



Reflecting on Your Child Needs: Designing a Tangible Object For Enhancing Parental Mentalization

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ABSTRACT

One of the main challenges parents face is recognizing and supporting the changing needs of their children. The Circle of Security (COS) psychology theory addresses this challenge by increasing parental mentalization, a parent's ability to mentally envision her child's mental states, and to engage in reflection on her own internal experiences. We present an exploratory design process of a tangible interface for parents of 5-7 years-old children, grounded in theoretical aspects from Attachment theory, Caregiving sensitivity theory, and COS theory. We designed three low-fidelity prototypes and evaluated them with four parents to generate initial insights about the potential of TUI as an aid for parental mentalization. Our work suggests that parents see potential in using a TUI to improve their parental mentalization abilities, however they report it is not easy and requires significant mental effort. Our work is a first step towards TUI as an aid for parental mentalization.

KEYWORDS

TUI, Parent-Child Interaction, Theory to Design, Circle of Security.

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1 INTRODUCTION

Many parents are challenged by the on-going task of identifying and addressing their child's needs [21]. Furthermore, parents commonly involve their own psychological tendencies when interpreting and defining a strategy to address their child's needs [21]. In many cases, they are not aware of the impact this tendency has on their behaviors as parents. In this work, we explore the potential of a Tangible User Interface (TUI) for assisting parents to deal with such challenges. Our theory-based design process is based

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on Attachment theory, Caregiving sensitivity theory, and Parental mentalization which suggest that high mentalization skills contribute to parents' abilities for managing sensitive interactions with 5-7 years-old children (e.g., [5, 6, 9]).

1.1 Attachment theory and parental sensitivity

Attachment theory [5, 6] suggests that parents who are sensitive to their child's needs are more capable in providing effective care when needed and contribute to the child's healthy development. According to [9], these parental qualities are facilitated by parents' *mentalizing* capacity - the ability to take a child's perspective and treat the child as an intentional agent with an active, coherent mind. Such parental qualities are critical to children's well-being, interpersonal skills, and personal growth [1], [19]. In contrast, lack of parental mentalization may lead to insecure attachment orientations, and increase the risk for future emotional and behavioral problems [8]. Elaborating the theory, [2] proposed that a child becomes more secure if parents balance between two key needs: a Safe Haven need, serving as a focal point for distress alleviation; and a Secure Base need, encouraging the child to explore and develop autonomy. However, parents' own attachment experiences and children's constant shift between needs for Safe Haven and Secure base throughout the day is challenging parents' ability to recognize, balance, and regulate these needs [21].

1.2 Traditional solutions for enhancing parental mentalization and sensitivity

A known intervention intended to guide parents is the Circle of Security intervention (COS; [21, 22]). The main aim of COS is to help parents identify and support Safe Haven and Secure Base needs, by educational training and video simulations of their parent-child interactions, which triggers reflective dialog and the development of mentalization processes. Yet, these interventions still require costly, long-duration sessions led by trained therapists [7, 21]. In addition, they rely on post-experience verbal reflection [21], and do not support practice of reflection immediately after the parent-child interaction has occurred.

1.3 Technology as a potential aid

Technology has been suggested as one way to increase the scale of psychological interventions. It is already known that technology can serve as a supportive tool to traditional therapy (e.g., [16],

[20]). We suggest that a tangible interface can be designed to promote parental mentalization, hopefully leading to increased parents' awareness of their child's needs, as well as facilitating reflection upon their own tendencies during day-to-day activities. The specific choice of TUI is justified by the well-documented advantages TUI has in enhancing reflection and awareness (i.e., [3, 17, 24]). TUIs are physical-digital objects, which have a tangible form that enables physical manipulation, and represent digital information in a physical form [11]. It is argued that the physical representation and manipulation can bridge between abstract processes and concrete representations [14]. Towards this end, we present a theory-driven design process of TUI prototypes aimed to support parental mentalization and increase parents' awareness of their own parental behavior.

