - Team lead medical pedagogical care

Generative sessions (intended)

To learn even more about the emotional experiences of children in the hospital, generative sessions were intended. Task cards were developed for this purpose, see Appendix B. Unfortunately, after several attempts it turned out that it was not possible to conduct generative research in the hospital because children were not allowed to leave their room (contact isolation, condition or mobility). There were also few children in the age group of the target group in the hospital at that time. For the same reasons, it was not possible to switch to 1-on-1 interviews. Moreover, 1-on-1 interviews quickly come across as threatening to a child in this age category (Gielen in a personal consultation meeting, 2022). Unfortunately, I received no response from children (and parents) who had recovered and who were approached after their hospital visit when they were invited for research. That is why a switch was made to individual activity booklets.

Figure 9: Example task cards of the intended group sessions

Activity booklets

Method
Children could fill in these activity booklets at their own time in the hospital, in the safe vicinity of their parents. Again it was difficult to find children in the target group (correct age category, short-term admission of several days, sufficient physical and mental condition to participate). 7 activity booklets were distributed, of which 3 were eventually returned (partially) completed:
P1, a boy, 11 years old, 6 nights in hospital, fifth time
P2, a boy, 13 years old, 49 nights in hospital, first time
P3, a girl, 13 years old, 7 nights in hospital, first time

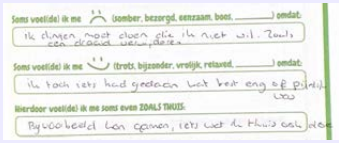
Due to the difficulty of finding participants and having to switch between different research strategies, this research was combined with the deeper research for the strategy (Chapter 5) considering the time limitations of the project. The full booklet can be found in Appendix C. Although P2 was in a long-stay hospitalization, participation could still bring insights.

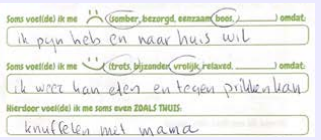
Activity 2 in the booklet focuses on the child's hospital experience. Which emotions play a role, what triggered these emotions and at which moments did the emotions arise? Which people from the normal social network does the child miss and which normal (daily) activities? What does the child's day in the hospital look like and are there any forms of social contact (inside or outside the hospital) during the hospital stay?

Although these assignments discuss some serious and perhaps negative things, there has been tried to frame the questions in a positive way (e.g. 'looking forward to' instead of 'missing'). The child is given a helpful role by emphasizing that sharing the story can help another child. In addition, positive emotions are also highlighted and there is room to highlight positive sides. In any case, the exact interpretation of a positive and a negative emotion is left to the child; after all, this can differ for each child (from angry to lonely and from proud to relaxed). The child is given the freedom to choose what is told. Sharing emotions and a personal story can also help the child feel heard.

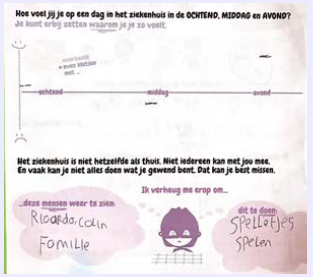
The answers in the child's story gave more clarity to the emotions and desires that play a role in children during their hospitalization. It is difficult for adults to estimate what a child's actual experience is; e.g. for children a day might seem to take longer than for adults, especially if the child cannot move freely. It wass therefore interesting to discover the experiences of children. The children who were approached for this research were selected through consultation between the departmental team leader and the medical pedagogical care team leader. In this way, only children were approached who are physically and emotionally in sufficient condition at that moment.

Gathered data
The answers in the activity booklets indicated that medical procedures and being away from home are challenges for children and have a negative impact on their mental well-being. It was indicated that this was mainly paramount during the day. The children indicated that they had not met any other children in the hospital, and that they mainly looked forward to seeing their friends again and playing games. There mental state was positively boosted by overcoming challenges and doing familiar things, such as gaming and cuddling with the parent.


P1 (boy, 11y, 6 nights in hospital)



P3 (girl, 13y, 7 nights in hospital)



P2 (boy, 13y, 49 nights in hospital)

P1
P2
P3

P3 (girl, 13y, 7 nights in hospital)

Figure 10: Package of the activity booklets

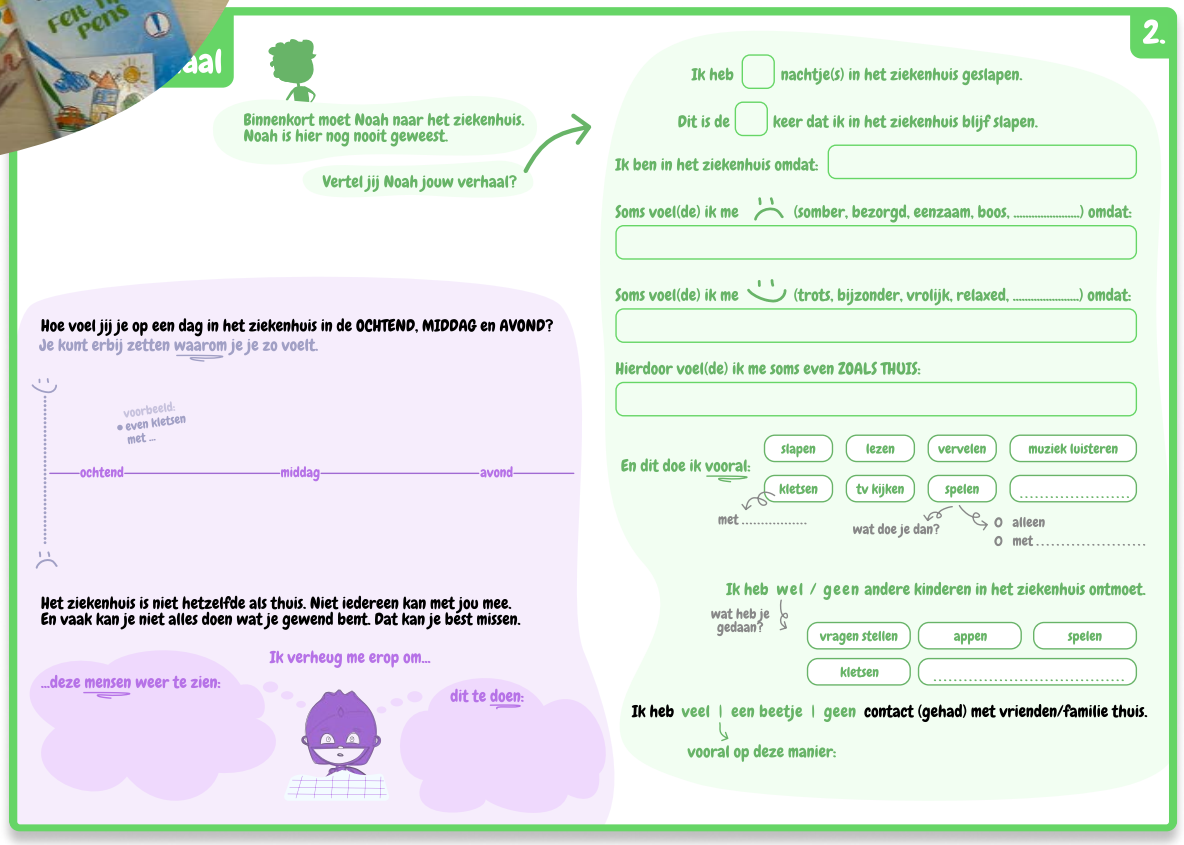


Figure 11: Activity 2 of the booklet, primarily focusing on the hospital experience and related emotions

3.2 | DATA ANALYSIS

Data analysis: statement card method

A context mapping study provides a lot of different information, in various forms. In order to discover patterns in terms of (contextual) challenges and influences on resilience, the statement card analysis was used. By using statement cards (see Figure 12), data can be encoded and the core elements can be recognized. This allows a deeper look at the information obtained and it is possible to combine data from different sources in a valuable way.

The color of the statement card indicates the type of study it originated from: lilac for observation, purple for a conversation and blue for semi-structured interview. It is also always mentioned from which type of person it originates. Which individual it comes from is indicated by the colored code in the top right corner. The white part shows the actual data. The attached icon (quotation marks or eye) indicates whether it contains a quote or an observation. The colored part indicates my interpretation of the data. Some examples of statement cards are given on the right, Appendix D contains all statement cards.

The data from the statement cards and separate notes and impressions were then used to map the context and to find patterns in terms of challenges and resilience. Insights on the context are visualized in chapter 3.3 *Being a child in the children's hospital*. These include *Environment*, *Daily contributors*, *Journey of hospitalization*, *Daily routine*, *Tools for stress management and entertainment*, *Normal daily social network of a child*, and *In-hospital daily social network of the pediatric patient*. Chapter 3.4 discusses the patterns in more detail and thus offers a stepping stone for the vision discussed in chapter 4.

Figure 12: Using a statement card analysis to find patterns and gain rich insights on challenges and resilience

3.3 | BEING A PATIENT IN THE CHILDREN'S HOSPITAL

Environment

Figure 12 presents a visual overview of the environment of a child in pediatric hospitalization.

iPad providing games and videos

IV; limits mobility

sofa bed for rooming-in
one parent can stay overnight

external play areas
only accessible during opening hours, when the physical condition/mobility permits and when child does not stays in contact isolation

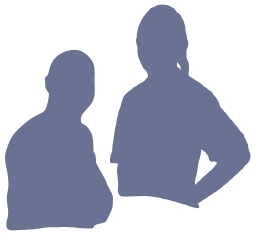
Stay in contact isolation
This is not only used in children with a low resistance, but also in the case of (suspicion) of an infectious infection or (resistant) bacteria. In practice this often occurs. In many cases this means that the child is not allowed to leave the room.

Figure 12: Visual overview of the environment of a child in pediatric hospitalization

Daily contributors

The child
What it's all about, and the child notices that all too well. The child is the center of attention and although everyone around the child talks about 'teaming up', the child feels that in the end [she] is the one undergoing the procedure.

The pediatrician
The pediatrician adjusts the treatment/observation plan for the child, monitors that the child responds well to this and makes the decisions about treatment and when the child can go home.



The nurse(s)
The nurse is the one who sees the child the most. Can be found regularly in the child's room for minor medical checks and procedures, and facilitates practical actions, such as getting into a wheelchair and going to the toilet.

The medical pedagogical careworker (MPC)
Together with the doctor and nurse, the MPC is the 'third person at the bedside'. The MPC focuses on making a hospital experience as least traumatic as possible. In practice, this mainly focuses on personal preparation for the (major) medical procedure, using photo books and medical material.

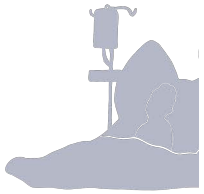
The medical specialist
In charge of the specialized treatment of the child. May have spoken to the child / family during intake and will in many cases take up the follow-up outpatient clinic. In principle, does not often visit the ward, but rather transfers the necessary information to the pediatrician.

The anesthetist
The anesthetist comes into play when the child has to undergo treatment or observation under anaesthesia. Meets and sees the child only in the operating room.

The parent/guardian
Is constantly with the child. Important person for child, as it is one of the 'attachment figures'. In many cases the only familiarity for the child in the hospital environment. Is a source of information and distraction for the child. (Stress) emotions in this figure will be easily taken over by the child.

The siblings
Important figures in the child's life and vice versa. Normally interact with each other every day. Can't always get together due to contact restrictions. If visiting is possible, it often only happens during visiting hours (regulations hospital, or school).

The toy
Almost all children take a pluche toy from home. One of the few sources of familiarity. Can also be used to explain medical procedures, mainly a comfort aid for children.



The fellow patients
In the same boat in certain areas, but have limited opportunities to interact with each other.

Journey of hospitalization

The actual hospital journey depends on each individual, with medical condition and associated treatment plan. On average, children stay in the hospital for 3 to 4 days. Most children are hospitalized due to accidental injury or poisoning, diseases of the respiratory system or diseases of the digestive system. The figure below illustrates an 'average' hospitalization journey, with actors, location and (assumed) emotions.

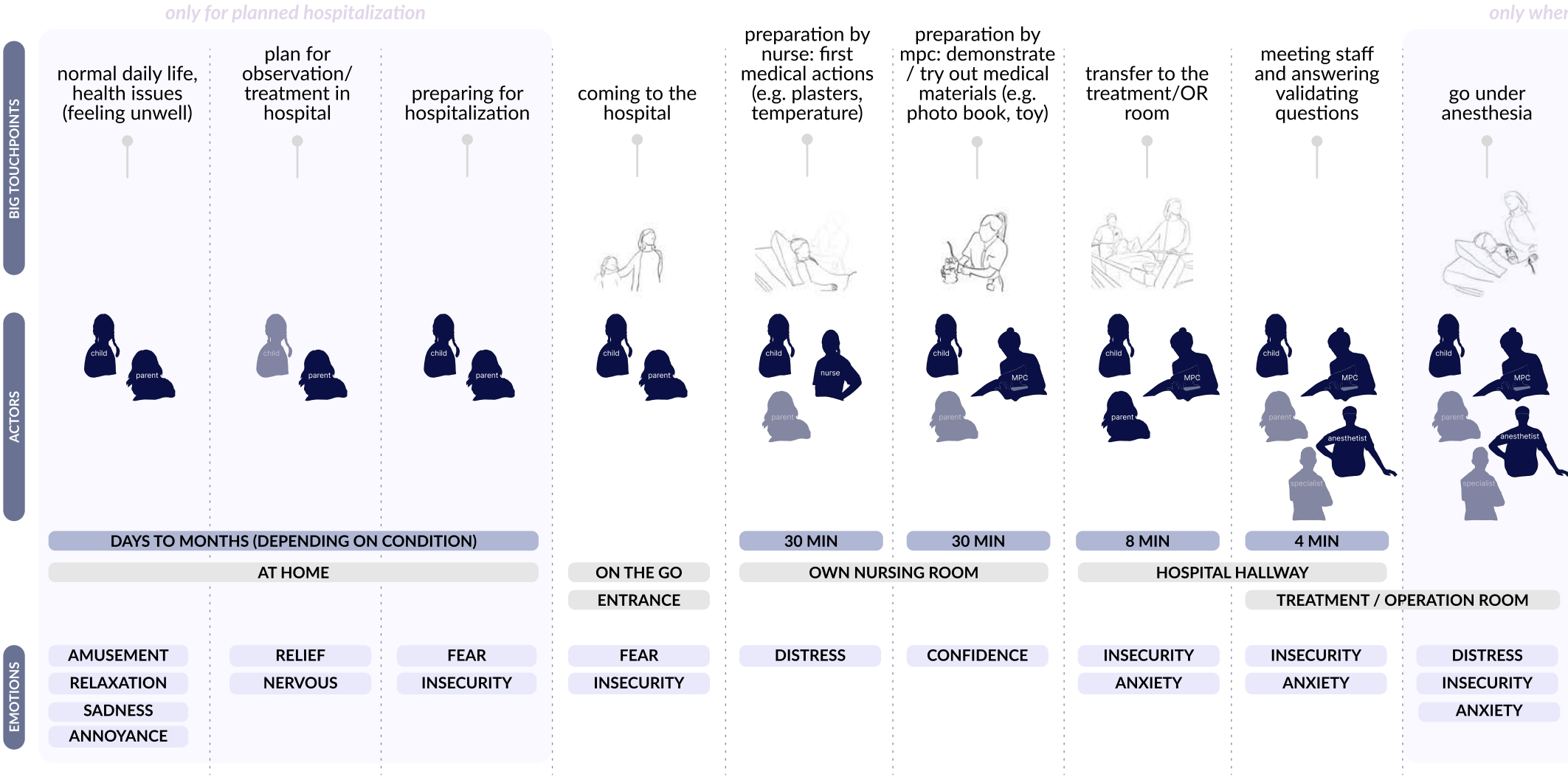


Figure 13: Overview of a general journey of hospitalization

n treatment requires anesthesia

parent: leaving child when child is under anesthesia	waking up in recovery room	transfer to own nursing room	medical checks with nurses recovery recovery	transfer to home	recovery at home	(back to) normal daily life	medical check-up
		8 MIN	DEPENDS (AVG. 3-4 DAYS)		DEPENDS (+-WEEK)		
HOSPITAL	RECOVERY ROOM	HOSPITAL HALL	OWN NURSING ROOM	ROAD	HOME	SCHOOL	OUTPATIENT
NERVOUS	INSECURITY RELIEF	INSECURITY RELIEF	LONELINESS BOREDOM INSECURITY DISTRESS DURING MED. ACTIONS	RELIEF	LONELINESS BOREDOM	AMUSEMENT INSECURITY	INSECURITY

Daily routine

A daily routine in the hospital differs per child. This is related to physical condition, possibilities to move, medical procedures that still have to be performed... Observations and some conversations in the hospital helped to draw a daily routine journey (Figure 14).

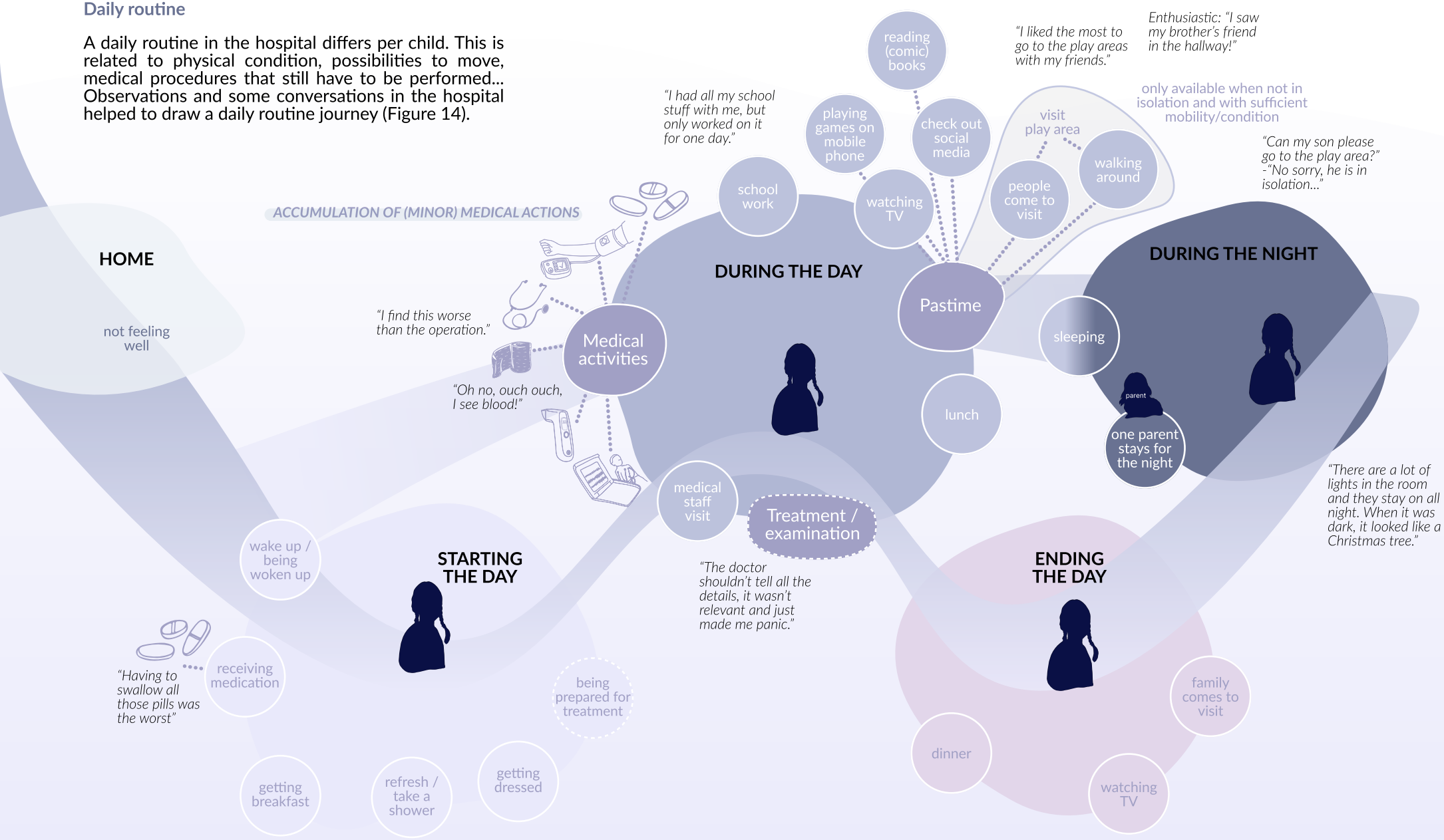


Figure 14: Daily routine of a child in hospitalization, including quotes from the context indicating challenges and positive boosts

Tools for stress management and amusement

The following tools and activities were observed or mentioned as used hospitalization stress management and amusement tools provided by the hospital or medical pedagogical care. A lot of these tools focus on preparation or short-term distraction.

WAKZ Krachtpas *Record a child's wishes and rituals regarding a procedure: control & communicating*

Kiwanis Doll *Act out the treatment on a doll beforehand (preparation) or afterwards (processing)*

MRI Lego *Lego version of an MRI scanner to make it more visible to children*

KidzFlitz *Studio to broadcast theatre or group activities like Bingo from out the hospital to in-room TV of the children*

CliniClowns *Once a week, to provide amusement and distraction (in the room).*

QwiekUp *Project calming scenes on walls and ceilings (mobile projector, currently one at WAKZ, not easily usable for every child)*

Zoekboek *Distraction right before or during treatment, by having to focus on a searching task*

iPad *Distraction by videos, games and music; preparation by videos of the treatment (e.g. operation)*

Franniez *(Chronic diseased children) For every treatment, child receives a sticker with a meaning to put on the spiral: reward + special diary*

external play areas
only accessible during opening hours, when the physical condition/mobility permits and when child does not stays in contact isolation

Figure 15: Overview of tools for stress management and amusement, used in the WAKZ (photos from Instagram WAKZ)

Normal daily social network of a child

To be able to understand the child and to find out about the differences between normal daily life and hospitalization, the normal daily social network of a child has been collected in figure 16. *Derived from conversations with children and professionals and observations.*

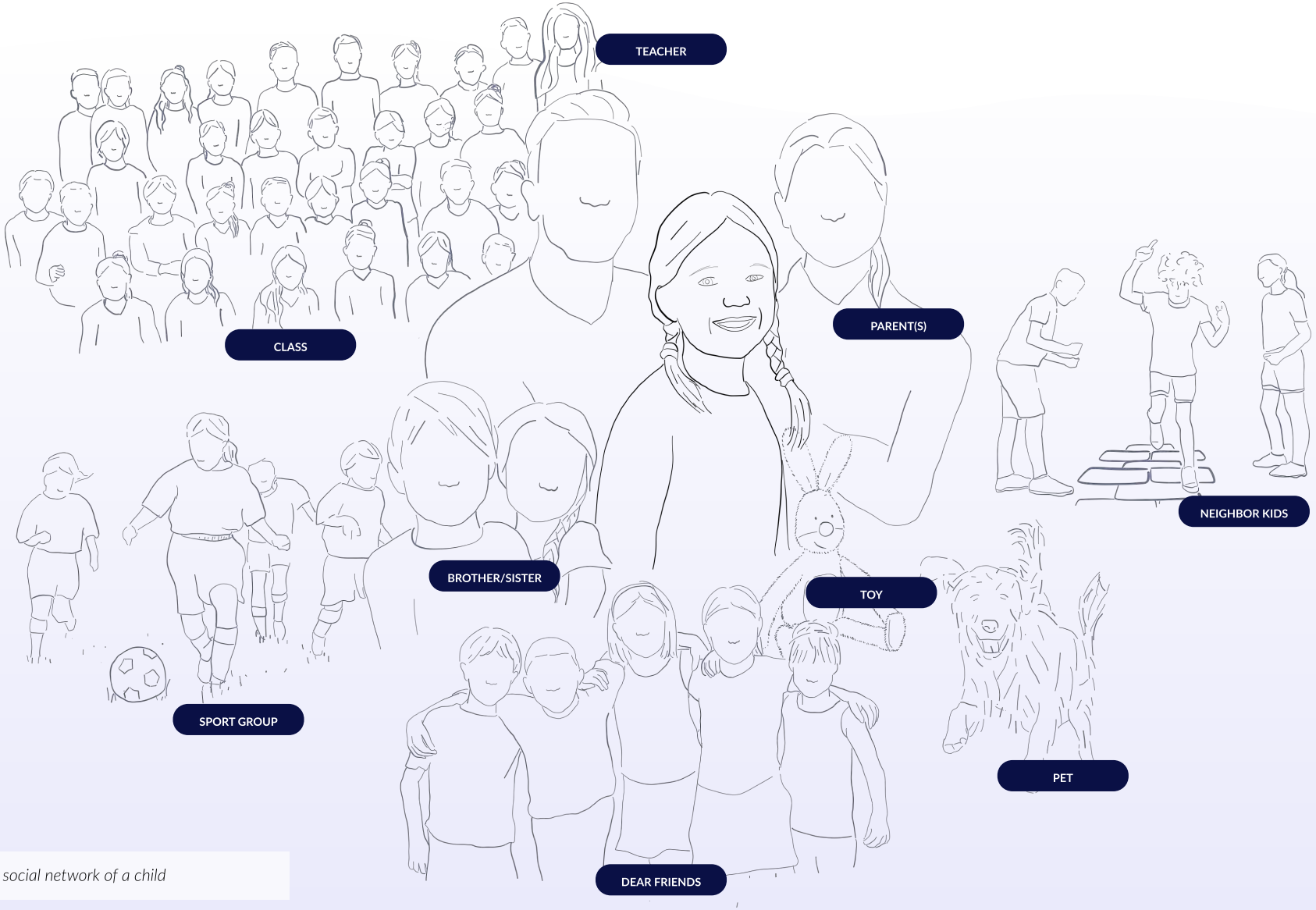


Figure 16: Familiar daily social network of a child

In-hospital social network of the pediatric patient

Figure 17 shows the social network of the pediatric patient in the hospital context, accompanied by interaction characteristics. It is totally different than the familiar daily social network. *Derived from observations and conversations with professionals.*

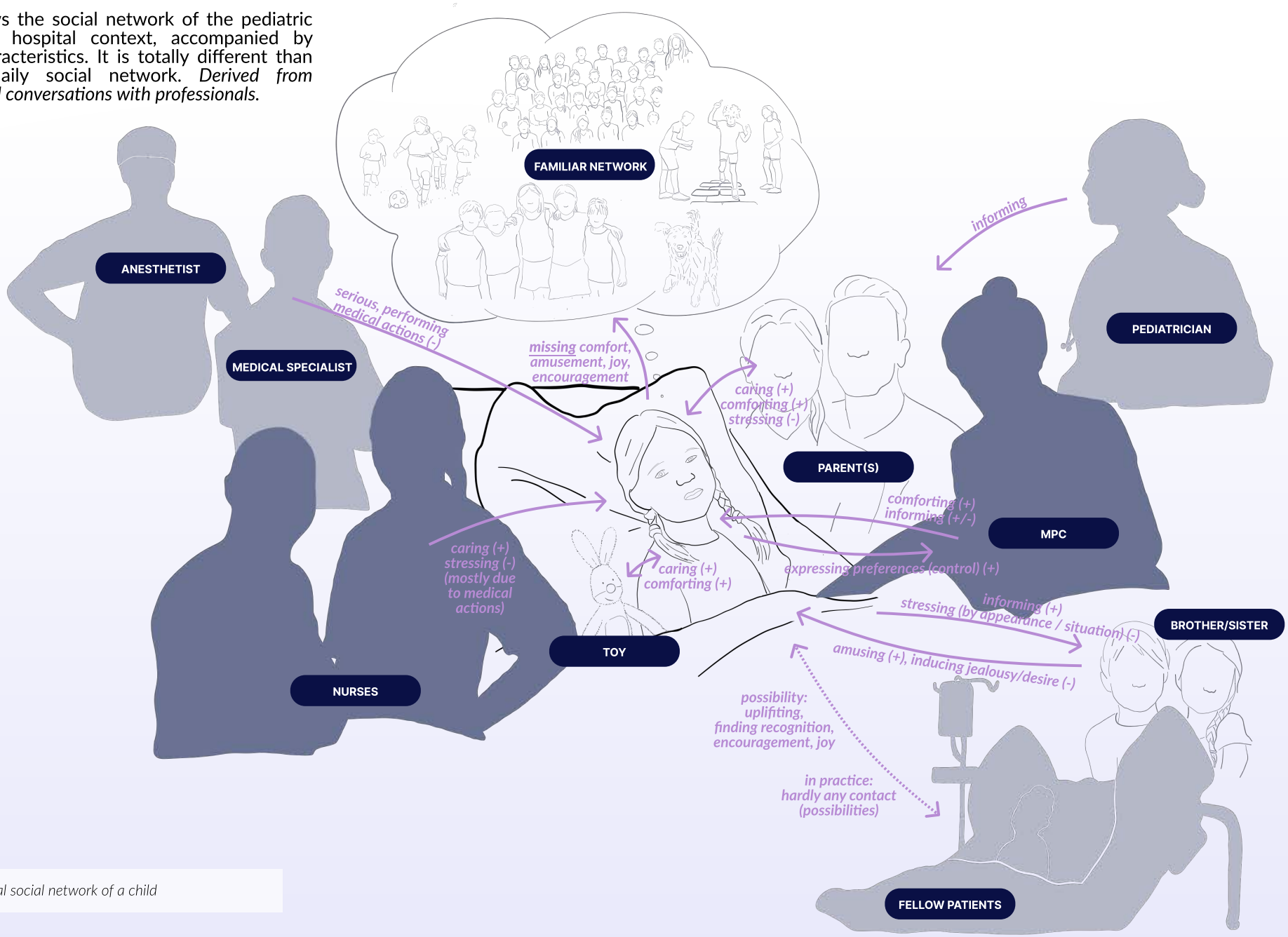


Figure 17: In-hospital social network of a child

3.4 | STATEMENTS FROM THE CONTEXT

Finding patterns

The pediatric hospital context, stress factors and responses, and ways of creating a positive state have been looked at from different angles. Talks were held with professionals from various specialties (*paediatricians*, *nurses*, *medical pedagogical care providers*, *medical pedagogical team leader*, *healthcare psychologist*, *remedial educationalist*, *neuropsychologist*). Further, walking along and helping various specialties (*paediatricians*, *nurses*, *medical pedagogical care*) in both an academic (WAKZ) and a peripheral (JKZ) provided (observational) insights. Conversations were held with pediatric patients and their parents.

All relevant information has been written down, reviewed and transformed into statement cards. Each card tells the source, the accompanying quote or observation and my own interpretation. These statement cards were then brought together and clustered to find patterns in terms of challengese and resilience. This resulted in 13 clusters expressing underlying (emotional) values in the pediatric hospital context, see figure 18. The motives provide perspectives on the situation and the underlying needs and can therefore be a good starting point for finding a focus and specifying the design goal.

On the right, an overview of the cluster motives is given. Appendix E provides all clusters and statement cards within.

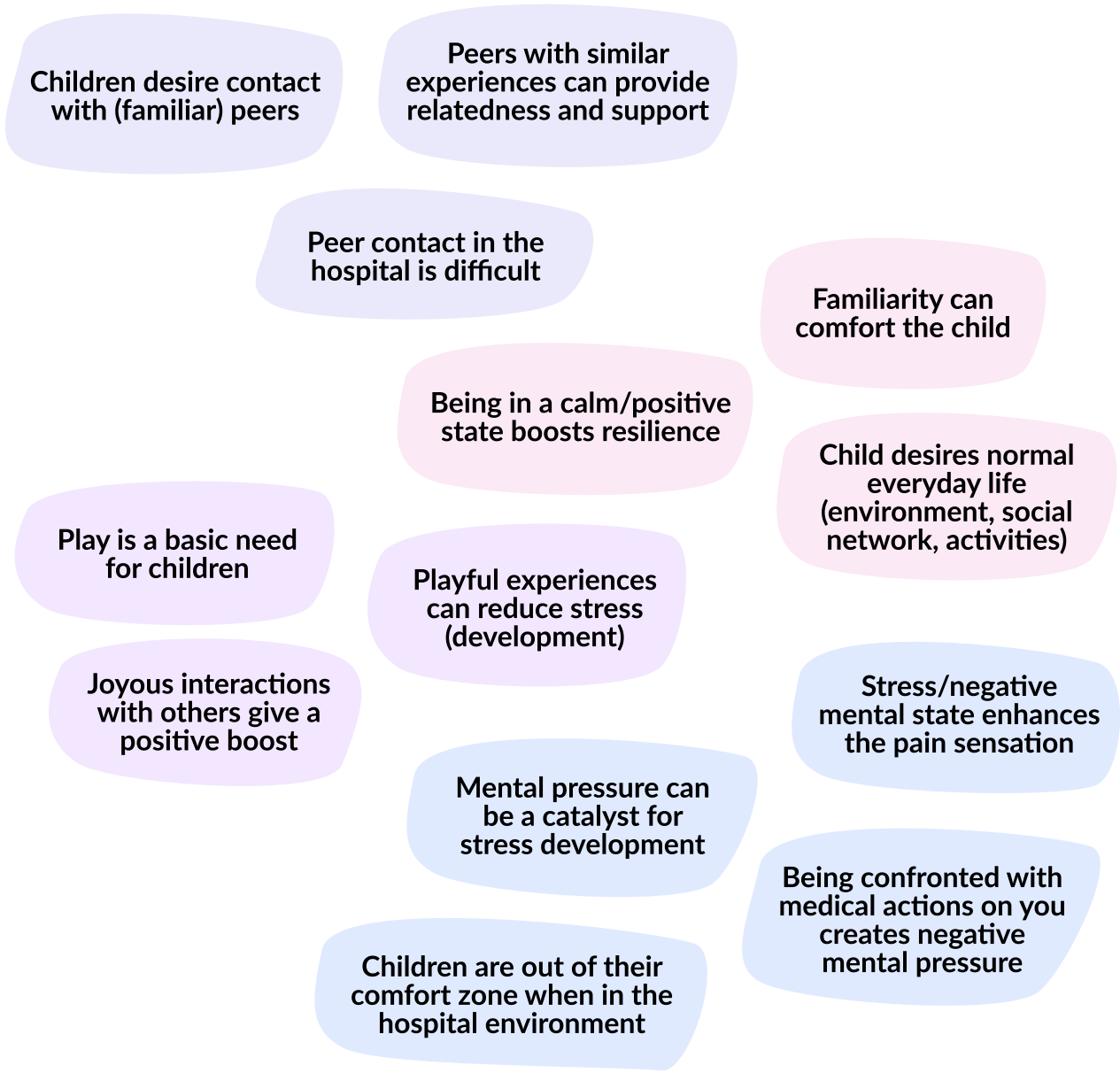


Figure 18: Overview of clusters derived from data from the context

Photo: Instagram WAKZ

KEY TAKE-AWAYS

- In the daily routine, children regularly have to undergo (minor) medical actions. Where prior to major medical treatment (such as surgery) stress management is used, i.e. by using preparation tools and distraction techniques, this is not or minimally used for all minor medical procedures that children (mainly in the recovery phase) have to undergo. Children find these small medical procedures challenging or even very stressful.
- Due to the need to monitor the physical health of the child, there are many medical devices, including lights, sounds en cables, in the room and around the child, which gives a serious impression, emphasizing the serious situation.
- Children generally have a private hospital room. Often one parent is allowed to stay with the child.
- Children frequently have to stay in contact isolation to protect themselves or others. This already happens from a suspicion of a runny nose. Children cannot leave their room and visiting options are often limited.
- Children are often bedbound due to their condition and the medical devices they are attached to (e.g. IV).
- Hospitals have created play areas, but these are proving difficult or impossible to reach (see above). In practice, this is therefore not used by many hospitalized children.
- All things considered, it appears to be difficult to have (playful) peer contact during a hospital admission. This is a challenge in itself, as play and contact with peers are basic needs for children. In addition, it is a missed opportunity, as these types of interactions that are familiar to children can provide comfort and contribute to a positive state.

4 CREATING A VISION

Photo by CJ Dayrit

4 | CREATING A VISION

Combining the results from the literature study and context mapping study, a vision can be created.

4.1 | From key learnings to a vision for improvement
4.2 | Touchpoints to intervene
4.3 | First ideas and encompassing strategies

4.1 | FROM KEY LEARNINGS TO A VISION FOR IMPROVEMENT

The problem in context

Both the literature and the context study learned that children face a lot of challenges during their hospitalization. It is difficult to tackle all stressors, since these are different per situation and per individual. Care workers try their best to minimize the stressors and assist children, mainly during the preparation phase. Sometimes interventions are used to assist, mainly focusing on short-term distraction during a medical action and in many cases only used when a child is already (classified as) extremely stressed.

For a large group of children, care is therefore inadequate in this area. Mainly in the recovery phase, in which medical actions are often not intense, but are experienced as such by children. In addition, current care often ignores the impact that the unfamiliar and contrasting environment and daily routine has on the child. Missing the 'normal life', in which playful experiences and social contacts with peers play an enormously important role, is paramount for children. This is not yet adequately addressed in hospitals. An attempt is made by creating play areas, but for many children this is unattainable due to contact isolation or being bedbound. This is another challenge, highly (negatively) influencing the emotional state of a child.

Only facing challenges without enough positive boosts can create a negative mental spiral. In this way, the brain goes into alarm mode and it is difficult to be resilient. Hence, neutral stimuli come across as threatening and the pain sensation is increased. As a result, a child experiences more and more stress and it becomes increasingly difficult to endure the situation.

A vision towards improvement

Turning this around, the research learned that a more positive emotional state could positively contribute to resilience to cope with (the variety of) challenges and to endure the though circumstances. A more comfortable and more positive hospital experience could be provided.

Considering the wide variety of stressors and the unpredictability and individual-specifity of challenges, it is envisioned to not intervene on a specific challenging moment (e.g. during a medical action), but on the time in between. It is envisioned that a positive emotional state during the day could foster resilience for the moments when it is needed, which can differ per child. Instead of a downward line, a wave movement or mental balance should be created in this way. Positive boosts can foster the ‘resilience balance’, supporting to better bear the impact of challenges.

The next step is to further investigate how this positive state can be achieved in hospitalized children during the day: determining a core intervention strategy. The literature and context study already revealed the possibilities within incorporating familiarity, peer contact and playful experiences. This will therefore serve as the starting point for further research towards the strategy. The research towards determining the core intervention strategy will be subject of Chapter 5.

KEY TAKE-AWAY: VISION

Creating a positive emotional state during the day strengthens resilience for the moments when it is needed.

Targeting the emotional state instead of a specific situation, makes it possible to support children in a variety of stress-inducing challenges, disease-transcending and personal, which is desirable.

4.2 | TOUCHPOINTS TO INTERVENE

Keeping the studied context and developed vision in mind, the journey of a (general) hospitalization was further examined to identify possible touchpoints at which there would be opportunities to use an intervention. Figure 19 shows the indicated touchpoints. Considering the limitations and possibilities of timing and duration, the incidende and impact of challenges, and already existing support opportunities, the preferred touchpoint to intervene is during the recovery phase. However, there are possibilities (but not necessities) that part of the intervention can be used in a certain way at the two other identified phases, e.g. by having a warm up in the first phase and/or a moment to process in the last phase.

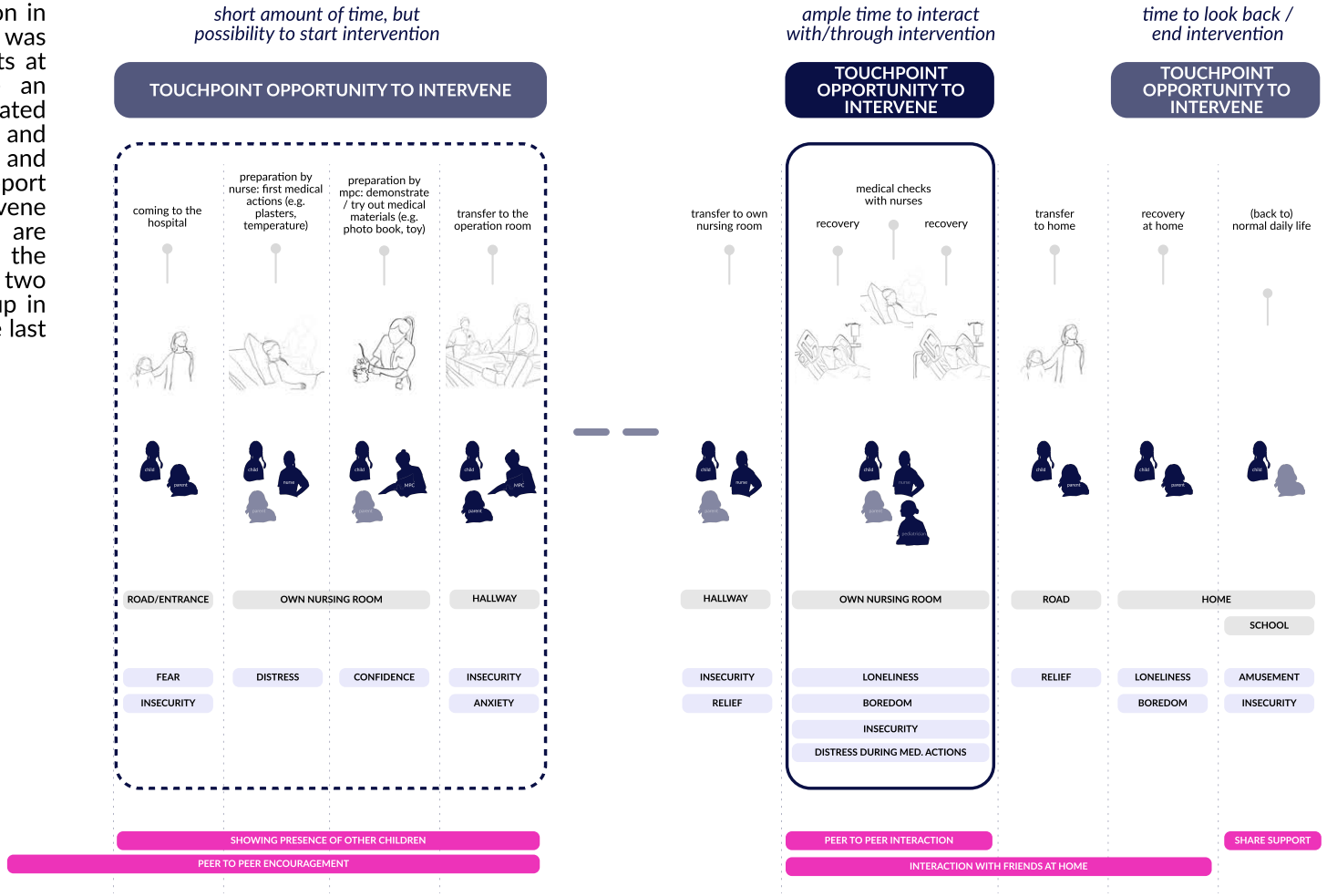


Figure 19: Possible touchpoints to intervene

4.3 | FIRST IDEAS AND ENCOMPASSING STRATEGIES

The knowledge gained from the literature and the context has already provided inspiration for a number of ideas. This marked the start of an explorative idea generation for possible solutions to offer pediatric patients a more positive, cheerful or relaxed state in order to suppress or overcome feelings of stress. For each idea it was described which 'problem' it is aiming to tackle. For each idea, it was also indicated with keywords how the problem would be tackled. This makes it easier to derive encompassing strategies from ideas, which in turn can give direction to the project. The ideas are explained in more detail in Appendix F.

To prevent tunnel vision and to challenge further thinking about the ideas, Edward de Bono's PMI method was used. For each idea, a Plus, Minus and Interesting point were written down. This help to thoroughly examine the idea and the situation and makes it possible to look at it from multiple perspectives. This provides a better understanding of the situation and brings inspiration for new ideas or adjustments to originals.

Subsequently, it was examined which overarching purposes, or strategies, to create a more positive state and to tackle stress feelings underlie the ideas (Figure 20). Although the ideas differ from each other, they can be grouped together into four core 'approaches':

- Strive for (the feeling of) peers around
- Strive for (the feeling of) own or familiar territory
- Strive for playful and dynamic distraction
- Strive for positive memory retrieval/processing

These approaches do not have to exist separately from each other, but can reinforce each other. Ideas can also be linked to several approaches, but in the overview they are linked to the approach they mainly use. Already creating a few ideas helps to make the vision come to life and guide and inspire the (research towards) determining the core intervention strategy.

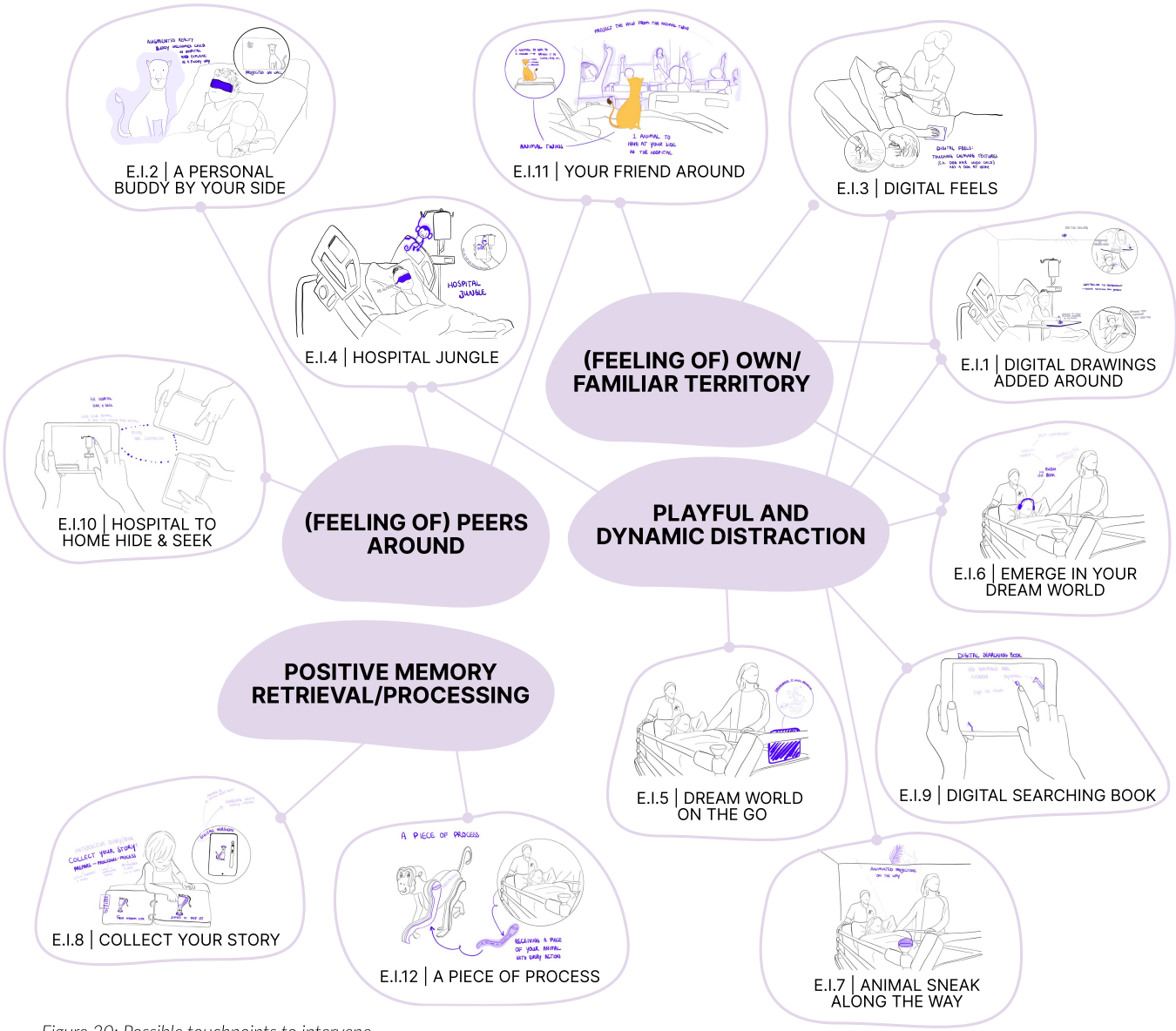


Figure 20: Possible touchpoints to intervene

5 TOWARDS A STRATEGY

Photo by Jorge Franco

5 | TOWARDS A STRATEGY

5.1 | Exploring children's joyous experiences
5.2 | Method: Activity booklets for hospitalized children
5.3 | Method: Make-and-say sessions
5.4 | Joyous experiences presented by children
5.5 | Core intervention strategy

The vision *Creating a positive emotional state during the day strengthens resilience for the moments when it is needed*, leaves room for more in-depth research: how to create this positive emotional state? This chapter summarizes the research done to determine the core intervention strategy.