2 RELATED WORK

2.1 Psychology studies linking parental mentalization, parental caregiving, and children's healthy development

In a recent work, [23] meta-analyzed 14 studies assessing parental mentalization and sensitivity, concluding positive correlation between these two parental qualities, supporting the belief that parental sensitivity is a manifestation of parental mentalization. In another study, [15] showed that improvements in mentalization abilities of parents after group intervention were associated with improvements in child reflective functioning. Parental mentalization was also associated with children's social skills, emotion regulation, behavioral strength (i.e., [10]), cognitive outcomes during child preschool years (i.e., [4]), and reading skills [12]. These findings highlight the importance and critical role of mentalization in a child's healthy development.

2.2 HCI works related to TUI-supported parent-child interaction

Prior work suggests that technology can play a key role in supporting parent-child interactions. For example, the 'Awareness Object' (AO) is a tangible object designed to encourage awareness and reflection on parents' roles during parent-child collaboration [17]. A later work on emotion regulation by [18], presented the design of a smart toy designed to help children regulate their emotions, and parents adopt supportive emotion socialization practices.

Both works involve relevant aspects to our approach: (1) support for parent-child interaction by increasing parental awareness and reflection [17]; and (2) facilitating transfer of traditional therapy learning into family homes using technology [18]. We extend prior work by designing a TUI that is aimed to facilitate parental mentalization during everyday activities, a domain that was not explored before.

3 DESIGN PROCESS

Our TUI design process started with deriving design guidelines from a psychological theory, continued with design of three low-fidelity TUI prototypes, followed by an exploratory evaluation with parents.

3.1 From psychological concepts to design guidelines

The COS theory (Circle of Security) defines high-level non-concrete concepts that help clinical psychologists guide parents how to improve their parental mentalization and then progress towards behavioral action. To define concrete design guidelines we started by classifying the COS concepts into more concrete steps in an iterative process with three experts that are knowledgeable of COS: a children's clinical psychologist, a social psychologist with expertise in attachment theory, and a developmental psychologist with expertise in parental mentalization and COS intervention. This iterative process led to five steps: (1) Parents should be aware and perceive the child as a distinct entity with a separate mind; (2) Parents should learn how to identify the two main and separate needs of their child, Secure Base and Safe Haven, and be open-minded to the fact that these needs are constantly changing; (3) Parents should be aware of their own attachment tendencies, and how these tendencies influence their interpretations of their child's needs; (4) Parents should practice how to evaluate the current context and circumstances; (5) Parents should take a deliberate decision how to act. Based on the five steps derived from COS, we prioritized and defined three guidelines for our TUI design process: (1) Child as a separate entity: The tangible design should emphasize and represent the child as a separate and different entity from the parent; (2) Child's top needs: The tangible design should represent the two main needs of children, Safe Haven and Secure Base, in a way that is accessible to parents; (3) Parent's tendencies: The tangible design should help parents become more aware of their own tendencies. We then started the design process, applying these guidelines and making design choices.

3.2 From design guidelines to low-fidelity prototypes

We engaged in an iterative design process, applying the three design guidelines and creating three different low-fidelity prototypes (see Figure 1).

Design A: the Flashlight. The inspiration for this design was the abstract concept of the non-existing light being a metaphor for the parent's attention ("shedding light") towards her own psychological tendencies. The COS concept of 'Child as a separate entity' is manifested in the design using the "handle" part where two sliders represent the parent and child as separate entities, each slider controls the intensity of the two-colors LED lights. The smaller slider represents the parents' understanding of child's needs, while the larger slider represents the parent's perception of the support they provided to their child; The COS concept of Secure Base vs. Safe Haven child's needs is represented using the inner circle of the LEDs; The COS concept of parents' awareness to their own tendencies is represented by the outer circle of LEDs, showing the most-used and under-used types of offered support.

Design B: the Circular form. The inspiration for this design was a path that represents a long term process, hoping to encourage parents to look at the bigger picture that encompasses the whole relationship with the child. On one side of the form, two tokens manifest the 'child as a separate entity' COS concept with one representing the child and the other representing the parent. These

tokens serve as input devices allowing parents to define in a single interaction their child's current need (inner circle of LEDs) and their own perception of the support they provided (outer circle of LEDs); The child's top needs are represented with two different colored LEDs. The parents' tendencies are represented using the outer path of LEDs.