Using activity booklets and conducting make-and-say sessions, more knowledge about inducing a positive emotional state in children was collected. From this, the core intervention strategy could be determined.

5.1 | EXPLORING CHILDREN'S JOYOUS EXPERIENCES

Targeted research

To further determine the core intervention strategy, research was done into how a positive state in children can be induced. In the literature and context study, elements were already discussed that could offer possibilities for creating a positive state in (hospitalized) children, including play, peer contact and familiarity. This was therefore used as a starting point for the targeted research.

In order to best match the wishes and perceptions of children, children were also involved in the study here. Data was collected both among hospitalized children, using individual activity booklets (Chapter 5.2), and among children in general, by organizing make-and-say sessions (Chapter 5.3). Hereafter the data was combined to find patterns within selected joyous experiences and underlying motives (Chapter 5.4), to determine a core intervention strategy.

5.2 | METHOD: ACTIVITY BOOKLETS FOR HOSPITALIZED CHILDREN

Get to know each other: Joyous and Comforting Activities

The booklet starts with a number of questions as if they come from a 'friend's book' (Figure 21). These are fairly easy questions for a child, which have been asked in a certain way many times before. This can make the child feel at ease, and in a positive mood: thinking about things that make the child happy. At the same time, the answers to the questions tell more about the child's daily life and joyous experiences/ wishes. These elements that make a child happy or calm can be a source of inspiration for detailing and developing concept ideas aimed at creating a positive state.

Figure 21: Activity booklet, activity 1

Experience and Emotions

The second activity of the activity booklet (Figure 22) has already been discussed in chapter 3, because it was also part of the context mapping study. However, this activity can also provide interesting insights into things that create a positive state. In particular, the parts in purple and the highlighted parts tell more about positive emotions or wishes.

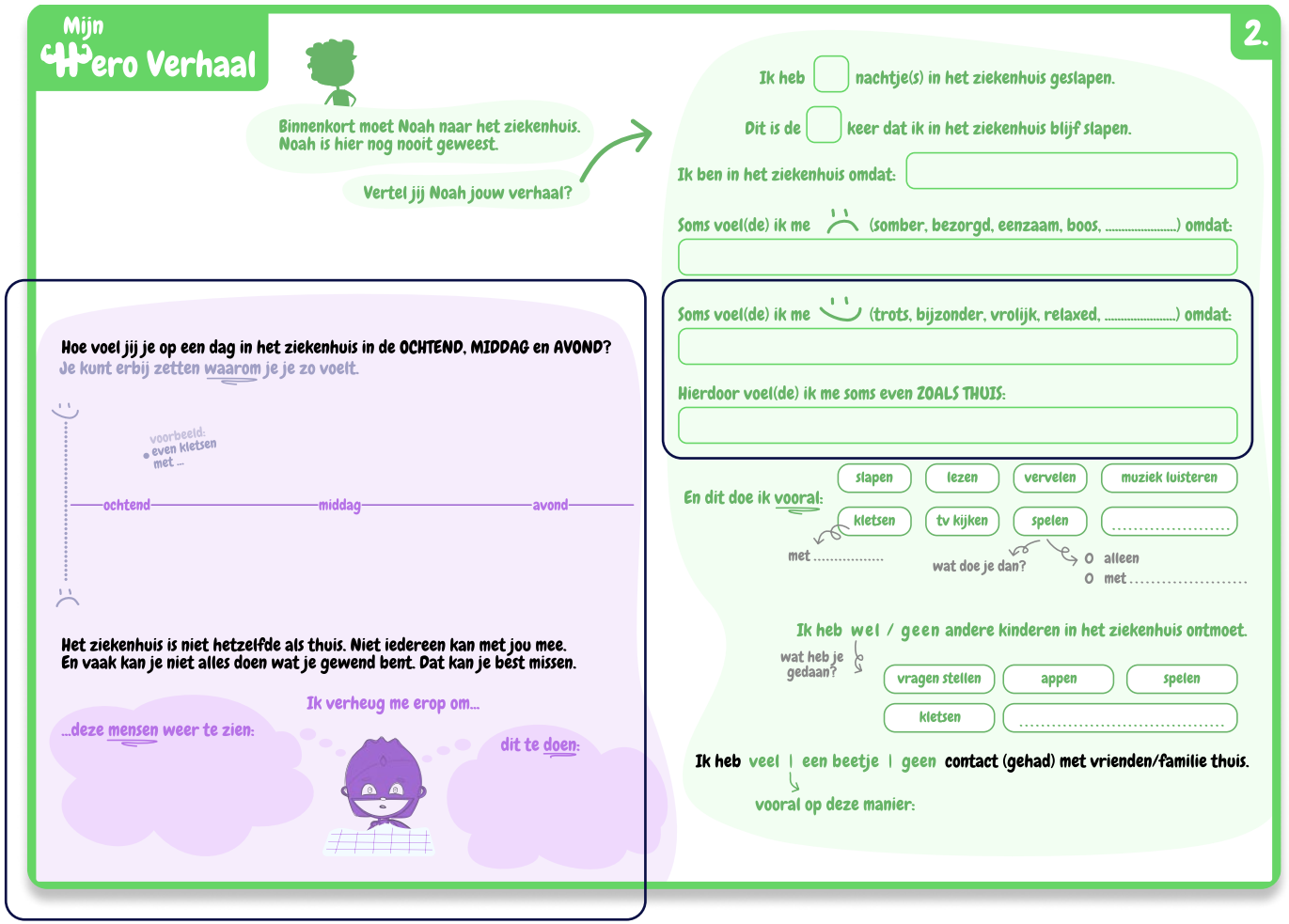


Figure 22: Activity booklet, activity 2

Comfort by Children

The book ends by moving the thoughts to places and moments where children feel good (outside the hospital context) (Figure 23). What kind of activities play a role in this, who are involved and does the location (and time of day) have anything to do with this? Here children are given the freedom to find out for themselves what they find important. It makes clear what could induce a positive state, which can provide inspiration for the detailing and direction of the design ideas, while at the same time preparing the children for the next question: the transfer to the hospital context. If everything is allowed, what would it be like and what would it look like? It will be interesting to see if things come back from everyday life here and if they were also apparent from the answers given earlier. By focusing it on the care context now, new things may come to their mind and may be discussed.

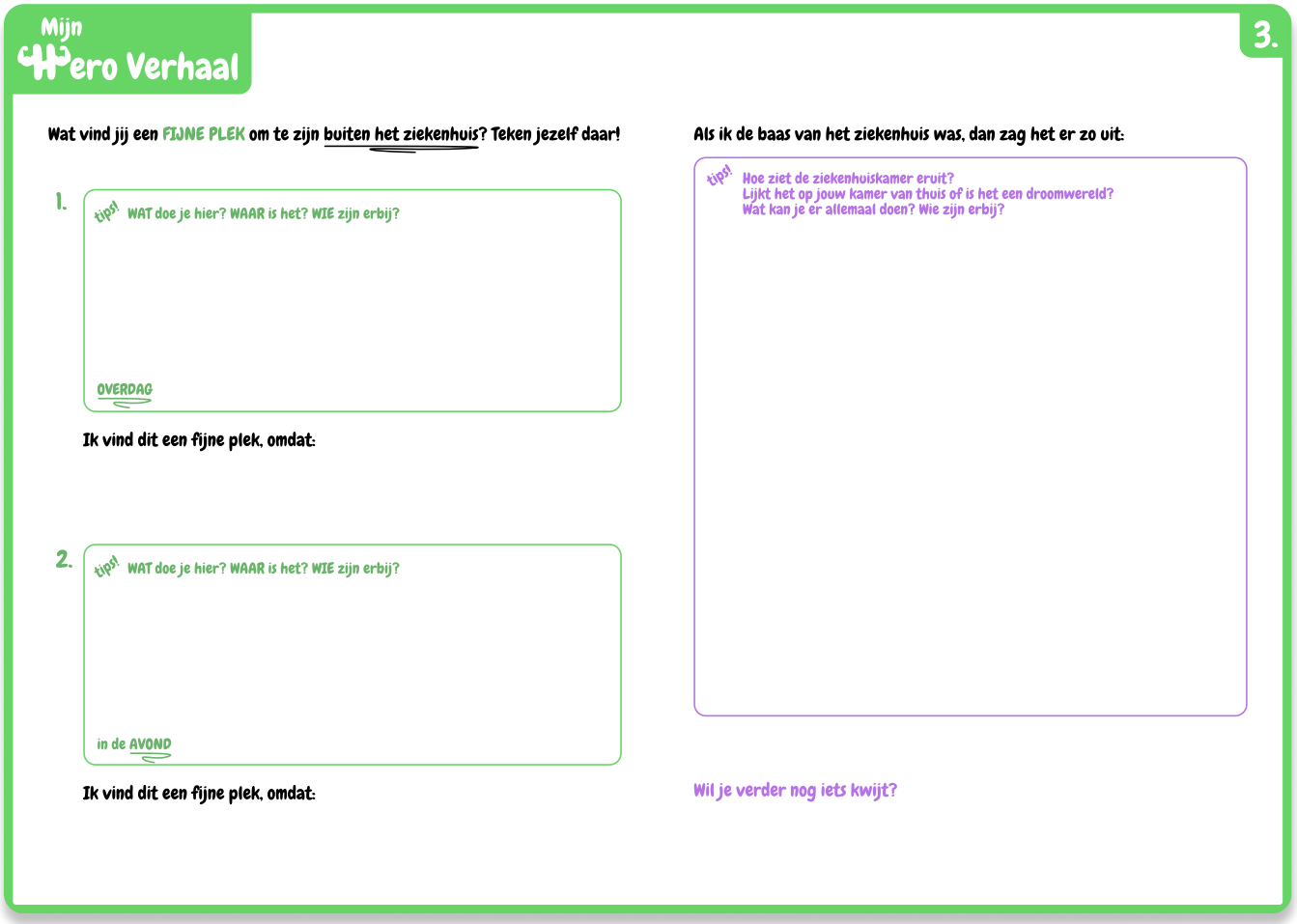


Figure 23: Activity booklet, activity 3

5.3 | METHOD: MAKE-AND-SAY SESSIONS

Background

To learn more about the ways in which children feel good and their preferences regarding play and social contact, make & say sessions have been organised. These took place at the event 'Kennis in de Wijk: Discover the secrets of the children's hospital', as part of the European City of Science programm.

5 task cards were designed to learn more about children's pleasurable experiences. The cards do not only stand on their own, but were also the starting point for conversations with and between children. What are the motives behind the choices they make or the things they bring up? The information that could be gathered from this can provide arguments for the direction of the design, and can provide inspiration for the detailing of the design ideas. By researching this among and with children, an attempt is made to ensure that the final design matches the wishes and perception of children as closely as possible. Ultimately, they will be the ones who should be able find enjoyment from the design.

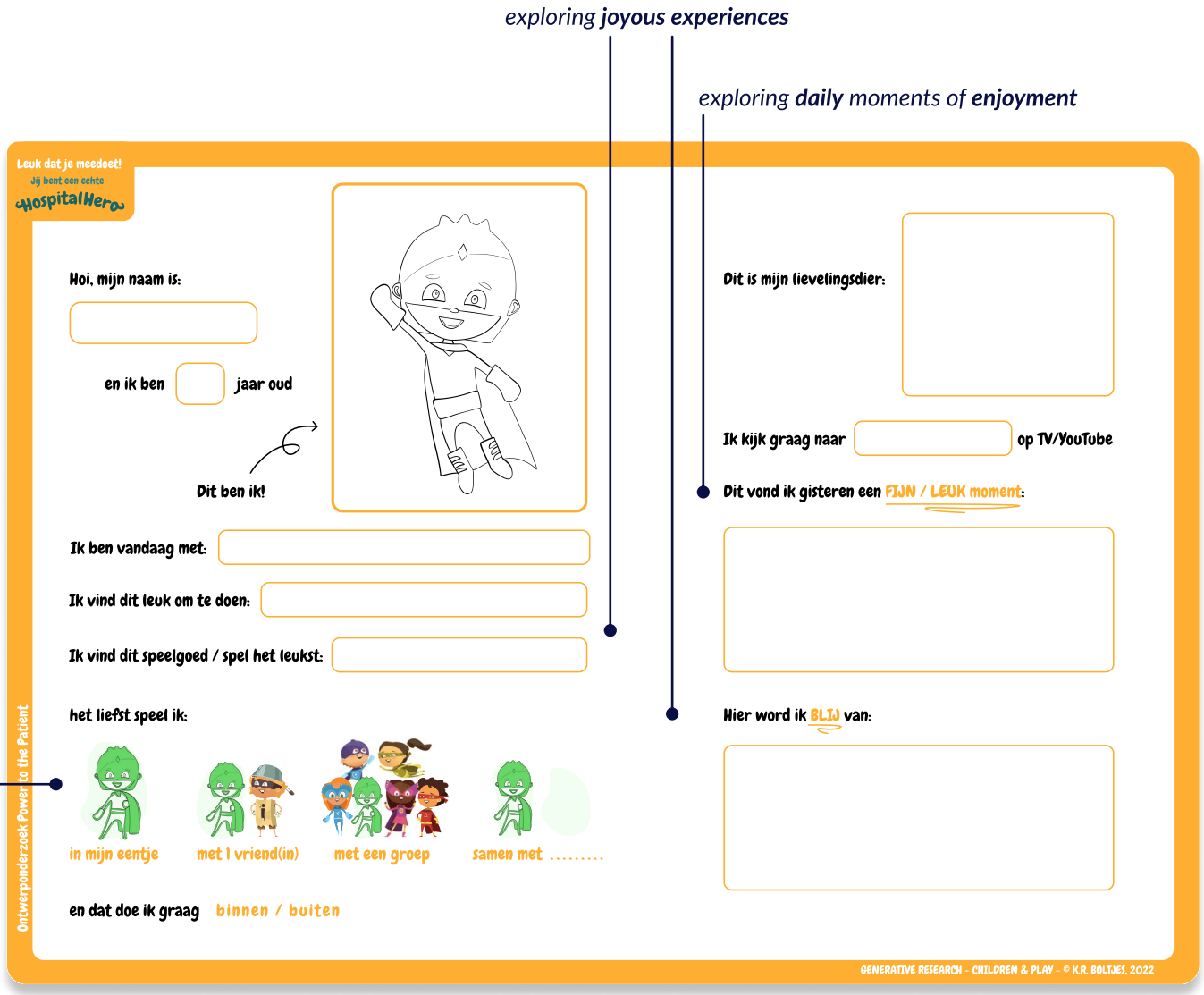


Figure 24: Make-and-say session, task card A

MindMap

The MindMap exercise (Figure 25) allows children to freely express their thoughts on certain topics. This is preferably done with several children at the same time, so that they can respond to each other and inspire each other with the elements they mention. The researcher writes the keywords on the paper of the mentioned elements, and thus has a facilitating role. By acting in this way, it should become clear that the researcher is part of the team, rather than being marked as a 'controller'. Children should get the feeling that they can say everything, instead of looking for the 'right answers'.

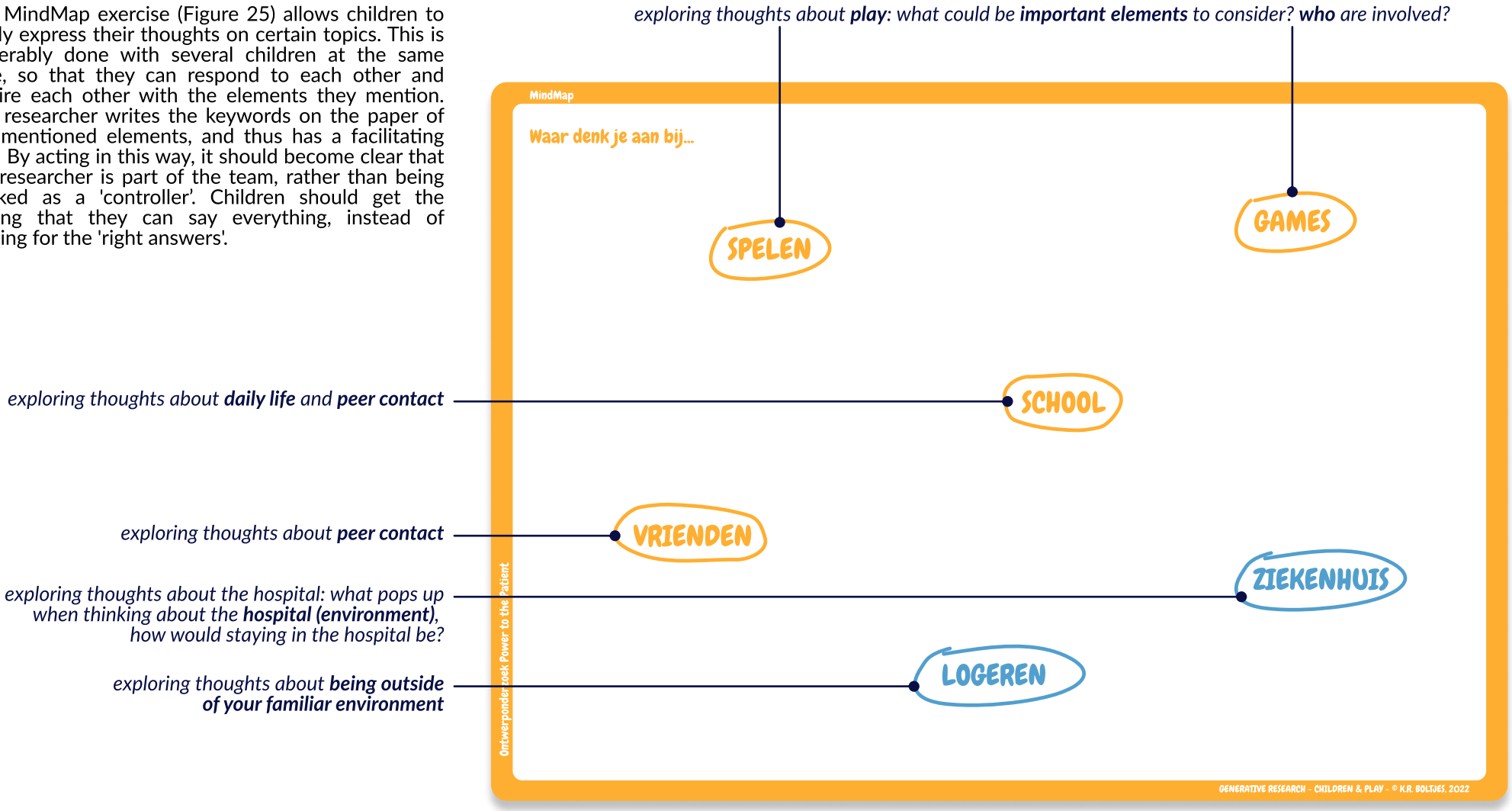


Figure 25: Make-and-say session, task card B

Photo Comparison

The Photo Comparison exercise (Figure 26) zooms in on two contrasts of an element. Where in many cases it can be expected that someone is not completely for one or completely for the other, children are still asked to choose one of the two photos. In this way the child is forced to think about preferences, the accompanying situation and motives. This can be the starting point to discuss the preferences of design elements.

***play together vs. play solo**: this may include thinking about role of the individual, autonomy, belonging, decision-making, stimuli, related activities*

***play in group vs. play in duo**: this may include thinking about social interactions, role of the individual, related activities*

***inside vs. outside**: this may include thinking about comfort, stimuli, nature, related activities*

***calm vs. energetic**: this may include thinking about intensity, related activities*

***digital vs. traditional**: this may include thinking about types of social interactions, related activities*

***physical interaction vs. digital interaction**: this may include thinking about promptness, clarity, possibilities, habituation, related activities*

Figure 26: Make-and-say session, task card C

Joyous Picture Preferences

Task card D shows various enjoyable elements by means of drawn images (Figure 27). This includes forms of play, forms of social contact and other assumed joyful activities. Elements from the ideas of the exploratory idea generation have been added to this. Children are asked to put stickers on the images that appeal to them the most. In a conversation we look for the underlying motives: “Why did you choose this image? Why do you like this? Can you cite an example?” While all elements assumably can bring fun or relaxation, this exercise makes clear where the preferences and accompanied motives of children themselves are about. This brings inspiration and argumentation for detailing the forms of relaxation, play and communication in the ideas.

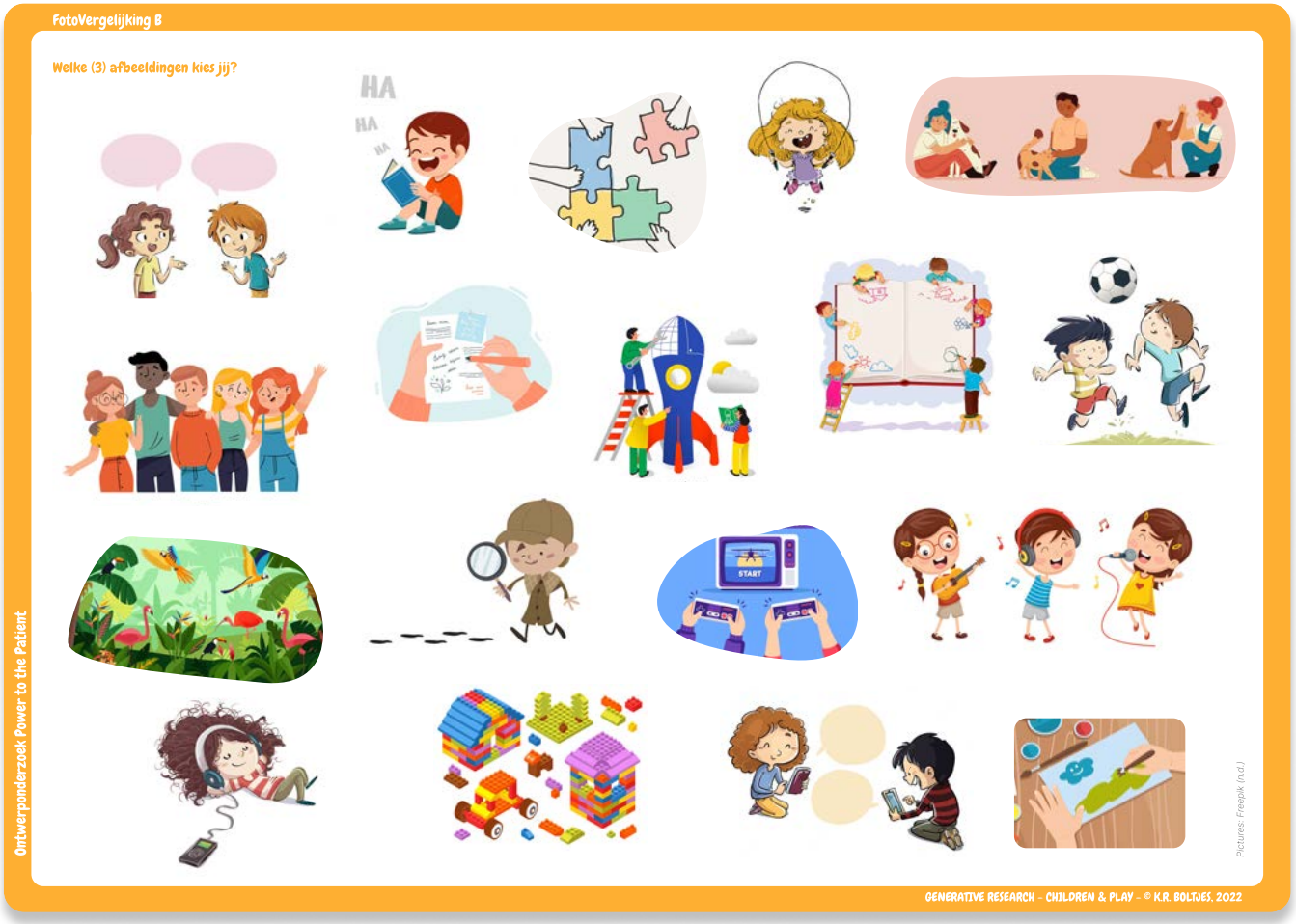


Figure 27: Make-and-say session, task card D

Comfort by Children

The exercises on task card E (Figure 28) try to reveal what are important elements for children that make them feel comfortable. They are asked to describe moments in everyday life when they feel comfortable. The activity, the location and the people present can be considered. The children are also challenged to imagine their 'ideal' hospital. What would they find important in such a situation where they are away from their normal daily activities and normal daily network. If everything is allowed, what would it look like, what could you do, who will be there? These questions can also clarify children's wishes and motives and provide inspiration for detailing the design direction.

especially for children, events during the day really differ from event during the night; therefore both moments are being brought up

Figure 28: Make-and-say session, task card E

5.4 | JOYOUS EXPERIENCES PRESENTED BY CHILDREN

Joyous activities

From activity card 'Joyous Pictures Preferences' and activity 1 of the activity booklet for hospitalized children, joyous activities were selected by children. A total of 10 children provided insights in this way:

- 8 children in the make-and-say sessions. All girls ranging in age from 5 to 10 years old.
- 3 hospitalized children in the activity booklets:
  - *P1, a boy, 11 years old, 6 nights in hospital, fifth time being hospitalized*
  - *P2, a boy, 13 years old, 49 nights in hospital, first time being hospitalized*
  - *P3, a girl, 13 years old, 7 nights in hospital, first time being hospitalized*

The results were superimposed and grouped (Figure 29). This has resulted in a pyramid of elements that were chosen most often to least often. These were analyzed together with the conversations of the participants and from this, four motives emerged that (in this group) are most likely to provide the most joyous experiences:

- Joining a playful activity
- Being intrigued by animals
- Being together
- Escaping reality

Raw data can be found in Appendix G.

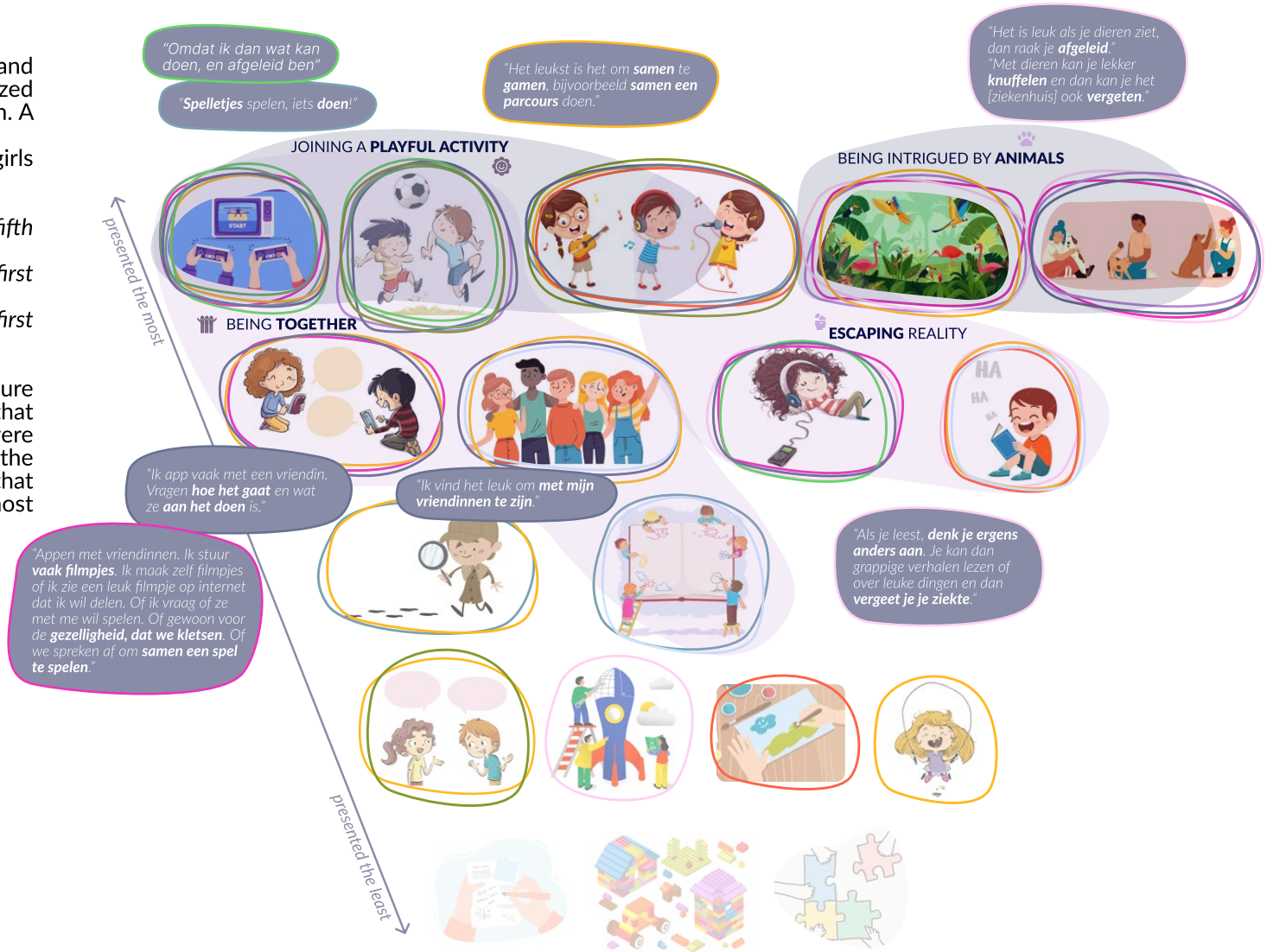


Figure 29: Results selected joyous experiences

Joyous example moments

Different exercises delved into pleasant moments from everyday life and things from everyday life that make children feel happy or comfortable. A total of 10 children shared experiences in this way:

- 4 children in the make and say sessions. All girls ranging in age from 6 to 8 years old.
- 3 hospitalized children in the activity booklets:
  - *P1, a boy, 11 years old, 6 nights in hospital, fifth time being hospitalized*
  - *P2, a boy, 13 years old, 49 nights in hospital, first time being hospitalized*
  - *P3, a girl, 13 years old, 7 nights in hospital, first time being hospitalized*

In addition to the pleasant moments from everyday life, the hospitalized children shared some positivity-inducing moments from their hospital experience. Again, overarching motives were examined (Figure 30), from which the following were identified:

- Joining a playful activity with peer(s)
- Being surrounded by intimates
- Expressing (through) creativity
- Being encouraged from overcoming challenges

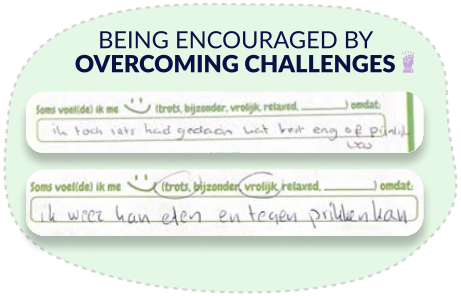


Figure 30: Results shared joyous example moments

The ‘ideal’ hospital

A total of 5 children shared their lights about the ‘ideal’ hospital (Figure 31):

- 3 children in the make-and-say sessions. All girls, ranging in age from 5 to 7 years old.
- 2 hospitalized children in the activity booklets:
  - *P1, a boy, 11 years old, 6 nights in hospital, fifth time being hospitalized*
  - *P3, a girl, 13 years old, 7 nights in hospital, first time being hospitalized*

When talking about the hospital context, two things stand out most. Firstly, children want to be able to **engage in fun activities**, preferably **with other children** both from the hospital and from home. It should be easy and accessible to **meet familiar peers** (friends, family). In addition, according to children, it would be good if the environment reminds you as much as possible of nice places outside the hospital, so that the **thoughts can wander off**.

*“Het is het belangrijkste dat je **gewoon leuke dingen kan doen** en dat je zo je **ziekte vergeet**.”*
- meisje, 7 jaar

*“Je moet een kind niet te ver verontrusten. **Je moet een kind gewoon kind laten zijn!**”*
- vader

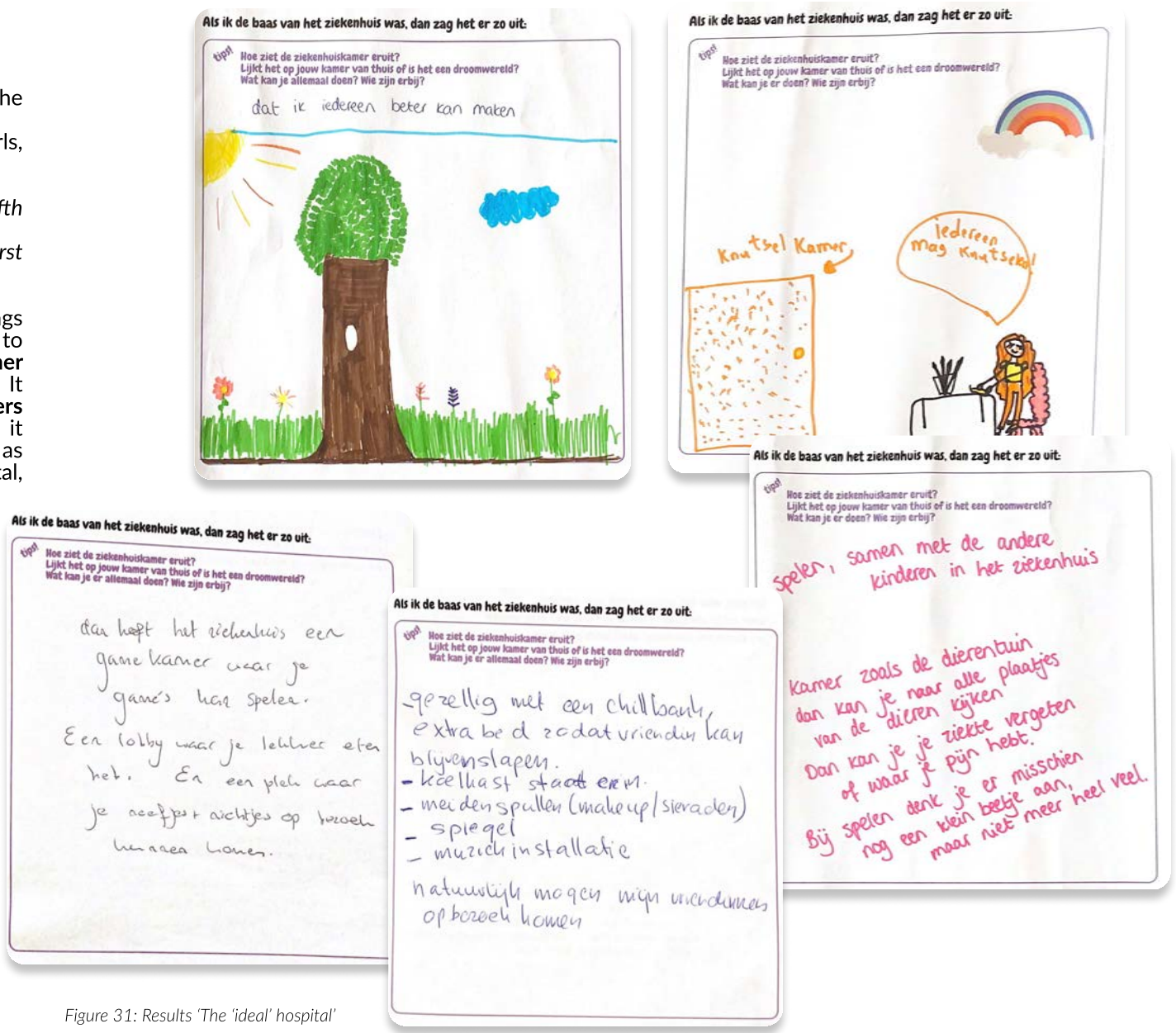


Figure 31: Results ‘The ‘ideal’ hospital’

5.5 | CORE INTERVENTION STRATEGY

Targeted research take-aways

The context study already revealed that it is important for children to continue with normal daily life, in which mainly peer contact and playful experiences play an important role. In the hospital context, this is the opposite of what a child is normally used to: adults instead of peers around them and few opportunities for spontaneous and playful interactions. Where this is now a challenge, the opportunity was discovered to turn this around and use this to foster resilience.

Diving deeper into this theme of joyous experiences the same kind of elements keep coming back. From the targeted research, the following motives are most likely to provide the most joyous experiences (as presented by children):

- Joining a playful activity (with peer(s))
- Being together / being surrounded by peers and intimates
- Being intrigued by animals
- Escaping reality / wandering thoughts
- Expressing (through) creativity
- Overcoming challenges

A strategy towards a valuable design

Combining all insights from the literature study, context study and targeted joyous experiences study, a core intervention strategy could be determined:

Bringing social interaction types from daily life to the hospital context, focussing on playful peer interactions.

Children should be able to engage in these **playful interactions with peers** from the **physical context of their own room**. These peers can be friends from home, as well as peers in the hospital, or combined. In order to have an immediate effect from the individual location, a **digital intervention** will be used. To maintain the playfulness and respond to children's preference for playing games and to provide the opportunity to 'escape reality', design methods for **Playful Design** and **gamification** are considered.

In addition, opportunities to **overcome challenges** will be looked at, since this was also one of the things that helped children develop a positive emotional state of mind.

KEY TAKE-AWAYS

- Elements providing joyous experiences in children:
  - Joining a playful activity (with peer(s))
  - Being together / being surrounded by peers and intimates
  - Being intrigued by animals
  - Escaping reality / wandering thoughts
  - Expressing (through) creativity
  - Overcoming challenges
- Core intervention strategy:

Bringing social interaction types from daily life to the hospital context, focussing on playful peer interactions.

- This experience should be accessible from the context of the own hospital room. Therefore, a digital intervention will be used.

6 DESIGN BRIEF

Photo by Unseen Studio

6 | DESIGN BRIEF

6.1 | Summary of research insights
6.2 | Design brief

This chapter first provides a summary of the research insights of the previous phases. From the insights on challenges and resilience, a design goal is formulated. The design brief and design methods help to give direction towards a valuable design intervention.

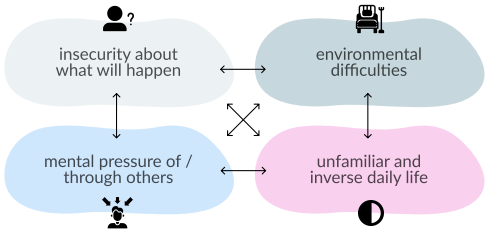
6.1 | SUMMARY OF RESEARCH INSIGHTS

literature study

context study

in-depth study with children

There is a variety of hospitalization-related factors inducing fear and stress responses (Chapter 2.2), roughly divided into 4 themes:



Due to the wide variety of stress factors and the complexity of differing factors per individual, it is difficult to effectively provide a less stressful experience in pediatric hospitalization by only responding to stress factors themselves.

Stressors should be minimized, but more importantly, should be able to **(mentally) overcome**.

Resilience is thus needed to be able to deal with the challenges and endure the though circumstances. **Self-esteem, self-efficacy and coping skills** influence resilience level. These elements are **impacted by emotional state**.

Frequently occuring factors in the children's hospital that negatively influence emotional state are *accumulation of (minor) medical procedures*, *unfamiliar daily routine and environment*, *not being able to play*. This is strengthened by *lack of peer-interactions* and *restricted mobility* (i.e. contact isolation, being bedbound).

A **positive emotional state** on the other hand, helps to manage stress and anxiety and boosts self-esteem, self-efficacy and thus resilience.

A positive emotional state in children can be **evoked by *playful experiences* and *peer-interactions***.

Familiarity, *being able to (mentally) escape reality*, *overcoming challenges*, *animals* and *being able to express yourself* also contribute to a positive emotional state in children, boosting resilience.

creating the design brief

Figure 32: Summary of research insights leading to the design brief

DESIGN GOAL

Design an interactive digital social game for hospitalized children that fosters a positive emotional state in children, by integrating peer-contact and familiar social play.

Function

As described in the vision and strategy, the most important function of the interactive game should be to create a positive emotional state in children in order to foster resilience and empower children during their short stay in the hospital.

Target group

The main target group includes children (7-12 years old) that are in a short-stay (i.e. 3-5 days) hospitalization. The final design might include other people (i.e. friends from home, siblings) as well.

Transfer effect

Even though a transfer effect description as described by Visch et al. (2013) is more used in persuasive game design, it could provide clarity in this design brief:

Effect type: Fostering resilience to better cope with hospitalization-induced challenges and difficult circumstances
Change type: The game helps to empower children by creating a positive emotional state
Point of impact: The users will engage with the game for 3-5 days but transfer effect should be achieved either directly during or shortly after having an interaction with the game
Domain: Within short-stay pediatric hospitalization

Context of use and implications

The primarily context of use will be the personal hospital room of the hospitalized child (user). It is important that children are not required to leave their room or be of great mobility to make the game accessible for every hospitalized child. Hence the game should be able to play from a mobile phone or tablet, to make it as easily accessible as possible. *Most hospital rooms have a tablet that the child can use freely. In addition, most children have (access to) a smart phone.* The game should be playable at any time so when integrating social play, the asynchronous timelines of the players should not play a disruptive role. It is expected that the game primarily will be played during the recovery phase. The game should therefore preferably remain fun and playable for several days.

Involved parties

The design will certainly take the effect on people closely related to the target group into account. This includes:

- Parents During a hospitalization, parents are constantly near the child. They are often the only ones allowed to have contact. Parents therefore have an important role, in which they often have to take on the role of play, distraction, calming and social contact. This can be tough for parents, as they are under mental pressure themselves. By offering children social contact and play in a different way, with peers, parents can also find some relaxation.
- Healthcare workers Since the context of use is the hospital room, healthcare workers are also involved. The healthcare employees should therefore preferably know about the game, so that they can help with the introduction. Healthcare workers are very busy, so this shouldn't take up too much of their time. In addition, it would be desirable if they get something in return; given the focus on resilience, the game could include a function of a conversation starter. It must be made clear that the design is not a replacement for (medical pedagogical) healthcare workers, but an addition to provided healthcare.
- Hospitals Of course, the design must not be harmful for hospitals and their supplies. In addition, it must take into account that the design must not impede either the condition and care of the user, or that of other children and visitors in the hospital, or harmfully interfere with the work of healthcare workers. Hospitals could actually benefit from the design because a design focused on stress reduction can contribute to the completeness of health that is taken into account by that hospital.
- Stichting Hospital Hero The design must make a valuable contribution to the tools of the Hospital Hero Foundation. In any case, this is already aimed for by expanding support for outpatient care (current Hospital Hero app) to support for hospitalization. It would be beneficial if the design can be easily linked to the Hospital Hero Foundation to strategically strenghten the position of the foundation. This can for example be established by creating a sense of similarity in certain design aesthetics.

Figure 33: Important elements to consider in the design

Design strategy elements

From the research a couple of design elements (Figure 33) are selected that should or could be integrated in order to fulfil the goal and function.

The core design elements should be
- ***Integrating peer-interactions***
- ***Integrating playful experiences***

Enhancing design elements could be
- *Bringing in familiarity;* enhancing familiarity, e.g. by connecting to intimates/social circle
- *Escaping reality;* minimizing the stressor of a serious unfamiliar environment
- *Overcoming challenges;* assisting children in overcoming specific challenges and enhancing the pride from overcoming a challenge
- *Integrating animals;* targeting a joyous experience presented by children and making a connection with design elements from the previously developed Hospital Hero app©
- *Expressing (through) creativity;* providing a personal element wherefore children feel in control (need for autonomy), e.g. over the environment

Design methods

Playful Experiences Framework
As described, one of the core design elements is that the design must offer a playful experience. The Playful Experience (PLEX) Framework, originally drawn up by Korhonen (2009) and revised in 2010 by Arrasvuori et al., was created to offer designers a tool to put playful experiences into a design. This framework consists of 22 Playful Experience categories, and embroiders on the pleasure framework of Costello and Edmonds by combining it with insights from studies on games.

The framework can provide directed inspiration for the design. Keeping the previously discussed design strategy elements in mind, the greatest potential is expected by integrating (one of) these ten categories: *captivation*, *challenge*, *competition*, *discovery*, *exploration*, *fantasy*, *fellowship*, *humor*, *relaxation*, *submission*.

In addition to providing guidelines for designing for playful experiences, Arrasvuori et al. (2010) describe that this framework also has the potential to provide inspiration for facilitating social interactions with design (e.g. by looking into integrating an experience of *competition* or *fellowship*).

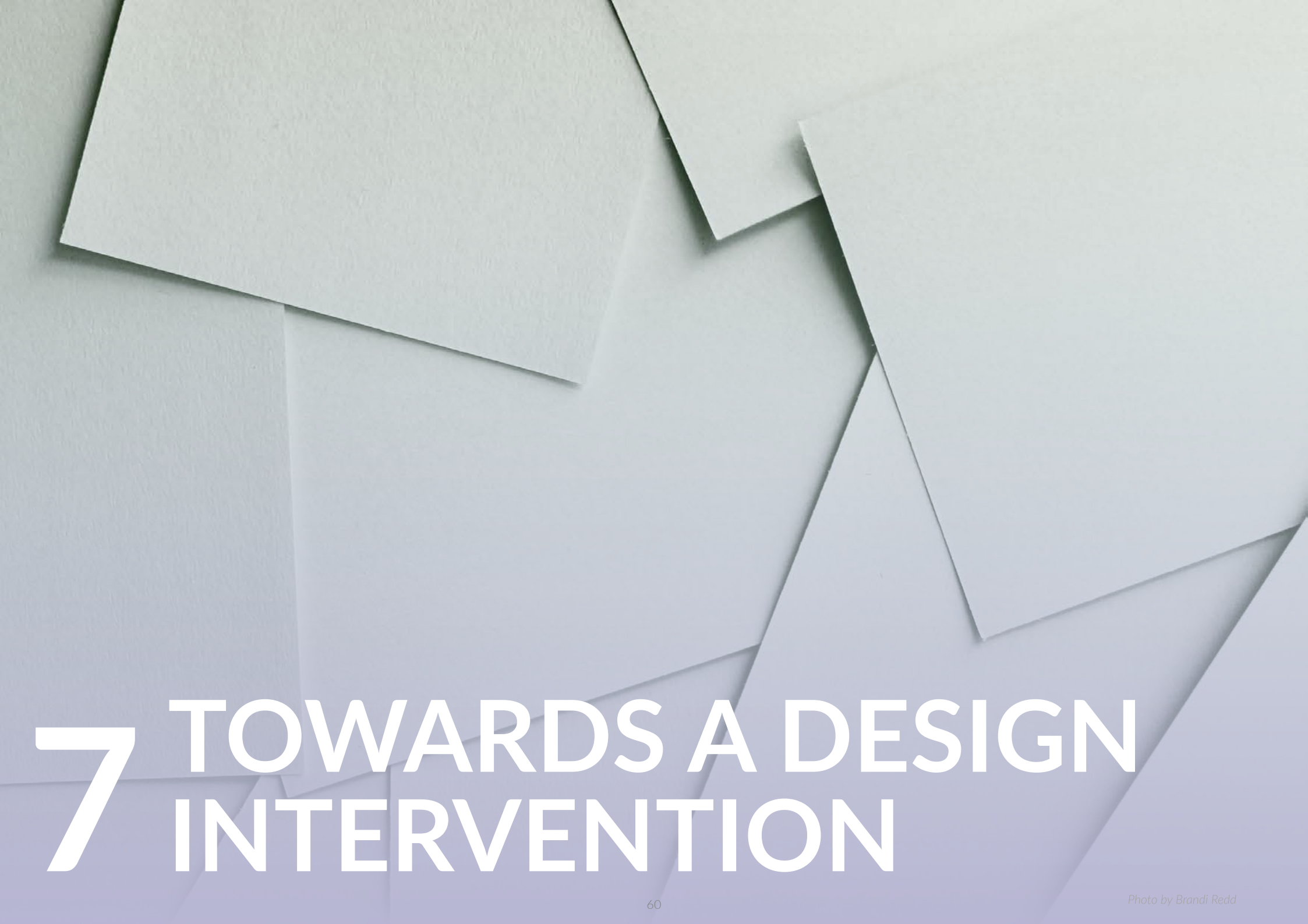
Game design
The fulfillment of needs contributes to wellbeing (Desmet & Fokkinga, 2020) and thus influences (a positive) emotional state. Where needs cannot always be fulfilled in reality, and where this certainly plays a role in children and in hospitalization (such as limited autonomy (*self-expression*)), a game can be designed in such a way that these needs are actually addressed (Visch et al. , 2013). Elements from the PLEX framework can be integrated as game-elements. A game world provides opportunities for joyous, immersive experiences in a safe way (Visch et al., 2013).