Design C: the Cylinder object. The inspiration for this design was "flexibility" to encourage parents to feel comfortable changing the type of support they provide during the day/week. This object has 3 parts: two rotation parts applying the 'child as a separate entity' concept, one to set the child's current needs and one for the parents' own perception of their support; LEDs with two different colors representing the child's need and the parent's support are placed along the circumference of the cylinder.

4 EXPLORATORY EVALUATION

The goal of the exploratory evaluation was to generate insights regarding parents' ability to understand the psychological concepts, to identify the concepts in the TUI design, and to learn from their approach towards TUI aimed to enhance parental mentalization during everyday lives.

5 STUDY PROCEDURE

The exploratory evaluation included interviews with 4 parents (2 males, 2 females) of children aged 5-7, each interview was 70-90 minutes long and included two parts: theory introduction and TUI prototypes exploration. COS understanding is not trivial. In the psychology-focused COS workshops, experts introduce participants to the theory in a verbal and graphic way before they start the video simulations part. We adopted that process, as our TUI is not aimed to replace the theory introduction, but to serve as an aid that enhances parental mentalization during everyday life. In the theory introduction phase, the researcher described each psychological aspect, and parents were asked to give examples from their day-to-day experiences with their child. Parents were able to ask questions and provide more examples if needed. In the TUI prototypes phase, participants explored all three objects (in a different order), and shared their thoughts about the object's form (testing for perceived metaphor), the perceived functionality (testing for perceived affordances), their thoughts about the design in the context of the theoretical aspects that were discussed in the introduction, and their thoughts about using such a prototype in their daily interactions with their child. Specific topics that were discussed included context-related questions (i.e. time of use, placement), design-related questions (i.e. choices related to tangible manipulation and tangible representation), and strengths and weaknesses of each prototype.

6 INTERVIEW FINDINGS

The four interviews were transcribed and analyzed using thematic coding. The analysis revealed insights regarding parents' challenges (and excitement) regarding the COS psychological concepts, preferences regarding the physical interaction and tangible representation, and the potential advantages and disadvantages parents see in the interaction with the TUI during or immediately after an interaction with their child.

6.1 Findings regarding the psychological concepts

The key concept that the child is a different entity with needs of her own was not easily accepted. Some parents understood it: (*"You have a child, who can be completely different from you, with his own personality, his own difficulties, his own desires, he is not me."* p.4), but at the same time found it challenging: (*"I want him to go to an afternoon theater class, I asked him and he doesn't want to. Just doesn't want to"* p.4). The need for Safe Haven was quickly understood by all the parents, for example, (*"He's afraid of dogs, so [in that situations] he really, really needs intimacy and closeness. If there is a dog around he will come close to me, and even after the dog has already left, he will still want to stay close to me."* p.1). One of the main challenges parents had was understanding the need for Secure Base, with 3 of 4 parents explaining it as their own need for their child to be more independent, rather than their child's need to feel safe and independent to explore new challenges. As the conversation continued they got more clarity, and provided more relevant examples: (*"He [the child] said why do I need a coat if I have a top? And I answered because it's cold outside. Then he asked to go outside by himself and see for himself if it's cold... I agreed, as this was his will, this is what he felt. He went outside and came back and said he didn't need a coat. I agreed, and took the coat in a bag [just in case he may ask for it later]"* p.2).

Regarding parents' reflection on their own tendencies and how those may impact the interaction with their child, in our small sample study there was a clear difference between mothers and fathers. The two mothers easily reflected on their own tendencies (*"For me, the need of security and love sometimes takes over the need for Secure Base"* p.1). The two fathers needed more time to reflect on it (*"It's hard for me to understand if I have... it makes sense... I don't know which side I'm on... if, for example, he takes scissors and cuts, then I just tell him to be careful with his fingers because I'm scared, and eventually I take the scissors myself and cut it for him."* p.2)

6.2 Findings regarding interaction with the TUI prototypes

In this phase, parents were able to touch and feel the objects, and shared their thoughts and opinions. Initially, the connection between the psychological concepts and the TUI was too abstract for parents. Gradually, as they interacted with the objects asking questions and getting clarifications, they were able to see the connection to the COS concepts.

Parents shared their experiences and preferences regarding the physical interaction and the tangible representation of the different TUI designs. Most parents preferred the Flashlight form, their comments revealed that this specific design (through its metaphor and affordances) led to easier perception of the COS concepts: (*"It seems comfortable to me; the perception of it was simpler for me."* p.2); (*"There is something symbolic here that I can connect with. The meaning of the form is clear, it sheds light on the situation, it shows you your own pattern."* p.3). The symbolic meaning of the size difference between the small and large sliders (representing the "child as a separate entity" COS concept), and the meaning of the two LED colors representing the two top needs of their child, were immediately understood with the Flashlight object, unlike the other



Figure 1: The TUI low fidelity prototypes (A-flashlight form; B-coin form; C-rotation object), each embodies the COS psychological concepts in a different way. The adult holding hand is added for scale and interaction context.

forms. The LEDs representing parents' tendencies were more easily understood in the Flashlight and Circular forms. One participant mentioned the potential in representing the parents' tendencies in a physical form: *"It can encourage reflection on internal processes... I got really excited about the visual part, that there is some kind of pattern, and I can see how many situations are aligned with my child. It can lead to impactful processes"* p.3).

6.3 Findings regarding day-to-day interactions with the TUI as an aid

All four parents said that they would be happy to use this kind of object to better understand their child's needs and own tendencies. Two parents (p.2, p.3) stated that interacting with the object while thinking about the context of parent-child interaction made them think about important aspects of their relationship with their child. The other two parents (p.3, p.4) pointed out the extent of mental effort and emotional maturity required from a parent in such a reflective process.

When asked when they will use the object (before, during, or after the interaction with their child), two parents (p.1, p.3) mentioned they will use it after an interaction, but will think about it during an interaction: *"I don't see myself using it in the middle of a conflict, but I definitely see myself thinking about it during the interaction, just thinking about it - I'm red, I'm green [the colors of the LEDs representations of the parent's provided support], it will help."* One parent considered using it before an interaction but changed her mind: *"this device helps a parent reflect after the interaction, and not before [like i initially thought]... It means that it is not a tool that... that lets you prepare yourself for the event."* p.4). Lastly, one parent stated that both approaches are beneficial *"I think it's better to use it before because then you come ready to the interaction. It is much more difficult [to guess what will be the child's need]. The advantage of using it after the interaction is that it's more accurate and then you can reflect and learn towards a future interaction."* p.2). Regarding a possible location for such an object in their house, two parents mentioned a central shared area like the kitchen or living room, while the other two mentioned a more private area that is more appropriate for reflection, besides their bed (*"Near my bed. It's my place...It represents my place, I have no other place in the house that is only mine"* p.2).

7 CONCLUSIONS

This paper described the first steps of a psychology theory-driven TUI design, aimed to enhance parents' mentalization regarding two top needs of children, as defined by the COS theory: Secure Base need and Safe Haven need. Parents differ in their ability to use mentalization when trying to make sense of their child's behavior [13], and many parents do not identify their child's needs appropriately, mixing their own psychological tendencies in their interpretations. At the same time, parents are highly motivated to learn and provide appropriate support for their children. We translated the theory recommendations into concrete design guidelines and applied these design guidelines in the design process of three low-fidelity TUI prototypes. Our preliminary work and initial findings suggest that through a short interaction with a tangible object and without a comprehensive workshop or tedious explanations, parents were able to understand abstract COS concepts related to their child's needs and their parental tendencies. Furthermore, it seems that TUI has the potential to assist parents in improving their ability to identify their child's needs before, during, or after an interaction, as well as reflecting on their own tendencies. At the same time, parents emphasized the mental effort required to perform parental mentalization, we hope a future TUI design can assist in offloading some of the required mental effort. Our work is just a first step towards a more comprehensive TUI design and evaluation process, suggesting the potential of TUIs as a new type of psycho-education technological tools. We hope future research, including more quantitative measures, can help better understand the opportunities and limitations of such technologies. We do not envision such technologies replacing the important roles of therapists, we see such tools as an aid for the therapists, complementing the standard therapy process with on-going awareness of theoretical concepts during daily life of parents.

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