Storytelling
The use of storytelling can potentially provide added value to the design. After all, a narrative can offer opportunities to interweave or combine elements of playful design with the design. For example, a storyline can cause thoughts to wander (captivation) and an imaginary situation can be presented (fantasy). Interaction with stories can further support understanding the world around us and the world within: thoughts and feelings (Visch et al., 2021). Storytelling can therefore be a means to integrate the design elements of playful experience, escaping reality and overcoming challenges, and can also play a role in the integration of the other design elements, e.g. using animals as characters.

Experience category	Brief description: the Playful Experience emerges from…
Captivation	Forgetting one's surroundings
Challenge	Testing abilities in a demanding task
Competition	Contest with oneself or an opponent
Completion	Finishing a major task or reaching closure
Control	Dominating, commanding or regulating
Cruelty	Causing mental or physical pain
Discovery	Finding something new or unknown
Eroticism	A sexually arousing situation
Exploration	Investigating an object or situation
Expression	Manifesting oneself creatively
Fantasy	An imagined situation

Experience category	Brief description: the Playful Experience emerges from…
Fellowship	Friendship, communality or intimacy
Humor	Fun, joy, amusement, jokes or gags
Nurture	Taking care of oneself or others
Relaxation	Relief from bodily or mental work
Sensation	Excitement by stimulating senses
Simulation	An imitation of everyday life
Submission	Being part of a larger structure
Subversion	Breaking social rules and norms
Suffering	Loss, frustration or anger
Sympathy	Sharing emotional feelings
Thrill	Excitement derived from risk or danger

Figure X: Playful Experience (PLEX) Framework (Korhonen, 2009; Arrasvuori et al., 2010)



7 TOWARDS A DESIGN INTERVENTION

Photo by Brandi Redd

7 | TOWARDS A DESIGN INTERVENTION

An iterative design process followed the design brief. This chapter describes the most important iterations.

7.1 | IDEATION
7.2 | TOWARDS A DESIGN CONCEPT
7.3 | CO-CREATION SESSIONS
7.4 | ITERATIONS BASED ON CO-CREATION
7.5 | FURTHER ITERATIONS

7.1 | IDEATION

Iterating on preliminary ideas

It was intended to include children in the design part of the design process. However, to just leave them with the design goal is too difficult and probably ineffective. Therefore a design concept would be created first, which could then be used as a starting point for further iteration in co-design with children.

Ideation was needed to come up with this concept. In an earlier stage, 12 ideas have been created. These were used as a starting point for further ideation, with now a specified design strategy in mind.

DESIGN GOAL

Design an **interactive digital social game** for hospitalized children that **fosters a positive emotional state** in children, by integrating **peer-contact** and **familiar social play.**

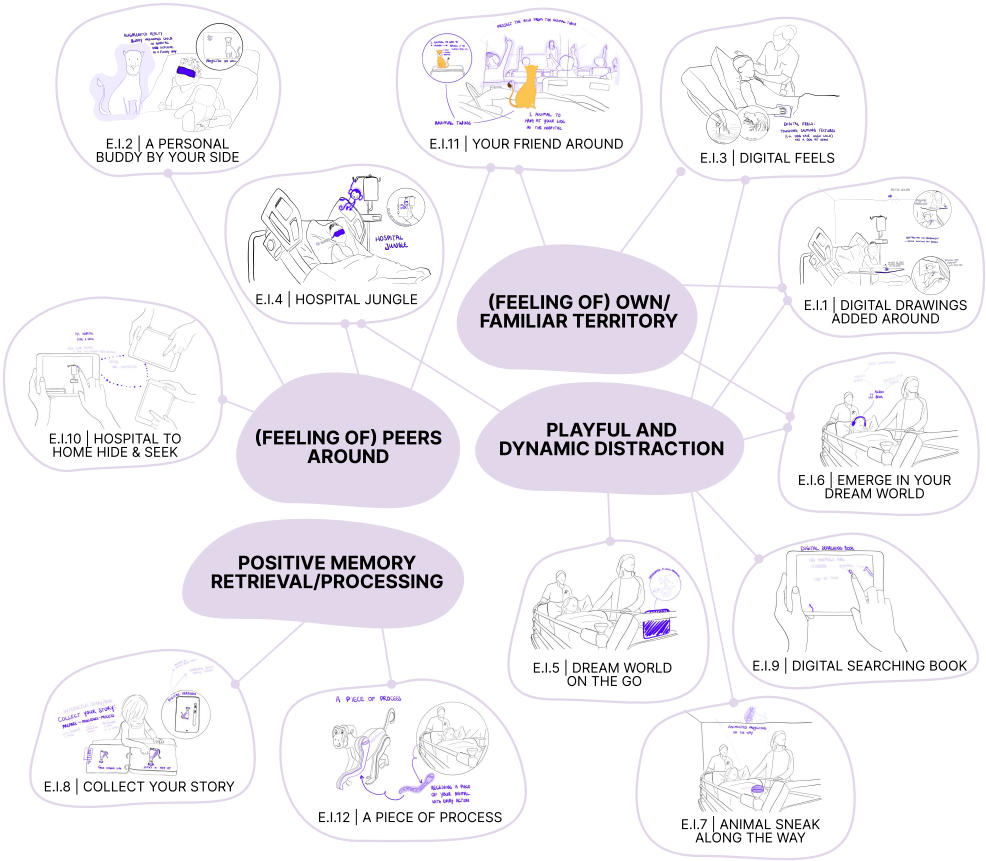


Figure 34: Iterating based on the formulated design goal and earlier developed design ideas

Further brainstorm activities, e.g. ‘How could you...?’, were done to challenge myself to come up with innovative ideas or iterations. The following figure provides an overview of a personal brainstorm session. Inspiration was found from multiple things, for example from mental health (children’s) books.

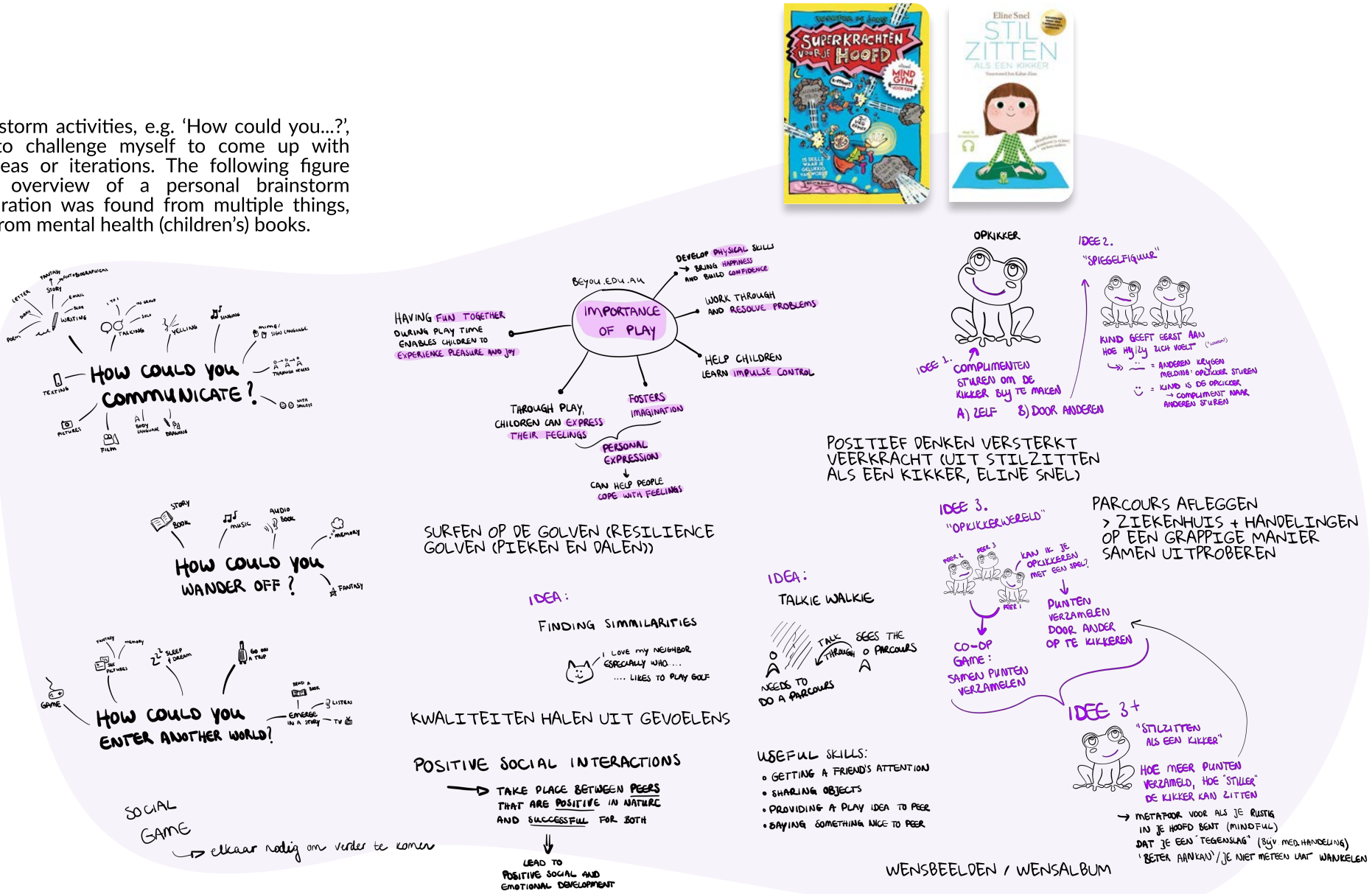


Figure 35: Brainstorm

7.2 | TOWARDS A DESIGN CONCEPT

Design concept 1: Hospital Hero Quartet

A first design concept of a social game was created: Hospital Hero Quartet. This digital game was inspired by the traditional quartet games, by having to collect four different versions of a card. However, instead of collecting the four cards physically and being rewarded with a pile of cards (as traditionally), in this game the user tries to collect the four versions of the card to win a super power. The super powers are related to animals and provide skills or helping thoughts for real-life hospitalization challenges.

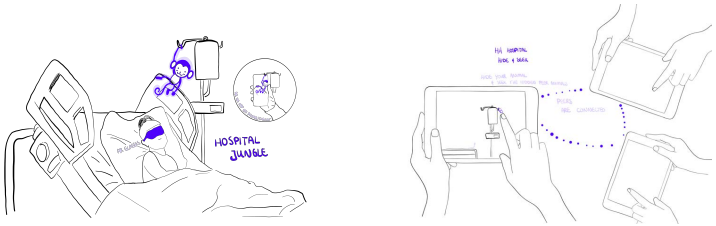
For example, a cameleon can differ in color, however even though it's appearance might change, it stays the same animal from the inside. This is one of the helping thoughts the cameleon tells on the cameleon cape card.

In order to receive the super power element (e.g. the cameleon cape), all four skill cards of the cameleon should be collected. The user can receive a card by another player and can send cards to other players by trading, asking or sending double cards away.

Figure 36: Impression of design concept 1

Design concept 2: Animal Hide & Seek

Design concept 2 was inspired by preliminary designs 4 and 10. In Animal Hide & Seek, children play a digital game of hide-and-seek with the animal collection of the Hospital Hero Foundation. The user wants to collect as many animals as possible to make the hospital room look more like a zoo. The animals are hidden in the hospital: in hospital rooms, hidden by a peer, and in the hallways, where peers need to work together to reveal the animal.



E.I.4 | HOSPITAL JUNGLE

E.I.10 | HOSPITAL TO HOME HIDE & SEEK

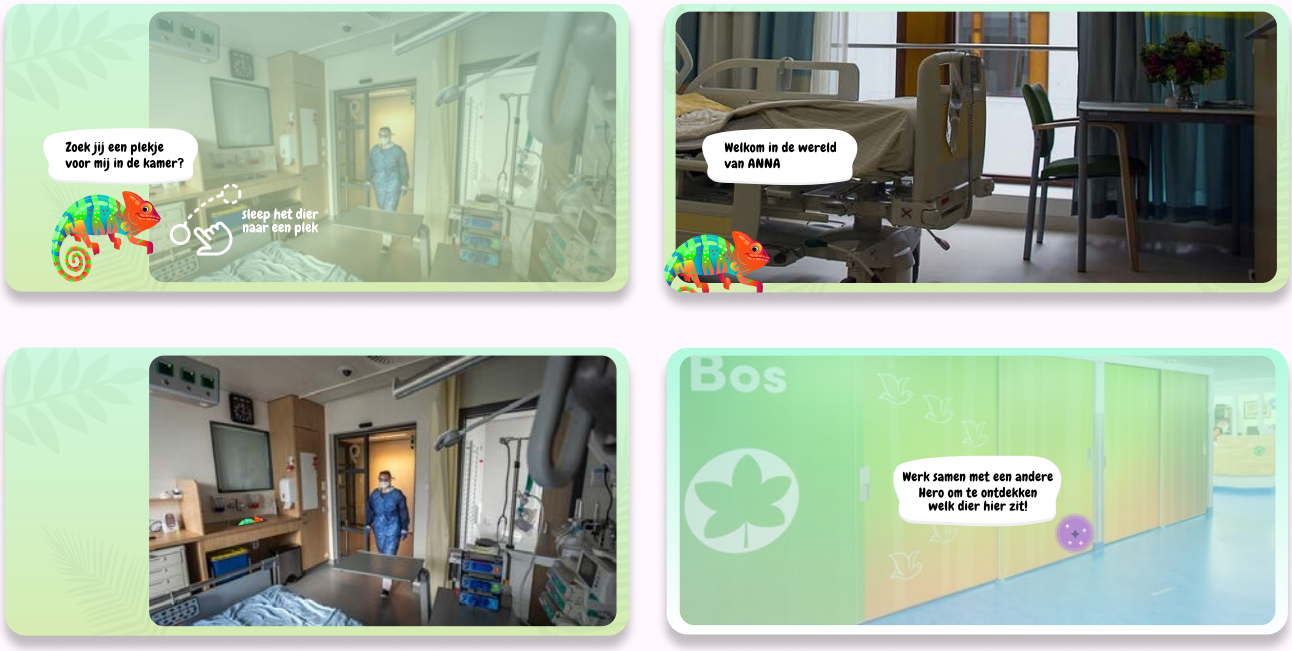
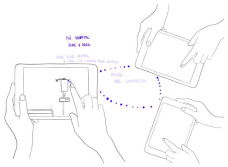


Figure 37: Impression of design concept 2

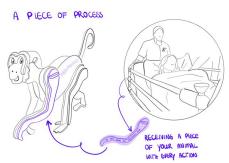
Design concept 3: Wiens Wereld

By taking another critical look at the design goal, an iteration was done in which the previous two design concepts were combined, based on a combination of three preliminary design ideas. This resulted in Design concept 3. In this game, children play a **hide-and-seek** game where they collect **animals that all carry helpful thoughts** in a humorous way. The child may find animals in the rooms of hospital peers or around friends at home. The found animals may subsequently be hidden by the player in their own room. With this, the player creates the playing field for another child. The skills found with the super animals are converted into a **super attribute or item of clothing that is added to the player's character**.



E.I.10 | HOSPITAL TO HOME HIDE & SEEK

A game played between peers: children can hide an animal and seek for animals hidden by peers



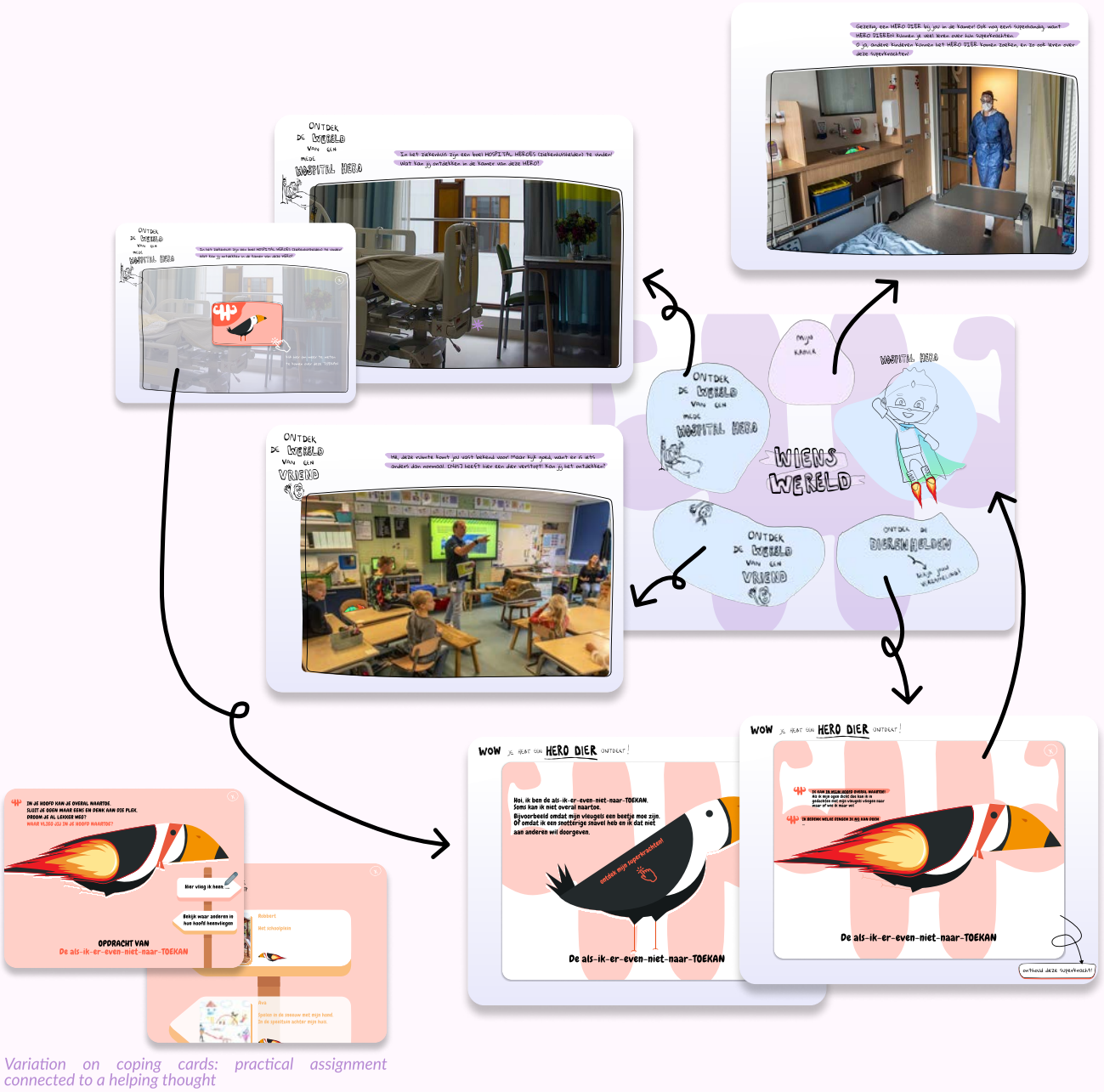
E.I.12 | A PIECE OF PROCESS

Emphasizing challenges that the child has overcome

Collecting things along the way

E.I.4 | HOSPITAL JUNGLE

Transforming the child's hospital room into a less seriously-looking environment



Variation on coping cards: practical assignment connected to a helping thought

Figure 38: Impression of design concept 3

7.3 | CO-CREATION SESSIONS

Motivation

Design concept 2 and concept 3 both use hide-and-seek as core game strategy. Collecting things ties in well with interests in this age group (e.g. *Pokémon Go*, Geocaching). The search fits well with Hospital Hero's current strategy, as used in a physical way in the waiting room game in the Hospital Hero app. Therefore, the core game mechanism is the basis for further thinking. Since concept 3 includes more of the pre-determined design qualities (play and overcoming challenges) this concept was used as the starting point for the co-creation sessions. At the same time it provides enough latitude for explorations in different areas:

- Creating a balance in searching/finding; not too easy, not too difficult
- Strengthening social interaction by going beyond space, for example by adding personal messages or hints
- Coherence and engagement: storyline/humor
- Adding a personal element

These are demarcated directions where inspiration from children can come in effectively. By actively involving children in the design process, there is a greater chance that the final design will better reflect the children's perception of the world. Therefore, three co-creation sessions were organized at a primary school.

In the sessions, it can be evaluated whether the core game element of hide-and-seek might indeed provide a playful experience, what kind of interactions derive from this game mechanism and what points should be further iterated on. In addition, the sessions should try to bring inspiration for further iterations and possibly additional design elements.

Method

3 co-creation sessions were organized at a primary school (Figure 39). Each session consisted of a group of four children, selected by their teacher (e.g. whether they dare to express their opinion). A total of 12 children participated:

3 x 4 children *30-45 minutes per session*
9 to 13 years old *grouped by age*
8 girls, 4 boys *mixed in each group*

During the session, the interactive prototype of design concept 3 was not used, so that children would not be too limited in their imagination. Instead, the core game mechanic was taken and carried out in reality: kids were given a small plush toy that acted as their animal to hide and seek. By using this toy animal (plushie), the imagination could be stimulated further; a toy animal could do anything, like a kind of robot.

The following activities were predetermined:

- *Observation: 2 people hide their plushies, each in their own area. 1 child will search in each area.*
- *Observation: 1 child hides a stuffed toy. The group will then search together.*
- *Superpowers: Suppose the hidden plushie was a robot. What should that robot be able to do to help you search? And what to help you hide? Why?*
- *Suppose your search plushie was a robot. What does that robot have to be able to do to help you find the hidden cuddly toy? Why?*
- *How can you let someone else know where the plushie is without saying so? How can you give hints? Why?*
- *How can you let us know that you have found the plushie? For example, what would you leave behind? Why?*
- *Which superpower would you like? If you have to trade that superpower with someone now, who are you going to trade it with, and why?*

Figure 39: Impression of the activities of the co-creation sessions, above: playing hide-and-seek (core game mechanism), below: brainstorming

Results & insights

Firstly, all participants were very enthusiastic about the hide-and-seek game. Kids of all ages enjoyed doing it and really got into a smiling, enthusiastic and positive state, implying that the core game mechanism of hide-and-seek provides a playful experience.

The following three word webs (Figure 40) represent an overview of the results of observations and brainstorming questions. These provide inspiration for detailing and exapnding the digital hide-and-seek play to make it more engaging and to enhance the connection to peers. **Time** and **access to hints** appeared important elements to balancing the difficulty of search. Further, a **competitive element** could potentially enhance the playful experience. A variety of **skills** were mentioned to incorporate to stimulate variety and play. **Leaving a mark or a message** could contribute to connecting the hiding spot or found animal to a fellow peer.

The co-creation sessions appeared to enthuse design thinking in children and a further brainstorm was started, both related to design concept 3 and beyond. This brainstorm provided more insight into **wishes of children regarding a (game-play) intervention** for the hospitalization context. Mentioned ideas are presented in the idea cloud on the next page (Figure 41). It was tried to find patterns in the collection of ideas to unravel (a hierachy in) desires and underlying motives. For example, the importance and desire for (practical) emotional support, following a storyline, playing from a first-person perspective (through the eyes of an animal) and variation emerged. Not all these aspects emerged in design concept 3, so this inspired further iteration to enhance the design to be more in line with the perceptions and desires of children.

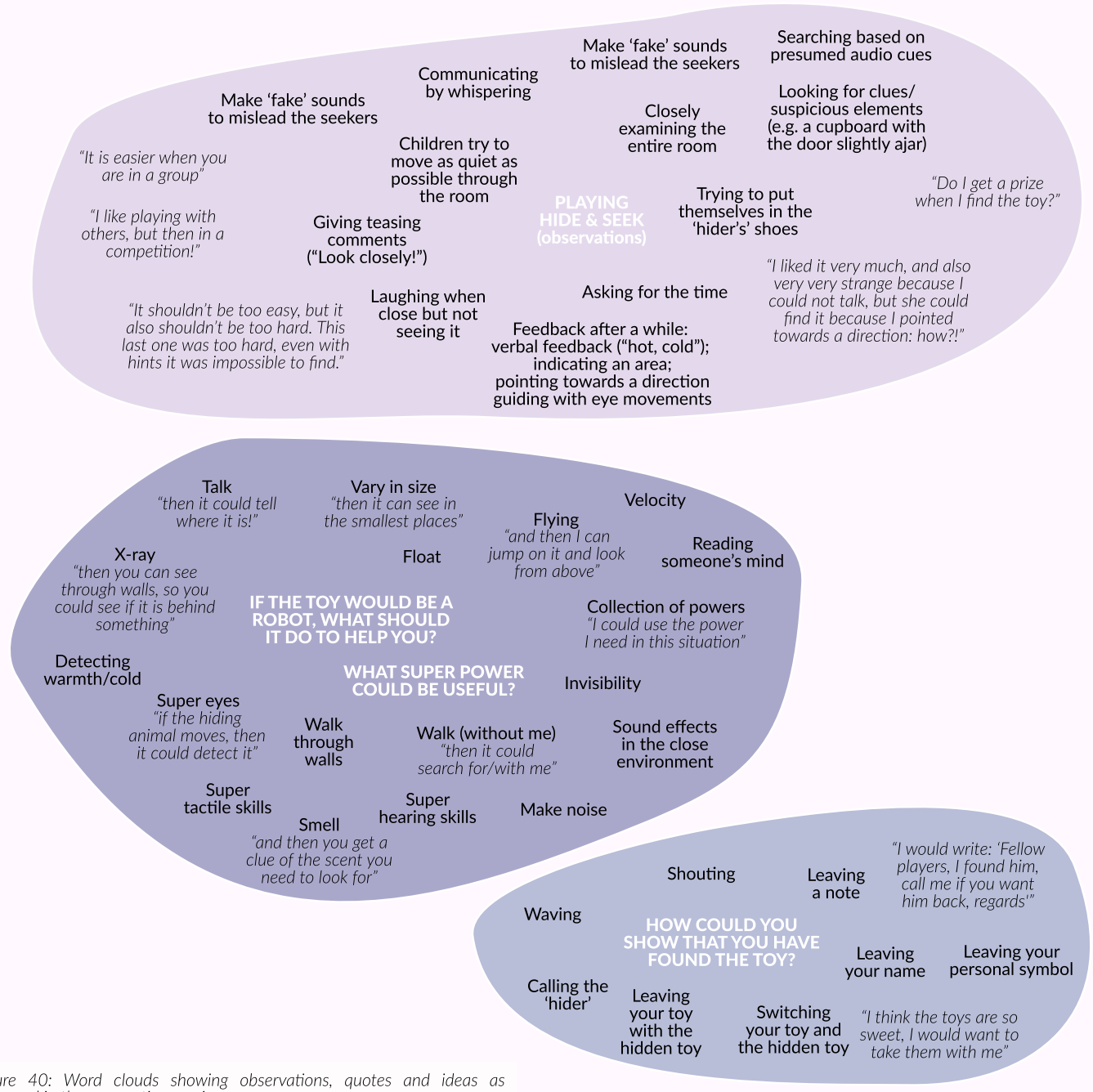


Figure 40: Word clouds showing observations, quotes and ideas as appeared in the co-creation sessions

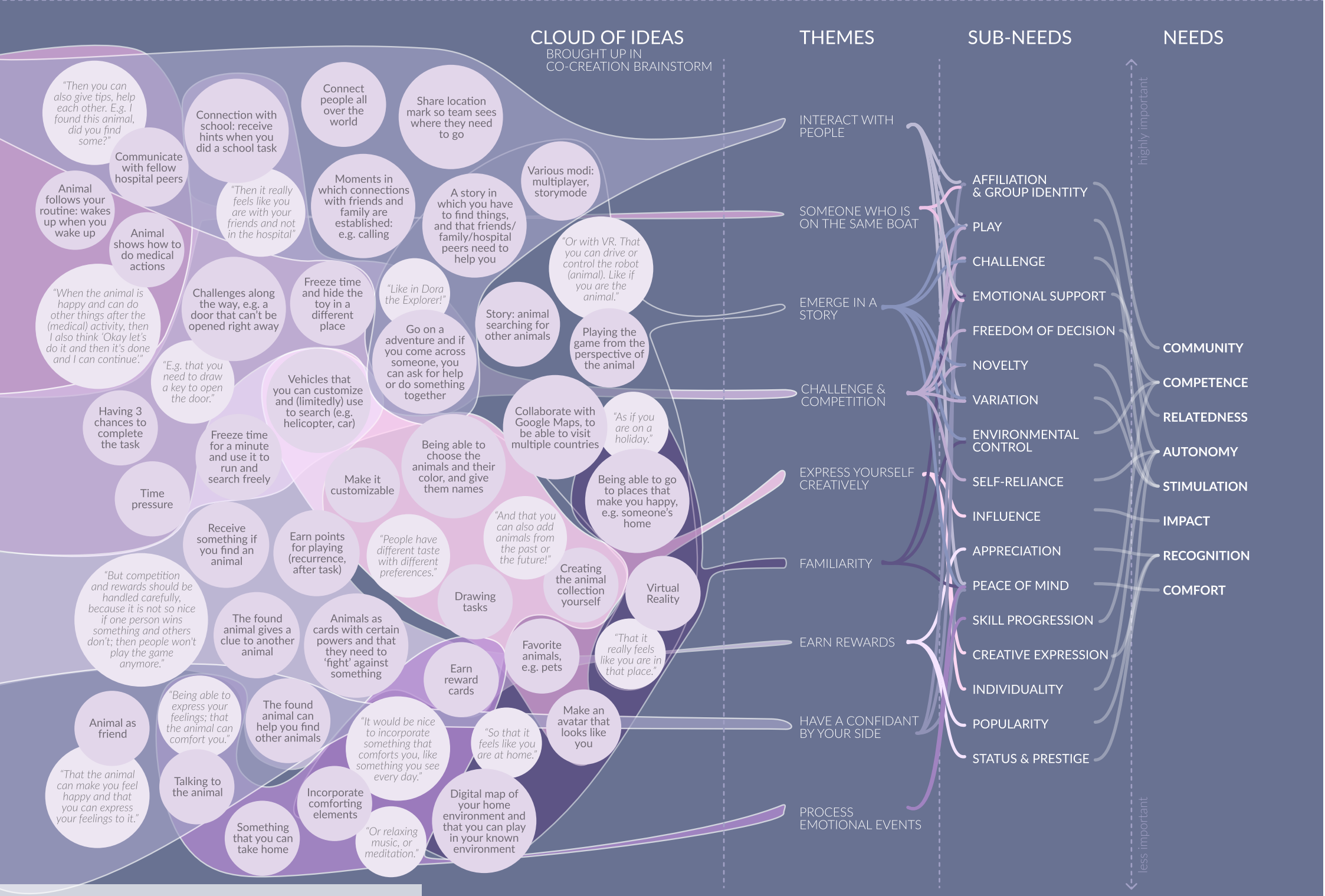


Figure 41: From co-creation brainstorm to underlying values and desires

Sub-needs & Needs from: Desmet & Fokkinga (2020)

7.4 | ITERATION BASED ON CO-CREATION

Design concept 4: From hospital to home

As previously described the co-creation sessions provided further base and inspiration to iterate. A few:

- The balance between not too difficult and not too easily, to keep the game challenging but fun
- A form of competition in the game
- A way to apply self-expression
- Being able to get something out of the game that could be applicable in real situations (especially older kids, i.e. 11, 12, 13 years old, indicated the importance and desire of this)
- Playing from first-person perspective
- Entering different familiar worlds
- Emerging in a story
- Variation by super powers

These elements were taken as a starting point for the iteration towards design concept 4:

In design concept 4, children try to collect as many animals as possible to make their **room less serious and more fun** *(emerging, escaping reality)*. Each animal also has a **coping tip for meeting the real-life challenges in the hospital** *(overcoming challenges)*.

Each child has its own favorite animal. They can **personalize** this favorite animal by adjusting the paw print. From the **perspective of the chosen animal** *(emerging)*, the player tries to 'steal' from the collection of animals from fellow players *(competition)*, which are hidden in other people's rooms, **both in the hospital and at home** *(escaping reality, familiarity)*. This search has to be done carefully: when not out on a search, **players can spot other players** trying to steal in their room. If the player gets spotted, the player has to provide a hint about the hiding place of animals in its own room.

At the place where the animal was found in the other room, a **personal paw print** *(self-expression)* will be left. Each animal also has a **super power** to make it easier to find animals. You can switch your favorite animal with the animals you have found (and thus get a different superpower: *variation*).

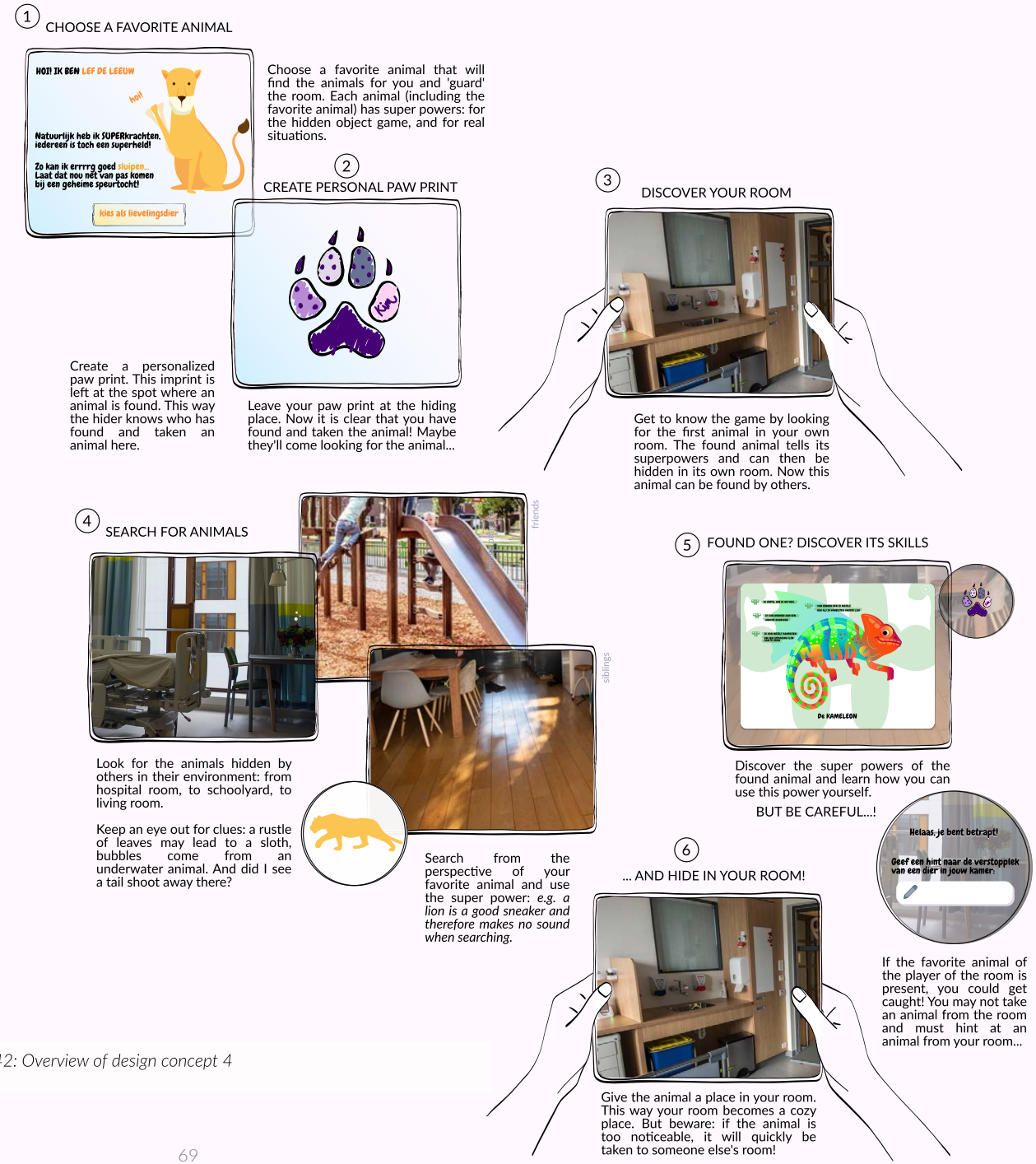


Figure 42: Overview of design concept 4

7.5 | FURTHER ITERATION

Further iteration

Although design concept 4 responds a lot better to the wishes of children within the chosen design strategy, there were still some snags. The main point of improvement was that design concept 4 technically depends a lot on simultaneous game use. This is very difficult in the hospital context. Each child has their own routine and hospital journey, making the timelines run asynchronously. The caught element is therefore difficult to create in reality. As a result, there would be a risk that this element would not be addressed in practice, as a result of which a large part of the social interaction would be missed. Therefore, one more iteration has to be done. In addition to enhancement and another form of social interaction, the emerge experience (storyline) must also be included in this iteration to increase engagement. Further, low-tech variants should be considered, so that the element of being able to explore and escape from one's own room is not lost if AR/VR proves to be technically or financially difficult.

Using inspiration from children's books, games, ideas from co-creation and personal ideation, a final brainstorm was done, resulting in Design concept 5.

Figure 43: Additional inspiration for further iteration

Design concept 5: Chaos in het Superdierenbos

It was quite difficult to find a storyline in which the different design elements come together logically and coherently. The design should include co-op and competition, without adding creepy elements to the context (such as a dangerous villain to battle against). Still, there must be a motivation to hide.

An attempt was made with Design concept 5. After a brainstorming session with a biologist, a storyline was created around hiding food and looking for the animals that approach the food. Your super animal carries food to lure the same kind of super animal to your room, which other players can then come to your room to find and collect. In the meantime, you go looking for super animals that have been lured into other rooms.

A balance in hiding difficulty has been created by adding a wolverine. The wolverine is hunting for all the food that has been laid down. Once the wolverine has eaten the food, a super animal can no longer approach it, and the children miss out on a large animal collection. In the story they have to make sure that each child collects 10 super animals. Therefore, children can give each other hints.

Instead of choosing an animal based on preference, it asks about choosing an animal based on what best suits the child at that moment. This makes the connection even more with the feelings and overcoming challenges in the real world. This arose after consultation with an experience expert who spent a lot of time in hospital (as a child) due to a chronic illness.

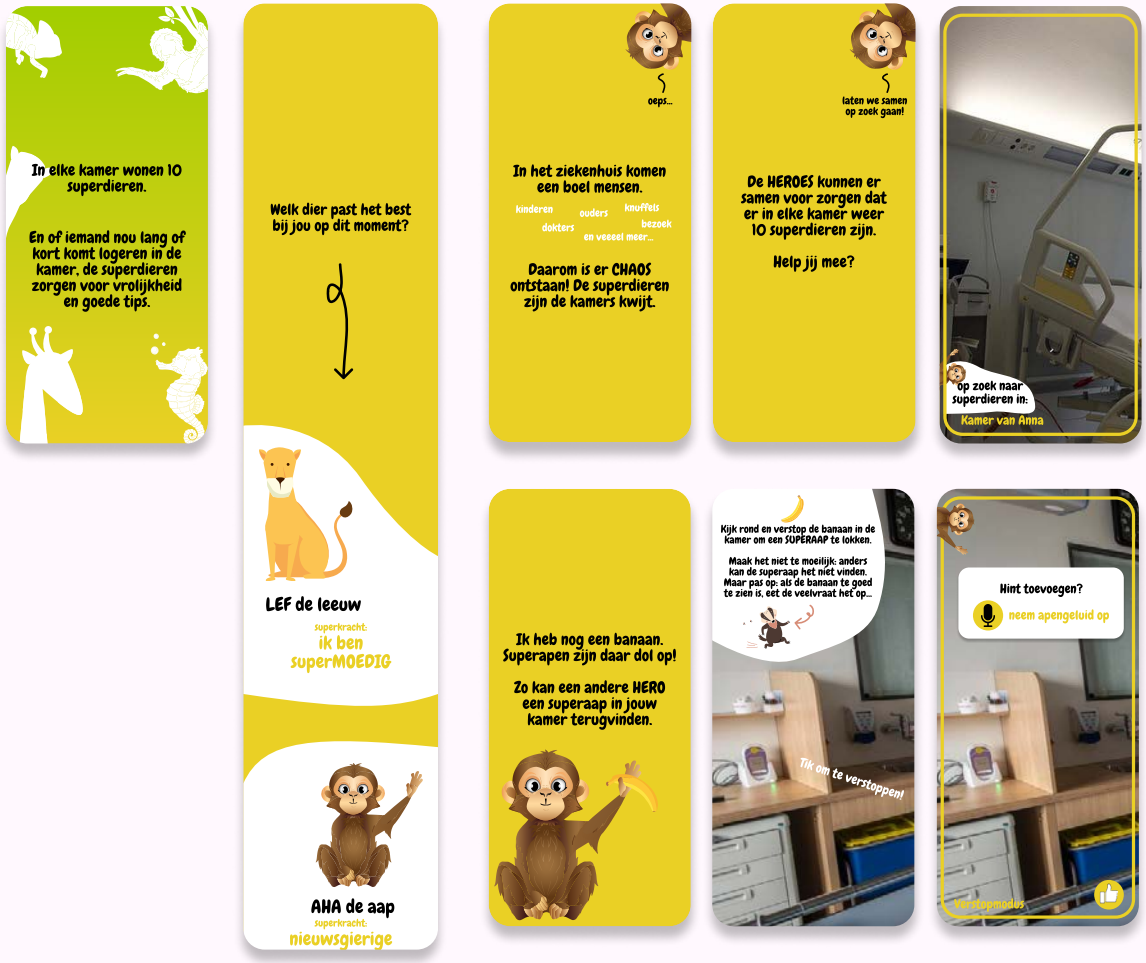


Figure 44: Example screens of design concept 5

Final iterations

Where Design concept 5 made a good attempt to bring all elements together, it was still not quite suitable. The storyline in which food was processed made the story more difficult to understand. In addition, social interaction was lost a bit as a result. This way there was less feeling that there is a real person behind an animal. A final iteration for the final design therefore had to take place.

The key take-aways helped to create a valuable iteration and final design. The final design is explained in chapter 8.

KEY TAKE-AWAYS

- The design should contain a coherent storyline to enhance understanding and engagement to fulfill in the need for play and stimulation.
- The design should contain child-friendly coping tips to support in real-life challenges to fulfill in the need for competence.
- The design should be from a first-person perspective to enhance engagement and emersion in a different environment.
- The design should make clear that there are real persons behind the animals to fulfill in the need for community.
- The design should contain competition against a fictive personage to enhance engagement.
- The personages in the design should contain humour and should not provide any risk of putting an extra fearful element in real-life.
- The design should provide some freedom of choice to the player to fulfill in the need for autonomy and self-expression.
- The design should make use of 2D pictures instead of 3D materials used for AR, since including AR maths needs a very heavy and intelligent online server (from consultation with a game developer). Still, the illusion of an immersive experience should remain.

8 FINAL DESIGN

8 | FINAL DESIGN

8.1 | Presenting the final design: Hideaway
8.2 | Scenario of use
8.3 | Elements & design choices

This chapter presents the final design: *Hideaway*. First, an introduction is given on Hideaway, including the main elements. Subsequently, the scenario of use will be presented in a visual storyboard and the game's narrative will be described in more detail. Hereafter, the design elements and the design choices will be further explained.

8.1 | PRESENTING THE FINAL DESIGN: *HIDEAWAY*

Hideaway is a narrative interactive digital hide-and-seek game to foster a positive emotional state in children. The main part of *Hideaway* consists of an **interactive application**, supplemented by a **physical poster package**. With this, *Hideaway* touches on the entire experience. Figure 45 presents an overview of the elements of *Hideaway*. Figure 46 on pages XX presents some important screens of the application.

In the interactive application, children are challenged through a storyline to step into the feet of a super animal and look for and befriend other super animals, i.e. other children. By **adding photos** from the actual environment, each player **prepares a game world** for the other players. Each child takes a picture of their own actual environment where the child is at that moment. The child can digitally add jungle elements, whereafter they can **hide their own avatar** in the created environment. The child can digitally enter the environments created by other children and **search for the hidden super animals**, i.e. the avatars of other children. Both other children in the hospital can participate as a player "*Adventurer Animal*", with their personal hospital room as a play environment, as friends and family from home as "*Home Animal*", with their home environment such as a living room, bedroom or garden as a play environment (often for the child **well-known places**).

Each super animal has certain *expertise*. The expertise, described as '*powers*' come in useful both in the game and in the real world. Each super animal gives a tip to **deal with (mental) challenges**. The super animals the child **befriends** are collected on the child's personal *gold super animal poster*. This is done in an overview in the app, but here the **connection to the physical poster set** is also made: for each animal found, the child can stick a sticker on the front of the poster and for each new animal, the child can scratch a box that reveals a the super animal tip on the back of the poster.

The various elements of *Hideaway* establish **play moments** and **peer contact** from the own environment, i.e. without having to physically leave (c.q. enter) the hospital room. While a large part of the game takes place during the admission of the child, the pre and post-phases are not disregarded. *Hideaway* offers opportunities to give a positive impulse to a hospital experience both before, during and after the challenges regarding an admission. *Hideaway* brings a sense of recognizability to the unfamiliar hospital environment and tries to let children feel powerful in a powerless environment. In this way, it tries to positively contribute to the entire hospital experience and thus to the emotional state of the child - and social circle.

See Hideaway in detail by scanning the QR code or clicking the link *(note: it works best when opening the link on a laptop)*

https://l.ead.me/bdignQ

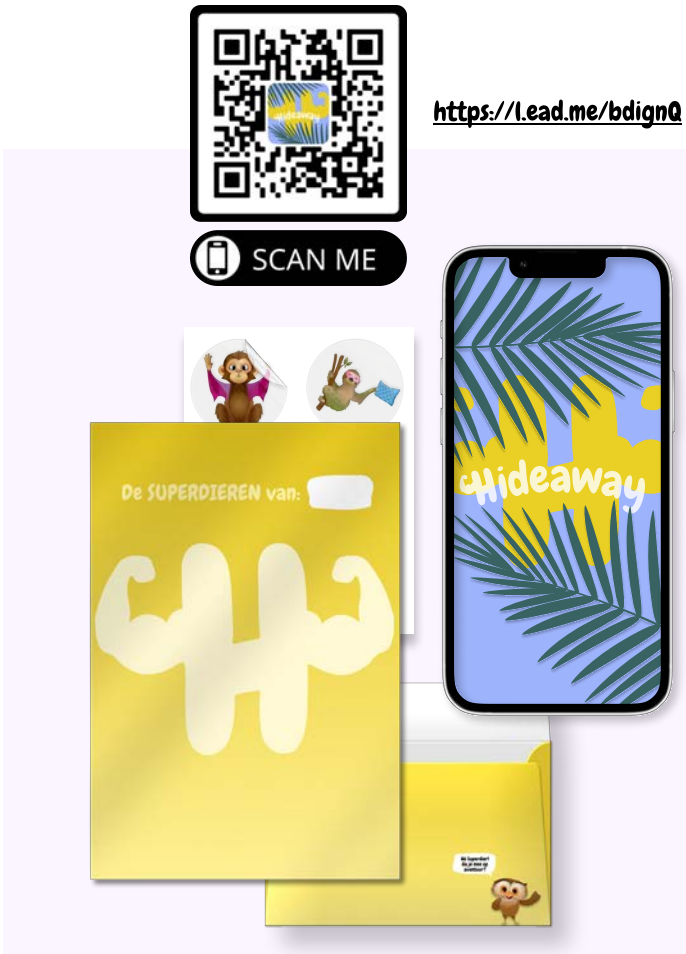


Figure 45: Overview of the Hideaway elements

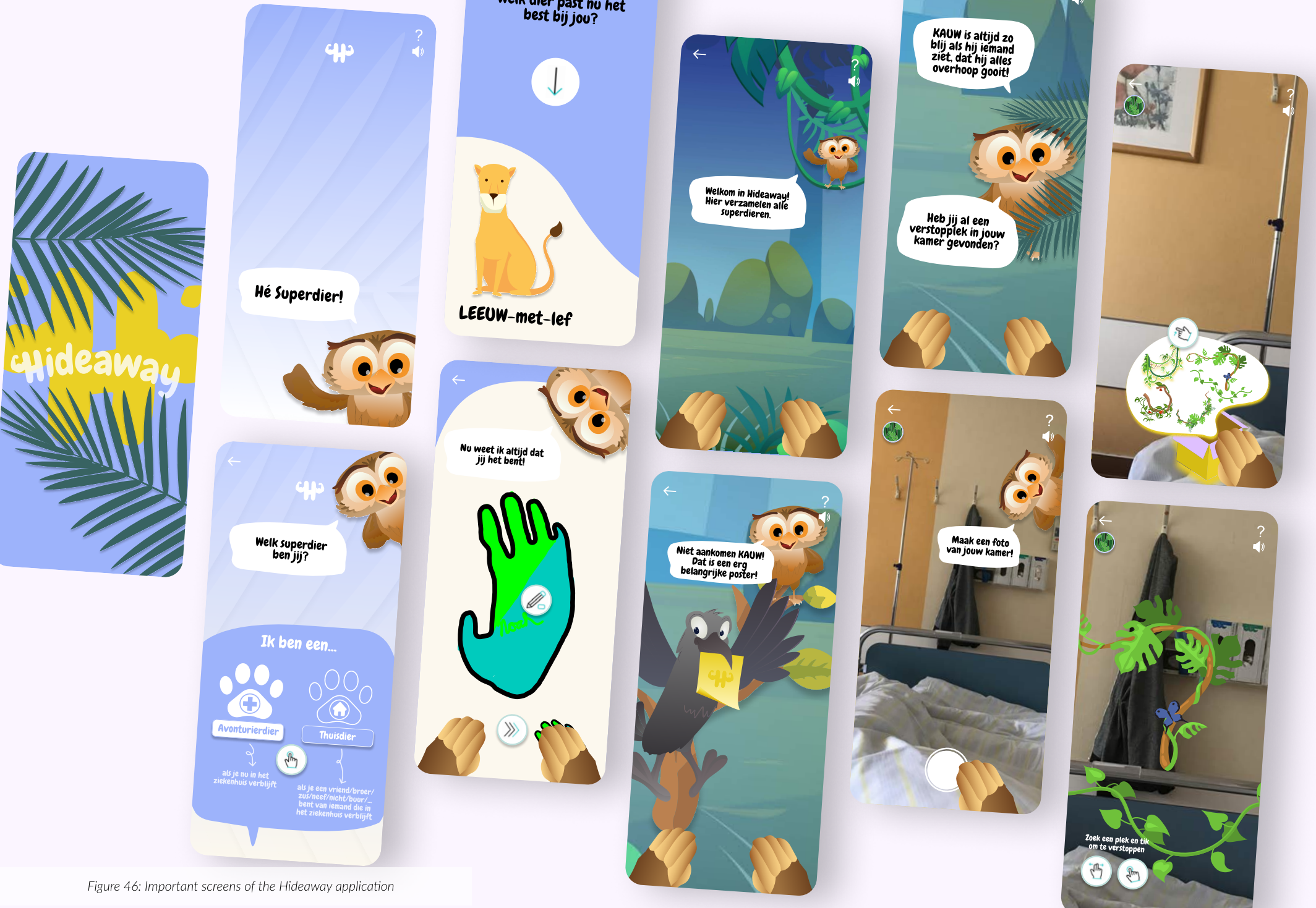
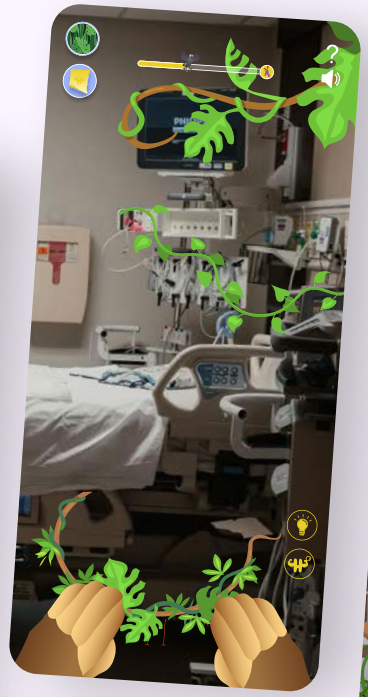
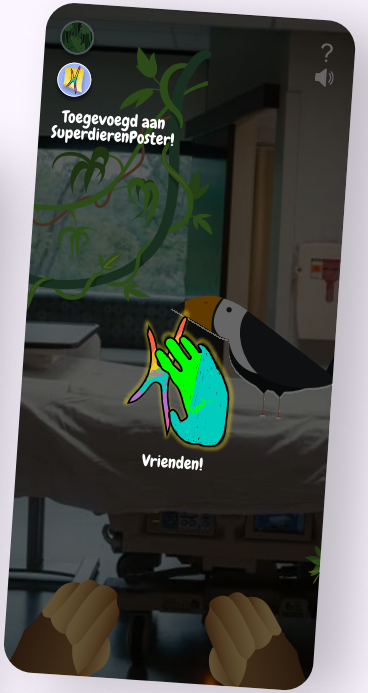


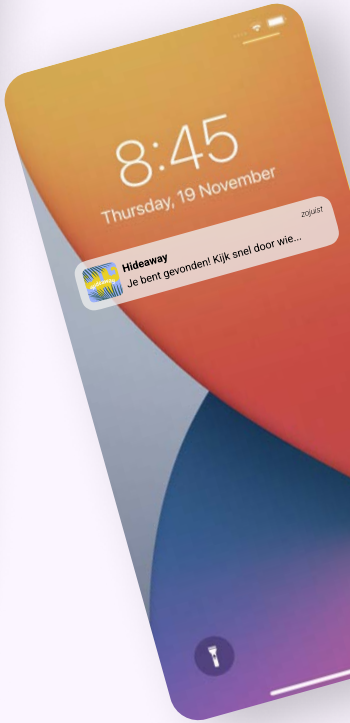
Figure 46: Important screens of the Hideaway application

Als jullie elkaar nou gaan zoeken en vrienden worden...
...kunnen jullie de Powers van elkaar leren!

Alle Superdieren hebben zich natuurlijk verstopt voor KAUW.
Dat wordt goed zoeken en samenwerken!




Toegevoegd aan SuperdierenPoster!
Vrienden!


8:45
Thursday, 19 November
Hideaway
Je bent gevonden! Kijk snel door wie...

En zo zelf een nieuwe SuperdierenPoster maken!

Ga op zoek naar andere Superdieren en maak een nieuwe SuperdierenPoster!
Andere Superdieren
ThuisDierenBos
AvonturierDierenBos

Hee, leuk dat je me gevonden hebt!

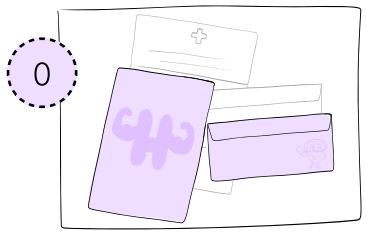
WOEF! Je hebt me gevonden!

Mijn SUPERDIERENPOSTER
met al mijn SUPERDIERENVRIENDEN

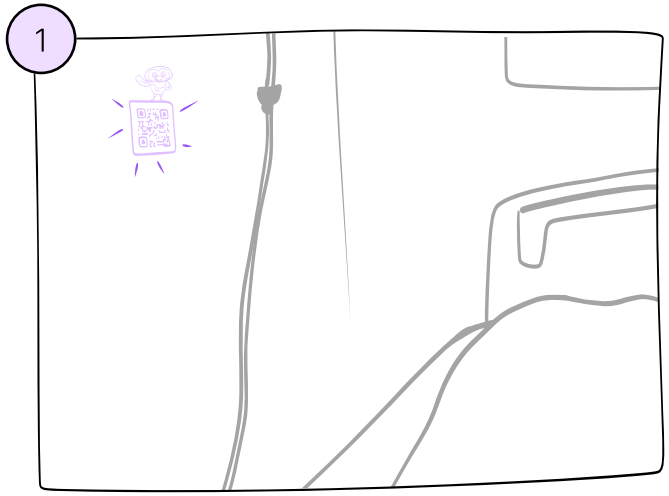
Mijn SUPERDIERENPOSTER
met al mijn SUPERDIERENVRIENDEN
als-ik-er-even-niet-naar-
TOEKAN
IN MIJN HOOFD VLIEG IK OVERAL HEEN
Als ik mijn ogen dicht doe kan ik in gedachten naar een fijne plek: naar waar of wie ik maar wil!
tip! Een vakantie, het schoolplein... Waar denk jij aan? En mama/broer/vriend/...?
SpeurSkill: turbovleugels

8.2 | SCENARIO OF USE

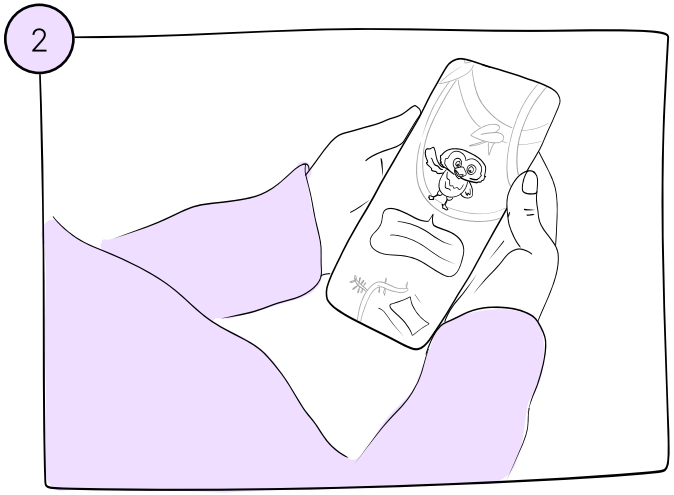
Overall scenario of use
Phase 0: Warm up (0-1)
Phase 1: Introduction (2-5)
Phase 2: Playing Hideaway (6-8)
Phase 3: Practice and processing (9-10)



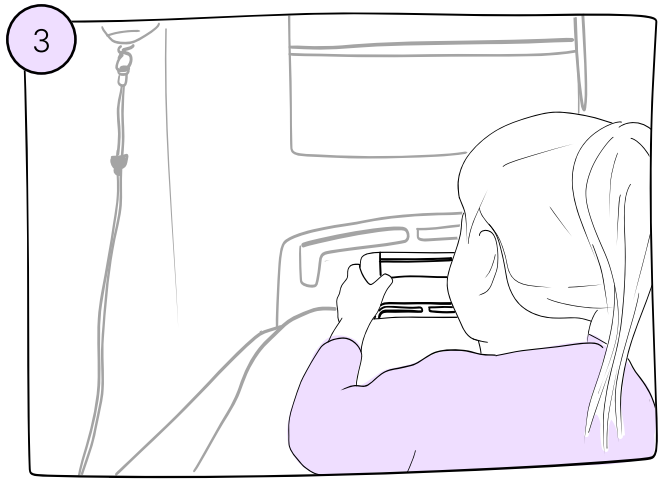
0. Warm-up (planned admission) With a planned admission, the child receives an envelope with an introduction story and a gold poster package, with the hospital letter. The child is already welcomed as a super animal. The child can possibly follow the introduction and choose a super animal. The child is invited to take the poster package to the hospital and continue the adventure there. In this way, the child can already feel empowered in preparation for the hospital visit and might adopt the feeling that there are also fun things to experience in the hospital.



1. Sparking curiosity (planned and acute admission) In every hospital room there is a wall sticker with character WISE the Owl and a QR code. By scanning the code, the child can easily download the *Hideaway* app. It also serves as a reminder for children of planned admission (who may have already downloaded the app from the introduction package at home) that they can open and play *Hideaway* from now on.

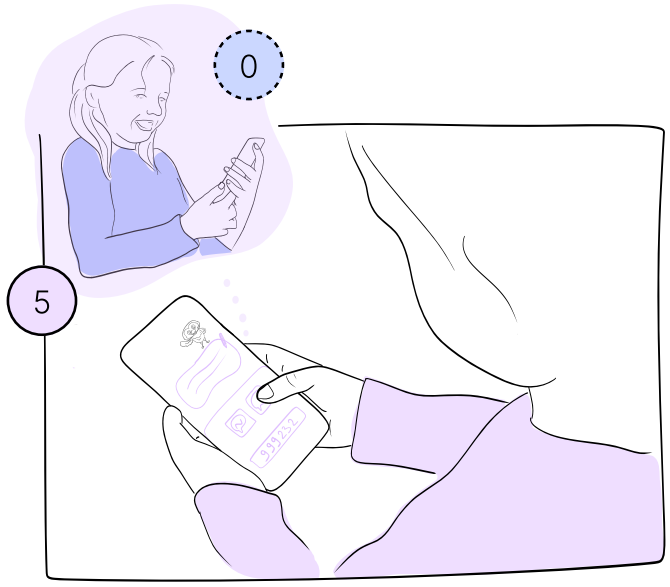


2. Introduction story When *Hideaway* is started for the first time, the child follows an introductory story. In the story, the child is gradually introduced to the super animal theme, the golden super animal poster, JACKDOW, and the mission to create their own poster by looking for fellow super animals.



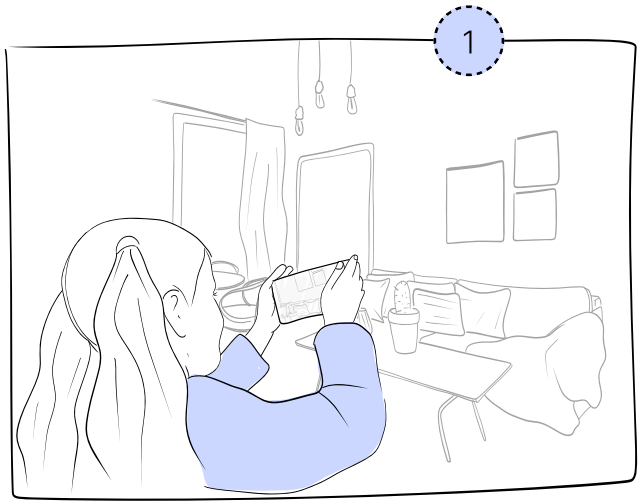
3. Capturing environment Halfway through the story, the child takes a picture of the environment it is in at that moment: the hospital room. This picture is automatically enlarged to create the foundation of a game world that can later be enterered by fellow players.

4. Adding jungle elements and finding a hiding spot In the newly created game world (the enlarged photo of the room) the child can add jungle elements. This not only brightens up the room, but also creates hiding spots. The child then chooses a hiding spot for their own avatar.

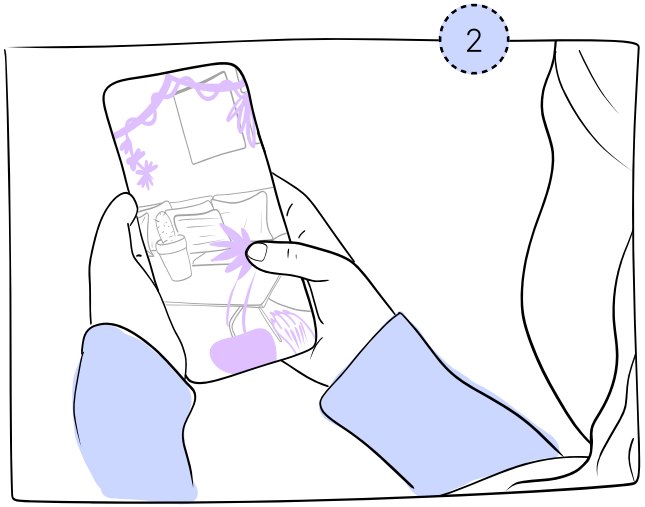


5. Inviting social circle By default, there can be searched in the rooms of hospital peers. In addition, there is the possibility to search in the environment of the child's social circle (and vice versa). To enable entering, the child invites friends/family to play along as a Home Animal via a personal link or code.

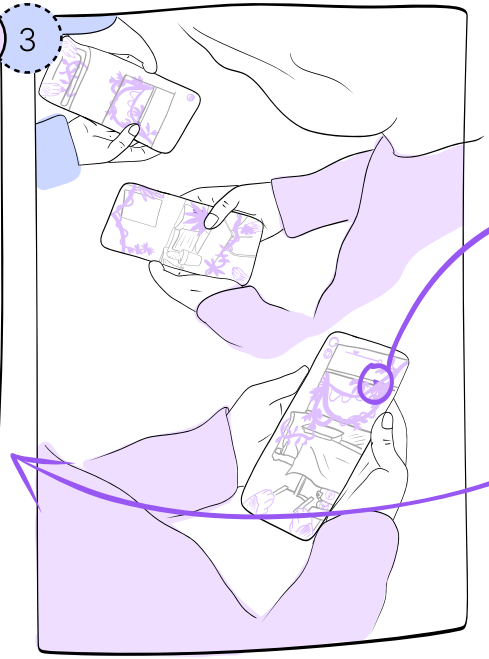
Figure 47: Overall scenario of use



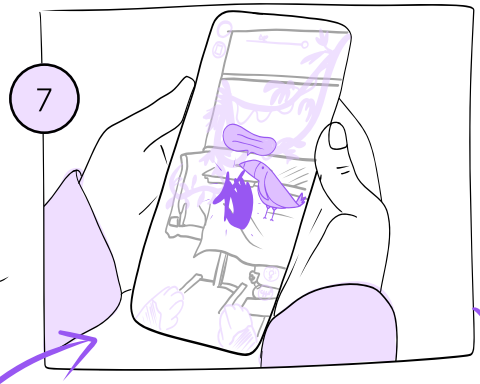
Scenario of use *social circle* When a player starts Hideaway via invitation (0), it follows the introduction as a Home Animal and then adds a personal game world. It takes a picture of the home environment (1), adds jungle elements (2) and chooses a hiding place for the Home Animal. From now on, the hospital friend can enter and play in this game world and the Home Animal can enter and play in the hospital child's game world (3).



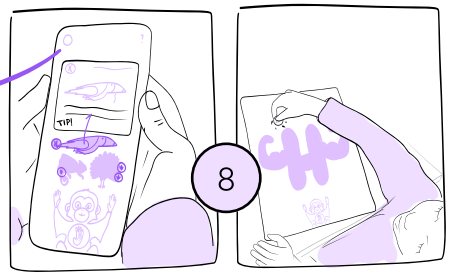
6. Playing *Hideaway* Children can look for fellow super animals in the created game world of fellow hospital peers or connected friends. As soon as the child starts a search, the game against JACKDAW starts: can you find the super animal before JACKDAW? Hints can be used. Each child can close/open Hideaway at their own time and continue playing.



9. Motivator Outside the game context, the poster, the super animals and their practical tips can be a starting point for conversation and helpful thoughts during the admission and its challenges.

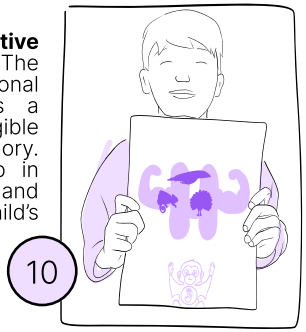


7. Finding fellow If a fellow animal is found in time, the player can befriend the found animal. The paw print of the player who found the animal is left in the hiding spot and the player of the found animal has to find a new spot to hide for JACKDAW.



8. Adding to poster The found animal is added to the personal poster, automatically on the digital poster and manually on the physical poster (sticker). Each animal has an expertise: by tapping the animal on the digital poster, the animal shares tips to cope with though situations.

10. A positive memory The physical personal poster offers a lasting tangible positive memory. It offers help in processing and sharing the child's experience.



time

Scenario including game narrative and important user actions

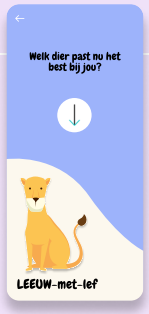
Hey super animal! Huh? Super animal? You must be thinking: I'm not an animal, am I? Then I'll tell you something funny: you are! Just like all other children! A super animal is super good at something. And everyone is super good at something! That's why every child is a super animal! So you too!

Which super animal are you?

Action: Child indicates whether he/she stays in the hospital at the moment or whether he/she is a friend of a player in the hospital.

Which animal suits you best?

Action: Child picks his/her avatar, i.e. a super animal character.



Hey, nice to meet you!

I can always recognize super animals by their personal paw print. For example, this is Anna's paw print! Anna is a toucan. And this is the paw print of Ilias, a lion! What does your paw print look like? Then I know it's you!

Action: Child creates personal paw print on outline of paw chosen avatar animal.

Oops, I haven't introduced myself yet! I am WISE, the OWL. I show new superanimals the way. Come with me!

Oohoo, here I am! Welcome to Hideaway! This is where all the super animals gather. Do you remember? Every child is a super animal! Because everyone is super good at something!

At the center of Hideaway is the golden Super Animal Poster! On the poster, each super animal gives a super tip. This way everyone can get to know each other and help each other.

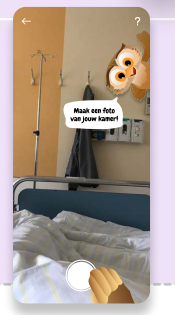
Oh, there's my clumsy cousin...
I'm JACKDAW! They also call me the Clumsy Crow... Hey, what do I see there for something beautiful...? I like gold!
Don't touch JACKDAW! That's a very important poster!
Oops... Sorry WISE, the poster has blown away! I am so clumsy... I'll better fly away for now...

Oh... My cousin is too clumsy. JACKDAW is always so happy when he sees someone that he throws everything upside down! That's why everyone always hides from JACKDAW. Have you already found a hiding place in your room? Because with all your joker jokes, JACKDAW must be laughing so hard when he sees you, that he messes up everything in your room! Let's go to your room.

Go to your room by clicking on this icon!

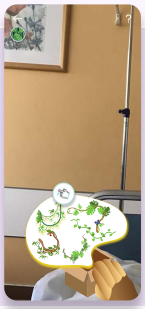
Take a picture of your room!

Action: Child takes a picture of the environment he/she is in at that moment.
Note: whenever people are detected in the picture, the child receives a notification to retake the photo.



Psst... I brought you something! With it you can brighten up the room yourself. This way the room really becomes your own place! And among all those plants you can hide well from that clumsy JACKDOW...

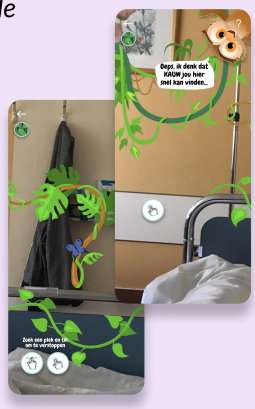
Action: Child drags and drops jungle elements to the enlarged picture that the child just took. With this, the digital game environment is created.



Your room looks so nice! A perfect room for a <grAAPjas> like you. To go back to Hideaway, click this Jungle button, but maybe it's smart to find a hiding place first... Because if JACKDAW sees you, your room will be a mess!

Find a spot and tap to hide

Action: Child moves around the room by sweeping the enlarged picture. Child hides his/her avatar by tapping a spot in the picture. The child can use the attached jungle elements as hiding spots.
Note: The avatar should be visible for 10% only. If the child taps a spot where no jungle elements are attached, the child will receive a message: "Oops, I think JACKDAW can find you here quickly!".



That seems like a good place to me!

Click here to discover more about Hideaway.

Oohoo, here I am! I need your help! So here was the golden Super Animal Poster... That was super handy, because that way everyone could learn all the Powers. Powers always come in handy. They help with difficult things. For example, you are an expert in making jokes, and therefore you can make yourself and the people around you happy!

But now the Super Animal Poster is lost... But I have an idea! There are a lot of Superanimals around. Everyone in their own place. Now if you guys start looking for each other and become friends, you learn the Powers from each other!And create a new Super Animal Poster yourself!Super handy right!

Oops... Forgot one thing. Of course, all the Superanimals have been hiding from JACKDAW. That will be good searching and working together! You can help each other with hints. And maybe you will learn some seeking powers from each other along the way! You'll probably outsmart clumsy JACKDAW.

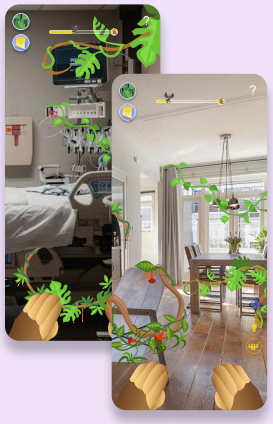
Find other Superanimals and create a new Superanimal Poster!

Action: Child taps a tree with a paw of another super animal. With this the child enters the room (game world) from the indicated peer behind the avatar. The child can choose to either enter the game world of an Adventurer Animal (peer from the hospital) or the game world of an Home Animal (friend from home).

Note: If there are no Home Animals connected yet, the child will receive a notification request to send a play-invitation to friends or family via message or social media.

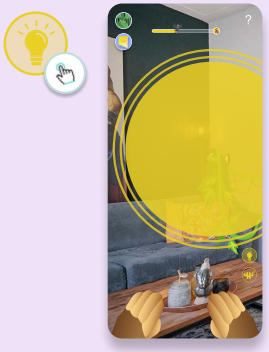
This is an <Adventurer Animal's / Home Animal's> room. Can you find each other before JACKDAW sees you? Here you can see if JACKDAW is nearby... Click here for help. (Owl pointing towards the buttons).

Action: Child looks around the presented game world by sweeping through the picture. Whenever the child thinks he/she has found the hidden super animal, the child taps on this spot.

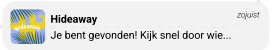


Watch out, JACKDAW is getting closer! Ask for a hint?

Action: If the child has trouble finding the hidden super animal (> 20 sec), the child will receive a notification from WISE the owl that it can ask for a hint. By pressing the hint button, the hint is revealed. This hint has been created by the 'owner of the room' in advance and consists of a sound effect (so the child can guess what animal might be hidden) and a more detailed search area.

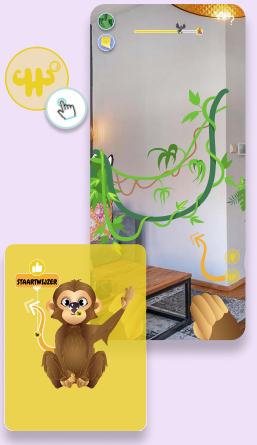


Push notification: When the child's avatar animal has been found, the child will be notified. Opening the app reveals the finder. A new hiding spot needs to be found.



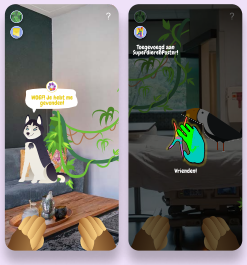
Be careful, JACKDAW is close to the super animal! It might help to use a Detective Power?

Action: If the child has trouble finding the hidden super animal (> 40 sec), the child will receive a notification from WISE the owl that it might be helpful to use a *detective power*, i.e. a hint to the hidden animal or extension of time. By pressing the power button, the child can choose from detective powers that are collected. For every found and befriended animal, the child receives a detective power. A detective power can only be used as many times as the specific animal behind this detective power has been collected.



<"Woof! You have found me!"> ***(text selected/ created by the child of the found super animal)***

Action: When the child has found the super animal by tapping on the right spot, the super animal appears in full. The child can befriend this animal (and thus add to the personal poster) by tapping the personal paw print of the animal. The paw print of the finder is in turn left on the hiding spot.



Friends! Added to your Super Animal Poster! See what you can learn from this Super Animal.

Action: Tap the poster button to go to the personal poster.

Action: Tap a super animal on the personal poster to discover tips in detail.

Action: Put the sticker of the found super animal on the physical poster.

repeated cycle of core-game loop

going home: children can digitally share their poster from the *Hideaway* app, or show their physical poster

8.3 | ELEMENTS & DESIGN CHOICES

Motives for design choices

The research of the earlier phases revealed certain points that turned out to be important to provide children with a comfortable and positive experience. These stimuli are also described in Chapter 6 (Design Brief) as core and enhancing design elements that should be integrated into the design to meet the design goal and ultimate mission:

The core design elements should be
- **Integrating peer-contact**
- **Integrating playful experiences**

Enhancing design elements could be
- **Feeling surrounded by familiarity |** making a connection with familiar people and surroundings
- **Escaping reality |** minimizing the stressor of a serious environment
- **Empowerment; overcoming challenges |** assisting children in overcoming specific challenges and enhancing the pride from overcoming a challenge
- **Integrating animals |** targeting a joyous experience presented by children and making a connection with design elements from the previously developed Hospital Hero app©
- **Expressing (through) creativity |** providing a personal element wherefore children feel in control, e.g. over the environment

Hideaway has been designed with these motives in mind. This page provides an overview of how these motives are connected to game aesthetics and subsequently integrated in *Hideaway*. The following pages will further zoom in on the various design elements. The presented icon(s) refer back to this overview.

Game aesthetics
According to the MDA framework (Hunicke, LeBlanc, Zubek, 2004) game aesthetics describe "the emotional responses evoked in the player". The following elements derived from the PLEX framework are applied to *Hideaway* as game aesthetic elements:

Captivation Forgetting one's surroundings
Challenge Testing abilities in a demanding task
Competition Contest with oneself or an opponent
Completion Finishing a major task, closure
Discovery Finding something new or unknown
Exploration Investigating an object or situation
Expression Manifesting oneself creatively
Fantasy An imagined experience
Fellowship Friendship, communality or intimacy
Humor Fun, joy, amusement, jokes, gags
Relaxation Relief from bodily or mental work
Submission Game as pastime

Figure 48: Design elements and related used game aesthetic elements

Hide-and-seek game

Core game element
The core game element of *Hideaway* is playing hide-and-seek. Hide-and-seek is a game that has been played by many children for years, where children hide themselves and / or look for other children. While this normally takes place in a physical environment, this is not possible in the hospital context. By designing a digital variant of this, this well-known game is made possible within a hospitalization.

Each player hides their own avatar (a chosen super animal). This happens in the own created game environment (Figure 49). The player can search for (the avatars of) other players in the game environments created by these players (Figure 50). The players have a common goal: creating a new super animal poster, a poster on which super animals provide tips for overcoming challenges in real-life situations regarding hospitalization. Each player can access their own composed super animal poster, showing all the animals that have been found and befriended, with the corresponding personal paw print to link to the specific player connected to the animal.

Balancing the difficulty of search
To keep the hide-and-seek game fun, a balance is created in the difficulty of finding another player. A player must hide the avatar in such a way that 10% of the avatar is visible. This prevents the avatar from being hidden in such a way that it is no longer visible to other players (too difficult), but also from hiding the avatar in such away that it is immediately noticed by other players (too easy). To reinforce this, a storyline is deployed where players battle against the JACKDAW: *JACKDAW is looking for super animals, but with his enthusiasm turns the whole room upside down when he sees a super animal. Therefore all the super animals are hiding from JACKDAW.*

If the system notices that an avatar is more than 10% visible, the player will receive a message from the narrator (WISE the Owl) that in this spot the avatar can be found very easily by JACKDAW, risking a messy room (time penalty). If the system notices that an avatar is less than 10% visible, the player will receive a message from the narrator that it cannot be found by other super animals and therefore cannot become friends with other players (this game environment will not become visible for other players).

During the searching game, the searching player can keep an eye on how far JACKDAW is from the hidden super animal by means of a distance bar at the top of the screen. The underlying game mechanic is duration.

Hints
If the player has difficulty finding the hidden animal during the search, the option to ask for a hint is enabled after 1 minute. The player can then receive the hint that the player created behind the hidden animal in advance: a sound clip that gives an indication of the type of animal being sought, and an area indication. If this does not help, the possibility to use a detective power will be enabled again 1 minute later. The player can then use any of the detective powers previously collected. These detective powers can provide an indication to the hiding spot of the animal, e.g. by means of scent clouds or a compass-like pointer, or give the searching player more time.

If JACKDAW wins
If the animal is still not found, the Jackdaw 'wins'. This means that the player of the hidden animal receives a 'time penalty' of 5 minutes, i.e. “the room has become a mess by JACKDAW so it must be cleaned up”, after which the player needs to find a new hiding spot. The searching player has not yet been able to add a new animal to the poster and needs to go back to this room and start over to add this animal.

Figure 49: Sample screens of hiding the own avatar (chosen super animal) in the own created game environment

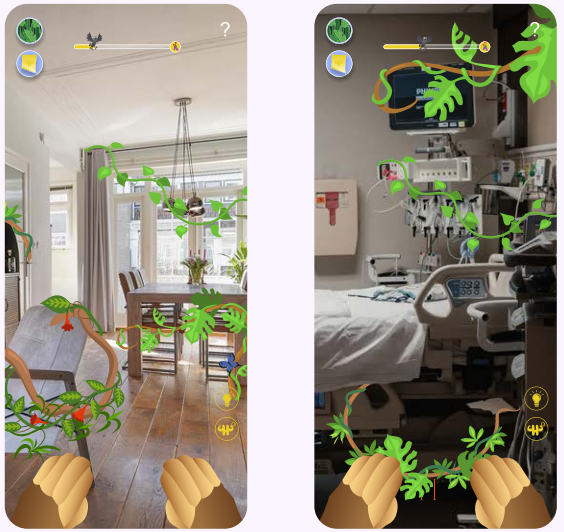


Figure 50: Searching for fellow super animals, left: in the game world created by a HomeAnimal, i.e. a friend of a hospitalized child, right: in the game world created by a AventurerAnimal, i.e. a hospitalized child

Super animal perspective (avatar)

The game is being played from the perspective of a super animal. When introducing the app, the player indicates whether it is playing the app as an Adventurer Animal, if the player is currently in the hospital, or as a Home Animal, if the player is a friend of someone who is in the hospital. Then the player chooses a personal avatar from the suggested super animals. From then on, the player plays the game from the perspective of this super animal. At the bottom of the screen, two paws correspond to the chosen super animal, enhancing the impression that the player is really this super animal. The player creates a personal paw print, making the animal feel even more personal, and enabling recognition of the player in the game.

Right from the start, it is introduced that all children, including the player, are super animals and that super animals are very good at something. This immediately takes the first step towards empowering the child.

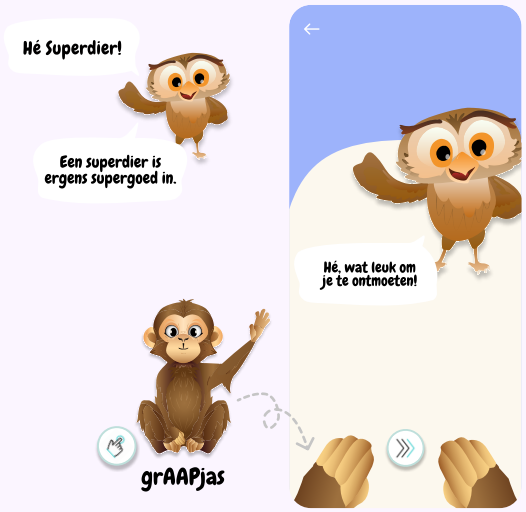


Figure 51: The game is played from the (first-person) perspective of the chosen super animal, e.g. illustrated by paws.

Game world creation

Capturing the environment
The game world is created by the players themselves. Each player takes a picture of the environment where the player is actually located. For an Adventurer Animal this is the hospital room, for a Home Animal an environment from home, such as the living room, playroom or garden. The captured photo is transformed into the game world by enlarging the photo and enabling horizontal and vertical scrolling. This creates the impression that the player can really look around in this world, without the need for technically heavy input (as would be the case when using 3D technology).

Jungle elements
Subsequently, the player is encouraged to add jungle elements to the game world. This creates hiding places for the game and brightens up the (serious hospital) room. This also has emotional benefits, especially for the hospital player: by adding elements to the serious room the player can experience a certain control in the room where he/she has little control in reality. This way the room becomes more personal and less scary.

Entering a different world
All in all, a variety of search environments is created. This offers the hospital player the opportunity to digitally escape the room, find recognition in other hospital rooms and get a sense of home by interacting in familiar home environments. For the players from the social circle (Home Animals it offers the opportunity to take a look at the environment where their hospitalized friend is staying and thus contributes to the perception of illness.

Immersive experience
The impression of a world in which you can 'look around' (scrolling) can create an enhanced feeling of being in or being part of this world. Enabling sound activates environmental sound effects (e.g. the rustle of leaves). The game elements, e.g. the cartoon jungle leaves, ensure distinction between real world and game world (i.e. world/game considered as safe).

Figure 52: Adventure Animal creating a game world; taking a picture (left) and adding jungle elements (right)

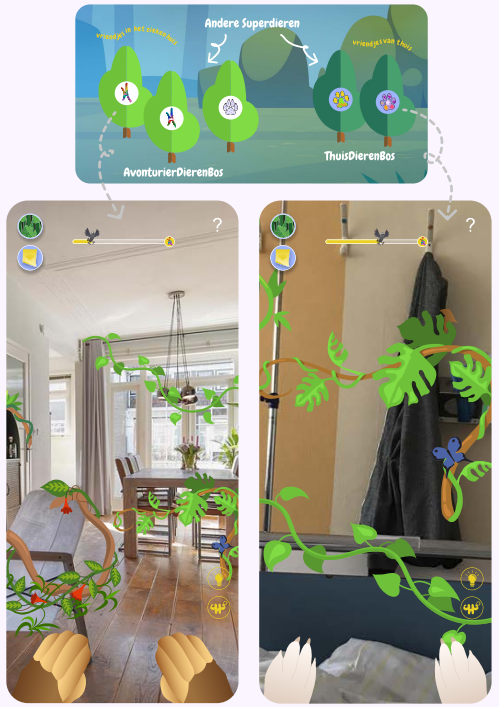


Figure 53: Adventure Animal playing in the game world created by the Home Animal (left) and vice versa (right)

Fellow players

All players in the game are super animals. The player can come across Adventurer Animals and Home Animals.

Adventurer Animals
Adventurer Animals are fellow players that are also hospitalized at that time. The game environment in which these animals can be found is therefore their personal hospital room. The Adventurer Animals have tips for different challenges in the hospital, such as resting, or telling how you feel. By being able to take a look at other hospital rooms in this way and connecting with peers who are in the same situation, children can experience recognition. In addition, it could act as an icebreaker for further peer contact, (physical) social contact when children are allowed to leave their room at a later stage, or for children who find it difficult to start up contact with peers.

Home Animals
Home Animals are fellow players from the social circle of the child in the hospital. The child in the hospital invites the social circle itself to join the game as a Home Animal, by sending a link. As previously explained, each player creates an own game world. This also applies to Home Animals. Home Animals thus hide their animal in the home environment, often familiar to the child. By enabling this connection to Home Animals, the 'hospital player' can step digitally into the familiar home environment. Vice versa, the social circle can as Home Animals take a look at the hospital room of their friend/family member/ classmate, which contributes to clarifying the perception of illness and making their friend's hospitalization less abstract. This allows both parties to feel more in touch with each other in a familiar, playful way. They can now make contact in a playful way, and the emphasis is less on asking about / explaining the disease and admission itself.

Personal paw print

Each player creates a personal paw print. This not only allows for creative self-expression, but makes it possible to recognize the specific player behind the super animal. It hereby enhances the feeling of not being alone, but being surrounded by all kind of other peers and further emphasizes the effect of becoming friends. The personal paw print can also be the start of further peer interaction when children may leave their room, e.g. as a conversation starter to find out if they already digitally connected.

Storytelling

To create more engagement and enhance the effect of wandering off, storytelling is used. Following the previously described narrative, the player slowly learns more and more about the game and related goals. It hereby tries to minimize the cognitive overload at once and tries to extend the usage time of *Hideaway* - n.b. *Hideaway* is intended to provide pleasure for a longer period of time during hospitalization (i.e. multiple hours, days). The narrative connects the different parts of *Hideaway*. A narrator (character WISE the Owl) has been used to take the player through the game story of creating a super animal poster. By using a narrator, the game can be easier understood and tasks can be conveyed in a clear and engaging way. Further, it might enhance the motivation to perform the tasks. By turning on sound, the story is 'read' aloud by the wise owl and environmental sound effects are applied, contributing to an immersive and mentally relaxing experience.

Storytelling helps to create a useful separation and connection between the game world and the real world. For example, the characters of animals are used to provide support for real-life situations in a safe, friendly and humorous way. Children can get useful information from the animals. Using animals instead of people, it comes across as less direct, serious and confrontational. The storyline and characters make it more easy to distinguish between what happens in the game world and what happens in the real world.

Blue circle around paw print: Home Animal
Two paw prints: this type of super animal is found twice, but from different individuals

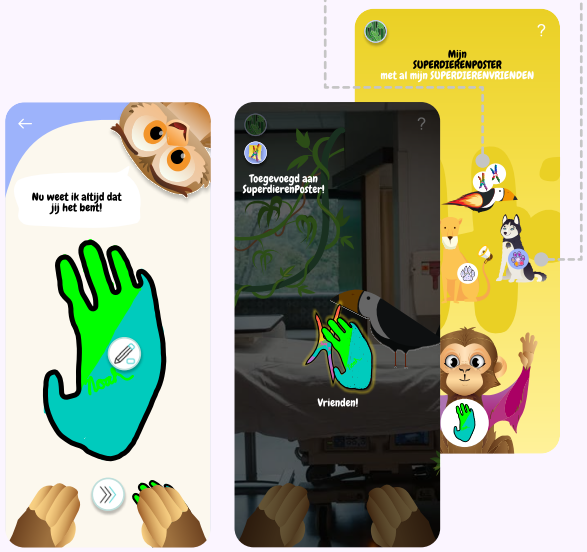


Figure 54: A personal paw print makes individual players recognizable. The paw prints can be found back on the poster.

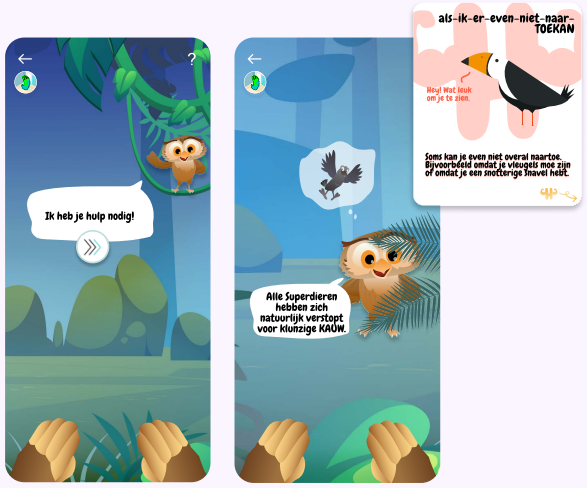


Figure 55: Some examples of the use of storytelling in Hideaway

Characters and coping cards

Hideaway features ten characters: WISE the Owl as the narrator, JACKDOW the clumsy Crow as the antagonist, and eight super animals.

The characters of the animals refer to helping thoughts and coping skills. In a humorous and child-friendly way, children are introduced to practical tips (example in Figure 56, all in Figure 57). They can find recognition in the animals, or be inspired. There was no ready-made list of coping tips and helpful thoughts for hospitalized children. The tips presented have therefore been drawn up based on the child tool My Positive Health (Institute for Positive Health, 2017), sample pediatric coping strategies from the Pediatric Mental Health Institute of the Children's Hospital Colorado and responses from our own context study (e.g. child who was proud because it had passed a medical procedure and therefore received a positive mental boost > tip: as proud as a peacock). The tips are linked to animals that have a relationship with the tip through appearance, behavior or proverb.

Visual appearance

Hideaway's visual appearance is in line with the aesthetics of the current Hospital Hero app: the same (type of) characters has been used in the cartoon style as visualized by Boostcartoon and the same type of font and text boxes.

Further, the Usability Heuristics for User Interface Design of Nielsen (1994) were taken into account, e.g. consistency, error prevention and help access.

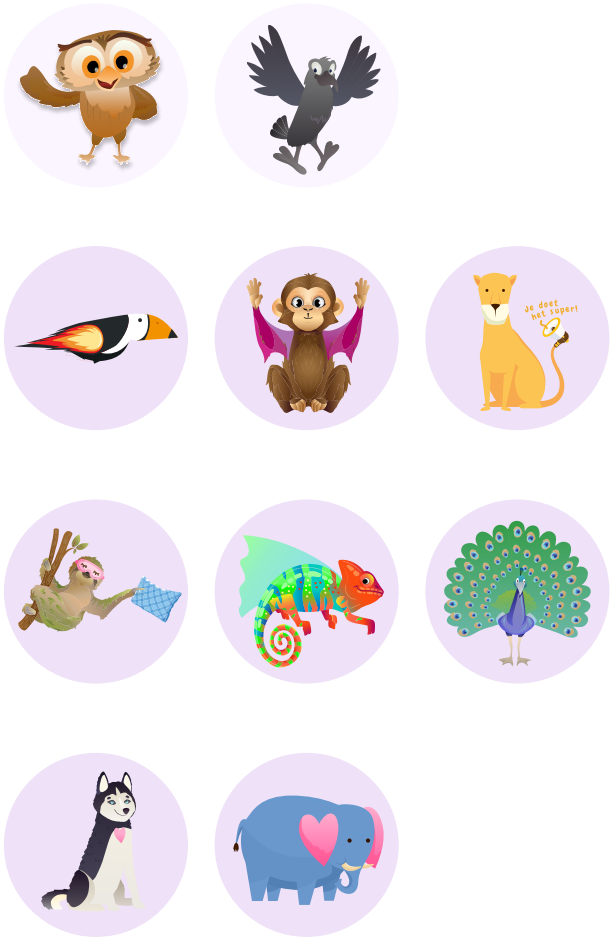


Figure 56: Example of a coping card. On the front (top) the animal explains a challenging situation. On the back (bottom) the super animal explains its related super power with a practical tip.

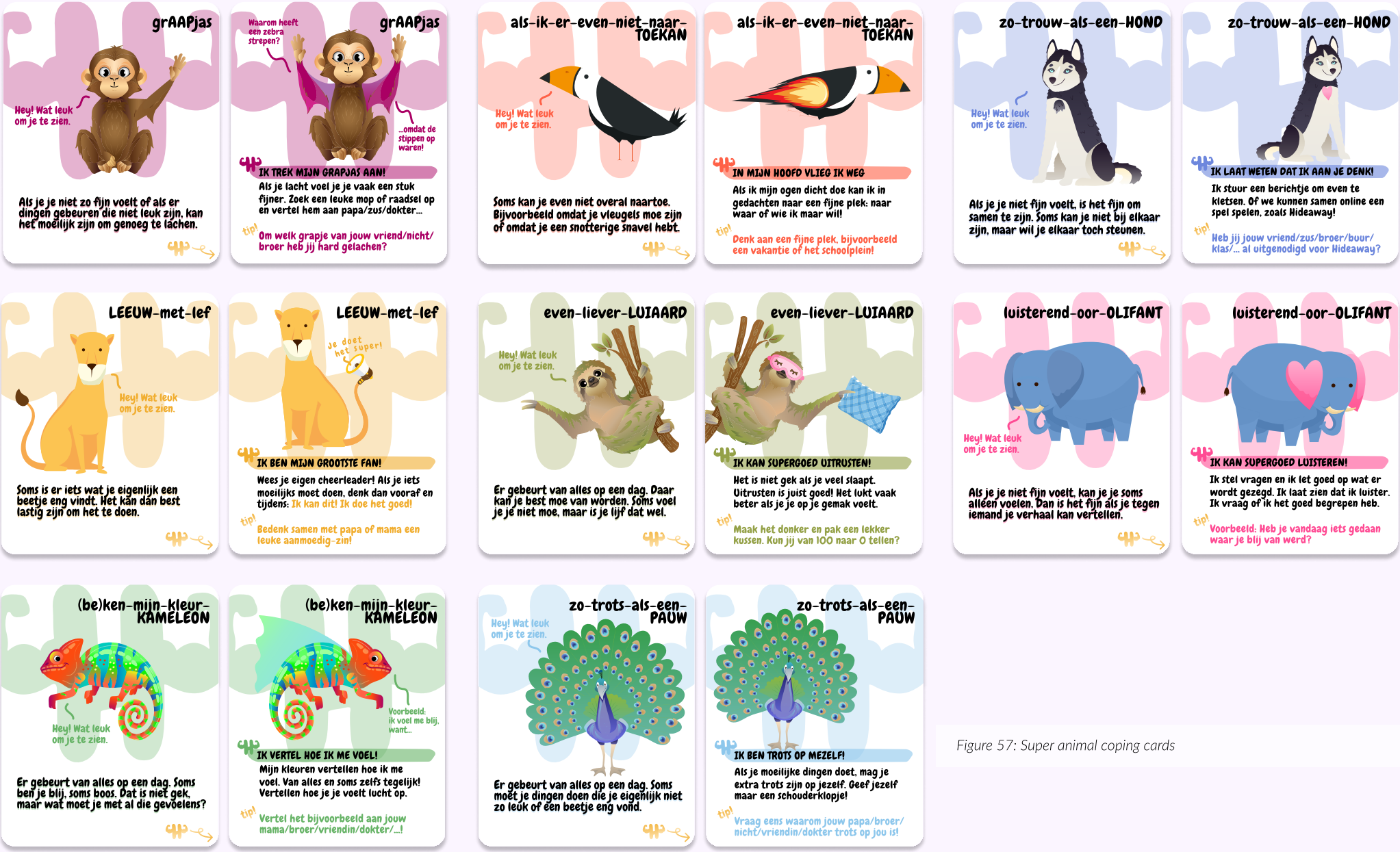


Figure 57: Super animal coping cards

9 EVALUATING *HIDEAWAY*

9 | EVALUATING *HIDEAWAY*

9.1 | Evaluation approach
9.2 | Results of the evaluation study
9.3 | Conclusion

This chapter describes the evaluation study of *Hideaway*. First, the evaluation approach is explained. Then, the results from the various perspectives are shown. The chapter ends with a conclusion from the insights.

9.1 | EVALUATION APPROACH

Motivation

Hideaway is designed based on insights from literature, context, co-creations, discussions and design explorations. *Hideaway* therefore aims to provide children with a more positive hospital experience and empowerment. To find out whether *Hideaway* fulfills the design goal:

...to design an interactive digital social game for hospitalized children that fosters a positive emotional state in children, by integrating peer-contact and familiar social play

and has the potential to contribute to the overall mission an evaluation study is valuable. In addition, the insights can provide inspiration for points for further development. To integrate multiple perspectives, *Hideaway* has been evaluated with (health care) professionals and children, both inside and outside the hospital context.

Participants

Pediatric (care) professionals
Five different types of professionals have provided input from their professional child (care) expertise:

- MPC: Medical pedagogical care (team lead) | *(hospitalization-related) psychosocial expertise*
- SPN: Senior pediatric nurse | *childcare expertise*
- RE: Remedial educationalist | *expertise in development, upbringing and behavior of children*
- SKZ: Project manager Stichting Kind & Ziekenhuis | *expertise in child and family integrated care*
- HP: Health psychologist | *expertise in psychological impact of hospitalization in children*

Children in hospital context
Despite many efforts in different hospitals, it was difficult to find children in the hospital of physically and mentally of suitable condition and willing to participate in an evaluation study. Eventually, two children participated:

- 1 girl (12 years old) in outpatient care
- 1 boy (5 years old) in day admission

Children in primary school
In order to integrate more perspectives of children, a primary school was approached for evaluation. Here, 8 children participated in the evaluation study of which 6 girls and 2 boys:

- 2 children of 9 years old
- 5 children of 10 years old
- 1 child of 11 years old

High-fi prototype

A large part of Hideaway consists of an application. To simulate this as closely as possible, a digital interactive prototype was created with the interface design and prototype program Figma. In Figma, the Hideaway screens have been added and the interactions linked to each other, so that an (almost) complete app experience can be offered. See Appendix H for an overview of the Figma prototype and linked interactions.

For privacy reasons, it was decided not to use actual camera use in the prototype for the evaluation study. Instead, a simulation of taking a photo of the environment has been included. Because the participants are children and locations such as a hospital and school are sensitive, sharing image information must be handled with care. Several prototype programs were tried, but it was not possible within the time constraints of the project to provide both an accurate user experience of *Hideaway* and security of uploaded camera images, and to have this approved. *This did not appear to be a critical problem during the evaluation studies; participants could all empathize with taking the photo as simulated.*

Procedure

The procedure of the evaluation studies was adapted to the different participant groups, taking into account the associated shift in focus and shift in circumstances.

Pediatric (care) professionals
The evaluation study with the professionals followed the following procedure:

1. Introduction to the context of the project and scenario of *Hideaway*;
2. Walkthrough of a Figma prototype of *Hideaway* and showing the physical poster pack, encouraging thinking/reacting aloud;
3. An evaluative semi-structured interview focused on (the value of) the most important design parameters as described in chapter 8.3: *playfulness, contact with peers, contact/feeling of home, contribution to resilience and recovery, added value, benefits, implementation.*

The following questions were asked in the evaluative interview:

- Playful experiences | *To what extent do you think Hideaway creates play moments for (hospitalized) children?*
- Peer-interactions | *To what extent do you think Hideaway helps to have a sense of connection between peers?*
- Connection to home and social circle | *To what extent do you think Hideaway helps create the feeling of a connection to home?*
- Resilience | *To what extent do you think Hideaway contributes to a more positive emotional state? Do you think Hideaway can (thus) increase resilience?*
- Recovery | *To what extent do you think Hideaway can contribute to recovery / in the recovery phase?*
- Value | *What value do you think Hideaway adds? What benefits do you think Hideaway can bring?*
- Implementation | *Do you think Hideaway can be implemented in the hospital? Are there things to keep in mind here?*
- Coping (feedback) | *What do you think of the super animal coping cards? Do you think the tips are clear and practical formulated? Do you have any feedback?*

The session was concluded with room for additional comments and feedback on both experience and usability (e.g. text, icons).

Data was collected by audio-recording and transcribing the sessions. Further, outstanding comments and facial expressions were written down in a note book during the session.

Children in hospital context
The evaluation study with the children in the hospital context was of observational nature, along the following procedure:

1. Introduction of *Hideaway* as new product for children in the hospital: *It was briefly explained that a new game for hospitalized children is being created. Both participants were familiar with the current Hospital Hero app, which searches for animals in the waiting room. The connection was made that this app could also be used to search for animals, but digitally, so that children who cannot leave their room or bed can also go on a search.*
Note: It was further explained to their parents that the play was part of an evaluation study.

2. Interaction with the Figma prototype of *Hideaway: participants were given an iPad on which they could play the Hideaway app as if they would do this 'in real life'. When things stood out during the observation, short further evaluative questions were asked about this.*

During the session both facial expressions were observed (observing in front of the participant) and the interaction with the prototype (observing from behind the participant). Data was collected by writing down reactions, quotes, facial expressions and further observations during the session. When given consent, some photographs and videos were taken by me and by a nurse.

Figure 58: Observing facial expressions during interaction with the prototype in the hospital. Noting down expressions and remarks.

Children in primary school
At the primary school, an agreement was reached about evaluating with two groups of four children. The evaluation followed the following procedure:

1. Introducing the context of the project and Hideaway as a new game for children hospitalized: *There was a short talk about hospitalization for children. Among other things, it was briefly discussed whether children had experience with this, for example, themselves or with someone they knew (this was not specifically discussed in detail, regarding privacy, but children often started talking about this on their own when they heard the hospital context) . It was agreed that we would try to empathize with children in the hospital and that we would go through the app based on that thought.*

2. Interactive walkthrough: *the whole group went through the app at the same time, with the children taking turns performing an interactive action (e.g. clicking a button, swiping). Notable actions, difficulties and comments about usability or experience were noted.*

3. Evaluation using the Structured Word Choice technique (Benedek & Miner, 2002): *the children were all given a post-it and asked to individually select words that they thought fit the app. They could select the words from a list of 15 descriptors that had been prepared in advance. The list of 15 descriptors included the qualities that the design aims to convey and contradictory or divergent ones and were presented in a randomized order. The focus of the evaluation study was on experience, so usability qualities were only slightly included in the list. The descriptors were translated in Dutch and were discussed in advance to see if children understood the meaning. The following descriptors were presented:*

useful | difficult | empowering | amusing | boring | familiar | unclear | funny | sociable | together | distraction | support | inconvenient | making me sad | important

Subsequently, each individual was asked which words had been selected and why. Based on the answers, further evaluative questions were asked about this.

4. Questionnaire with 10 statements about Hideaway, considering experience and using 5-point Likert scale.

5. Room for further feedback and comments: previous co-creation sessions showed that children's creative ability, especially when it comes to apps and games, is something they say they are working on a lot these days. Space was provided to indicate individual points for further development. This could provide inspiration for the selection of further development points.

Data was collected by letting the participants write down descriptors from the descriptors list on a post-it themselves. Further, quotes and remarks during the interactive walkthrough and verbal evaluation sessions were written down in a note book. There was no consent on making audio recordings.

Ethical considerations & Limitations

Hideaway's main target group is hospitalized children. It is therefore mainly important that Hideaway connects to the experience of this group. However, this group itself proved difficult to reach for evaluation. Due to ethical considerations, only children who were physically and mentally fit and agreed to this were approached. Nursing staff helped to find children on the ward who would fall into this group. As a result, several children appeared not suitable for the evaluation study. The selected children were approached to see if they would like to try and participate. Several children indicated that they did not want to do this. This is understandable and respected. It is to be expected that this mainly had to do with the evaluation study (observation and/or filling in evaluation questions) and perhaps the moment at which the children were approached. No further pressure was put on the children to convince them to participate in the study. All participants who did participate (professionals, children within and without hospital experience) made a valuable contribution to the evaluation study.

Figure 59: Interactive walkthrough in groups

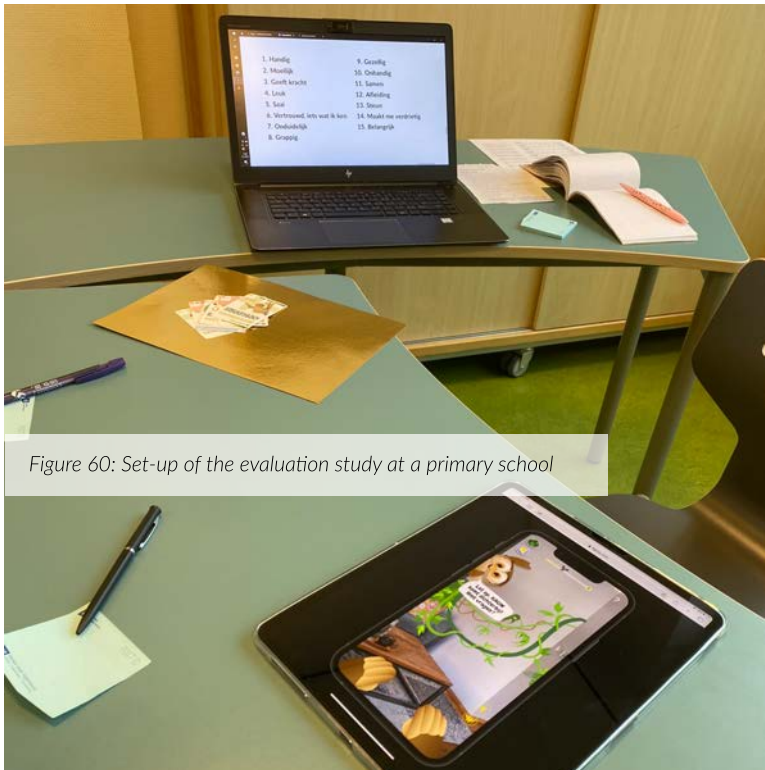


Figure 60: Set-up of the evaluation study at a primary school

9.2 | RESULTS OF THE EVALUATION STUDY

Hideaway to *provide a playful experience*

When observing the ten children who interacted with the prototype, it was striking that everyone was quite involved in the story. The story was followed closely and often caused laughter, especially when characters like Jackdaw appeared. Yet the most enthusiastic response was given from the active interactions, such as decorating the room, choosing a hiding place, and certainly looking for the animals. Apart from the observations, children also indicated that they liked looking for animals the most. Children were motivated to find the animal (on time) and became happy when they found the hiding spot and the animal appeared.

"It is fun to do. I liked the animal-search the most." - Child primary school

"The game is just fun! The search is fun and the Jackdaw is funny." - Child primary school

"The animals have funny names, making children laugh. Being sad all day is not good, just being able to smile is important." - Child primary school

The fact that this animal was subsequently added to their poster made it complete. Children were motivated to continue searching for even more animals.

"I really like it!" - Child in hospital

"I want to find more animals!" - Child in hospital

Further, in the Structured Word Choice evaluation, 6 out of 8 children reported Hideaway as **amusing**, and 6 out of 8 as **funny**. Both qualities contribute to having a playful experience according to the PLEX framework (Korhonen et al., 2009).

The various experts were also asked about their professional perspective on the intended playfulness for children. The experts indicated that Hideaway can certainly create a play moment for children.

"I certainly think so, yes!" - MPC

"This is great for kids." - RE

They indicated that if a child needs play - and children often do, despite not feeling well, according to the RE - Hideaway can jump in.

"I think if children are in need for play, it really can contribute" - RE

According to the senior pediatric nurse, it can even go beyond the child itself; she envisions that parents or other family members will play the game together with the player, thus extending the playful experience, as it were, to the adults in the social circle around the child:

"It can also be very nice that brother or sister is at home with mom and dad, and you are in the hospital with an uncle or aunt or grandma and you had dinner and then you all go play and hide animals." - SPN

In addition to the game activities, they also reported added value in the humor within Hideaway. Humor, e.g. within the names and characters of the animals may not be understood by every child, but that is not a critical point. If it is understood, it is above all an added value, an extra fun playful element:

"Genius, those names of the animals. You also have those smart kids, they like that too. There's definitely humor in it. And you know what it is, even if the clue doesn't end up, it doesn't matter, it's still fun. And if they get the clue, it's even more fun." - RE

Figure 61: A child in the hospital cheering from finding a new super animal and befriending the animal.

Hideaway to *interact with peers*

Because Hideaway could not be extensively tested with several children in the hospital and the evaluation at primary school had to be done in groups, it is difficult to say much about peer contact from observation. It was noticeable that there was a degree of recognition with the boy from the day care when he entered other rooms in Hideaway. Further, it appeared that he really put value in befriending the animals.

"Hey, a bed. Is this animal also in the hospital?" - Child in hospital

"Yeay, friends! We are friends!" - Child in hospital

The children in primary school tried to think about (*Hideaway* in) the hospital context and to empathize. They mentioned, for example:

"Children then think 'I am not alone, there are many children around me'."

"Other kids support you."

"It looks like the animals are with you."

"It feels like together; you're with the animals."

"It's fun, you can be together."

"You can trust the other kids."

6 out of 8 children chose **together** as a descriptor of Hideaway and 5 out of 8 children found Hideaway **sociable**.

What is striking is that not only the interactions with other children, but also with the animals are seen as some kind of peer-interactions.

From their knowledge, experts shared their perspective on peer interactions in Hideaway:

*"Yes! I think it's **precisely the contact**, even if it's playful, like 'Oe, **what's happening in another room?**'." - MPC*

*"This definitely helps to create a **feeling that you are with more children instead of alone in your room**! Especially when you see those photos of other hospital rooms and beds. Then I am almost certain that children think "I am not alone."." - RE*

*"Just having the **connection with other kids** there. That children who are either too ill or have to be in isolation, or children who are too shy and want to play but don't dare, try to find that connection a bit." - RE*

Experts think peer interactions are definitely happening. They mention they expect a feeling that other children are also in the hospital; that you can make contact with other children without having to leave your room. But also that it can be a basis for (further) contact if you are allowed to leave your room, as a kind of conversation starter.

*"The super animals connected to real children are also real **conversation starters**, should they ever run into each other in the hallway." - SKZ*

*"Peer contact is very important, but **peers currently often don't find each other**." - SKZ*

Experts also emphasize the benefits of peer connections not only with children within the hospital, but also with peers from home. Ranging from friends, to siblings, to nephews and nieces, neighbors, or schoolmates. Hideaway offers opportunities to have contact with all these peers in an accessible way. Since children nowadays often do not stay in the hospital for months, it appears that even when visitors are allowed, this visit often does not take place.

"I think the strength in this is that you make the link with the hospital world and with the home world. That's where you connect. The contact between the children, whether they are nephews, neighbors or siblings." - SPN

"So the friends from home can see where their friend is. That's great!" - MPC

"It's so flexible that you can do it with your friends too." - SPN

Both experts and a child began to think further about expanding the peer interactions. Adding a chat or calling function was mentioned several times.

"Maybe that you can chat with the animals you have found." - Child in primary school

"It would be great to add some kind of chat function, or if you could put the image on yourself instead of the room." - MPC

"Is there a possibility to chat with each other via Skype or so? I would take that as a recommendation I think. Of course, nowadays you can easily make phone calls or video calls. But it is nice to make the connection with the game, that if you are connected to your friend or with your grandmother "no, you have to go to the left!". How nice would that be!"- SPN

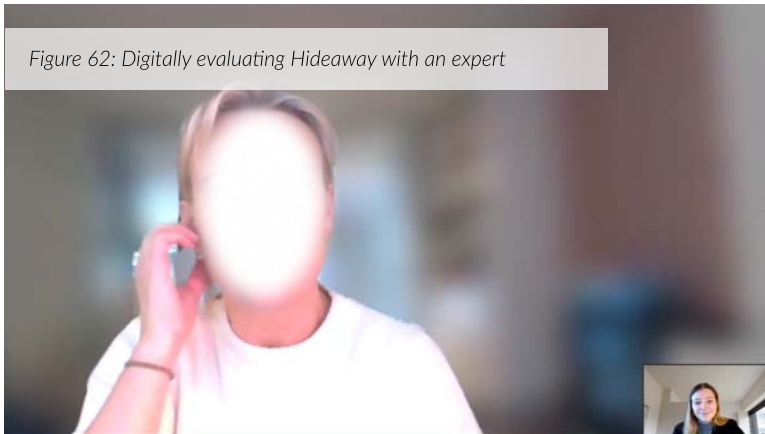


Figure 62: Digitally evaluating Hideaway with an expert

Hideaway to *bring familiarity*

Familiarity is difficult to evaluate with children, because in the prototype they cannot really make contact with their social circle or home environment. This has been simulated with a photo of a home environment. Yet, 2 of the 8 children chose familiarity from the descriptors list.

Experts can zoom out more and review Hideaway in its entirety, with its intended effect. They indicated that they are very excited about how Hideaway brings familiarity to the hospital environment. Play played an important role in this, as this is an important part of the child's daily life.

"Normalizing, being busy with normal day-to-day things. And play is a big part of that." - MPC

"I do think it's nice if you feel alone and you have a brother or sister, that it's especially fun then. (...) That seems like a nice connection to me, then you still play together." - RE

This is about play in itself, but also being able to play with your own friends and family members through the connection with the HomeAnimals. The familiar home environment that is thereby added as a game world was said to be of great value. Children can recognize this from their daily lives and have the feeling of 'being there'.

"I think the strength in this is that you make the link with the hospital world and with the home world. You make the connection with that. In any case, the contact between the children, whether they be nephews, neighbors or brusjes. And that the child also the hospital can take a look at the home situation." - SPN

"There is a bit of recognition in it: 'I always play with you, and now I see your room, your bed, your toys that we always play with so much.' We can all see that in the picture now." - SPN

"Sometimes they can be really sad that they can't go home and aren't home and then you have a little connection." - SPN

“So cool [that you can enter the home environment].” - RE

"Nice how you put ‘the ordinary world’ in it." - SKZ

“What I think speaks out is certainly the contacts with home. Because of course children want the normal life. Everything that plays at home, they actually want to belong. This way you involve both worlds. That's very positive.” - MPC

"Everyday life is integrated into the hospital." - MPC

"It is precisely that connection with home, that is what you miss so much. Especially if you are hospitalized for a long time. Some children miss a lot of fun moments. Those moments, then it is nice if you can play along. So yes, obviously very nice ." - SPN

What was also striking during an observation of the interaction with Hideaway in the hospital was that Hideaway can also accentuate a known interaction type between parent and child. In this case, mom went through the game with her son. For example, mother read the texts and the story sometimes provided extra conversation starters, such as thinking together which super animal would suit the child. The literature and context research in the earlier phases showed that parents are often stressed when their child is in hospital. In some parent-child pairs, this can also mean that relaxed interactions no longer take place between each other, where this is often the case at home (reading aloud, playing a game together). It turned out that Hideaway can contribute to continuing this kind of parent-child interaction in the hospital as well.

"'Every child is super good at something', what are you good at? You are super good at cycling and super good at chatting and..." - Mother of a child (5y) in the hospital during the interaction with Hideaway

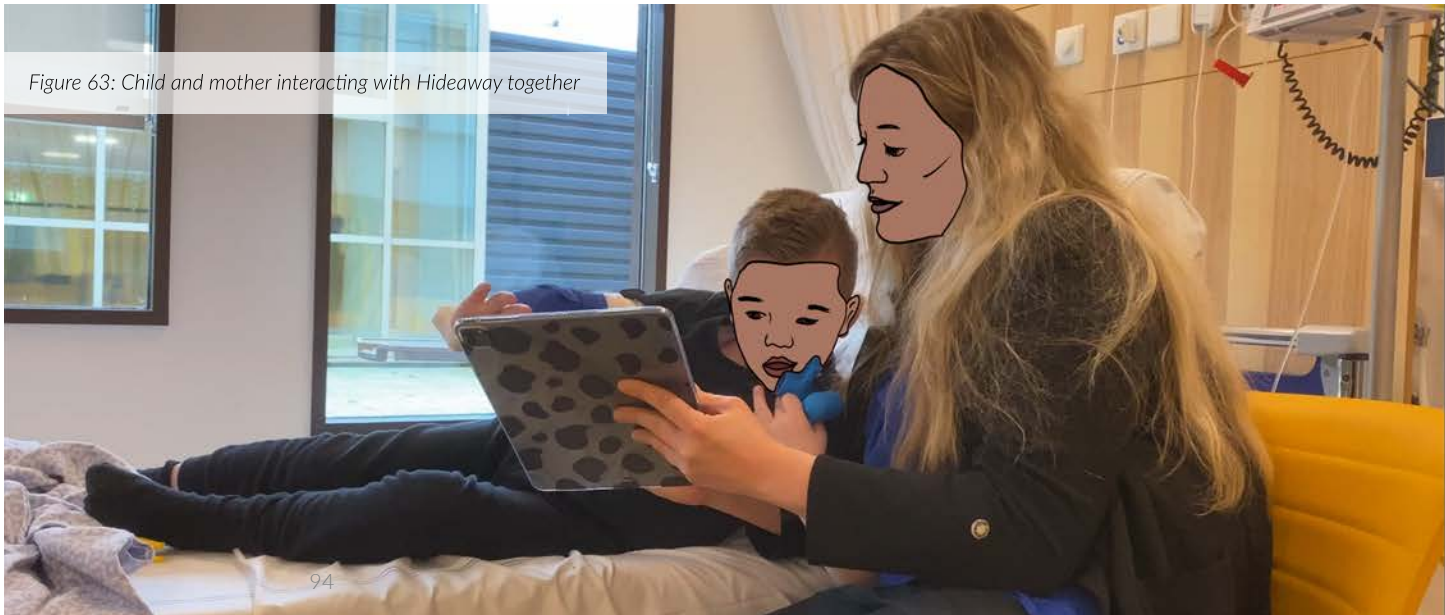


Figure 63: Child and mother interacting with Hideaway together

Hideaway to *escape reality*

It is striking that all children are completely absorbed in the story. In addition, they indicate that Hideaway as a whole ensures that they can mentally wander for a while. Not only the story, but also the game itself and the characters help with that.

"It helps to forget the hospital and everything for a while." - Child in primary school

“It can distract you from bad things.” - Child in primary school

"It's important that they have something fun." - Child in primary school

“That way they can forget most of it.” - Child in primary school

"It brings distraction. It's like you are in the screen, in the game world. That's good." - Child in primary school

5 out of 8 children specifically indicate that Hideaway can bring **distraction**.

Experts also indicate that Hideaway can provide a welcome distraction:

"It helps kids get distracted anyway." - RE

"It gives them something fun to do while in hospital." - RE

"Away from where you are now. Also a distraction, something you can integrate in your daily program." - SPN

"Play is distracting and that is of course nice for children within a hospital setting." - MPC

"No, it is not a risk to show the home environment, feelings are there anyway and that’s okay." - HP

Hideaway to *overcome challenges*

Hideaway tries to contribute to overcoming challenges in various ways. Very practical, by giving tips by the super animals with their cards with helping thoughts, and emotionally, by making children feel powerful, for example by feeling more calm and pleasant.

"You can get stronger." - Child in primary school

"It's useful because it can make you happy and help you not think bad things, but think positive." - Child in primary school

"Maybe also that the child feels more powerful. Pleasure also brings good hormones with it." - SPN

"You start laughing and that causes positive hormones." - RE

"Well certainly, it does contribute positively to recovery. Because it is of course a positive approach. So there again, normalizing, being busy with normal daily things." - MPC

Being a super animal, but also learning from other super animals, appears to have the potential to help in difficult situations. It can give children tools to deal with the situation in an encouraging and engaging way.

"The animal is like a kind of assistance dog." - Child in primary school

“You are a super animal, that is important.” - Child in primary school

"I like the connection with the helping thoughts. (...) Because that is of course the case: you want to encourage children. So ‘What to do if you do indeed feel bad, or what to do if everything feels negative?’ I think that's the nice thing about it." - MPC

The child should not necessarily absorb and use the tips from the cards individually: experts indicate that the super animals and their tips can be openings for parents and care workers to start a conversation about fears and resilience. This can be both in advance, during and after a medical procedure.

"Most of the children who come here have a very long trajectory. Then it's nice that you can hang that poster in a room and that a parent can also fall back on those superpowers, on those helping thoughts. Then you're not alone busy with experiencing illness, then you are also busy with processing illness. And that would be nice." - MPC

"In practice, we notice that on the part of the care providers, the conversation with young people about resilience is really still a dream. (...) ~These can be a kind of conversation starters." - SKZ

“It gives a very positive spin, super animals and that you all have a positive quality that you can use." - HP

“You show that your mind can be anywhere." - HP about the tucan

6 out of 8 children report **support** as a quality of Hideaway.

Overall value of Hideaway

In the evaluation interviews, professionals were asked what value they see in Hideaway as a tool for the hospital. In addition to the individual elements, here was a look at Hideaway in general and the things that stood out. A few examples:

"Well, I think, the child can be a child. The healthy child image is paramount. The disease is integrated into it. Daily life is integrated in the hospital." - MPC

"It's part of the daytime. (...) Pleasure brings good hormones. And the added value of the connection with home, family, friends and perhaps also with other children in the hospital." - SPN

"I think the part that, unless you want to, you are not in a bubble if you don't want to. (...) And it brings humor in a serious environment." - RE

The collection of all selected words in the evaluation with children at a primary school also gives an impression of how children experience Hideaway as a whole (Figure 64). In addition, four children at a primary school completed the evaluation statement form. The results vary widely (Figure 65), and sometimes conflict with the selected descriptors and explanations (see also limitations discussed in Chapter 10). Despite the varying answers to the statements, all children have indicated that they really want Hideaway to be implemented in the hospital. Regarding implementation, the professionals described no critical problems. They do advise to include an implementation plan that can be consulted by care workers.

Age
Both professionals as children indicate that Hideaway is suitable for children up to 10 years old. However, both groups suggest to make two modi (4-8y and 8-12y) to prevent difficulty for young children and simplicity for older children.

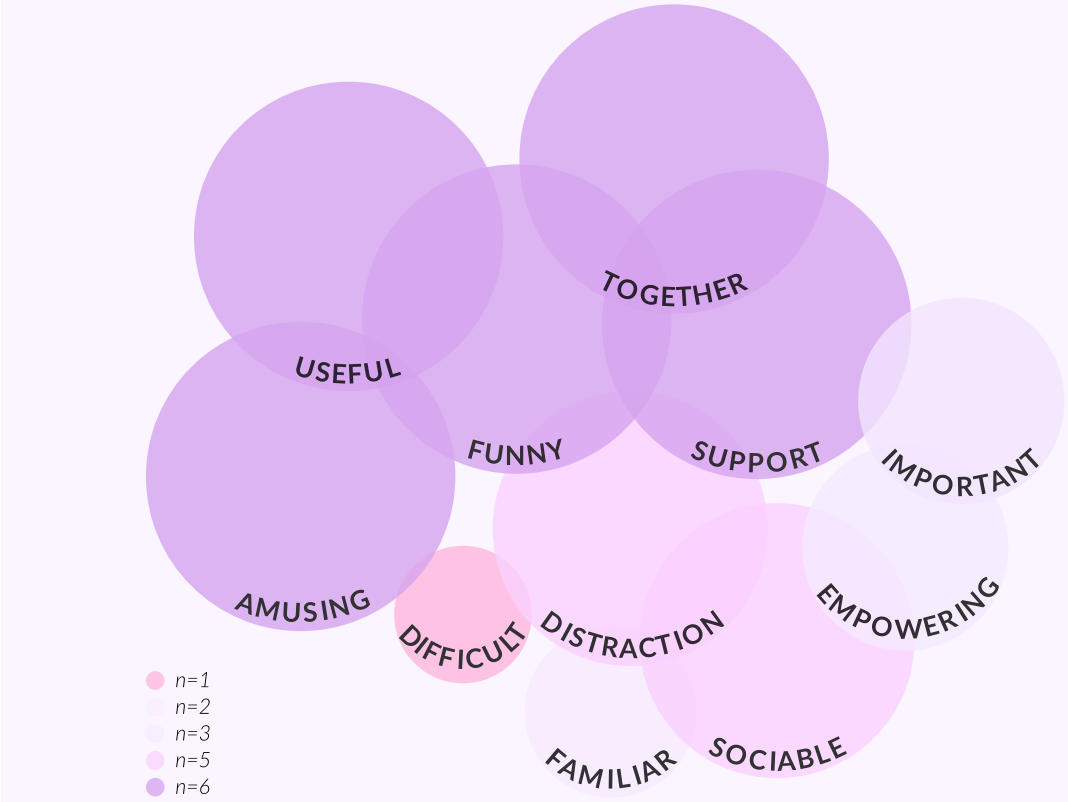


Figure 64: Overview of all descriptive qualities children in primary school (n=8) selected. The larger the circle, the more often reported.

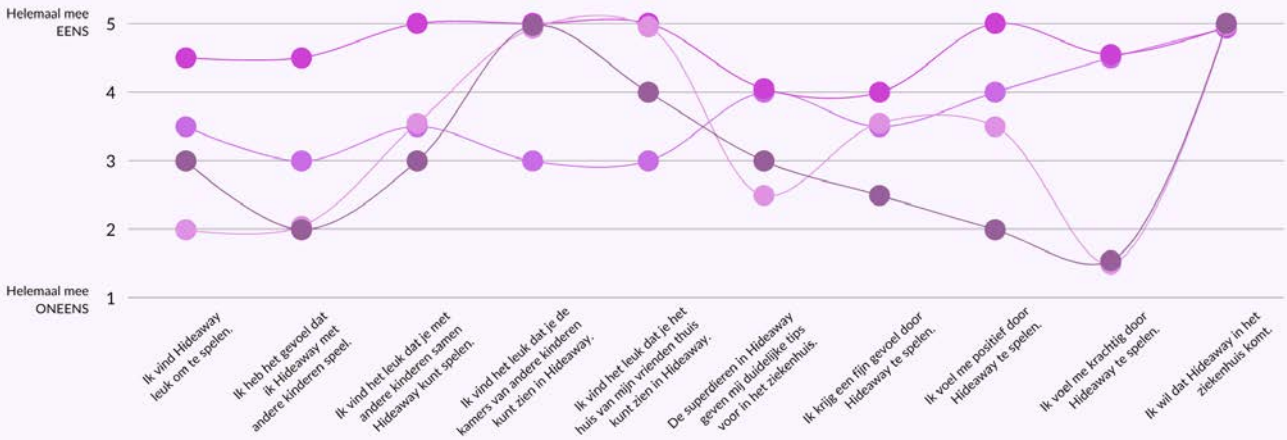


Figure 65: Results of questionnaire conducted with children in primary school (n=4)

9.3 | CONCLUSION

Conclusion of the evaluation study of *Hideaway*

Hideaway was designed according to the strategy of bringing social interaction types from daily life to the hospital context, focusing on playful peer interactions. From this strategy a narrative interactive social game has emerged, which aims to contribute to a more positive emotional state during the day in order to empower children. In previous research, several design elements were determined that play an important role in achieving this positive state. By integrating these into *Hideaway*, an attempt has been made to meet this goal.

In the evaluation study, an answer was sought to the question whether *Hideaway* can contribute to a more positive emotional state in children. For this purpose, a qualitative study was carried out in which the different design elements and their effects were examined.

The results showed that *Hideaway* can create play moments for (hospitalized) children. Hideaway was generally found to be amusing and funny, with active interactions and the humor in the characters being paramount. Especially the search for fellow super animals made for a playful experience.

The results showed that (a feeling of) peer contact is certainly brought about by *Hideaway* and that this also had positive effects on the mental state. Children reacted happily by befriending other animals and indicated that the feeling can be created that you are not alone, but that there are other children around. Experts shared this opinion in their view, stating that digitally entering each others rooms enhances this feeling. They further indicated that the interactions within the game can be a conversation starter for further interactions between children (digital or physical). It was suggested several times to add a chat function to facilitate subsequent talks. They indicated that *Hideaway* enables peer interactions in an accessible way, both between children in the hospital and with peers from home.

Experts indicated that *Hideaway* brings familiarity to the hospital environment, both by adding play within itself and by allowing playful peer contact with one's own friends and relatives, as well as by being able to digitally enter the familiar environments of everyday life. The results also showed that *Hideaway* can contribute to facilitating familiar child-parent interactions in the hospital context, with the storyline being a starting point to have a relaxed moment together.

The results showed that *Hideaway* helps to mentally escape the situation. Children (5 out of 8) and experts indicated that *Hideaway* offers distraction, through the storyline, the immersive game world and the game play activities themselves. Although difficult to claim from observations, children in the hospital context also seemed to be(come) relaxed at the moment of interacting with *Hideaway*.

This mental relaxation turned out to be a way to deal with the difficult situations in reality. In addition, the results indicate that the practical tips linked to the super animals are also a practical way to deal with hospitalization-induced challenges or to open the conversation about them. In addition to the expert opinions, 6 out of 8 children indicated that they found *Hideaway* a support.

Overall, the evaluation study showed that *Hideaway* contains the intended design elements and that these elements can positively contribute to the emotional state of (hospitalized) children. Children indicate *Hideaway* as useful, amusing, funny, being a support, and evoking a feeling of ‘togetherness’. *Hideaway* can be an important sociable tool, providing distraction and empowerment. Experts indicate that in Hideaway "the child can be a child". "The healthy child image is paramount and the disease is integrated into it." In addition to being a "day activity", it offers "added value by making the connection with home, family, friends and the other children in the hospital". Integrating normal daily activities such as play and peer contact helps to have a "positive attitude". Vice versa, it "contributes to spreading awareness and understanding of a hospitalization" in the social circle. Moreover, it supports the child and family in “processing the hospitalization experience”.

Figure 66: A child playing Hideaway, making a relaxed impression

10 *HIDEAWAY* INTO THE FUTURE

Photo by Patrick Perkins

10 | *HIDEAWAY* INTO THE FUTURE

10.1 | Discussion
10.2 | Further development of Hideaway
10.3 | Implementation

This chapter describes the evaluation study of *Hideaway*. First, the evaluation approach is explained. Then, the results from the various perspectives are shown. The chapter ends with a conclusion from the insights.

10.1 | DISCUSSION

Interpretation of results

Both the literature review and the context study showed that children face many challenges around and during their hospitalization. To overcome these challenges, it is important that children can feel as comfortable as possible during their hospitalization. The previous studies showed that a positive emotional state can help in facing the challenges and difficult situations more resiliently. Further research into boosting this positive state in children led to a selection of different characteristics and design elements that should contribute to this positive state. Based on this, Hideaway was designed in an iterative and co-creative process.

A qualitative evaluation study has provided insight into whether Hideaway could contribute to this positive emotional state and resilience in hospitalized children. The results suggest that Hideaway creates play moments and facilitates playful peer interactions in a humorous and accessible way, thereby evoking happy feelings. This further supports the idea of the positive effect by bringing something familiar to a child to the hospital context: play and other children. Children can make contact with friends and hospital peers. This seems to create recognition on several levels. It may therefore help children to feel less alone, and subsequently feel more comfortable. The study suggests that this comfortable feeling is further enhanced because children gain access to their familiar environment from normal daily life, digitally, but with similar opportunities for interaction. Children can still play in their home environment and with their social contacts from home, even if they do not have access to them due to the (physical) limitations of a hospitalization. Experts suggested that this brings children the opportunity to still participate in their familiar life and contributes to feeling more 'normal'. They indicate that this in itself can contribute to a positive emotional state.

The game, story and characters put humor in a serious context. It helps children to laugh. According to the experts in the evaluation study, this laughter can cause certain hormones to be released that contribute to the positive state. In addition, it seems that Hideaway can provide distraction, causing children to focus less on their hospitalization and the challenges that come with it. This is at the time of interaction with Hideaway itself, but can also be at times when it is not possible to interact with Hideaway (for example, during some medical procedures), when healthcare workers or parents use Hideaway as a starting point for a distracting or encouraging conversation. This encouragement is mainly taken from Hideaway's super animals. The super animals with their helping thoughts give the individual child the opportunity to link Hideaway to reality, but also prove to be conversation starters.

The results of the evaluation study are related to the expectations based on the literature, context and in-depth study. Hideaway was designed based on seven elements that were selected as key contributors to positive experiences in children. In addition, 12 categories for Playful Experiences have been integrated from the PLEX framework (Korhonen, 2009; Arrasvuori et al., 2010). The results from the evaluation study suggest that Hideaway has successfully integrated these elements and that these elements, on their own and in conjunction, seem to induce a positive emotional state in children.

Examining the success potential

Hideaway is designed according to a human-centered value-based iterative research and design process. Evaluation with professionals and children has shown promising results. To further express and reflect on the value of *Hideaway*, this chapter will go into the desirability, feasibility and viability of *Hideaway*. According to Ideo this could help determining the success potential of an innovation.

Desirability
Literature research and context research have shown that children often find hospitalization a stressful experience (e.g. Lerwick, 2016; Stichting Kind & Ziekenhuis, 2017). There appeared to be a variety of stressful factors and negative responses (Chapter 2.2) with the risk of a host of short-term and long-term effects (see Figure X). These reactions were also observed in the context study. Hospitals try to respond by incorporating the use of positive language and distraction interventions. This is primarily focused on limiting stress factors and reactions during a medical procedure. It turned out that the emotional experience of the total hospitalization was not sufficiently addressed. A hospitalization goes beyond the medical procedures that come with it. The unfamiliar context and the absence of normal life put additional negative pressure on the mental state of a child in hospital. The literature and context study showed that this negative spiral can create a risk of an (extra) stressful and painful experience, while a positive state of mind on the other hand could actually contribute to feeling more powerful during the entire hospitalization. Hospitals have not yet responded sufficiently to this. Children have few opportunities for playful peer interactions, especially when being bedbound or in isolation.

The evaluation study has shown that Hideaway can provide these playful peer interactions and that the combination of the design elements can evoke a positive state in different ways. Experts expect that Hideaway can certainly contribute to a more comfortable hospital experience and have positive expectations that this can promote resilience. A future comprehensive evaluation study should reveal the profound emotional and psychological effects of Hideaway in the context of hospitalization. All spoken experts and children are in any case enthusiastic and indicate that they would like to have Hideaway implemented in reality.

"I really like it, and I want it!" - SPN

"I'm very excited. (...) I think you've struck gold with this one. I really think it's in the need of hospitals." - SKZ

Children in primary school (n=4):

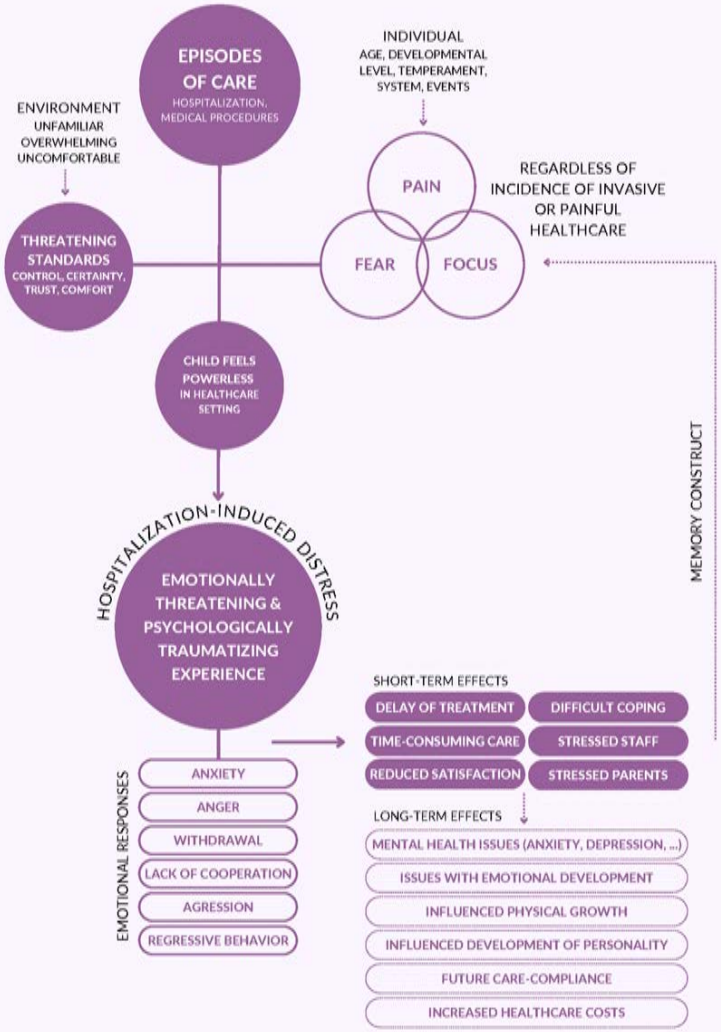


Figure 67: Risks of hospitalization-induced distress

Feasibility
During the development of *Hideaway*, it was taken into account that *Hideaway* can be developed easily and within a relatively short period of time to be implemented in Dutch hospitals. For example, a conscious decision was made to make *Hideaway* a mobile application. The current product for the waiting room of the Hospital Hero Foundation is also a mobile application, the Hospital Hero App©. The Hospital Hero Foundation therefore already has know-how about and partners within app development and implementation. For example, the team has an in-house usability expert and they have a partnership with Zooma as an app developer company. Moreover, the Hideaway prototype was made in the same prototyping tool that the Hospital Hero Foundation is familiar with: Figma. This makes it easy to iterate further on Hideaway without having to build an expensive new prototype.

In order to keep costs relatively low for development, a conscious decision was made to use 2D technology only. Hideaway wants to create an immersive experience. This could be enhanced using 3D and/or XR technology. However, implementing these kinds of technology can be time and cost-consuming. High production costs could not only be a risk or barrier for the Hospital Hero Foundation, but might also increase purchase costs, making it more difficult for hospitals to purchase *Hideaway*. It would be a shame if many children could not use *Hideaway* because of this; it is part of the mission to offer as many children as possible a more positive hospital experience. That is why the design process looked for a relatively technically-easy way to create an immersive experience. It has been chosen to enlarge a normal flat photo, which can be made by any camera, in such a way that the player can scroll through the photo both horizontally and vertically. Without actually having to load a 3D image, this still creates the impression of 'looking around'.

In the evaluation study it was stated that it "looks like you are in the screen". The expectation is therefore that the used 2D technology is sufficient to achieve the desired effect. The 2D jungle elements are used to create hiding places. These are digitally added layers that are placed in the foreground. So no sensors and technology that measure depth in space are required. This also contributes to the technical feasibility, and at the same time ensures that Hideaway can also be used on devices without these sensors (such as a LiDAR scanner). This makes Hideaway accessible to more people, and therefore more attractive to hospitals.

It is, however, advisable to keep track of the development of these kind of technologies and associated costs, or to discuss them further with developer partners. If the implementation of 3D technology is simplified in the future and thus becomes cheaper and/or if more and more devices have LiDAR scanners or comparable depth sensors in the future, an iteration can be made towards an even deeper immersive experience. For example, the link with VR glasses can also be looked at when more hospitals purchase VR glasses. In this case, investments should be made to research the effects of VR on sick children. Under no circumstances should playing Hideaway have adverse effects on children's health, e.g. due to the intensity of VR.

ZOOMA

Figure 68: App developer studio Zooma, partner

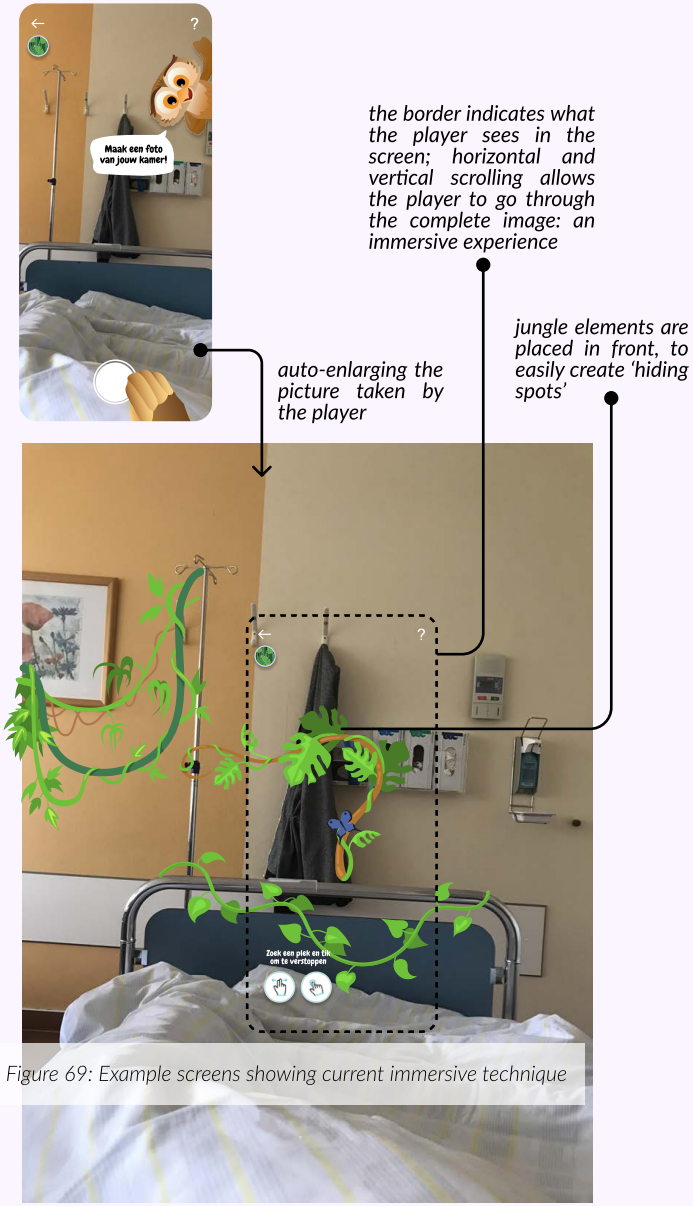


Figure 69: Example screens showing current immersive technique

Viability
Hideaway is designed to be added as a module of Stichting Hospital Hero. It is in line with the foundation's mission of making a hospital visit less stressful for children and the overarching mission of contributing to trauma-free pediatric care. Both the aesthetics and the game connect *Hideaway* with the other module of Stichting Hospital Hero: the Hospital Hero app for the outpatient waiting room. Both have a core game strategy of seek and find. In addition, in both animals are the central characters. Similar visual elements are also used, such as the same font, similar text clouds and animals in the same true-to-life comic style. These connections allow the apps to increase each other's use; for example, children who have been admitted often return to the outpatient clinic, and in some cases vice versa. If they have already become acquainted with an app from Stichting Hospital Hero in one of the two contexts, it is to be expected that children are curious or motivated to try the other app.

Hideaway has applied a different vision and strategy than existing tools for hospitalization, and therefore has the potential to take a positively striking position in the market. While many hospitalization tools focus on distraction during the medical procedure, are not always at hand or require healthcare workers to function, Hideaway focuses on the complete (emotional) experience. Figure 70 shows qualities of Hideaway compared to other tools used in a hospital (in this case the WAKZ, see also chapter 3.3) for children in short-term admission. Note that this scheme is not intended to supplant other tools; Hideaway is not intending to be a replacement for existing tools. After all, children differ and so does their preference for a tool. A wide landscape of tools can respond to different needs of children.

	Preparation for challenges in hospitalization	Receiving rewards during hospitalization	Providing distraction during hospitalization	Connecting to peers during hospitalization	Escaping environment during hospitalization	Supporting processing of hospitalization experience	Connecting to home during hospitalization	Accessibility
Hideaway	✓	✓	✓	✓	✓	✓	✓	Always
Searching book			✓					On demand, primarily used during medical procedures
QwiekUp			✓		✓			On demand
ClinClowns			✓					Once a week
KidzFlitz		✓	✓	✓				Once a week
Franniez		✓				✓		Always
VR goggles			✓		✓			On demand, primarily used during medical procedures
KiwanisDoll	✓					✓		During meetings with MPC
iPad: games, music, videos			✓					Always
Play areas			✓	✓	✓			*Not accessible for many hospitalized children

Figure 70: Hideaway's benefits compared to 9 existing tools

The advantage of *Hideaway* is that it responds to many different needs in one application. An app can also be modified remotely, or elements can be easily added. With this, *Hideaway* creates the opportunity for personal customization when an organization purchases it. For example, if desired, the hospital's mascot can take the place of WISE the Owl as the narrator. Or, if a hospital has difficulty uploading photos for privacy reasons, can a hospital indicate that the children within this hospital use a standard photo of a hospital room from this hospital for the game world. In addition, other organizations will eventually be able to purchase *Hideaway* and possibly have it tailored to the situation, such as rehabilitation centres. More about this can be found in Chapter 10.3 Implementation. However, further investigation is needed into what the costs are for these kinds of personal adjustments and what implications they have for the gaming experience.

Limitations

Limited time and resources
Since the project had to be completed within 100 days and it takes place in a sensitive context, it was difficult to reach participants and some parts in the prototype had to be limited (eg actual upload of photos).

Limited options for evaluation with target group in context
Hideaway's primary target group are children between the ages of 6 and 12 who have been admitted to hospital for a short-term stay of several days. *Hideaway* is therefore designed mainly for use by these children in the hospital context during short-term admission. To find out if *Hideaway* really fulfills its goal and induces a positive state in these children in this specific context, *Hideaway* should ideally be tested with the specific target group in those circumstances. In ideal circumstances, this test would even last for the duration of the entire hospitalization, where children can grab *Hideaway* and put it away at their own chosen moment. This type of evaluation was not possible within this project given the time limitations and difficulty of finding participants.

Multiple attempts were made to recruit children from the target group in the intended context, both by approaching children and parents directly and by letting the evaluation study be introduced through familiar health care workers, but unfortunately there were no children who fit into the target group in the context, who were both physically and were mentally fit enough to participate in an evaluation study and wanted to do so. Timely contact was also sought about the use of children's advisory councils, but unfortunately these councils could not meet within the time frame of the project.

In order to be able to evaluate *Hideaway* as well as possible from the perspective of a child and within the context, children were therefore approached in day care and an outpatient waiting room and at a primary school (where some children did have hospital experience). Valuable insights have emerged here.

Appropriate assessment methods for children
Children differ from adults, i.e. in development, cognitive and social skills and experience, and this also influences use research (Idler, 2020). However, many design evaluation methods are designed and intended for use in evaluation with adults. In many cases, these methods are not suitable for (one-on-one) adoption in evaluation with children.
Although the main evaluation methods included observations and evaluation conversations, three structured evaluation methods were also converted to be able to use in the evaluation with children. For example, the Structured Word Choice technique of Benedik & Miner (2002) was used. The list of 118 product reaction words from the original Microsoft Desirability Toolkit was taken as inspiration. However, to keep it manageable and understandable for children, a list of 15 words was drawn up and a Dutch translation was written for it. Although this is more in line with a child's cognitive skills, it does limit the answer options. In addition, even though the words were discussed beforehand, children may have given a different meaning to the words.

A questionnaire with 10 statements and a 5-point Likert scale was drawn up. These questions were very much related to the actual intended use of Hideaway. It is questionable whether children who have not used Hideaway in the real context of multi-day hospitalization can provide reliable answers to these statements. In addition, the questionnaire was given at the end of the evaluation session, when the children's concentration started to run out. This may also have influenced the answers given.

Furthermore, a System Usability Scale test (SUS test), originally developed for adults by Brooke (1986), was adapted for use in children. The statements were formulated in such a way that it should be understandable for children, by using simple words in Dutch. This test was not carried out in practice, because it turned out to be too much for children to carry out in addition to the evaluative questions.

Research recommendations

Further evaluation with target group in context
Limitations in the evaluation study including time limitations and difficulties in finding suitable participants meant that Hideaway could not be evaluated with children in a multi-day recording. Despite the valuable insights of experts and substitute participants, **it is advisable to carry out an extensive evaluation in a follow-up study with children from the target group during a short-stay hospitalization**. As described earlier, the ideal evaluation study would be one in which children could interact with Hideaway as intended, i.e. at freely chosen times. Evaluative questions should be asked afterwards and possibly in between. It is advisable to combine this with an observational study within this context, so that knowledge can also be gained about things that participants would not indicate themselves in evaluative questions, such as facial expression, behavior and possible interaction bottlenecks.

In addition, in a longer study, the prototype can be worked out in even more detail with all the desired functions (such as uploading a photo and actually being able to see the context of your own home). For example, it can be better evaluated whether the connection with home is also experienced by children in this way and it can be investigated what effects Hideaway has on the social circle (the players who participate as a Home animal).

Further research on coping cards
The current coping cards link a helping thought to an animal. These helpful thoughts are inspired by the child tool of My Positive Health, sample pediatric coping strategies described by Children's Hospital Colorado and results from our own context research. There does not appear to be a ready-made list of helpful thoughts and coping tips specifically aimed at challenges and situations for children in the hospital. In consultation with many different experts in the field of (psychological and psycho-social) care of children, but certainly also in consultation with children with hospital experience, these coping cards should be further refined and supplemented. In this way it can be ensured that the cards offer the most complete possible practical help in a variety of situations and challenges in and around hospitalization. As mentioned by one of the experts during evaluation: “The further development and refinement of the coping cards can be a full study in itself.”

10.2 | FURTHER DEVELOPMENT OF *HIDEAWAY*

Recommended iterations on *Hideaway*

The evaluation study also raised some points for further development.

Enhancing the coping cards by connecting to the physcial poster set
Experts were very pleased with the super animals with the helping thoughts ("coping cards"). In previous co-creations it was also indicated by (mainly older) children that they needed practical tips in the game that they could use in the real situation. In the evaluation studies with children, however, it appeared that the coping cards now disappear in the game. Kids can now reach the coping cards by actively clicking on an animal on the digital gold poster. Now it turned out that children are so busy looking for and finding the animals that they don't take the time to really go through the coping card of the found animal. Because the experts saw a lot of added value in these cards, it was decided that more emphasis should be given to the cards by making a stronger and more engaging link with the physical poster set.

In the iterated version of the poster set, children not only put a sticker on their physical gold poster, but the children can open the box of the found super animal on the back. In the opened box, the tip of the animal is hidden under a gold layer. By scratching this layer open, the coping card of this animal emerges. On the other side of the box, the child can keep track of which child this found animal belonged to.

In this way, more emphasis is placed on the coping card. Additionally, a stronger sense of reward might be created, ‘feeling rewarded from opening a box’.

Modules within Hideaway (age/difficulty level)
There can be quite large differences in development within the target group. This also has consequences for how engaging Hideaway is for the child. In the evaluation study, both children themselves and professionals indicated that it would be a valuable addition to create two modules in Hideaway. Hideaway as it is now is expected to best suit children who are a bit earlier in their development (up to about 9 years old). Hideaway does not pose critical problems for children who are further along in their development, but it does run the risk of being less engaging. To connect even better with this group, it is advisable to make the graphics of, for example, the animals a little more realistic ("between a photo and a drawing") and to increase the difficulty in searching, e.g. the animal only for 5 % visible, or less time while searching (JACKDAW is faster).

Implementing a function for further peer-contact
During the evaluation study, the wish emerged to facilitate an opportunity for further contact with a (newly) befriended peer. While Hideaway is mainly about playful peer contact, some children may feel the need to continue a conversation as a result of the game, either about the game or to get to know each other further. It is recommended to further investigate how this can best be arranged without compromising the game itself or privacy rules.

Developing an implementation guide
To prevent problems during implementation, it is advisable to draw up an implementation plan and short implementation guide for care workers. To maintain consistency with the current Hospital Hero app, it is recommended to include Hideaway in a paragraph of the Hospital Hero plan, or to create a comparable implementation plan.

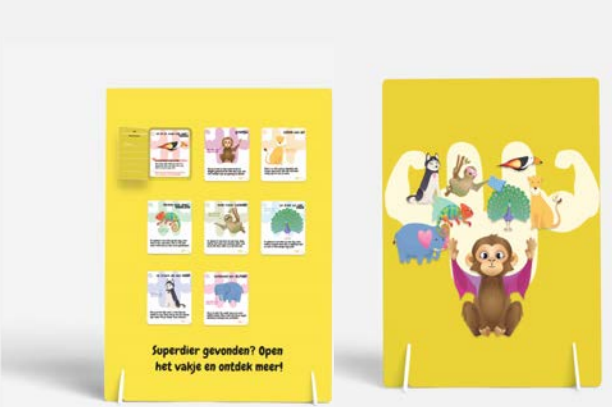


Figure 71: Example of an elaborated physical set with physical cards on the back of the poster board

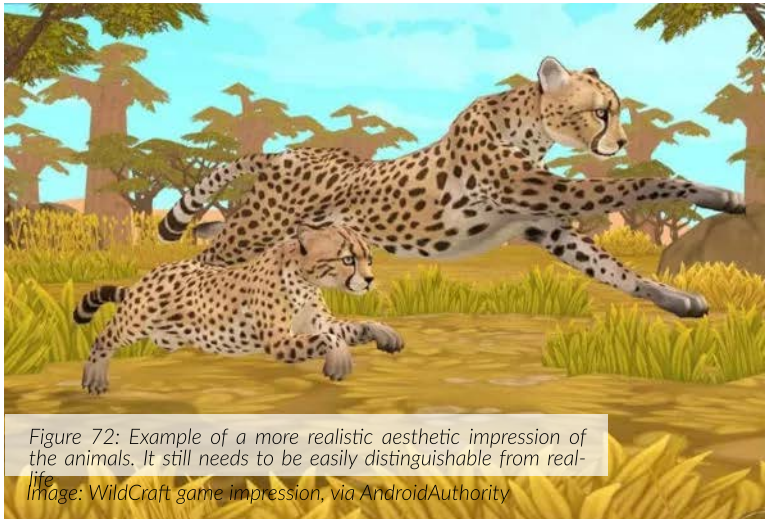


Figure 72: Example of a more realistic aesthetic impression of the animals. It still needs to be easily distinguishable from real-life
Image: WildCraft game impression, via AndroidAuthority

10.3 | IMPLEMENTATION OF *HIDEAWAY*

Implementation in Dutch children's hospitals

During the development of *Hideaway*, it was taken into account that *Hideaway* can be developed easily and within a relatively short period of time to be implemented in Dutch hospitals. For example, a conscious decision was made to make *Hideaway* a mobile application. At the moment almost everyone has a telephone and more and more hospitals are giving children access to a hospital tablet or iPad. Moreover, the current product for the waiting room of the Hospital Hero Foundation is also a mobile application. The Hospital Hero Foundation therefore already has partners to develop and implement mobile applications. Hideaway can join this. In order to keep costs relatively low, a conscious decision was made to use 2D technology for the immersive experience. When using 3D technology, it is expected that it will be a lot more time-consuming to program the app. This will also increase costs, making it more difficult for hospitals to purchase *Hideaway*. It would be a shame if many children could not use *Hideaway* because of this; it is part of the mission to offer as many children as possible a more positive hospital experience.

When a hospital purchases Hideaway, it will receive an internal implementation plan and a short instruction manual for the healthcare staff. It is recommended, especially in the early stages, to designate an ambassador within the hospital who can be the first point of contact (for the staff) in case of ambiguities surrounding the use of Hideaway. Another task of the ambassador can be to ensures that Hideaway remains under the attention of healthcare personnel, for example by informing staff meetings once in a while. Materials can be supplied with the implementation plan that support these reminders (poster, video, presentation).

Implementation on a wider scale

Hideaway could also be applied in other contexts where children face similar challenges and need to be resilient. Hideaway can also mean an addition to, for example, child rehabilitation. Further research should show whether adjustments to *Hideaway* are required for this.

In addition, parts of *Hideaway* can also find another application. For example, the coping cards could be used in therapy with children in class discussions on primary schools about challenges and resilience.

11 TO CONCLUDE

Photo by Pexels

11 | TO CONCLUDE

This master thesis project looked at how a design intervention can **foster resilience in hospitalized children** and provide a **comfortable hospitalization experience**, in order to provide **emotionally-safe pediatric care**.

A human-centered iterative and co-creative research and design process resulted in forming a vision and strategy to meet the overarching goal. Based on the vision that **a positive emotional state strengthens resilience for the moments when it is needed** and the strategy that this positive state can be achieved by **bringing interaction types from everyday life, i.e. playful peer interactions, to the hospital context**, the narrative interactive game *Hideaway* was designed. Seven design elements determined from the in-depth studies were combined with knowledge from storytelling and game design to create a valuable, child-friendly and engaging design.

Hideaway and its design qualities have been evaluated with professionals and children inside and outside the hospital. This showed promising results, but more research is needed to measure the true effect of *Hideaway* in the context of multi-day short-term hospitalization.

The master thesis project has tried to give a glimpse into the (emotional) experience of children during a hospitalization. It has tried to expose what kind of challenges children face. It further tried to propose an innovative vision, expressing that emotionally-safe care could not (only) be attempted by addressing specific stressors, but by empowering children to deal with the different and personal challenges. With a peek in children's experiences, an overview of stress factors and a vision on how to respond to this, this project can hopefully provide inspiration for future designers, policy makers and healthcare professionals. Together we can contribute to emotionally-safe pediatric hospitalization. Combine insights, but provide power to the patient.

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APPENDICES

A | PREDETERMINED QUESTION INTERVIEW HEALTH PROFESSIONALS

How do you define stress (by hospital visit)? How do you define fear?

When do children experience moments of stress?
What role do parents/brothers play?
Are there times when the stress is extra high or mainly occurs? E.g. prior to visit, just before surgery, etc.
Are there places/attributes that “generate” stress? (e.g. in the hospital room).
Are there differences in terms of type of treatment/ age?
How do children mainly express stress? What consequences can this have? How do children deal with stress? Do you also see that children themselves have coping mechanisms for stress?
How do parents/brothers react to a child in hospital and to a stressed child?

At what age do children become aware of their own disease? Does something change in their behaviour/ coping mechanism/stress moments?

What kind of interventions/strategies do you use to reduce stress? What makes an intervention effective?
Does this work in all cases? When/why not?
Are you involved with all children by default or only with very stressed children / when asked? Do you always know (right away) if children are stressed?
Is there a lot of preparation going on? How and for whom can preparation play a role/help? Are tips given?
Do you know whether children still experience a lot of stress afterwards? Does it make sense to process things afterwards / to provide tools for this?
What's still missing? Where could an improvement take place?
Manpower
What are things to consider when designing for children/this target group?
How can children handle the intensity of an intervention?

B | TASK CARDS FOR INTENDED GENERATIVE RESEARCH SESSIONS

Hé, wat leuk dat je jouw verhaal wil vertellen. Zo help jij het ziekenhuis te verbeteren!

1.

Mijn Hero Verhaal

Hoi, mijn naam is:

en ik ben jaar oud

Dit ben ik!

Thuis woon ik met:

plak, teken of schrijf met wie jij woont

Mijn hobby's zijn:

en als ik speel, doe ik dit het liefst:

het liefst speel ik:

in mijn eentje

met 1 vriend(in)

met een boel vrienden

samen met .....

Dit is mijn lievelingsdier:

Hier word ik BLIJ van:

GENERATIVE RESEARCH - PEDIATRIC PATIENTS - © K.R. BOLTJES, 2022

MindMap

i Waar denken jullie aan bij [SPELEN]? Waarom? Heb je daar een voorbeeld van?

GENERATIVE RESEARCH - PEDIATRIC PATIENTS - © K.R. BOLTJES, 2022

FotoAssociatie

Waar denken jullie aan bij deze foto('s)? Welk gevoel hoort hier voor jullie bij?

Hé, wat leuk dat je jouw verhaal wil vertellen. Zo help jij het ziekenhuis te verbeteren!

Mijn Hero Verhaal

2.

Binnenkort moet Noah naar het ziekenhuis.
Noah is hier nog nooit geweest.

Vertel jij Noah jouw verhaal?

(ziekenhuis-held)

Jij bent een echte HOSPITAL HERO!
Jij weet hoe het is om in het ziekenhuis te zijn.

Ik heb ☐ nachtje(s) in het ziekenhuis geslapen.

Ik ben in het ziekenhuis (geweest) omdat:

Soms voel(de) ik me ☐ omdat:

Soms voel(de) ik me ☐ omdat:

Hierdoor voelde ik me soms even ZOALS THUIS:

Het ziekenhuis is niet hetzelfde als thuis. Niet iedereen kan met jou mee.
En vaak kan je niet alles doen wat je gewend bent. Dat kan je best missen.

Wie mis(te) jij?

Wat mis(te) jij om te doen?

Ik heb veel | een beetje | geen **contact (gehad) met vrienden/familie thuis.**

vooral op deze manier:

En dit heb ik vooral gedaan:

- slapen
- lezen
- vervelen
- muziek luisteren
- kletsen
- tv kijken
- spelen
- .....

met wie?

hoe deed je dat?

- O alleen
- O met:

Met andere kinderen in het ziekenhuis?

wat heb je gedaan?

- geen contact
- spelen
- kletsen
- .....

GENERATIVE RESEARCH - PEDIATRIC PATIENTS - © K.R. BOLTJES, 2022

Hé, wat leuk dat je jouw verhaal wil vertellen. Zo help jij het ziekenhuis te verbeteren!

Mijn Hero Verhaal

3.

Zo zou ik THUIS helpen:

Zo zou ik IN HET ZIEKENHUIS helpen:

Jij bent een echte HOSPITAL HERO!
Hoe zou jij als HERO Noah kunnen helpen?

Als ik de baas van het ziekenhuis was, dan zag het er zo uit:

Hoe ziet de ziekenhuiskamer eruit? Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je allemaal doen? Wie zijn erbij? Hoe voel je je?
Laat het zien in jouw tekening!

GENERATIVE RESEARCH - PEDIATRIC PATIENTS - © K.R. BOLTJES, 2022

VOORBEELD STICKERS VOOR GEBRUIK IN SESSIE

kaartje krijgen

telefoongesprek

appen / chatten

social media

online games

videobellen

mensen komen op bezoek

gehoord van papa/mama

blij	verveeld	nerveus
bang	relaxed	onzeker
verdrietig	boos	vertrouwd
opgelucht	gezellig	saai

GENERATIVE RESEARCH - PEDIATRIC PATIENTS - © K.R. BOLTJES, 2022

C | ACTIVITY BOOKLET FOR HOSPITALIZED CHILDREN

Mijn Hero Verhaal

(ziekenhuis-held)

Jij bent een echte HOSPITAL HERO
Jij weet hoe het is om in het ziekenhuis te zijn.

Wil je jouw verhaal vertellen?
Zo help je mee het ziekenhuis te verbeteren!

Bedankt voor het vertellen van jouw verhaal.
Door echte verhalen te horen van kinderen zelf, kunnen wij samen het ziekenhuis een fijnere plek maken.

Hoi! Mijn naam is Kim.
Voor veel kinderen is het ziekenhuis best spannend.
Mijn missie is om het ziekenhuis een fijnere plek te maken voor kinderen.
Ik vind het erg leuk dat je mij hierbij helpt!

Kim Ruby Boltjes, ontwerponderzoeker
Stichting Hospital Hero
contact: k.r.boltjes@student.tudelft.nl

Dit onderzoek maakt deel uit van het afstudeerproject *Power to the Patient*
Master Design for Interaction/Medisign, faculteit Industrieel Ontwerpen, TU Delft

Mijn Hero Verhaal

1.

Hoi, mijn naam is:

en ik ben ____ jaar oud

Dit ben ik!

Ik vind dit leuk om te doen:

Ik vind dit speelgoed / dit spel het leukst:

Ik speel het liefst...

in mijn eentje

met 1 vriend(in)

met een groep

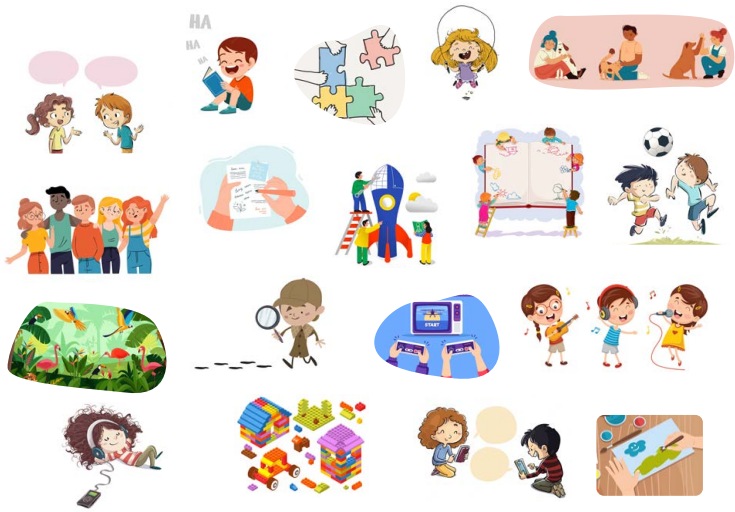
samen met .....

en dat doe ik graag binnen / buiten

Ik kijk graag naar dit programma op TV/YouTube:

Kies 3 plaatjes.

Dit vind ik leuk:



Ik heb deze plaatjes gekozen, omdat:

Ik word BLIJ van:

Ik word RUSTIG van:

Mijn Hero Verhaal

Binnenkort moet Noah naar het ziekenhuis.
Noah is hier nog nooit geweest.

Vertel jij Noah jouw verhaal?

2.

Ik heb ☐ nachtje(s) in het ziekenhuis geslapen.

Dit is de ☐ keer dat ik in het ziekenhuis blijf slapen.

Ik ben in het ziekenhuis omdat:

Soms voel(de) ik me ☹ (somber, bezorgd, eenzaam, boos, ...) omdat:

Soms voel(de) ik me ☺ (trots, bijzonder, vrolijk, relaxed, ...) omdat:

Hierdoor voel(de) ik me soms even ZOALS THUIS:

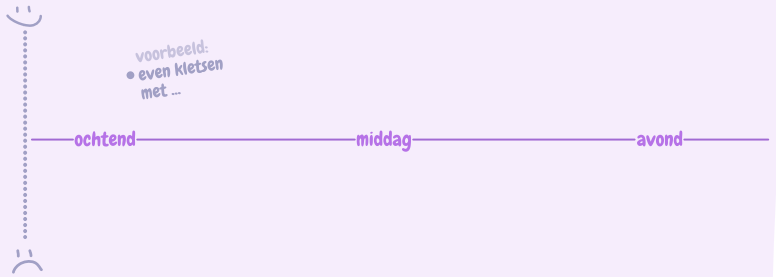
En dit doe ik vooral:

slapen | lezen | vervelen | muziek luisteren
kletsen | tv kijken | spelen | .....

met .....

wat doe je dan?
o alleen
o met .....

Hoe voel jij je op een dag in het ziekenhuis in de OCHTEND, MIDDAG en AVOND?
Je kunt erbij zetten waarom je je zo voelt.



Het ziekenhuis is niet hetzelfde als thuis. Niet iedereen kan met jou mee.
En vaak kan je niet alles doen wat je gewend bent. Dat kan je best missen.

Ik verheug me erop om...

...deze mensen weer te zien:

dit te doen:

Ik heb wel / geen andere kinderen in het ziekenhuis ontmoet.

wat heb je gedaan?

vragen stellen | appen | spelen
kletsen | .....

Ik heb veel | een beetje | geen contact (gehad) met vrienden/familie thuis.

vooral op deze manier:

Mijn Hero Verhaal

3.

Wat vind jij een FIJNE PLEK om te zijn buiten het ziekenhuis? Teken jezelf daar!

1.

tips! WAT doe je hier? WAAR is het? WIE zijn erbij?

OVERDAG

Ik vind dit een fijne plek, omdat:

2.

tips! WAT doe je hier? WAAR is het? WIE zijn erbij?

in de AVOND

Ik vind dit een fijne plek, omdat:

Als ik de baas van het ziekenhuis was, dan zag het er zo uit:

tips! Hoe ziet de ziekenhuiskamer eruit?
Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je er allemaal doen? Wie zijn erbij?

Wil je verder nog iets kwijt?

D | STATEMENT CARDS

Professional: health psychologist

This page provides an overview of the statement cards deriving from an interview with a health psychologist. The upper parts expresses my interpretation (statement), the lower part shows where this statement is based upon.

OVERVIEW OF STATEMENTS

- The younger, the greater the impact of environmental change
- A hospital is full of stimuli that are strange and different than normal
- Physical discomfort/burden already gives stress and insecurity
- Most children are already in 'stress mode' when entering the hospital
- Children often have to interact with various and differing medical staff
- Children dislike/fear not being in their normal zone and not being able to interact with friends

- Presence of calm parents can be crucial for distress management
- If someone is already emotionally burdened, fears can arise more quickly
- Being in a positive state makes it easier to cope with setback/unfavorable events
- When you feel calm in basis, it is easier to maintain that state and cope with an unfavorable event
- Pain is not determined by the stimulus, but by the translation by the brain: in a positive state, the brain can filter out pain
- Reduced sense of fear is reduced experience of pain
- If your attention is on something you like, you are more relaxed, so stimuli are less amplified

- Fear responses occur at every age
- When in 'stress mode', all/neutral stimuli will be interpreted as negative/threatening
- Children experience more pain when in stress
- The more fear/pain/stress there has been, the more time it takes to process

- In the hospital they do their best to allow children to be kids, but there is not much contact with peers
- Children can find recognition by seeing and playing with other children in the hospital
- Often children have no one in their network experiencing the same thing
- Children are now looking for their own ways to have contact with peers (not much facilitated)

- Ideally, children can play and have contact with their familiar friends
- If children can be kids apart from medical actions, they can have a more positive experience and memory
- When children are playing, they can get into a flow where they forget everything around them
- If a child can just be a kid and play with peers, stress can be lowered
- Ideally, every child should be able to continue playing as they do at home
- Being able to contine 'as normal' gives a lot of resilience power, distraction and stress reduction

- Positive words that give confidence are very helpful
- Healthcare providers prefer communication to reduce stress and anxiety
- Feeling of 'teaming up' instead of 'undergoing something' boosts the experience
- Rewards can help mark the moment, but should not be linked to 'performance'
- Gaining/providing confidence is important to tone down stress mode and responses

HEALTH PSYCHOLOGIST HP

THE YOUNGER, THE GREATER THE IMPACT OF ENVIRONMENTAL CHANGE

"Hoe kleiner je bent, hoe groter de impact is van verandering van omgeving. Voor een baby is dat een groter verschil dan voor een 13-jarige, die daar makkelijker in schakelt en dat makkelijker overziet en snapt.

HEALTH PSYCHOLOGIST HP

FEAR RESPONSES OCCUR AT EVERY AGE

"Ik heb niet op voorhand het beeld dat het op een bepaalde leeftijd het meest voorkomt, ik zou zeggen op alle leeftijden.

HEALTH PSYCHOLOGIST HP

HEALTHCARE PROVIDERS PREFER COMMUNICATION TO REDUCE STRESS AND ANXIETY

"Verpleegkundigen vinden die kleintjes wel het moeilijkst, omdat je daar nog niet (goed) mee kan communiceren. Zorgverleners vinden het vaak comfortabeler als ze met iemand kunnen praten, dan hebben ze het gevoel dat ze meer kunnen betekenen voor het reduceren van stress en angst.

HEALTH PSYCHOLOGIST HP

IF SOMEONE IS ALREADY EMOTIONALLY BURDENED, FEARS CAN ARISE MORE QUICKLY

"Kinderen die al wat kwetsbaarder zijn, of zelf meer hebben meegemaakt, of minder stabiel gezin hebben of ouders die angstig zijn, moeilijke geboorte hebben gehad, dat zijn wel kinderen die sneller andere angsten ontwikkelen.

HEALTH PSYCHOLOGIST HP

CHILDREN EXPERIENCE MORE PAIN WHEN IN STRESS

"Het is dus niet de prikkel zelf die bepaalt of je pijn hebt, maar het is hoe je brein het vertaalt. Als je brein zegt 'oké, je gaat nu gewoon winnen, je ligt op kop en je bent helemaal veilig', dan wordt die pijn gewoon even weggefilterd. Maar als je in stress zit, dan wordt die pijn versterkt doorgegeven. Dus in stress ervaren kinderen en volwassenen meer pijn, dat is één.

HEALTH PSYCHOLOGIST HP

A HOSPITAL ENVIRONMENT IS FULL OF STIMULI THAT ARE STRANGE AND DIFFERENT THAN NORMAL

"Dan ga je ook nog naar een ziekenhuis toe. (...) En dan weet je niet wat er gaat gebeuren. Je hebt allemaal vreemde mensen die je niet kent, vreemde geluiden, alle prikkels zijn anders. (...) Ook al heeft een kind bijna geen ervaring, ze voelen als heel snel van 'oh shit, wat gaat hier gebeuren'.

HEALTH PSYCHOLOGIST HP

PHYSICAL DISCOMFORT/BURDEN ALREADY GIVES STRESS AND INSECURITY

"Moet je voorstellen: als kind, er is iets met je lijf, dat is al niet fijn. Je hebt al dat je je ziek voelt, of pijn hebt, of allebei. Er is al iets mis en dat maakt al onzeker, dat geeft al stress.

HEALTH PSYCHOLOGIST HP

BEING IN A POSITIVE STATE MAKES IT EASIER TO COPE WITH SETBACKS/ UNFAVORABLE EVENTS

"Ik denk absoluut [dat je tegenslagen makkelijker kunt handelen als je goed in je vel zit]. Als je jezelf rustig kan houden en minder vanuit stress kan reageren dan reageer je minder vanuit de automatische reflex dat het foute boel is. Angst verlamt ook, als je bang bent dan denk je niet meer logisch na. Dat kan ook gebeuren in het ziekenhuis. Dan is niks meer logisch.

HEALTH PSYCHOLOGIST HP

WHEN IN 'STRESS MODE', ALL/NEUTRAL STIMULI WILL BE INTERPRETED AS NEGATIVE/ THREATENING

"Wat ik ook echt heel belangrijk vindt: je brein reageert anders als je al gestrest bent, die filtert informatie anders. Op het moment dat je gestrest bent, ga je informatie die je op twee manieren kan opvatten, door het brein negatief interpreteren.

HEALTH PSYCHOLOGIST HP

MOST CHILDREN ARE ALREADY IN 'STRESS MODE' WHEN ENTERING THE HOSPITAL

"Die onvoorspelbaarheid in combinatie met pijn en ongemak en een andere omgeving, en ouders die soms echt dik in de stress zitten... (...) Die dingen samen maken dat de meeste kinderen al in een soort stressmodus zitten als ze binnenkomen.

HEALTH PSYCHOLOGIST HP

WHEN YOU FEEL CALM IN BASIS, IT IS EASIER TO MAINTAIN THAT STATE AND COPE WITH AN UNFAVORABLE EVENT

"Als je je in de basis rustig voelt en kalm, dan is het makkelijker die status vast te houden zeg maar, dan een kind die al voortdurend in de stress zit. Dat helpt natuurlijk niet, het is moeilijker om dan die draai te maken.

HEALTH PSYCHOLOGIST HP

THE MORE FEAR/PAIN/STRESS THERE HAS BEEN, THE MORE TIME IT TAKES TO PROCESS

"Als je alleen een policontrole hebt en je voelt je daar rustig onder en het verloopt ook allemaal rustig, dan heb je daar meestal weinig verwerkingstijd voor nodig. Als je een opname hebt gehad waar veel gebeurd is en waar ook veel stress is geweest, dan meer. Ik denk dat hoe meer angst/pijn/stress er is geweest tijdens opname/controle/handeling, hoe meer verwerkingstijd er meestal nodig is.

HEALTH PSYCHOLOGIST HP

REDUCED SENSE OF FEAR IS REDUCED EXPERIENCE OF PAIN

Maar op het moment dat de angst omlaag gaat, dan gaat ook de pijnbeleving omlaag.

HEALTH PSYCHOLOGIST HP

IF A CHILD CAN JUST BE A KID AND PLAY WITH PEERS, STRESS CAN BE LOWERED

Ik weet niet of [het missen van leeftijdsgenoten] direct een stressgevoel geeft, maar ik denk dat het wel kan helpen als jij gewoon kind kan zijn en kan spelen met leeftijdsgenoten, dat het de stress kan verlagen. Dat is ook waarom we ons best doen om een kind te laten spelen, we de daktuin hebben en de MPZ die spelmateriaal of afleiding biedt en de cliniclowns.

HEALTH PSYCHOLOGIST HP

WHEN CHILDREN ARE PLAYING, THEY CAN GET INTO A FLOW WHERE THEY FORGET EVERYTHING AROUND THEM

Op het moment dat jij helemaal lekker in een flow zit, en zeker kinderen kunnen dat heel goed, als ze lekker aan het spelen zijn, dan zijn ze dat helemaal en dan zitten ze helemaal in een flow en dan vergeten ze alles om hun heen. En dat is natuurlijk een supergoede manier.

HEALTH PSYCHOLOGIST HP

PAIN IS NOT DETERMINED BY THE STIMULUS, BUT BY THE TRANSLATION BY THE BRAIN: IN A POSITIVE STATE, THE BRAIN CAN FILTER OUT PAIN

Het is dus niet de prikkel zelf die bepaalt of je pijn hebt, maar het is hoe je brein het vertaalt. Als je brein zegt 'oké, je gaat nu gewoon winnen, je ligt op kop en je bent helemaal veilig', dan wordt die pijn gewoon even weggefilterd. Maar als je in stress zit, dan wordt die pijn versterkt doorgegeven. Dus in stress ervaren kinderen en volwassenen meer pijn, dat is één.

HEALTH PSYCHOLOGIST HP

CHILDREN ARE NOW LOOKING FOR THEIR OWN WAYS TO HAVE CONTACT WITH PEERS (NOT MUCH FACILITATED)

Ze hebben soms wel contact via de Bingo bijvoorbeeld op donderdag. Dan wint er iemand iets en dan komt die even in beeld en dan weten ze 'oja, die ligt hier ook op de afdeling!' En soms appen ze ook met elkaar of via ouders. Soms zelfs via videobellen dat ze samen gaan spelen, dat ze samen via videobellen met Playmobil gaan spelen bijvoorbeeld. Ze vinden wel hun manier.

HEALTH PSYCHOLOGIST HP

IF YOUR ATTENTION IS ON SOMETHING YOU LIKE, YOU ARE MORE RELAXED, SO STIMULI ARE LESS AMPLIFIED

Op het moment dat jij je aandacht op iets anders richt, en zeker op iets wat je leuk vindt, dan ben je meer ontspannen en dan gaat dat schakelstationnetje de afweging maken en signalen minder versterkt doorgeven.

HEALTH PSYCHOLOGIST HP

IDEALLY, EVERY CHILD SHOULD BE ABLE TO CONTINUE PLAYING AS THEY DO AT HOME.

Je kan met volwassenen (als die leuk meedoen) ook leuk spelen, maar het is natuurlijk wel anders. In de ideale wereld zou je elk kind, hoe lang die ook in het ziekenhuis is, gunnen om gewoon door te kunnen gaan met spelen zoals ze dat ook thuis doen. Als ze thuis gewend zijn om elke dag met een vriendje/vriendinnetje af te spreken, dat ze dat ook in het ziekenhuis gewoon kunnen doen.

HEALTH PSYCHOLOGIST HP

CHILDREN CAN FIND RECOGNITION BY SEEING AND PLAYING WITH OTHER CHILDREN IN THE HOSPITAL

Aan de andere kant is het soms voor kinderen heel helpend om juist andere kinderen in het ziekenhuis te zien en daarmee te spelen die hetzelfde meemaken als zij. Zeker als het heftig of intensief of grote trajecten zijn. Dan vinden ze vaak niemand in hun omgeving die dat meemaken, dus dan vinden ze herkenning bij kinderen die hetzelfde meemaken.

HEALTH PSYCHOLOGIST HP

POSITIVE WORDS THAT GIVE CONFIDENCE ARE VERY HELPFUL

Dat betekent dat je heel ontvankelijk voor suggestie bent als je in stress bent, maar dat betekent ook dat als een arts juist heel bewust en heel duidelijk iets positief neerzet, dat dat ook binnenkomt. Een kind zit in de stress en ouders ook en als je op dat moment als zorgverlener juist precies iets helpends weet te zeggen, wat vertrouwen geeft, dan doet dat ook onwijs veel.

HEALTH PSYCHOLOGIST HP

IDEALLY, CHILDREN CAN PLAY AND HAVE CONTACT WITH THEIR FAMILIAR FRIENDS

Ik zou zeggen dat het het allermooist is als je gewoon met je eigen vriendjes en vriendinnetjes kan afspreken. Aan de andere kant is het soms voor kinderen heel helpend om juist andere kinderen in het ziekenhuis te zien en daarmee te spelen die hetzelfde meemaken als zij.

HEALTH PSYCHOLOGIST HP

IN THE HOSPITAL THEY DO THEIR BEST TO ALLOW CHILDREN TO BE KIDS, BUT THERE IS NOT MUCH CONTACT WITH PEERS

Dat is ook waarom we ook wel ons best doen om een kind te laten spelen, dat we de daktuin hebben en de MPZ die spelmateriaal of afleiding biedt en de cliniclowns. Kijk het zijn geen leeftijdsgenoten, maar het is wel aansluiten bij dat kind-zijn.

HEALTH PSYCHOLOGIST HP

BEING ABLE TO CONTINUE 'AS NORMAL' GIVES A LOT OF RESILIENCE POWER, DISTRACTION AND STRESS REDUCTION

Dat zou het allermooist zijn, die gewone ontwikkeling door laten lopen. Hoe meer die gewone ontwikkeling door kan lopen, dat geeft ook een stuk veerkracht en afleiding en stressreductie.

HEALTH PSYCHOLOGIST HP

OFTEN CHILDREN HAVE NO ONE IN THEIR NETWORK EXPERIENCING THE SAME THING

Zeker als het heftig of intensief of grote trajecten zijn. Dan vinden ze vaak niemand in hun omgeving die dat meemaken, dus dan vinden ze herkenning bij kinderen die hetzelfde meemaken.

HEALTH PSYCHOLOGIST HP

REWARDS CAN HELP MARK THE MOMENT, BUT SHOULD NOT BE LINKED TO 'PERFORMANCE'

We moeten rewards loskoppelen van hoe ze het doen. Je staat stil bij de markering van het moment, het maakt helemaal niet uit of je het 'goed of niet goed' hebt gedaan.

HEALTH PSYCHOLOGIST HP

IF CHILDREN CAN BE KIDS APART FROM MEDICAL ACTIONS, THEY CAN HAVE A MORE POSITIVE EXPERIENCE AND MEMORY

Alles wat ze tijdens de opname kunnen doen, los van de medische handelingen, hoe meer ze daarin kind kunnen zijn, ik geloof wel dat dat iets doet in de beleving natuurlijk. Ook in hoe ze herinneren hoe het was.

HEALTH PSYCHOLOGIST HP

CHILDREN OFTEN HAVE TO INTERACT WITH VARIOUS AND DIFFERING MEDICAL STAFF

Als jij de enige verpleegkundige bent die steeds prikt, dus je hebt een heel proces bij het kind, dan ga je een beetje op elkaar ingespeeld raken [...]. Maar je hebt vaak niet een proces dat je steeds dezelfde verpleegkundige bij hetzelfde kind hebt en dat je het bewust kan afbouwen.

HEALTH PSYCHOLOGIST HP

CHILDREN DISLIKE/FEAR BEING NOT IN THEIR NORMAL ZONE AND NOT BEING ABLE TO INTERACT WITH FRIENDS

Haar grootste issue was dat ze niet meer naar school kon en niet meer met vriendjes/vriendinnetjes kon afspreken, dat vond ze het allerergst. Verschilt enorm per kind waar ze het meest mee bezig zijn. Al de gewone dingen. Gelukkig kan het wel steeds meer, met videobellen of online gamen, dat is vaak een belangrijke om een connectie te houden, zeker bij wat oudere kinderen.

HEALTH PSYCHOLOGIST HP

PRESENCE OF CALM PARENTS CAN BE CRUCIAL FOR DISTRESS MANAGEMENT

Die onvoorspelbaarheid in combinatie met pijn en ongemak en een andere omgeving, en ouders die soms echt dik in de stress zitten... Dat is ook een heel belangrijke factor, ik denk belangrijker dan wisseling van omgeving, want je kan beter in een andere omgeving zitten met ouders die stabiel blijven dan in dezelfde omgeving met ouders die helemaal in de stress zitten.

HEALTH PSYCHOLOGIST HP

FEELING OF 'TEAMING UP' INSTEAD OF 'UNDERGOING SOMETHING' BOOSTS THE EXPERIENCE

Niemand kan het alleen, het kind kan het niet alleen, maar de verpleegkundige kan het ook niet alleen, je hebt elkaar nodig. Het is handig aan een kind om uit te leggen 'we gaan het samen doen, als jij mij vertelt wat voor jou het best werkt'. Dat is al helpen, dat is al samen doen. Het is ook anders qua beleving als kind als iemand iets bij jou doet of dat je iets 'samen' doet.

HEALTH PSYCHOLOGIST HP

GAINING/PROVIDING CONFIDENCE IS IMPORTANT TO TONE DOWN STRESS MODE AND RESPONSES

Er is een soort 'goede reden' dat het alarmsignaal afgaat, daar kunnen zij niets aan doen. Het is aan ons om zo veel mogelijk het vertrouwen te winnen, zodat het alarmsignaal wat minder scherp wordt afgesteld of inzakt.

Pediatric patients

PEDIATRIC PATIENT P1

CHILDREN DESIRE SCHOOL

“ Ik heb zin in school, maar het is ook wel gek want iedereen weet dat ik in het ziekenhuis was.

PEDIATRIC PATIENT P1

CHILDREN MIGHT FEAR HOW FRIENDS/PEERS WILL REACT

“ Ik heb zin in school, maar het is ook wel gek want iedereen weet dat ik in het ziekenhuis was.

PEDIATRIC PATIENT P1

CHILDREN DON’T WANT TO SEE/SHOW MEDICAL MATERIALS ON THEM

“ (Wijst naar infuus) hier gaan we dan thuis een sok of bandana om doen.

PEDIATRIC PATIENT P1

SWALLOWING PILLS IS AN UNFAVORABLE EVENT

“ Ik vond al de pillen het stomst.

PEDIATRIC PATIENT P1

CHILDREN DON’T WANT TO HEAR TOO MANY DETAILS

“ De dokter (anesthesist) zei dat ik zou gaan slapen en dat ik niet zo’n zware narcose zou krijgen als wat ik eerder heb gehad. Toen raakte ik wel een beetje in paniek, want ik dacht als je gaat slapen, kan ik dan ook zo wakker worden? Dus een dokter moet dat soort details helemaal niet vertellen, dat is helemaal niet relevant.

PEDIATRIC PATIENT P1

CHILDREN DON’T DO MUCH SCHOOL WORK ON THEIR OWN

“ Ik had wel mijn schoolboeken mee, maar ik heb maar één dag aan school gewerkt.

PEDIATRIC PATIENT P1

HOSPITAL ROOM DOESN’T FEEL LIKE HOME

“ Na een paar dagen hier voelt de kamer wel een beetje als ‘eigen’, maar niet als thuis.

PEDIATRIC PATIENT P1

CHILDREN DESIRE THEIR NORMAL DAILY LIFE (FRIENDS, BEDROOM)

“ Ik heb zin in school en vrienden en thuis in mijn eigen kamer.

PEDIATRIC PATIENT P2

CHILDREN CAN PUT A POSITIVE SPIN ON SERIOUS ROOM ELEMENTS

“ Je hebt heel veel lampjes in de kamer en die blijven ook aan. Als het donker was, dan leek het net een kerstboom. Dat was wel grappig.

PEDIATRIC PATIENT P2

BEING WITH FRIENDS IS A POSITIVE EXPERIENCE FOR CHILDREN

“ Ik vond naar de Daktuin gaan met vrienden het leukst.

PEDIATRIC PATIENT P2

CHILDREN DISLIKE STAYING IN THE HOSPITAL

“ Ik vond het het stomst... om hier te zijn.

PEDIATRIC PATIENT P2

CHILDREN CAN MISS PRACTICAL INFORMATION OF HOSPITAL-STAY

“ Je hebt een menukaart waar je iets te eten kunt kiezen. Er staan alleen geen tijden bij. In het begin wisten we niets. Het zou wel handig zijn als iemand even naar je toe komt over die eettijden en over de tijden van de Daktuin enzo.

PEDIATRIC PATIENT P2

FOR SIBLINGS AT HOME IT CAN BE DISTRESSING NOT TO KNOW HOW THINGS ARE GOING

“ Ik heb wel eens gehad dat mijn zusje in het ziekenhuis lag en dat ik er niet bij kon zijn. Als je er niet bij bent dan weet je niet wat er aan de hand is en hoe het gaat.

PEDIATRIC PATIENT P2

CHILDREN DESIRE SPORTY ACTIVITY

“ Misschien een idee om iets met sport te doen, zoals bijvoorbeeld fietsen. Dat je zoiets kan doen.

PEDIATRIC PATIENT P2

CHILDREN CAN FIND JOY IN INTERACTIONS WITH PEOPLE (STAFF)

“ Ik vond het eigenlijk wel gezellig als mensen (medisch personeel) binnenkomen. Meestal komen ze voor antibiotica.

PEDIATRIC PATIENT P2

PEOPLE VISITING MAKE THE TIME FLY BY

“ De dag gaat eigenlijk wel snel voorbij. ‘s Ochtends komt de antibiotica enzo en daarna het bezoek en dan is de helft van de dag alweer voorbij.

PEDIATRIC PATIENT P2

IT IS NOT THE STAY ITSELF, BUT THE MISSING OF EVERYDAY LIFE THAT MAKES HOSPITALIZATION UNFAVORABLE

“ Ik dacht ‘niet weer naar het ziekenhuis!’. Het verblijf is niet zo erg, maar wat er bij komt kijken: pillen slikken, niet naar school, niet naar sport. Ik voetbal en ik golf.

Observations

OBSERVATION O3

SMALL MEDICAL PROCEDURES IN THE ROOM CAN BE VERY SCARY FOR CHILDREN, EVEN WHEN NOT PAINFUL

Bandage is removed/changed in boy (9y). Finds it very scary, indicates that it is even more scary than the operation itself. Looks at it even though he doesn't really want to see the blood. Seeing the blood makes him most anxious (even if it's partially dried blood from surgery). Also thinks it hurts.

OBSERVATION O1

PRESENCE OF A FAMILIAR PEER CAN BRIGHTEN UP THE CHILD

Child brightened up, became a little more active, when he saw another child in the hallway whom he happened to know from home. He immediately wanted to share this with his brother. Is it because it is another child or because he also knew this child? I think knowing the child enhanced the bright feeling: something familiar, of your level.

OBSERVATION O1

MEDICAL ELEMENTS MAKE THE ROOM LOOK SERIOUS

Although an attempt is made to create a friendly appearance in the hallways and somewhat in the rooms, many medical elements such as tubes and lights are visible. This might look scary, serious, or threatening.

OBSERVATION O1

CHILDREN DEPEND ON ADULTS WHETHER THEY CAN PLAY

Children have access to an iPad in their room, but it is located behind the bed in a holder. They cannot access this themselves and will therefore have to ask someone for the iPad. Parents may be hesitant to pick up an iPad, especially during medical procedures, while it can provide a nice distraction for children.

OBSERVATION O1

MANY CHILDREN ARE IN ISOLATION (UNEXPECTEDLY): VISIT/MOBILITY CONSEQUENCES

It is common for children to be in isolation. Initially you would expect this in children who are very vulnerable themselves, but often children are placed in isolation so as not to infect others (other children, employees) themselves (for example with a hospital bacteria, stomach flu, or cold virus). As a result, many children cannot leave their room, while they may not have expected this.

OBSERVATION O3

CHILD MISSES SCHOOL AND FRIENDS

Moeder: Hij mist school en zijn vriendjes erg.

OBSERVATION O2

USING FAMILIAR STUFF (E.G. TOY) TO PREPARE CAN COMFORT THE CHILD

The MPC first comes to meet the child and the parent. This all takes places in the room of the child. A pleasant conversation follows, during which, for example, the child's toys are also introduced.

OBSERVATION O2

CHILDREN SEARCH FOR PEERS WITH SIMILAR EXPERIENCES

Patiënt: Is die in de foto's hier ook echt in het ziekenhuis geweest?
MPZ: Die is hier wel geweest, maar alleen voor de foto's. Die heeft niet echt de behandeling gedaan.

OBSERVATION O2

ENVIRONMENT OUTSIDE THE PEDIATRIC WARD LOOKS SERIOUS (NOT CHILD-FRIENDLY)

When it's time to go to the treatment room, the MPC drives the child from the pediatric ward to the general treatment rooms. The environment here no longer looks child-friendly and cozy. The MPC tries to distract and reassure the child by continuing to chat and by giving an iPad to the child in the bed.

OBSERVATION O4

DAILY MEDICAL VISIT WITH A LARGE (UNFAMILIAR) GROUP CAN BE OVERWHELMING/THREATENING

During daily medical visit, there is often a large group of medical people (with white coats/suits, sometimes masks) that enter the child's room. It often happens that there are extra people who are in a learning trajectory. I can imagine that such a large group of large 'serious' people that 'all of a sudden' enters your room, can be threatening to a child in bed. The visit also contains much talking about the child instead of to the child.

OBSERVATION O2

VISUAL/TACTILE ELEMENTS OF THE PERSONAL EXPERIENCE CAN HELP IN PROCESSING THE HOSPITAL EXPERIENCE AFTERWARDS

MPC asks/encourages parent to make pictures. Children or parents themselves might want to look back to the procedure afterwards, pictures can help to process.

Later, MPC indicates that they sometimes encourage people to take stuff like hospital pajamas to home.

OBSERVATION O2

STRESSED PARENTS CAN NEGATIVELY EFFECT STRESS LEVEL OF THE CHILD

MPZ: Ouderparticipatie is belangrijk; we willen ouder en kind als team zien. Maar vaak zijn ouders gestrest en dat kan effect hebben op het kind.

OBSERVATION O2

TEAMING UP WITH PARENT COULD HAVE A CALMING EFFECT (FOR BOTH CHILD AND PARENT)

MPZ: Ouderparticipatie is belangrijk; we willen ouder en kind als team zien. Maar vaak zijn ouders gestrest en dat kan effect hebben op het kind. Misschien zijn er manieren om dit te verbeteren, bijvoorbeeld met ademhalingsoefeningen. Dat ouder en kind samen een team kunnen zijn.

OBSERVATION O4

CHILD DESIRES TO SEE / PLAY WITH PEERS

Moeder: Mag mijn zoontje misschien even naar de speeltuin toe?
(mag niet in verband met contactisolatie)

OBSERVATION O4

CHILD DESIRES TO PLAY

Moeder: Hebben jullie misschien wat speelgoed voor hem?

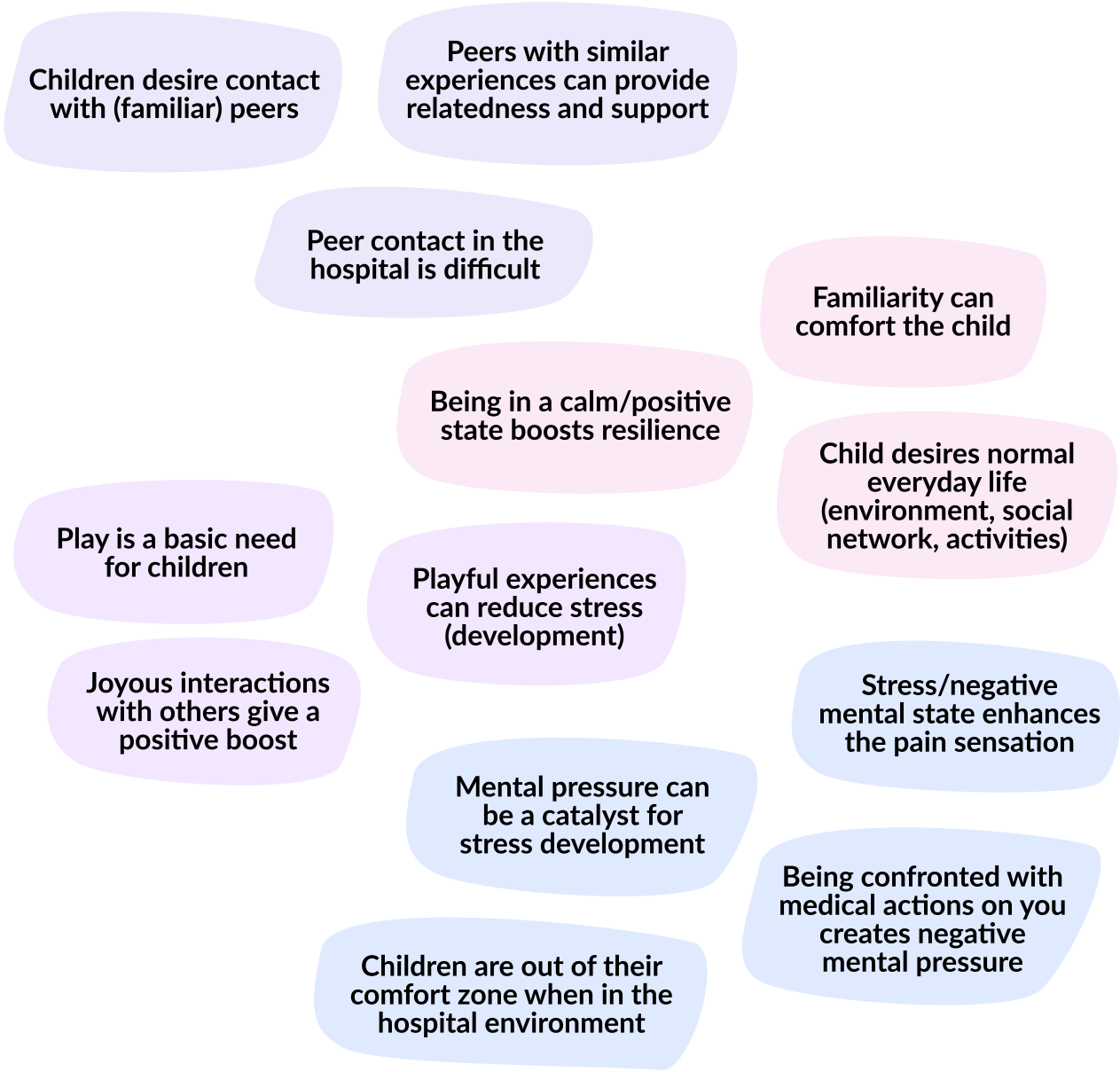
E | STATEMENT CARD CLUSTERS

Analyzing from the context

The pediatric hospital context, stress factors and responses, and ways of creating a positive state have been looked at from different angles. Talks were held with professionals from various specialties (paediatricians, nurses, medical pedagogical care providers, medical pedagogical team leader, healthcare psychologist, remedial educationalist, neuropsychologist), I have walked along and helped with various specialties (paediatricians, nurses, medical pedagogical care) and in both an academic (WAKZ) and a peripheral (JKZ) children's hospital, and I have observed in the hospitals and spoken to pediatric patients and their parents.

All relevant information has been written down, reviewed and transformed into statement cards. Each card tells the source, the accompanying quote or observation and my own interpretation. These statement cards were then brought together and clustered. This resulted in 13 clusters expressing underlying (emotional) values in the pediatric hospital context. On the right, an overview of the cluster motives is given; on the following pages the clusters are shown with associated source information.

The motives provide perspectives on the situation and the underlying needs and can therefore be a good starting point for finding a focus and specifying the design goal.



Peers with similar experiences can provide relatedness and support

PEDIATRIC PATIENT	P2
CHILDREN CAN MISS PRACTICAL INFORMATION OF HOSPITAL-STAY	
“ Je hebt een menukaart waar je iets te eten kunt kiezen. Er staan alleen geen tijden bij. In het begin wisten we niets. Het zou wel handig zijn als iemand even naar je toe komt over die eettijden en over de tijden van de Daktuin enzo.	

HEALTH PSYCHOLOGIST	HP
OFTEN CHILDREN HAVE NO ONE IN THEIR NETWORK EXPERIENCING THE SAME THING	
“ Zeker als het heftig of intensief of grote trajecten zijn. Dan vinden ze vaak niemand in hun omgeving die dat meemaken, dus dan vinden ze herkenning bij kinderen die hetzelfde meemaken.	

OBSERVATION	O2
CHILDREN SEARCH FOR PEERS WITH SIMILAR EXPERIENCES	
“ Patiënt: Is die in de foto's hier ook echt in het ziekenhuis geweest? MPZ: Die is hier wel geweest, maar alleen voor de foto's. Die heeft niet echt de behandeling gedaan.	

HEALTH PSYCHOLOGIST	HP
CHILDREN CAN FIND RECOGNITION BY SEEING AND PLAYING WITH OTHER CHILDREN IN THE HOSPITAL	
“ Aan de andere kant is het soms voor kinderen heel helpend om juist andere kinderen in het ziekenhuis te zien en daarmee te spelen die hetzelfde meemaken als zij. Zeker als het heftig of intensief of grote trajecten zijn. Dan vinden ze vaak niemand in hun omgeving die dat meemaken, dus dan vinden ze herkenning bij kinderen die hetzelfde meemaken.	

Children desire contact with (familiar) peers

PEDIATRIC PATIENT	P1
CHILDREN DESIRE SCHOOL	
“ Ik heb zin in school, maar het is ook wel gek want iedereen weet dat ik in het ziekenhuis was.	

OBSERVATION	O4
CHILD DESIRES TO SEE / PLAY WITH PEERS	
“ Moeder: Mag mijn zoontje misschien even naar de speeltuin toe? (mag niet in verband met contactisolatie)	

HEALTH PSYCHOLOGIST	HP
CHILDREN ARE NOW LOOKING FOR THEIR OWN WAYS TO HAVE CONTACT WITH PEERS (NOT MUCH FACILITATED)	
“ Ze hebben soms wel contact via de Bingo bijvoorbeeld op donderdag. Dan wint er iemand iets en dan komt die even in beeld en dan weten ze 'oja, die ligt hier ook op de afdeling!' En soms appen ze ook met elkaar of via ouders. Soms zelfs via videobellen dat ze samen gaan spelen, dat ze samen via videobellen met Playmobil gaan spelen bijvoorbeeld. Ze vinden wel hun manier.	

OBSERVATION	O3
CHILD MISSES SCHOOL AND FRIENDS	
“ Moeder: Hij mist school en zijn vriendjes erg.	

PEDIATRIC PATIENT	P2
BEING WITH FRIENDS IS A POSITIVE EXPERIENCE FOR CHILDREN	
“ Ik vond naar de Daktuin gaan met vrienden het leukst.	

Peer contact in the hospital is difficult

OBSERVATION O1

MANY CHILDREN ARE IN ISOLATION (UNEXPECTEDLY): VISIT/MOBILITY CONSEQUENCES

It is common for children to be in isolation. Initially you would expect this in children who are very vulnerable themselves, but often children are placed in isolation so as not to infect others (other children, employees) themselves (for example with a hospital bacteria, stomach flu, or cold virus). As a result, many children cannot leave their room, while they may not have expected this.

HEALTH PSYCHOLOGIST HP

IN THE HOSPITAL THEY DO THEIR BEST TO ALLOW CHILDREN TO BE KIDS, BUT THERE IS NOT MUCH CONTACT WITH PEERS

Dat is ook waarom we ook wel ons best doen om een kind te laten spelen, dat we de daktuin hebben en de MPZ die spelmateriaal of afleiding biedt en de cliniclowns. Kijk het zijn geen leeftijdsgenoten, maar het is wel aansluiten bij dat kind-zijn.

HEALTH PSYCHOLOGIST HP

CHILDREN ARE NOW LOOKING FOR THEIR OWN WAYS TO HAVE CONTACT WITH PEERS (NOT MUCH FACILITATED)

Ze hebben soms wel contact via de Bingo bijvoorbeeld op donderdag. Dan wint er iemand iets en dan komt die even in beeld en dan weten ze 'oja, die ligt hier ook op de afdeling!' En soms appen ze ook met elkaar of via ouders. Soms zelfs via videobellen dat ze samen gaan spelen, dat ze samen via videobellen met Playmobil gaan spelen bijvoorbeeld. Ze vinden wel hun manier.

PEDIATRIC PATIENT P2

FOR SIBLINGS AT HOME IT CAN BE DISTRESSING NOT TO KNOW HOW THINGS ARE GOING

Ik heb wel eens gehad dat mijn zusje in het ziekenhuis lag en dat ik er niet bij kon zijn. Als je er niet bij bent dan weet je niet wat er aan de hand is en hoe het gaat.

OBSERVATION O1

CHILDREN DEPEND ON ADULTS WHETHER THEY CAN PLAY

Children have access to an iPad in their room, but it is located behind the bed in a holder. They cannot access this themselves and will therefore have to ask someone for the iPad. Parents may be hesitant to pick up an iPad, especially during medical procedures, while it can provide a nice distraction for children.

A positive experience makes it easier to process the hospital experience

HEALTH PSYCHOLOGIST HP

IF CHILDREN CAN BE KIDS APART FROM MEDICAL ACTIONS, THEY CAN HAVE A MORE POSITIVE EXPERIENCE AND MEMORY

Alles wat ze tijdens de opname kunnen doen, los van de medische handelingen, hoe meer ze daarin kind kunnen zijn, ik geloof wel dat dat iets doet in de beleving natuurlijk. Ook in hoe ze herinneren hoe het was.

OBSERVATION O2

VISUAL/TACTILE ELEMENTS OF THE PERSONAL EXPERIENCE CAN HELP IN PROCESSING THE HOSPITAL EXPERIENCE AFTERWARDS

MPC asks/encourages parent to make pictures. Children or parents themselves might want to look back to the procedure afterwards, pictures can help to process.

Later, MPC indicates that they sometimes encourage people to take stuff like hospital pajamas to home.

HEALTH PSYCHOLOGIST HP

THE MORE FEAR/PAIN/STRESS THERE HAS BEEN, THE MORE TIME IT TAKES TO PROCESS

Als je alleen een policontrole hebt en je voelt je daar rustig onder en het verloopt ook allemaal rustig, dan heb je daar meestal weinig verwerkingstijd voor nodig. Als je een opname hebt gehad waar veel gebeurd is en waar ook veel stress is geweest, dan meer. Ik denk dat hoe meer angst/pijn/stress er is geweest tijdens opname/controle/handeling, hoe meer verwerkingstijd er meestal nodig is.

Familiarity can comfort the child

OBSERVATION O1

PRESENCE OF A FAMILIAR PEER CAN BRIGHTEN UP THE CHILD

Child brightened up, became a little more active, when he saw another child in the hallway whom he happened to know from home. He immediately wanted to share this with his brother. Is it because it is another child or because he also knew this child? I think knowing the child enhanced the bright feeling: something familiar, of your level.

OBSERVATION O2

USING FAMILIAR STUFF (E.G. TOY) TO PREPARE CAN COMFORT THE CHILD

The MPC first comes to meet the child and the parent. This all takes places in the room of the child. A pleasant conversation follows, during which, for example, the child's toys are also introduced.

OBSERVATION O2

TEAMING UP WITH PARENT COULD HAVE A CALMING EFFECT (FOR BOTH CHILD AND PARENT)

MPZ: Ouderparticipatie is belangrijk; we willen ouder en kind als team zien. Maar vaak zijn ouders gestrest en dat kan effect hebben op het kind. Misschien zijn er manieren om dit te verbeteren, bijvoorbeeld met ademhalingsoefeningen. Dat ouder en kind samen een team kunnen zijn.

HEALTH PSYCHOLOGIST HP

PRESENCE OF CALM PARENTS CAN BE CRUCIAL FOR DISTRESS MANAGEMENT

Die onvoorspelbaarheid in combinatie met pijn en ongemak en een andere omgeving, en ouders die soms echt dik in de stress zitten... Dat is ook een heel belangrijke factor, ik denk belangrijker dan wisseling van omgeving, want je kan beter in een andere omgeving zitten met ouders die stabiel blijven dan in dezelfde omgeving met ouders die helemaal in de stress zitten.

HEALTH PSYCHOLOGIST HP

BEING ABLE TO CONTINUE 'AS NORMAL' GIVES A LOT OF RESILIENCE POWER, DISTRACTION AND STRESS REDUCTION

Dat zou het allermooist zijn, die gewone ontwikkeling door laten lopen. Hoe meer die gewone ontwikkeling door kan lopen, dat geeft ook een stuk veerkracht en afleiding en stressreductie.

HEALTH PSYCHOLOGIST HP

IDEALLY, CHILDREN CAN PLAY AND HAVE CONTACT WITH THEIR FAMILIAR FRIENDS

Ik zou zeggen dat het het allermooist is als je gewoon met je eigen vriendjes en vriendinnetjes kan afspreken. Aan de andere kant is het soms voor kinderen heel helpend om juist andere kinderen in het ziekenhuis te zien en daarmee te spelen die hetzelfde meemaken als zij.

Being in a calm/positive state boosts resilience

HEALTH PSYCHOLOGIST HP

WHEN YOU FEEL CALM IN BASIS, IT IS EASIER TO MAINTAIN THAT STATE AND COPE WITH AN UNFAVORABLE EVENT

Als je je in de basis rustig voelt en kalm, dan is het makkelijker die status vast te houden zeg maar, dan een kind die al voortdurend in de stress zit. Dat helpt natuurlijk niet, het is moeilijker om dan die draai te maken.

HEALTH PSYCHOLOGIST HP

BEING IN A POSITIVE STATE MAKES IT EASIER TO COPE WITH SETBACKS/ UNFAVORABLE EVENTS

Ik denk absoluut [dat je tegenslagen makkelijker kunt handelen als je goed in je vel zit]. Als je jezelf rustig kan houden en minder vanuit stress kan reageren dan reageer je minder vanuit de automatische reflex dat het foute boel is. Angst verlamt ook, als je bang bent dan denk je niet meer logisch na. Dat kan ook gebeuren in het ziekenhuis. Dan is niks meer logisch.

HEALTH PSYCHOLOGIST HP

IF YOUR ATTENTION IS ON SOMETHING YOU LIKE, YOU ARE MORE RELAXED, SO STIMULI ARE LESS AMPLIFIED

Op het moment dat jij je aandacht op iets anders richt, en zeker op iets wat je leuk vindt, dan ben je meer ontspannen en dan gaat dat schakelstationnetje de afweging maken en signalen minder versterkt doorgeven.

HEALTH PSYCHOLOGIST HP

GAINING/PROVIDING CONFIDENCE IS IMPORTANT TO TONE DOWN STRESS MODE AND RESPONSES

Er is een soort 'goede reden' dat het alarmsignaal afgaat, daar kunnen zij niets aan doen. Het is aan ons om zo veel mogelijk het vertrouwen te winnen, zodat het alarmsignaal wat minder scherp wordt afgesteld of inzakt.

Child desires normal everyday life (environment, social network, activities)

PEDIATRIC PATIENT P2

IT IS NOT THE STAY ITSELF, BUT THE MISSING OF EVERYDAY LIFE THAT MAKES HOSPITALIZATION UNFAVORABLE

“ Ik dacht 'niet weer naar het ziekenhuis!'. Het verblijf is niet zo erg, maar wat er bij komt kijken: pillen slikken, niet naar school, niet naar sport. Ik voetbal en ik golf.

PEDIATRIC PATIENT P1

CHILDREN DESIRE THEIR NORMAL DAILY LIFE (FRIENDS, BEDROOM)

“ Ik heb zin in school en vrienden en thuis in mijn eigen kamer.

PEDIATRIC PATIENT P2

CHILDREN DESIRE SPORTY ACTIVITY

“ Misschien een idee om iets met sport te doen, zoals bijvoorbeeld fietsen. Dat je zoiets kan doen.

PEDIATRIC PATIENT P1

HOSPITAL ROOM DOESN'T FEEL LIKE HOME

“ Na een paar dagen hier voelt de kamer wel een beetje als 'eigen', maar niet als thuis.

HEALTH PSYCHOLOGIST HP

CHILDREN DISLIKE/FEAR BEING NOT IN THEIR NORMAL ZONE AND NOT BEING ABLE TO INTERACT WITH FRIENDS

“ Haar grootste issue was dat ze niet meer naar school kon en niet meer met vriendjes/vriendinnetjes kon afspreken, dat vond ze het allerergst. Verschilt enorm per kind waar ze het meest mee bezig zijn. Al de gewone dingen. Gelukkig kan het wel steeds meer, met videobellen of online gamen, dat is vaak een belangrijke om een connectie te houden, zeker bij wat oudere kinderen.

PEDIATRIC PATIENT P1

CHILDREN DON'T DO MUCH SCHOOL WORK ON THEIR OWN

“ Ik had wel mijn schoolboeken mee, maar ik heb maar één dag aan school gewerkt.

Play is a basic need for children

OBSERVATION O4

CHILD DESIRES TO PLAY

“ Moeder: Hebben jullie misschien wat speelgoed voor hem?

HEALTH PSYCHOLOGIST HP

IDEALLY, EVERY CHILD SHOULD BE ABLE TO CONTINUE PLAYING AS THEY DO AT HOME.

“ Je kan met volwassenen (als die leuk meedoen) ook leuk spelen, maar het is natuurlijk wel anders. In de ideale wereld zou je elk kind, hoe lang die ook in het ziekenhuis is, gunnen om gewoon door te kunnen gaan met spelen zoals ze dat ook thuis doen. Als ze thuis gewend zijn om elke dag met een vriendje/vriendinnetje af te spreken, dat ze dat ook in het ziekenhuis gewoon kunnen doen.

Playful experiences can reduce stress (development)

HEALTH PSYCHOLOGIST HP

IF A CHILD CAN JUST BE A KID AND PLAY WITH PEERS, STRESS CAN BE LOWERED

“ Ik weet niet of [het missen van leeftijdsgenoten] direct een stressgevoel geeft, maar ik denk dat het wel kan helpen als jij gewoon kind kan zijn en kan spelen met leeftijdsgenoten, dat het de stress kan verlagen. Dat is ook waarom we ons best doen om een kind te laten spelen, we de daktuin hebben en de MPZ die spelmateriaal of afleiding biedt en de cliniclowns.

HEALTH PSYCHOLOGIST HP

WHEN CHILDREN ARE PLAYING, THEY CAN GET INTO A FLOW WHERE THEY FORGET EVERYTHING AROUND THEM

“ Op het moment dat jij helemaal lekker in een flow zit, en zeker kinderen kunnen dat heel goed, als ze lekker aan het spelen zijn, dan zijn ze dat helemaal en dan zitten ze helemaal in een flow en dan vergeten ze alles om hun heen. En dat is natuurlijk een supergoede manier.

PEDIATRIC PATIENT P2

CHILDREN CAN PUT A POSITIVE SPIN ON SERIOUS ROOM ELEMENTS

“ Je hebt heel veel lampjes in de kamer en die blijven ook aan. Als het donker was, dan leek het net een kerstboom. Dat was wel grappig.

HEALTH PSYCHOLOGIST HP

IF CHILDREN CAN BE KIDS APART FROM MEDICAL ACTIONS, THEY CAN HAVE A MORE POSITIVE EXPERIENCE AND MEMORY

“ Alles wat ze tijdens de opname kunnen doen, los van de medische handelingen, hoe meer ze daarin kind kunnen zijn, ik geloof wel dat dat iets doet in de beleving natuurlijk. Ook in hoe ze herinneren hoe het was.

Joyous interactions with others give a positive boost

PEDIATRIC PATIENT P2

CHILDREN CAN FIND JOY IN INTERACTIONS WITH PEOPLE (STAFF)

“ Ik vond het eigenlijk wel gezellig als mensen (medisch personeel) binnenkomen. Meestal komen ze voor antibiotica.

PEDIATRIC PATIENT P2

PEOPLE VISITING MAKE THE TIME FLY BY

“ De dag gaat eigenlijk wel snel voorbij. ‘s Ochtends komt de antibiotica enzo en daarna het bezoek en dan is de helft van de dag alweer voorbij.

HEALTH PSYCHOLOGIST HP

FEELING OF ‘TEAMING UP’ INSTEAD OF ‘UNDERGOING SOMETHING’ BOOSTS THE EXPERIENCE

“ Niemand kan het alleen, het kind kan het niet alleen, maar de verpleegkundige kan het ook niet alleen, je hebt elkaar nodig. Het is handig aan een kind om uit te leggen ‘we gaan het samen doen, als jij mij vertelt wat voor jou het best werkt.’ Dat is al helpen, dat is al samen doen. Het is ook anders qua beleving als kind als iemand iets bij jou doet of dat je iets ‘samen’ doet.

HEALTH PSYCHOLOGIST HP

REWARDS CAN HELP MARK THE MOMENT, BUT SHOULD NOT BE LINKED TO ‘PERFORMANCE’

“ We moeten rewards loskoppelen van hoe ze het doen. Je staat stil bij de markering van het moment, het maakt helemaal niet uit of je het ‘goed of niet goed’ hebt gedaan.

HEALTH PSYCHOLOGIST HP

HEALTHCARE PROVIDERS PREFER COMMUNICATION TO REDUCE STRESS AND ANXIETY

“ Verpleegkundigen vinden die kleintjes wel het moeilijkst, omdat je daar nog niet (goed) mee kan communiceren. Zorgverleners vinden het vaak comfortabeler als ze met iemand kunnen praten, dan hebben ze het gevoel dat ze meer kunnen betekenen voor het reduceren van stress en angst.

HEALTH PSYCHOLOGIST HP

POSITIVE WORDS THAT GIVE CONFIDENCE ARE VERY HELPFUL

“ Dat betekent dat je heel ontvankelijk voor suggestie bent als je in stress bent, maar dat betekent ook dat als een arts juist heel bewust en heel duidelijk iets positief neerzet, dat dat ook binnenkomt. Een kind zit in de stress en ouders ook en als je op dat moment als zorgverlener juist precies iets helpends weet te zeggen, wat vertrouwen geeft, dan doet dat ook onwijs veel.

Stress/negative mental state enhances the pain sensation

OBSERVATION O3

SMALL MEDICAL PROCEDURES IN THE ROOM CAN BE VERY SCARY FOR CHILDREN, EVEN WHEN NOT PAINFUL

Bandage is removed/changed in boy (9y). Finds it very scary, indicates that it is even more scary than the operation itself. Looks at it even though he doesn't really want to see the blood. Seeing the blood makes him most anxious (even if it's partially dried blood from surgery). Also thinks it hurts.

HEALTH PSYCHOLOGIST HP

CHILDREN EXPERIENCE MORE PAIN WHEN IN STRESS

“ Het is dus niet de prikkel zelf die bepaalt of je pijn hebt, maar het is hoe je brein het vertaalt. Als je brein zegt ‘oké, je gaat nu gewoon winnen, je ligt op kop en je bent helemaal veilig’, dan wordt die pijn gewoon even weggefilterd. Maar als je in stress zit, dan wordt die pijn versterkt doorgegeven. Dus in stress ervaren kinderen en volwassenen meer pijn, dat is één.

HEALTH PSYCHOLOGIST HP

PAIN IS NOT DETERMINED BY THE STIMULUS, BUT BY THE TRANSLATION BY THE BRAIN: IN A POSITIVE STATE, THE BRAIN CAN FILTER OUT PAIN

“ Het is dus niet de prikkel zelf die bepaalt of je pijn hebt, maar het is hoe je brein het vertaalt. Als je brein zegt ‘oké, je gaat nu gewoon winnen, je ligt op kop en je bent helemaal veilig’, dan wordt die pijn gewoon even weggefilterd. Maar als je in stress zit, dan wordt die pijn versterkt doorgegeven. Dus in stress ervaren kinderen en volwassenen meer pijn, dat is één.

HEALTH PSYCHOLOGIST HP

REDUCED SENSE OF FEAR IS REDUCED EXPERIENCE OF PAIN

“ Maar op het moment dat de angst omlaag gaat, dan gaat ook de pijnbeleving omlaag.

Being confronted with medical actions on you creates negative mental pressure

PEDIATRIC PATIENT P1

SWALLOWING PILLS IS AN UNFAVORABLE EVENT

“ Ik vond al de pillen het stomst.

PEDIATRIC PATIENT P1

CHILDREN DON'T WANT TO HEAR TOO MANY DETAILS

“ De dokter (anesthesist) zei dat ik zou gaan slapen en dat ik niet zo'n zware narcose zou krijgen als wat ik eerder heb gehad. Toen raakte ik wel een beetje in paniek, want ik dacht als je gaat slapen, kan ik dan ook zo wakker worden? Dus een dokter moet dat soort details helemaal niet vertellen, dat is helemaal niet relevant.

OBSERVATION O4

DAILY MEDICAL VISIT WITH A LARGE (UNFAMILIAR) GROUP CAN BE OVERWHELMING/THREATENING

👁 During daily medical visit, there is often a large group of medical people (with white coats/suits, sometimes masks) that enter the child's room. It often happens that there are extra people who are in a learning trajectory. I can imagine that such a large group of large 'serious' people that 'all of a sudden' enters your room, can be threatening to a child in bed. The visit also contains much talking about the child instead of to the child.

PEDIATRIC PATIENT P1

CHILDREN DON'T WANT TO SEE/SHOW MEDICAL MATERIALS ON THEM

“ (Wijst naar infuus) hier gaan we dan thuis een sok of bandana om doen.

PEDIATRIC PATIENT P1

CHILDREN MIGHT FEAR HOW FRIENDS/PEERS WILL REACT

“ Ik heb zin in school, maar het is ook wel gek want iedereen weet dat ik in het ziekenhuis was.

Mental pressure can be a catalyst for stress development

HEALTH PSYCHOLOGIST HP

IF SOMEONE IS ALREADY EMOTIONALLY BURDENED, FEARS CAN ARISE MORE QUICKLY

“ Kinderen die al wat kwetsbaarder zijn, of zelf meer hebben meegemaakt, of minder stabiel gezin hebben of ouders die angstig zijn, moeilijke geboorte hebben gehad, dat zijn wel kinderen die sneller andere angsten ontwikkelen.

OBSERVATION O2

STRESSED PARENTS CAN NEGATIVELY EFFECT STRESS LEVEL OF THE CHILD

“ MPZ: Ouderparticipatie is belangrijk; we willen ouder en kind als team zien. Maar vaak zijn ouders gestrest en dat kan effect hebben op het kind.

HEALTH PSYCHOLOGIST HP

WHEN IN 'STRESS MODE', ALL/NEUTRAL STIMULI WILL BE INTERPRETED AS NEGATIVE/ THREATENING

“ Wat ik ook echt heel belangrijk vindt: je brein reageert anders als je al gestrest bent, die filtert informatie anders. Op het moment dat je gestrest bent, ga je informatie die je op twee manieren kan opvatten, door het brein negatief interpreteren.

HEALTH PSYCHOLOGIST HP

PHYSICAL DISCOMFORT/BURDEN ALREADY GIVES STRESS AND INSECURITY

“ Moet je voorstellen: als kind, er is iets met je lijf, dat is al niet fijn. Je hebt al dat je je ziek voelt, of pijn hebt, of allebei. Er is al iets mis en dat maakt al onzeker, dat geeft al stress.

HEALTH PSYCHOLOGIST HP

FEAR RESPONSES OCCUR AT EVERY AGE

“ Ik heb niet op voorhand het beeld dat het op een bepaalde leeftijd het meest voorkomt, ik zou zeggen op alle leeftijden.

Children are out of their comfort zone when in the hospital environment

HEALTH PSYCHOLOGIST HP

CHILDREN OFTEN HAVE TO INTERACT WITH VARIOUS AND DIFFERING MEDICAL STAFF

Als jij de enige verpleegkundige bent die steeds prikt, dus je hebt een heel proces bij het kind, dan ga je een beetje op elkaar ingespeeld raken [...]. Maar je hebt vaak niet een proces dat je steeds dezelfde verpleegkundige bij hetzelfde kind hebt en dat je het bewust kan afbouwen.

HEALTH PSYCHOLOGIST HP

MOST CHILDREN ARE ALREADY IN 'STRESS MODE' WHEN ENTERING THE HOSPITAL

Die onvoorspelbaarheid in combinatie met pijn en ongemak en een andere omgeving, en ouders die soms echt dik in de stress zitten... (...) Die dingen samen maken dat de meeste kinderen al in een soort stressmodus zitten als ze binnenkomen.

OBSERVATION O1

MEDICAL ELEMENTS MAKE THE ROOM LOOK SERIOUS

Although an attempt is made to create a friendly appearance in the hallways and somewhat in the rooms, many medical elements such as tubes and lights are visible. This might look scary, serious, or threatening.

HEALTH PSYCHOLOGIST HP

THE YOUNGER, THE GREATER THE IMPACT OF ENVIRONMENTAL CHANGE

Hoe kleiner je bent, hoe groter de impact is van verandering van omgeving. Voor een baby is dat een groter verschil dan voor een 13-jarige, die daar makkelijker in schakelt en dat makkelijker overziet en snapt.

PEDIATRIC PATIENT P2

CHILDREN DISLIKE STAYING IN THE HOSPITAL

Ik vond het het stomst... om hier te zijn.

HEALTH PSYCHOLOGIST HP

A HOSPITAL ENVIRONMENT IS FULL OF STIMULI THAT ARE STRANGE AND DIFFERENT THAN NORMAL

Dan ga je ook nog naar een ziekenhuis toe. (...) En dan weet je niet wat er gaat gebeuren. Je hebt allemaal vreemde mensen die je niet kent, vreemde geluiden, alle prikkels zijn anders. (...) Ook al heeft een kind bijna geen ervaring, ze voelen als heel snel van 'oh shit, wat gaat hier gebeuren'.

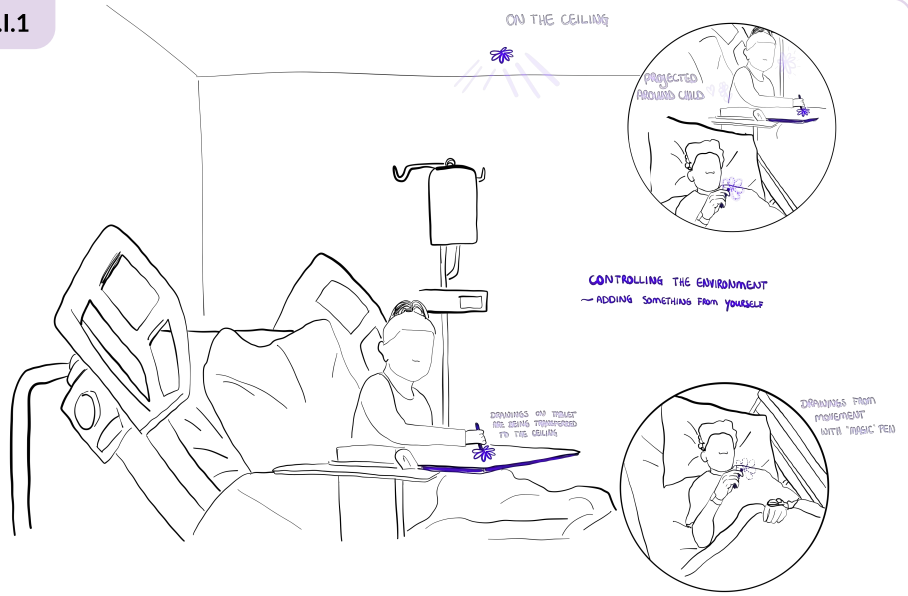
OBSERVATION O2

ENVIRONMENT OUTSIDE THE PEDIATRIC WARD LOOKS SERIOUS (NOT CHILD-FRIENDLY)

When it's time to go to the treatment room, the MPC drives the child from the pediatric ward to the general treatment rooms. The environment here no longer looks child-friendly and cozy. The MPC tries to distract and reassure the child by continuing to chat and by giving an iPad to the child in the bed.

F | IDEAS

E.I.1



IDEA: DIGITAL DRAWINGS ADDED AROUND

Tackling problem(s):
serious environment; unfamiliarity; pastime

By:
creating personal touch, own territory, play, creative expression

Plus:
creative, provides distraction, makes it feel personal

Minus:
children might get quickly bored with it

Interesting:
personal touch to your room

E.I.2

IDEA: A PERSONAL BUDDY BY YOUR SIDE

Tackling problem(s):
serious environment; lack of knowledge; separation anxiety

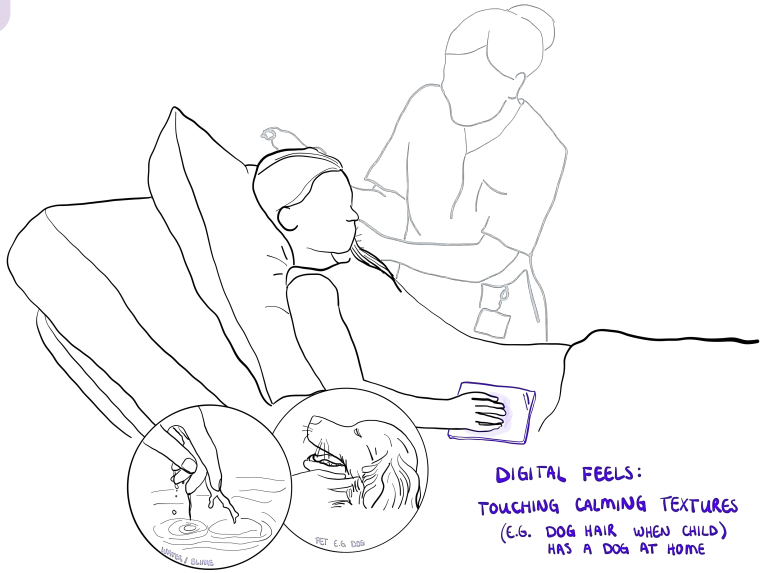
By:
information exchange; creating feeling of peer

Plus:
always accessible help

Minus:
might be too heavy for sick children

Interesting:
not feeling alone, a funny help

E.I.3



IDEA: DIGITAL FEELS

Tackling problem(s):
loss of existing living patterns/ unfamiliarity; overwhelming environment; lack of relaxation

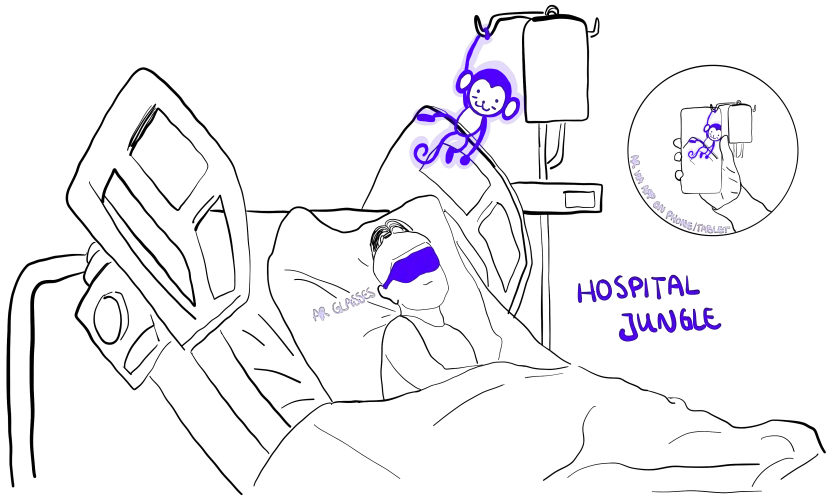
By:
bring in own territory; connect to existing living patterns

Plus:
personal choice: 'who is around, what location do I want to be'

Minus:
children might get quickly bored with it

Interesting:
stimulating bodily senses in a positive way

E.I.4



IDEA: HOSPITAL JUNGLE

Tackling problem(s):
serious and overwhelming environment

By:
bring in play; creating feeling of friends around

Plus:
turning the serious hospital room into a playful place

Minus:
VR might be too heavy for sick children

Interesting:
emerging in a dream world

E.I.5

IDEA: DREAM WORLD ON THE GO

Tackling problem(s):
serious/sicky environment, difficult to relax

By:
relaxation; personal touch (familiar story); distraction; storytelling

Plus:
distraction along the way

Minus:
might be not emerging enough

Interesting:
distraction in a personal way

E.I.6

IDEA: EMERGE IN YOUR DREAM

Tackling problem(s):
serious/sicky environment; separation anxiety, difficult to relax

By:
relaxation; bring in calm parents/ familiarity; distraction

Plus:
distraction along the way

Minus:
might be difficult when child needs to respond to questions

Interesting:
emerging experience

E.I.7

IDEA: ANIMAL SNEAK ALONG THE WAY

Tackling problem(s):
serious/sicky environment

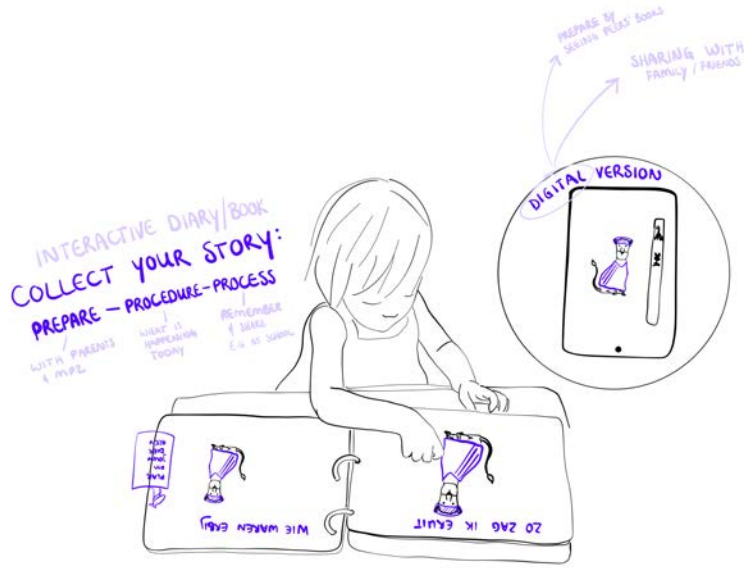
By:
play while physically limited; distraction

Plus:
friendly environment continues outside the Children's department

Minus:
might add up to the overwhelming environment/ sphere

Interesting:
dynamic distraction

E.I.8



IDEA: COLLECT YOUR STORY

Tackling problem(s):
lack of knowledge; lack of control; incorrect interpretation of events; falling out of tune with peers

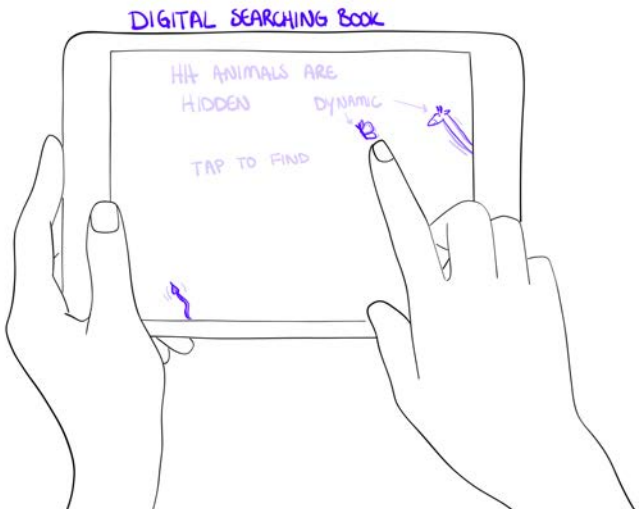
By:
information exchange; creative expression; positive memory retrieval

Plus:
personal story book to make and share

Minus:
risk of being to (emotionally) burdensome; or boring

Interesting:
from preparation to process, something in each phase

E.I.9



IDEA: DIGITAL SEARCHING BOOK

Tackling problem(s):
focus on pain; in need of play (loss of existing living patterns)

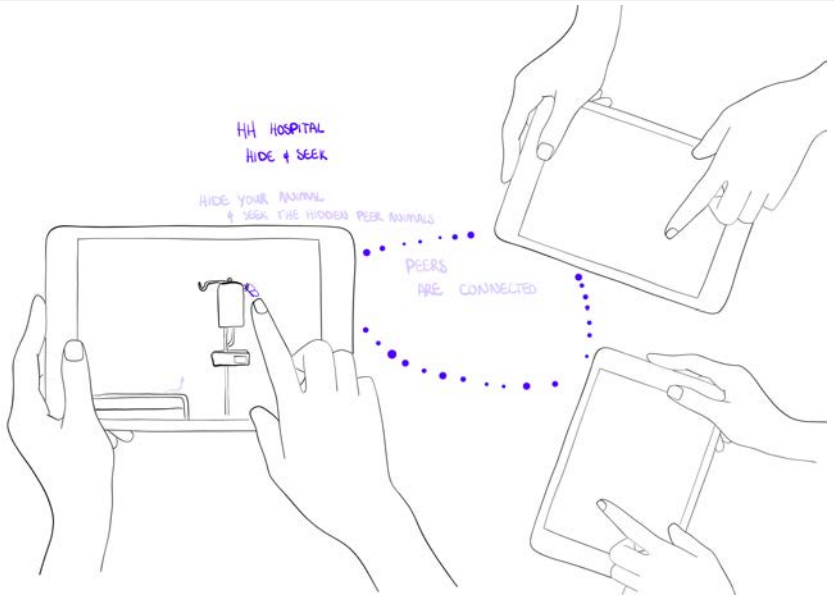
By:
play; dynamic distraction

Plus:
provides active distraction, gives children something playful to do

Minus:
children might get quickly bored with it

Interesting:
dynamic images; game-like

E.I.10



IDEA: HOSPITAL TO HOME HIDE & SEEK

Tackling problem(s):
loss of existing living patterns/ unfamiliarity; missing social environment

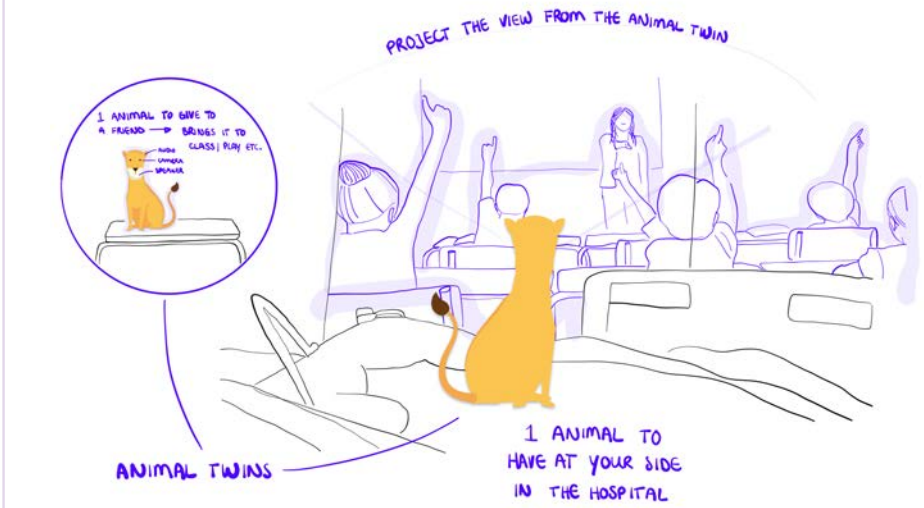
By:
connect to peers; play; dynamic distraction

Plus:
game

Minus:
might cause disappointment when children (fellow players) do not respond

Interesting:
connecting peers (both in and outside the hospital)

E.I.11



IDEA: YOUR FRIEND AROUND

Tackling problem(s):
loss of existing living patterns/ unfamiliarity; serious environment

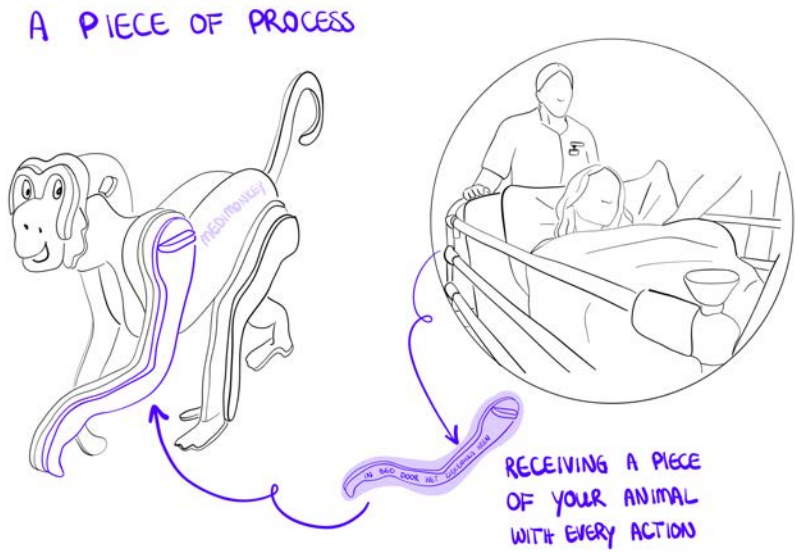
By:
bring in own territory; connect to existing living patterns; connect to peers; personal element/item in hospital

Plus:
feeling like normal life is continuing

Minus:
too burdensome; the 'healthy side' might not really interact

Interesting:
remind friends that you are there

E.I.12



IDEA: A PIECE OF PROCESS

Tackling problem(s):
irrational cognitions; lack of self-confidence; focus on pain

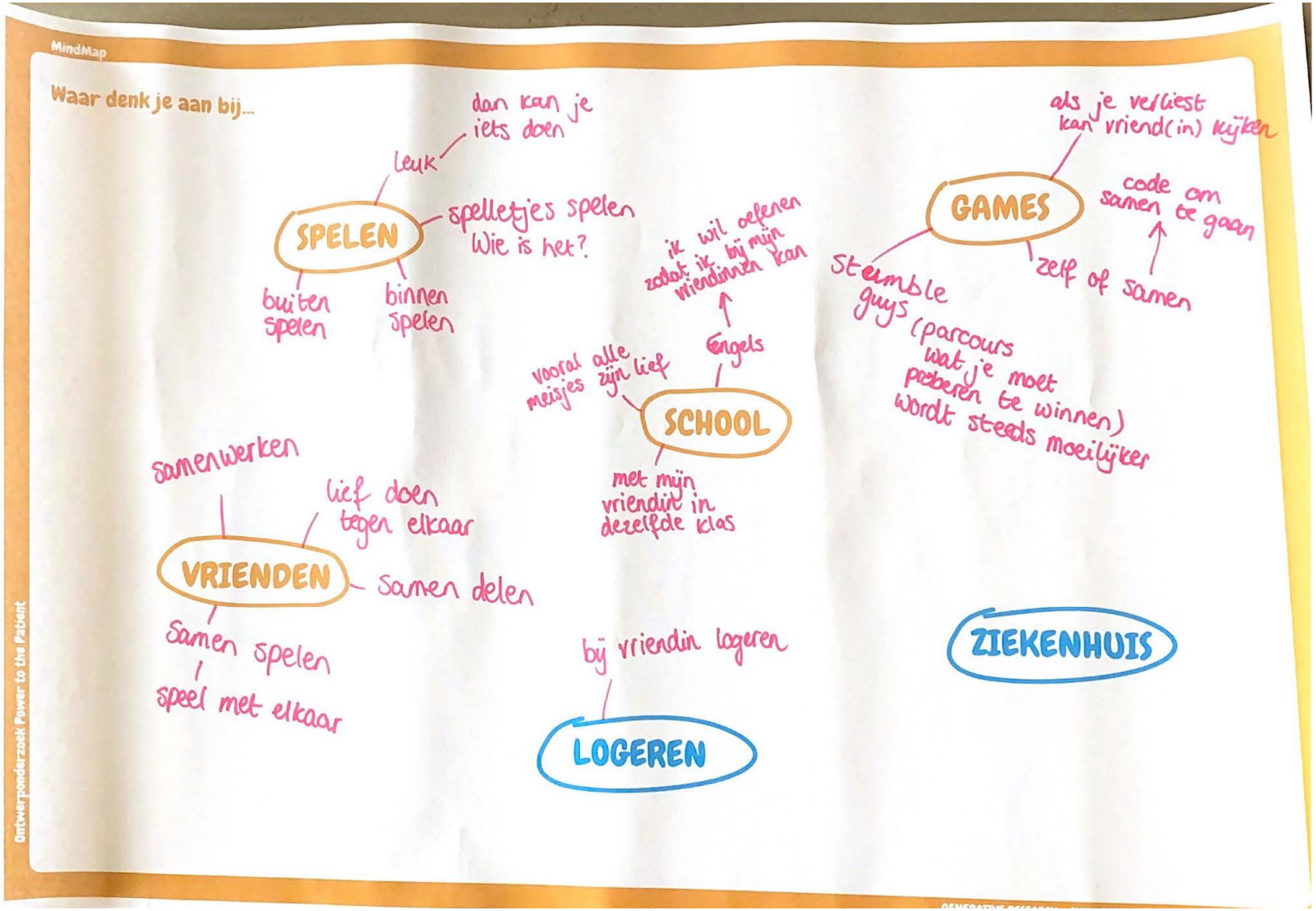
By:
shift focus to reward; overview of process; postive memory retrieval

Plus:
overview of the whole process

Minus:
maybe too difficult for young children; if careworkers need to interact: they might forget

Interesting:
rewarding

G | RAW DATA MAKE & SAY SESSIONS


MindMap
Waar denk je aan bij...
SPELEN
leuk
dan kan je iets doen
spelletjes spelen
Wie is het?
buiten spelen
binnen spelen
SCHOOL
ik wil oefenen zodat ik bij mijn vriendinnen kan
Engels
vooral alle meisjes zijn lief
met mijn vriendin in dezelfde klas
GAMES
als je verliest kan vriend(in) kijken
code om samen te gaan
zelf of samen
Stumble guys (parcours wat je moet proberen te winnen) wordt steeds moeilijker
VRIENDEN
samenwerken
lief doen tegen elkaar
samen delen
samen spelen
speel met elkaar
LOGEREN
bij vriendin logeren
ZIEKENHUIS
Ontwerponderzoek Power to the Patient

Dit vond ik gisteren een FIJN / LEUK moment:
feestje van vriendin, we gingen skaten
Hier word ik BLIJ van:
knuffel geven aan papa

Dit vond ik gisteren een FIJN / LEUK moment:
We gingen spelletje doen!
op school met de hele klas
Hier word ik BLIJ van:
Knutselen!
En knutsel spulen kopen!

Wat vind jij een fijne plek om te zijn? Teken jezelf daar!
naar school te gaan.
"Ik vind het leuk om naar school te gaan. Ik houd van leren en ik vind het gewoon leuk om met vriendinnen te zijn."
OVERDAG

Dit vond ik gisteren een FIJN / LEUK moment:
met mijn BFF computer knutselen

Wat vind jij een fijne plek om te zijn? Teken jezelf daar!
Kim
OVERDAG
Ik vind dit een fijne plek, omdat: ik kan er tekenen!
Met me hele familie avond thee drinken! En wat kijken!
's AVONDS
Ik vind dit een fijne plek, omdat: het gezellig is!

Als ik de baas van het ziekenhuis was, dan zag het er zo uit:
Hoe ziet de ziekenhuiskamer eruit?
Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je er doen? Wie zijn erbij?
Knutsel Kamer
Iedereen mag knutselen!

Als ik de baas van het ziekenhuis was, dan zag het er zo uit:
Hoe ziet de ziekenhuiskamer eruit?
Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je allemaal doen? Wie zijn erbij?
dat ik iedereen beter kan maken

Als ik de baas van het ziekenhuis was, dan zag het er zo uit:
Hoe ziet de ziekenhuiskamer eruit?
Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je er doen? Wie zijn erbij?
spelen, samen met de andere kinderen in het ziekenhuis
Kamer zoals de dierentuin dan kan je naar alle plaatjes van de dieren kijken
Dan kan je je ziekte vergeten of waar je pijn hebt.
Bij spelen denk je er misschien nog een klein beetje aan, maar niet meer heel veel.

"Ik vind het leuk om naar school te gaan. Ik houd van leren en ik vind het gewoon leuk om met vriendinnen te zijn."

"Ik zou naar het ziekenhuis een knuffel van thuis meenemen, dat is vertrouwd."

meisje, 9 jaar oud

"Ik vind lezen leuk. Ik heb een lievelingsboek over een allerbeste vriend van iemand die alles meedoet en nadoet. Dat is heel spannend."

"Op school ben ik bijna altijd aan het praten en kletsen. Als we aan het samenwerken zijn of als ik iets tegen de juf ga vertellen."

"Ik hou van appen met mijn vriendin. We sturen dan foto's. Ik stuur bijvoorbeeld een foto van mijn zusje, een grappige foto, of een mooie foto die moeilijk was om te maken. Dat vindt ze [de vriendin] grappig en leuk."

"Samen spelen."

"Gamen is leuk. Ik heb één keer Minecraft gedaan samen met mijn buurjongen. En ik doe ook Roblox. Het leukst is het om samen te gamen, om bijvoorbeeld samen een parcours te doen."

"Ik vind springtouwen met een grote groep / hele klas ook leuk. Dan gaan we een rij maken en dan gaan we om de beurt springen."

"Ik zing in een zangkoor. Dat is leuk."

*"Ik kies voor deze, want hier zijn ze lekker **met z'n allen** gezellig een **spelletje** aan het spelen."*
- meisje, 6 jaar

meisje, 5 jaar oud

"Ik houd heel erg van dieren."

"Ik heb zelf ook een poes, Jennifer. Het is zo lekker om haar te aaien."

"In Frankrijk was het zo leuk. Ik had daar een vriendje gemaakt die veel ouder was, en toen gingen we samen met mijn broer een team maken en voetballen. Ik was heel goed."

meisje, 10 jaar oud

"Ik vind het leuk om met mijn vriendinnen te zijn."

"Ik hou van honden, ze luisteren goed."

"Ik hou van zingen."

"Appen met je vriendin. Vragen hoe het gaat en wat ze aan het doen is."

"Samen games spelen."

"Muziek luisteren."

meisje, ? jaar oud

"Ik vind het leuk als je iets kan onderzoeken."

"Spelletjes spelen, iets doen."

*"Je moet een kind niet te ver verontrusten. **Je moet een kind gewoon kind laten zijn!**"*
- vader

*"Het is het belangrijkste dat je **gewoon leuke dingen kan doen** en dat je zo je **ziekte vergeet**."*
- meisje, 7 jaar

meisje, 8 jaar oud

"Je kan mooie dieren zien. Ik vind de dierentuin leuk."

"Ik vind muziek luisteren leuk, zoals van Bruno Mars. Daar word je vrolijk van."

"Appen met vriendinnen. Ik stuur vaak filmpjes. Ik maak zelf filmpjes of ik zie een leuk filmpje op internet dat ik wil delen. Of ik vraag of ze met me wil spelen. Of gewoon voor de gezelligheid, dat we kletsen. Of we spreken af om samen een spel [game] te spelen."

"Ik doe vaak Roblox. Het kan samen of alleen, maar meestal samen, dat is ook leuker. Of je kan 'joinen', dan kan je poppetjes maken en in hetzelfde spel komen en elkaar daar tegenkomen."

"Met katten en hondjes kan je knuffelen, spelen, lopen. Ik word er blij van en ik vind het gezellig. Je kan er ook rustig van worden. Ik vind de hoofdjes gewoon zo schattig!"

meisje, 7 (?) jaar oud

"Door muziek kan je afgeleid worden. Je kan naar een muziekje luisteren en dan voel je je fijn. Allemaal verschillende liedjes."

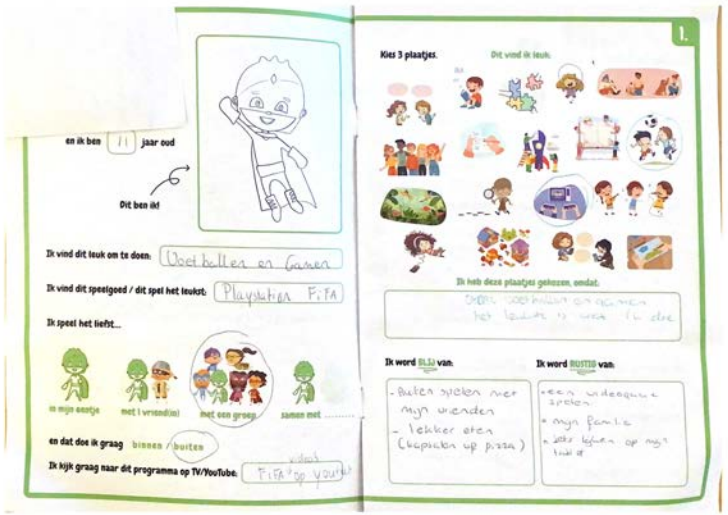
"Leuk als je de dieren ziet, dan raak je afgeleid."

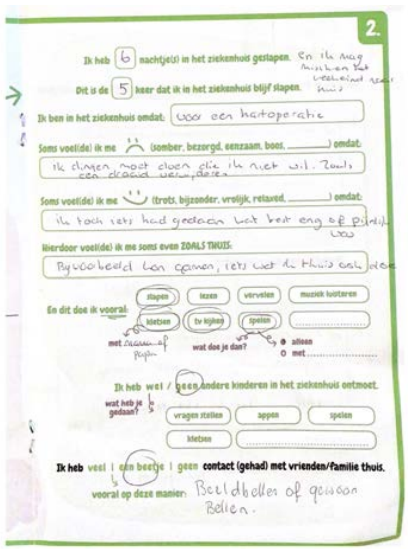
"Lezen, want dan denk je ergens anders aan. Dan kan je grappige verhalen en leuke dingen lezen en dan vergeet je je ziekte."

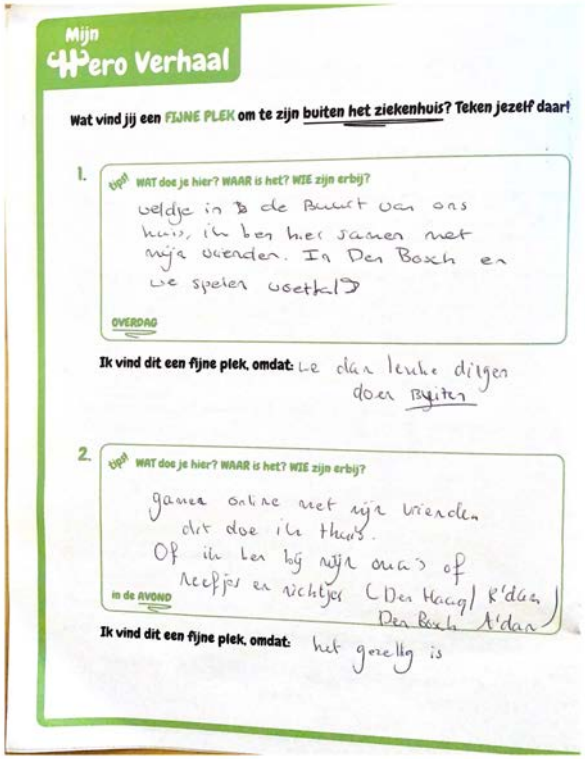
"Met dieren kan je lekker knuffelen en dan kan je het [ziekte, ziekenhuis] ook vergeten."

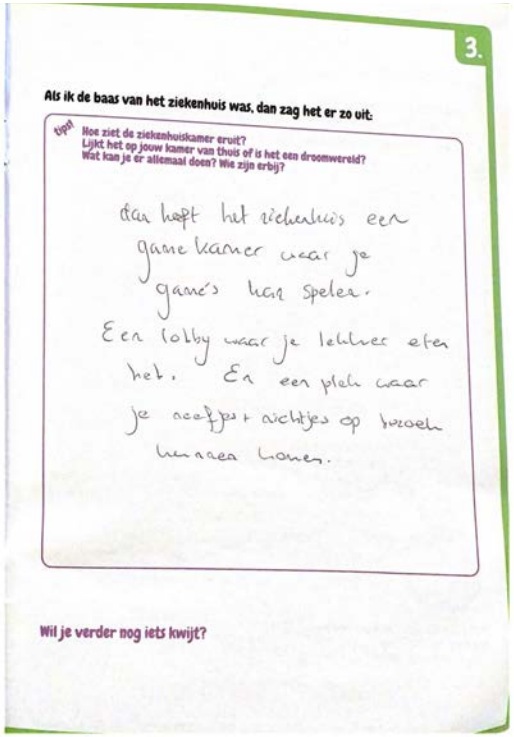
"Het belangrijkste is dat je gewoon leuke dingen kan doen en dat je zo je ziekte vergeet."

H | RAW DATA ACTIVITY BOOKLETS HOSPITALIZED CHILDREN



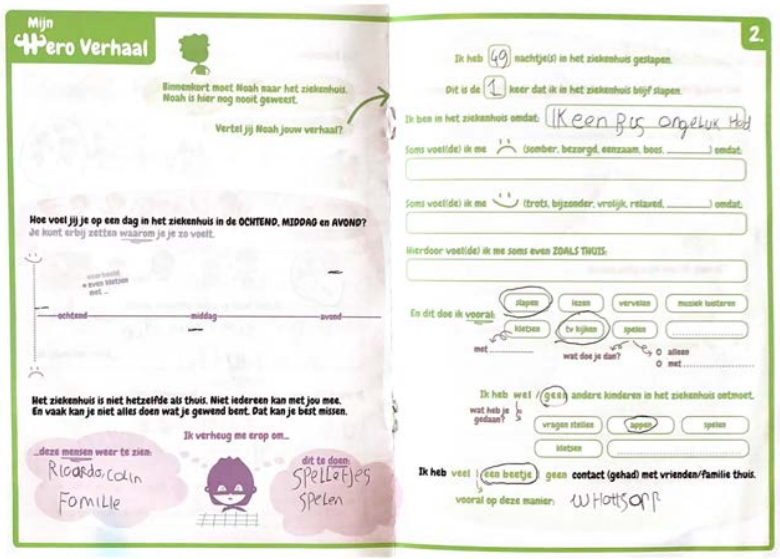






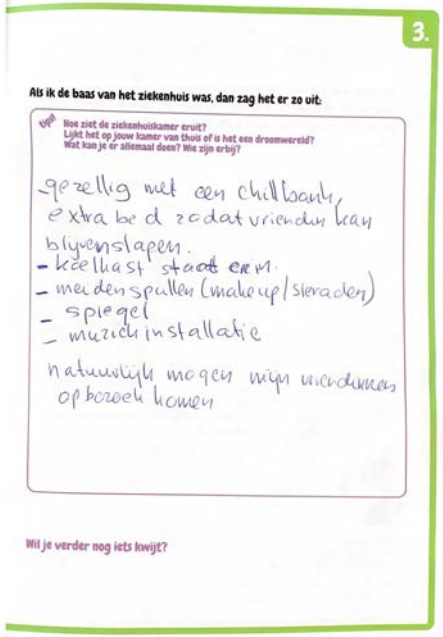
P1

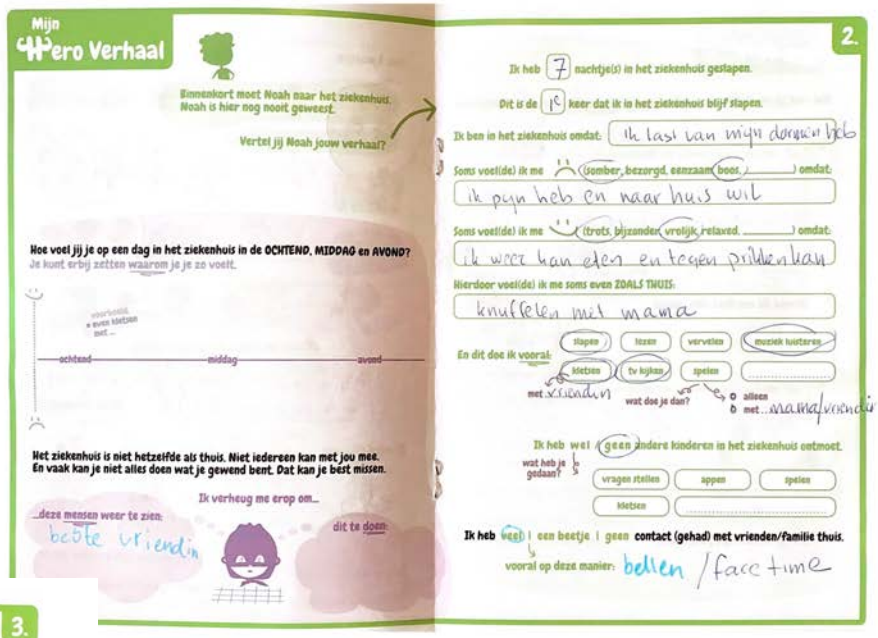
Mijn Hero Verhaal
Hoi, mijn naam is:
en ik ben 13 jaar oud
Dit ben ik!
Ik vind dit leuk om te doen: game, buiten spelen
Ik vind dit speelgoed / dit spel het leukst: Loma
Ik speel het liefst...
in mijn eentje
met 1 vriend(in)
met een groep
samen met .....
en dat doe ik graag binnen / buiten
Ik kijk graag naar dit programma op TV/YouTube: Paradoxe
1.
Kies 3 plaatjes.
Dit vind ik leuk:
Ik heb deze plaatjes gekozen, omdat:
Ik pan wat kan doen en afgelegd ben
Ik word BLIJ van:
gezelschap
Ik word RUSTIG van:
muziek


Mijn Hero Verhaal
Binnenkort moet Noah naar het ziekenhuis.
Noah is hier nog nooit geweest.
Vertel jij Noah jouw verhaal?
Hoe voel jij je op een dag in het ziekenhuis in de OCHTEND, MIDDAG en AVOND?
Je kunt erbij zetten waarom je je zo voelt.
ochtend
middag
avond
Het ziekenhuis is niet hetzelfde als thuis. Niet iedereen kan met jou mee.
En vaak kan je niet alles doen wat je gewend bent. Dat kan je best missen.
Ik verheug me erop om...
...deze mensen weer te zien:
Ricardo, Colin
Familie
dit te doen:
spelletjes spelen
2.
Ik heb 49 nachtje(s) in het ziekenhuis geslapen.
Dit is de 1 keer dat ik in het ziekenhuis blijf slapen.
Ik ben in het ziekenhuis omdat: Ik een gat in mijn hoofd
Soms voel(de) ik me (somber, bezorgd, eenzaam, boos, ...) omdat:
Soms voel(de) ik me (trots, bijzonder, vrolijk, relaxed, ...) omdat:
Hierdoor voel(de) ik me soms even ZOALS THUIS:
En dit doe ik vooral:
slapen
lezen
verveling
muziek luisteren
kletsen
tv kijken
spelen
met .....
wat doe je dan?
alleen
met .....
Ik heb wel / geen andere kinderen in het ziekenhuis ontmoet.
wat heb je gedaan?
vragen stellen
appen
spelen
kletsen
Ik heb veel / een beetje / geen contact (gehad) met vrienden/familie thuis.
vooral op deze manier: WhatsApp

P2

Mijn Hero Verhaal
Hoi, mijn naam is:
en ik ben 13 jaar oud
Dit ben ik!
Ik vind dit leuk om te doen: chillen met vrienden
Ik vind dit speelgoed / dit spel het leukst: voetbal
Ik speel het liefst...
in mijn eentje
met 1 vriend(in)
met een groep
samen met .....
en dat doe ik graag binnen / buiten
Ik kijk graag naar dit programma op TV/YouTube:
1.
Kies 3 plaatjes.
Dit vind ik leuk:
Ik heb deze plaatjes gekozen, omdat:
Zingen is mijn hobby, och voetbal en ik houd van kletsen
Ik word BLIJ van:
eten en gezelligheid
Ik word RUSTIG van:
muziek
slapen


3.
Als ik de baas van het ziekenhuis was, dan zag het er zo uit:
Hoe ziet de ziekenhuiskamer eruit?
Lijkt het op jouw kamer van thuis of is het een droomwereld?
Wat kan je er allemaal doen? Wie zijn erbij?
gezellig met een chillbank, extra bed zodat vriendin kan blijvenslapen.
- keelhast staat erin.
- meidenspullen (make up/sieraden)
- spiegel
- muziekinstallatie
natuurlijk mogen mijn vriendinnen op bezoek komen
Wil je verder nog iets kwijt?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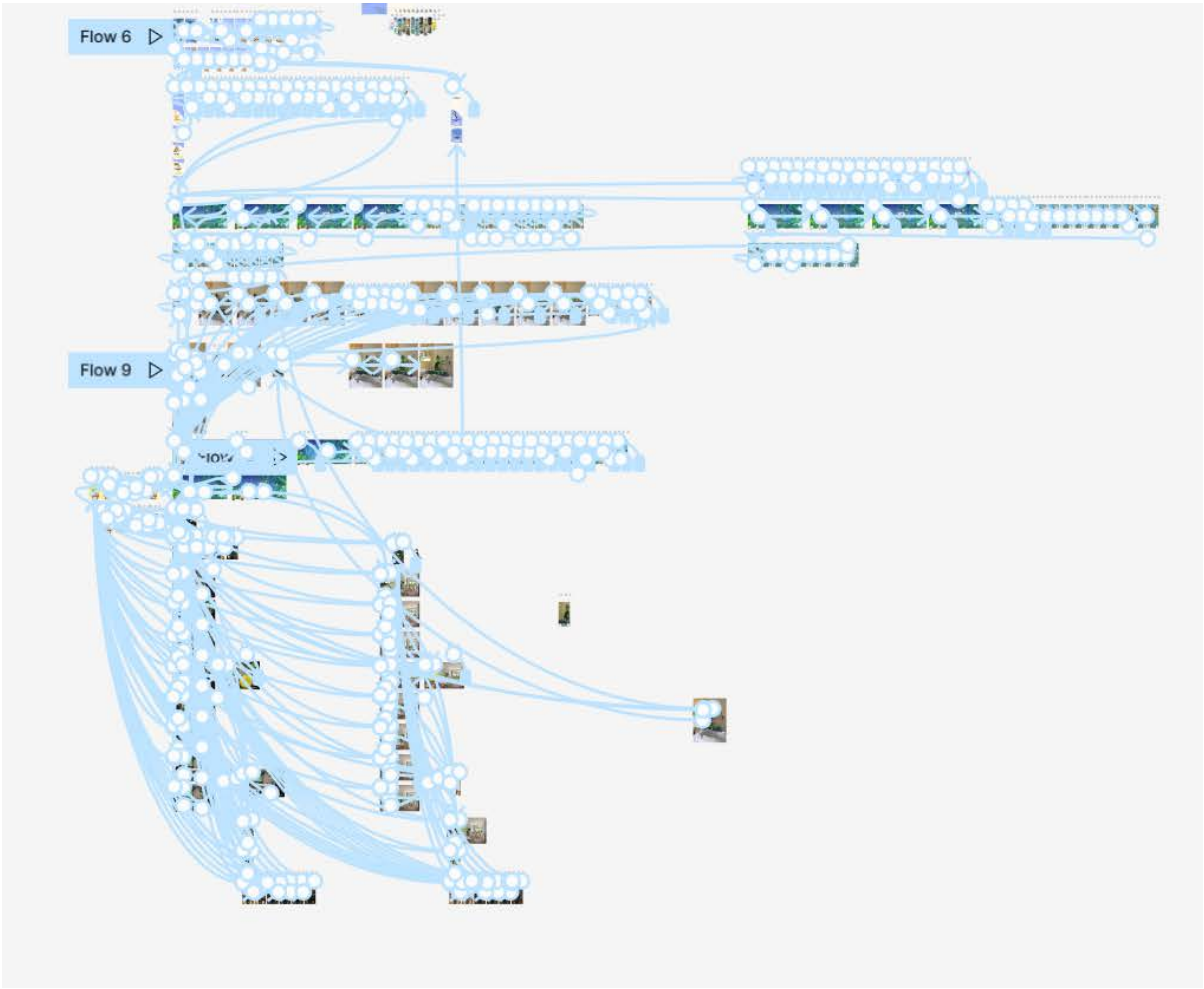
Je kunt erbij zetten waarom je je zo voelt.
ochtend
middag
avond
Het ziekenhuis is niet hetzelfde als thuis. Niet iedereen kan met jou mee. En vaak kan je niet alles doen wat je gewend bent. Dat kan je best missen.
Ik verheug me erop om...
deze mensen weer te zien:
beste vriendin
dit te doen:
2.
Ik heb 7 nachtje(s) in het ziekenhuis geslapen.
Dit is de 1e keer dat ik in het ziekenhuis blijf slapen.
Ik ben in het ziekenhuis omdat: Ik last van mijn darmen heb
Soms voel(de) ik me somber, bezorgd, eenzaam, boos, ... omdat:
ik pijn heb en naar huis wil
Soms voel(de) ik me trots, blijzonder, vrolijk, relaxed, ... omdat:
ik weer kan eten en tegen pijtjes kan
Hierdoor voel(de) ik me soms even ZOALS THUIS:
knuffelen met mama
En dit doe ik vooral:
slapen
lezen
verven
muziek luisteren
kletsen
tv kijken
spelen
met vriendin
wat doe je dan?
alleen
met... mama/vriendin
Ik heb wel / geen andere kinderen in het ziekenhuis ontmoet.
wat heb je gedaan?
vragen stellen
appen
spelen
kletsen
Ik heb wel / een beetje / geen contact (gehad) met vrienden/familie thuis.
vooral op deze manier: bellen / face time

P3

G | HIDEAWAY PROTOTYPE

A prototype of Hideaway has been made in Figma. To access and see all screens and relations in detail, click on the following link and enter the password Hideaway

https://www.figma.com/file/1sBJytRRZyUpRRZMlXBFFg/Hideaway-iterated?node-id=0%3A1&t=6KUA49DELbsDVQWS-1



H | EVALUATION MATERIALS

	Helemaal mee ONEENS				Helemaal mee EENS
Ik vind **Hideaway** leuk om te spelen.	1	2	3	4	5
Ik heb het gevoel dat ik **Hideaway** samen met andere kinderen speel.	1	2	3	4	5
Ik vind het leuk dat je met andere kinderen samen **Hideaway** kunt spelen.	1	2	3	4	5
Ik vind het leuk dat je de kamers van andere kinderen kunt zien in **Hideaway**.	1	2	3	4	5
Ik vind het leuk dat je het huis van mijn vrienden thuis kunt zien in **Hideaway**.	1	2	3	4	5
De superdieren in **Hideaway** geven mij duidelijke tips voor in het ziekenhuis.	1	2	3	4	5
Ik krijg een fijn gevoel door **Hideaway** te spelen.	1	2	3	4	5
Ik voel me positief door **Hideaway** te spelen.	1	2	3	4	5
Ik voel me krachtig door **Hideaway** te spelen.	1	2	3	4	5
Ik wil dat **Hideaway** in het ziekenhuis komt.	1	2	3	4	5

Dit vind ik van **Hideaway**:

1. Handig
2. Moeilijk
3. Geeft kracht
4. Leuk
5. Saai
6. Vertrouwd, iets wat ik ken
7. Onduidelijk
8. Grappig
9. Gezellig
10. Onhandig
11. Samen
12. Afleiding
13. Steun
14. Maakt me verdrietig
15. Belangrijk

I | GRADUATION PROJECT BRIEF

DESIGN FOR our future

5929

TU Delft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name: Boltjes
initials: K.R. given name: Kim Ruby
student number: 4665538
street & no.: Mij
zipcode & city: 262
country: The
phone: +3'
email: k r t

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD (★) DfI ( ) SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ( ) Honours Programme Master
specialisation / annotation: (★) Medisign
( ) Tech. in Sustainable Design
( ) Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: V.T. Visch dept. / section: HCD / DA
** mentor: N.J.H. Vegt dept. / section: HCD / DA
2nd mentor: C. Poot
organisation: Stichting Hospital Hero
city: Leiden country: The Netherlands

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

comments (optional): I wish to include both V.T. Visch and N.J.H. Vegt, since they cover valuable complementary expertise regarding the graduation subject, varying from fear-reduction to interactive applications, to storytelling to design in (e)health.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30 Page 1 of 7

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Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair V.T. Visch date 21 - 09 - 2022 signature

CHECK STUDY PROGRESS
To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 27 EC
Of which, taking the conditional requirements into account, can be part of the exam programme 27 EC
List of electives obtained before the third semester without approval of the BoE

(x) YES all 1st year master courses passed
( ) NO missing 1st year master courses are:

name K. Veldman date 23- 9 - 2022 signature

FORMAL APPROVAL GRADUATION PROJECT
To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: (V) APPROVED ( ) NOT APPROVED
Procedure: (V) APPROVED ( ) NOT APPROVED

- also approved for Medisign

comments

name Monique von Morgen date - KE 4/10/2022 signature MvM

Initials & Name K.R. Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization

Personal Project Brief - IDE Master Graduation

TU Delft

Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 13 - 09 - 2022 17 - 02 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Procedural distress can be defined as unpleasant or negative psychological and physical states related to medical procedures (Porter, 1995). Especially children commonly report experiencing fear or anxiety before and/or when engaging in a healthcare setting. In this setting, the pediatric patient often feels powerless due to the combination of pain, fear and lack of control, wherefore episodes of care, such as hospitalization and medical actions, can be 'emotionally threatening and psychologically traumatizing' (Lerwick, 2016). This is demonstrated by a variety of emotional responses (anxiety, agression, anger, withdrawal, lack of cooperation, regression, ...), that in turn can delay medical treatment, make it more time-consuming to complete treatment, increase pain sensation, decrease patient-satisfaction, complicate proper coping with the situation, and stress staff and parents. Subsequently, a distress-experience can cause severe mental health issues (anxiety, depression, behavior problems), negatively influence physical growth, personality and emotional development, and can decrease compliance with care in adulthood - with rising healthcare costs and mistrust to top it off (Leroy, 2016; Lerwick, 2016), see figure 1 for overview.

To prevent this possible series of negative consequences, it is important to intervene on 'emotionally threatening' elements. What can be experienced as emotionally threatening can differ per situation and individual; figure 2 demonstrates the complexity of the context of encountering and dealing with stressors. However, most hospitalized children can experience a certain loss of control, certainty and trust; they entered an environment which is or feels unknown and where they can't do what they are used to. Needs like autonomy, security and comfort can be compromised, inducing an approach and respons of fear. Where it is difficult to meet those needs in all parts of a hospitalization - to ensure successful treatment and patient safety -, opportunities could to be explored where a sense of fulfillment can be achieved. This can be described as 'providing power in a powerless environment'. According to Lerwick (2016), this can mitigate and reduce the risk for distress and trauma responses.

Reducing the risk for distress and trauma responses (and therefore creating a more comfortable hospitalization-experience), applies to the vision of the Council of Europe to incorporate children's values (rights, needs, feelings, opinions) into the healthcare process (Expert Committee et al., 2014), and supports the aim of Stichting Hospital Hero to limit anxiety and stress in children during hospital visits. While outpatient care is already making progress in the field of trauma-free care with the Hospital Hero App, there is still room for improvement within hospitalization. While hospitals are increasingly aware that effective care goes beyond physical wellbeing, current intraprocedural strategies mainly focus on distraction. Children can often only be kept shortly within a mood of distraction (Leroy, 2016), so this falls short for the full hospitalization period and experience. An attempt is made to give children more control through pre-procedural preparation, but here too resources fall short. Parents often still have to play a crucial role (without adequate knowledge or support), consulting a medical pedagogical specialist feels like a bridge too far and is not always available, and children cannot easily follow age-appropriate preparation themselves.

This leaves a gap with valuable yet challenging opportunities to seize. It is a challenge that both the research and the intervention may not be burdensome or restrictive for (the treatment of) the child nor for the parents, caretakers and other patients, but should feel as a valuable addition to the current care and hospital. Further, since the project will be carried out in the healthcare sector (WAKZ/JKZ) and in only 100 working days, research and design of the project could be confronted with both time, environmental and situational difficulties. As the healthcare sector is struggling with financial tightness, it is beneficial if the development of the designed intervention not requires excessively high costs since this would make it more realistic to develop and expand the design for use by multiple pediatric patients.

space available for images / figures on next page

Initials & Name K.R. Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization

Personal Project Brief - IDE Master Graduation

TUDelft

introduction (continued): space for images

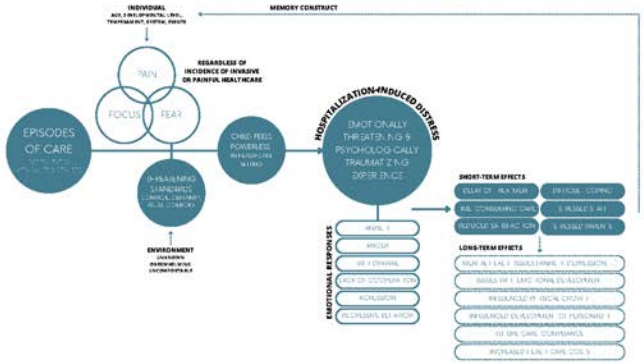

image / figure 1: 'Overview causes and effects hospitalization-induced distress', based on Lerwick (2016)&Leroy (2016)

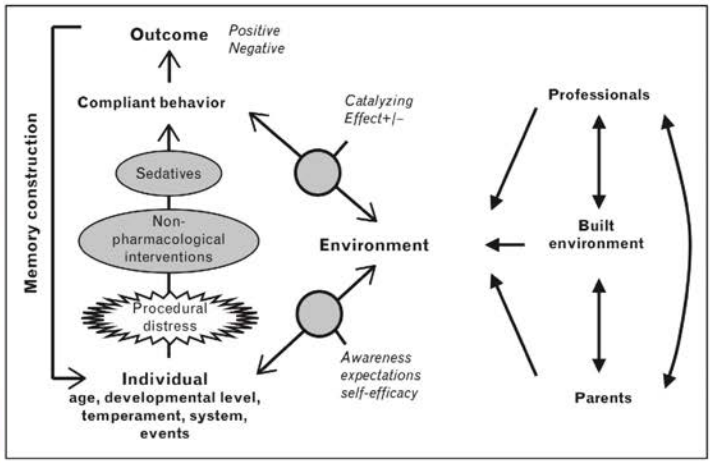

image / figure 2: 'Complex context of a child facing and experiencing procedure-related distress' (Leroy et al. 2016)

Initials & Name K.R. Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization

Personal Project Brief - IDE Master Graduation

TU Delft

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

The final goal of the project is to reduce hospitalization-induced distress and deliver emotionally-safe (i.e. trauma-free) care to pediatric patients. Therefore, as a starting point, the goal is to investigate how to empower pediatric patients e.g. by providing a sense of control in their hospitalization process. Providing power in a powerless environment could create an upward spiral: providing psychological-control in certain areas helps to reduce distress (Lerwick, 2016), and less distress helps patients 'to approach medical situations with a sense of comfort, achievement, and control' (Barkley & Stephens, 2000). This in turn contributes to a more positive hospitalization experience and overall wellbeing (Maslow) and decreases the risk for psychological trauma (responses) in the short and long-term.
Based on theory, starting point for ideation will be seeking an opportunity to create a sense of control, and will therefore include exploring ideas regarding the procedure, environment or (social) belongings. Research in the context and with the target group and discussing with medical (pedagogical) specialists will show how and where impact can/should be made, guiding the idea generation and concept design process.
With distress regarding outpatient visits targeted in the already existing Hospital Hero App, this project primarily focuses on children (4-12y) that have or are in a planned hospitalization (avg. 2-7 nights). Since distress has been present 'regardless of the incidence of invasive or painful healthcare' (Lerwick, 2016), in first instance children with various illnesses, examinations, operations or treatments are included (without major cognitive disabilities). Depending on learnings from the context, this target group may be specified more in the first weeks of the project; e.g. similar journey/treatment, age, medical experience, hospitalization-duration.
The project will be executed in two Dutch child hospitals: Willem-Alexander Child Hospital (WAKZ) and Juliana Child Hospital (JKZ). While staying manageable, this ensures not only a larger patient-pool, but makes it possible to notice if there are important differences between child hospitals that need to be taken into account in concept-development (keeping in mind later implementation and value for Stichting Hospital Hero). In line with the scope of Stichting Hospital Hero, the project focuses on Dutch child hospitals (and therefore primarily Dutch-speaking pediatric patients).

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

I expect to create a concept design for a non-pharmacological interactive product that helps to reduce distress and trauma-responses and minimize emotionally-threatening hospitalization. Instead of developing negative associations with healthcare, the concept attempts to create a positive and comfortable experience and memory construct.

I expect to deliver an interactive solution that manages feelings of distress in pediatric patients, for example by empowering through providing a sense of control. This should make the hospitalization experience more comfortable. This will include a tool that will be used primarily by the pediatric patient to make the unknown (feel) known, e.g. either creating a feeling of control about the upcoming treatment (in advance) or to provide control over part of the environment (immediate). It is expected that the non-pharmacological product will therefore either assist the child in interactive preparation prior to hospitalization/prior to medical actions during hospitalization; or will create interactions in the hospital, e.g. with their parents, staff, peers, or the physical environment.
With the complex context in which every individual is different, inspiration will be taken from the things that are the same for everyone: the Thirteen Fundamental Psychological Needs as described by Desmet & Fokkinga (2020). Not only the need for autonomy (control) will be examined; further unmet needs can strengthen feelings of fear (Erikson, 1963). Vice versa, fulfilment will result in enhanced wellbeing and can in this way contribute to distress-management.
Starting point is a sense of control as empowerment. The project will start by investigating this theory-based starting point and various in-context factors to create a further focus. This will include

- Duration of hospitalization
- Touchpoint (effect in hospital or also at home)
- Design opportunities within the dynamic system of building and needing power/resilience (incl. storytelling/play)
- Medical experience/memory
- Type of illness & Journey (incidence of actions)
- Effects of interactions on child
- Fitting child hospitals/Hospital Hero (e.g. medium).

Initials & Name K R Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization

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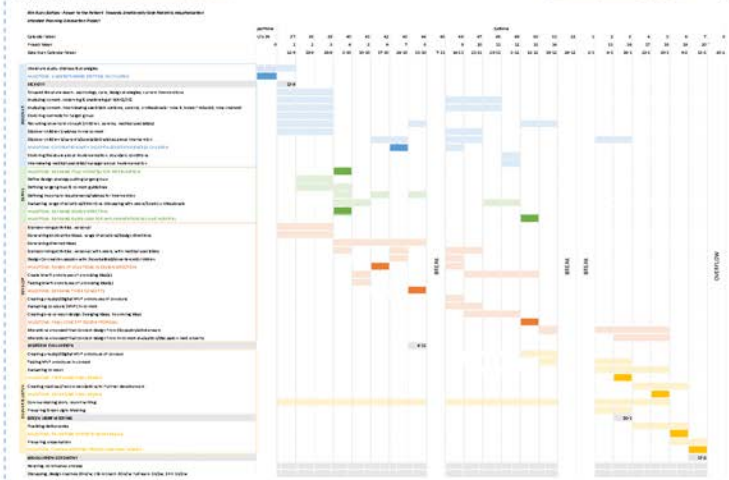
PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 13 - 9 - 2022 17 - 2 - 2023 end date



The design process of the project is an ongoing iterative process of diverging and converging. I will try to understand the context by empathizing and defining and will use this an input for ideating. Prototyping and testing will be used as a learning input to spark new ideas and to improve on promising solutions, but will at the same time reveal more insights about the context, users and problem. This will in turn provide input for developing and improving the concept more and more, to finally come up with a valuable design for the context.

The planning offers scope for exploring design directions and design solutions and for ultimately delivering a concept design that expects to be able to offer a solution to the problem. This concept design can (with recommendations) be the starting point after the graduation project for Stichting Hospital Hero to further develop the proposed concept into a usable product, as one of the tools the foundation can offer to hospitals to reduce stress in pediatric care.

While the schedule should reflect the expected actions, it can be subject to change through iterations, adjustments to hospital schedules, or evolvement/specification of the project along process insights. The planning will be kept up to date and this will be regularly shared with the supervisory team.

Every week all members of the supervisory team will be updated, digitally and during scheduled meetings. Design coach meetings will be every week for 30 minutes, along the project evolvement timing and duration may fluctuate. Every week there will be a 30 minutes meeting with the client mentor. Every once in a while, there will be a meeting with the complete team (supervisory team + possibly important members of the client team) to foster fruitful discussion. Additionally, every two weeks there will be a meeting with the full Stichting Hospital Hero crew to update each other. In the meantime, unscheduled casual discussions can take place with peers or the crew (e.g. at the office).

Initials & Name K.R. Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization

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MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

I am very fond of Hospital Hero's mission to offer children the most positive and stress-free care possible. Anyone can imagine that undergoing a medical procedure is at its core an unpleasant experience. This can have an effect on a reduced wellbeing or even traumatic feelings both at that time and at a later age. I find it very valuable to be able to contribute to make this experience more positive. This contributes to the quality of life of patients and people around at the time of care, as well as to the attitude towards health care in general.

This project gives me the opportunity to show and develop further in aspects from the entire MSc program, because it offers the possibility to do literature research, contextmapping methods, qualitative research and analysis, free generation of ideas, concept-creation and iterative validation. Among other things, I can use obtained knowledge from Health Psychology, Emotion Design, eHealth, Contextmapping Skills and Medisign; and knowledge from a volunteer design project in eHealth at the Willem-Alexander Child Hospital.

Working with and for children, both in previous design projects and extra-curricular as a teaching assistant at a primary school, I found very fun, interesting and inspiring and I would like to develop further in this. This project gives me the opportunity to gain more knowledge and experience in this area. Further, this project gives the opportunity to do in-setting design work in the healthcare setting and can help me learn more about how to act and work as a designer in the medical world.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Initials & Name K R Boltjes Student number 4665538

Title of Project Power to the Patient: Towards Emotionally-Safe Pediatric-Hospitalization